EXPOSURE SCENARIO FOR COMMUNICATION

Substance Name: Zinc borate
EC Number: 235-804-2
CAS Number: 12767-90-7
Registration Number: 01-2119691658-19-0000
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0. Qualitative assessment – Additional conditions and measures based on human health classification

The substance anhydrous zinc borate has been classified as Eye Irritant 2 (H319), hence specific conditions of use (OCs and RMMs) should be implemented and PPE should be in place if exposure is expected. The following measures are suggested to ensure that the risk attributed to the classification is adequately controlled.

General OCs and RMMs

- Ensure a minimisation of manual phases/work tasks.
- Assumes work procedures minimising of splashes and spills.
- Ensure avoidance of contact with contaminated tools and objects.
- Assumes regular cleaning of equipment and work area.
- Ensure management/supervision in place to check that the RMMs in place are being used correctly and OCs followed.
- Ensure training for staff on good practice.
- Assumes a good standard of personal hygiene.

PPE

- Wear chemical goggles. Suitable materials to ensure a breakthrough time > 8 hours: butyl rubber with a thickness of 0.5 mm or 0.35 mm and neoprene with a thickness of 0.5 mm and nitrile rubber with a thickness of 0.35 mm.

Additional measures as given by the precautionary statements

- Wash thoroughly after handling.
- Wear protective gloves/ protective clothing/eye protection/face protection.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists: Get medical advice/attention.

1. ES 1: Formulation or re-packing; Various products (PC 1, PC 9a, PC 12, PC 24, PC 32)

1.1. Use descriptors

ES name: *Formulation of zinc borate into mixture or materials*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a), Fertilizers (PC 12), Lubricants, Greases, Release Products (PC 24), Polymer Preparations and Compounds (PC 32)

Environment	
1: *Formulation into mixture - Zinc*	ERC 2
2: *Formulation into mixture - Boron*	ERC 2
3: *Formulation into solid matrix - Zinc*	ERC 3
4: *Formulation into solid matrix - Boron*	ERC 3
Worker	
5: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 1
6: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 1
7: *Dehydration process to receive anhydrous zinc borate*	PROC 2
8: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 2
9: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 2
10: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate*	PROC 3
11: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate*	PROC 3
12: *Chemical production where opportunity for exposure arises - powder - anhydrous zinc borate*	PROC 4
13: *Chemical production where opportunity for exposure arises - liquid formulation - anhydrous zinc borate*	PROC 4
14: *Mixing or blending in batch processes - powder - anhydrous zinc borate*	PROC 5
15: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate*	PROC 5
16: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate*	PROC 8a
17: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - anhydrous zinc borate*	PROC 8a
18: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8a
19: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate*	PROC 8b
20: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - anhydrous zinc borate*	PROC 8b
21: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8b

22: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate*	PROC 9
23: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - anhydrous zinc borate*	PROC 9
24: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate*	PROC 9
25: *Use of blowing agents in manufacture of foam - anhydrous zinc borate*	PROC 12
26: *Tabletting, compression, extrusion, pelletisation, granulation - anhydrous zinc borate*	PROC 14
27: *Use as laboratory reagent - powder - anhydrous zinc borate*	PROC 15
28: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate*	PROC 15
29: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate*	PROC 28
30: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate*	PROC 28
31: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 1
32: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 1
33: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 2
34: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 2
35: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate*	PROC 3
36: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate*	PROC 3
37: *Chemical production where opportunity for exposure arises - powder - zinc borate hydrate*	PROC 4
38: *Chemical production where opportunity for exposure arises - liquid formulation - zinc borate hydrate*	PROC 4
39: *Mixing or blending in batch processes - powder - zinc borate hydrate*	PROC 5
40: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate*	PROC 5
41: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate*	PROC 8a
42: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - zinc borate hydrate*	PROC 8a
43: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8a
44: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate*	PROC 8b
45: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - zinc borate hydrate*	PROC 8b
46: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8b
47: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate*	PROC 9

48: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - zinc borate hydrate*	PROC 9
49: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate*	PROC 9
50: *Use of blowing agents in manufacture of foam - zinc borate hydrate*	PROC 12
51: *Tabletting, compression, extrusion, pelletisation, granulation - zinc borate hydrate*	PROC 14
52: *Use as laboratory reagent - powder - zinc borate hydrate*	PROC 15
53: *Use as laboratory reagent - liquid formulation - zinc borate hydrate*	PROC 15
54: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate*	PROC 28
55: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate*	PROC 28

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: *Formulation into mixture - Zinc* (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.6 tonnes/day
Annual amount per site ≤ 135 tonnes/year
Technical and organisational conditions and measures
Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

1.2.2. Control of environmental exposure: *Formulation into mixture - Boron* (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.6 tonnes/day
Annual amount per site ≤ 135 tonnes/year
Technical and organisational conditions and measures
Electrostatic precipitators or wet electrostatic precipitators or cyclones or fabric/bag filter or ceramic/metal mesh filter
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

1.2.3. Control of environmental exposure: *Formulation into solid matrix - Zinc* (ERC 3)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.6 tonnes/day
Annual amount per site ≤ 135 tonnes/year

Technical and organisational conditions and measures
Assumes air emission is reduced by one or more of the following RMMs: electrostatic precipitators, wet electrostatic precipitators, cyclones, fabric/bag filter or ceramic/metal mesh filter.
Assumes on site treatment of wastewater with either chemical precipitation, sedimentation, filtration, electrolysis, reverse osmosis or ion exchange.
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

1.2.4. Control of environmental exposure: *Formulation into solid matrix - Boron* (ERC 3)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.6 tonnes/day
Annual amount per site ≤ 135 tonnes/year
Technical and organisational conditions and measures
Assumes air emission is reduced by one or more of the following RMMs: electrostatic precipitators, wet electrostatic precipitators, cyclones, fabric/bag filter or ceramic/metal mesh filter.
Assumes on site treatment of wastewater with either chemical precipitation, sedimentation, filtration, electrolysis, reverse osmosis or ion exchange.
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

1.2.5. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Indoor use

1.2.6. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.7. Control of worker exposure: *Dehydration process to receive anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 425 °C
Indoor use

1.2.8. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

1.2.9. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.10. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

1.2.11. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.12. Control of worker exposure: *Chemical production where opportunity for exposure arises - powder - anhydrous zinc borate* (PROC 4)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

1.2.13. Control of worker exposure: *Chemical production where opportunity for exposure arises - liquid formulation - anhydrous zinc borate* (PROC 4)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.14. Control of worker exposure: *Mixing or blending in batch processes - powder - anhydrous zinc borate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

1.2.15. Control of worker exposure: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.16. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.17. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.18. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.
Ensure that the handling reduces contact between product and adjacent air (e.g. transfer of liquid through a small filling opening, such as refuelling of vehicles).

1.2.19. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 1000 kg/min

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

1.2.20. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

1.2.21. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

1.2.22. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.23. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.24. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. transfer of liquid through a small filling opening, such as refuelling of vehicles).

1.2.25. Control of worker exposure: *Use of blowing agents in manufacture of foam - anhydrous zinc borate* (PROC 12)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface > 3 m2
Ensure that distance between the source of emission and the worker is at least 1m.

1.2.26. Control of worker exposure: *Tabletting, compression, extrusion, pelletisation, granulation - anhydrous zinc borate* (PROC 14)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 1000 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 300 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

1.2.27. Control of worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.28. Control of worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.29. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Assumes careful handling
Covers handling of objects with visible residual dust (e.g. object covered with dust from surrounding dusty activities).

1.2.30. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

1.2.31. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Indoor use

1.2.32. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.33. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Indoor use

1.2.34. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.35. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Indoor use

1.2.36. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.37. Control of worker exposure: *Chemical production where opportunity for exposure arises - powder - zinc borate hydrate* (PROC 4)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 kg

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

1.2.38. Control of worker exposure: *Chemical production where opportunity for exposure arises - liquid formulation - zinc borate hydrate* (PROC 4)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.39. Control of worker exposure: *Mixing or blending in batch processes - powder - zinc borate hydrate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 kg
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume > 1000 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

1.2.40. Control of worker exposure: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

1.2.41. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.42. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.43. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.
Ensure that the handling reduces contact between product and adjacent air (e.g. transfer of liquid through a small filling opening, such as refuelling of vehicles).

1.2.44. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

1.2.45. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

1.2.46. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

1.2.47. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.48. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; Medium dustiness: Handling the product in its dry form results in a dust cloud that settles quickly due to gravity. For example, sand.
Powders, granules or pelletised material
Covers the use of granules, flakes or pellets.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

1.2.49. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. transfer of liquid through a small filling opening, such as refuelling of vehicles).

1.2.50. Control of worker exposure: *Use of blowing agents in manufacture of foam - zinc borate hydrate* (PROC 12)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface > 3 m2
Ensure that distance between the source of emission and the worker is at least 1m.

1.2.51. Control of worker exposure: *Tabletting, compression, extrusion, pelletisation, granulation - zinc borate hydrate* (PROC 14)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 300 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

1.2.52. Control of worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.53. Control of worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

1.2.54. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 100 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Assumes careful handling
Covers handling of objects with visible residual dust (e.g. object covered with dust from surrounding dusty activities).

1.2.55. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 100 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: *Formulation into mixture - Zinc* (ERC 2)

Release route	Release rate	Release estimation method
Water	0.015 kg/day	Estimated release factor
Air	3 kg/day	Estimated release factor
Soil	0.06 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	5.59E-4 mg/L (EUSES 2.1.2)	0.027
Sediment (freshwater)	61.32 mg/kg dw (EUSES 2.1.2)	0.521
Marine water	7.2E-5 mg/L (EUSES 2.1.2)	0.012
Sediment (marine water)	7.89 mg/kg dw (EUSES 2.1.2)	0.14
Sewage Treatment Plant	7.49E-3 mg/L (EUSES 2.1.2)	0.075
Agricultural soil	0.296 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.14E-4 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.029 mg/kg bw/day (EUSES 2.1.2)	0.035
Man via environment - combined routes		0.035

1.3.2. Environmental release and exposure: *Formulation into mixture - Boron* (ERC 2)

Release route	Release rate	Release estimation method
Water	0.015 kg/day	Estimated release factor
Air	3 kg/day	Estimated release factor
Soil	0.06 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.74E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.69E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	7.5E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	6.34E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.14E-4 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.077 mg/kg bw/day (EUSES 2.1.2)	0.454
Man via environment - combined routes		0.454

1.3.3. Environmental release and exposure: *Formulation into solid matrix - Zinc* (ERC 3)

Release route	Release rate	Release estimation method
Water	0.03 kg/day	SPERC
Air	0.03 kg/day	SPERC
Soil	0.6 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	8.43E-4 mg/L (EUSES 2.1.2)	0.041
Sediment (freshwater)	92.39 mg/kg dw (EUSES 2.1.2)	0.784
Marine water	1E-4 mg/L (EUSES 2.1.2)	0.016
Sediment (marine water)	10.99 mg/kg dw (EUSES 2.1.2)	0.195
Sewage Treatment Plant	0.015 mg/L (EUSES 2.1.2)	0.15
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.3E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	3.84E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

1.3.4. Environmental release and exposure: *Formulation into solid matrix - Boron* (ERC 3)

Release route	Release rate	Release estimation method
Water	0.03 kg/day	SPERC
Air	0.03 kg/day	SPERC
Soil	0.6 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	4.49E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	4.44E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0.015 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.25E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.14E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.19E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

1.3.5. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.01 mg/m³ (TRA Workers 3.0)	0.014
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.6. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.01 mg/m³ (TRA Workers 3.0)	0.014
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.7. Worker exposure: *Dehydration process to receive anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (TRA Workers 3.0)	0.04
Inhalation, local, long term	0.1 mg/m³ (TRA Workers 3.0)	0.145
Dermal, systemic, long term	1.37 mg/kg bw/day (TRA Workers 3.0)	0.039
Combined, systemic, long term		0.079

1.3.8. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.197

1.3.9. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4.4E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.025

1.3.10. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.185

1.3.11. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4.4E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.013

1.3.12. Worker exposure: *Chemical production where opportunity for exposure arises - powder - anhydrous zinc borate* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.233

1.3.13. Worker exposure: *Chemical production where opportunity for exposure arises - liquid formulation - anhydrous zinc borate* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.044 mg/m³ (ART)	0.018
Inhalation, local, long term	0.044 mg/m³ (ART)	0.064
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.134

1.3.14. Worker exposure: *Mixing or blending in batch processes - powder - anhydrous zinc borate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.405

1.3.15. Worker exposure: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.409

1.3.16. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.386

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.56

1.3.17. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.405

1.3.18. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.386
Combined, systemic, long term		0.564

1.3.19. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.194
Inhalation, local, long term	0.48 mg/m³ (ART)	0.696
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.386
Combined, systemic, long term		0.58

1.3.20. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.349

1.3.21. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.15 mg/m³ (ART)	0.06
Inhalation, local, long term	0.15 mg/m³ (ART)	0.217
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.386
Combined, systemic, long term		0.447

1.3.22. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.193
Combined, systemic, long term		0.367

1.3.23. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.233

1.3.24. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.161
Inhalation, local, long term	0.4 mg/m³ (ART)	0.58
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.193
Combined, systemic, long term		0.355

1.3.25. Worker exposure: *Use of blowing agents in manufacture of foam - anhydrous zinc borate* (PROC 12)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	0.34 mg/kg bw/day (ECETOC TRA Workers)	< 0.01
Combined, systemic, long term		0.187

1.3.26. Worker exposure: *Tabletting, compression, extrusion, pelletisation, granulation - anhydrous zinc borate* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	2.058 mg/kg bw/day (TRA Workers 3.0)	0.058
Combined, systemic, long term		0.175

1.3.27. Worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m³ (TRA Workers 3.0)	0.202
Inhalation, local, long term	0.5 mg/m³ (TRA Workers 3.0)	0.725
Dermal, systemic, long term	0.34 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.211

1.3.28. Worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m³ (TRA Workers 3.0)	0.202
Inhalation, local, long term	0.5 mg/m³ (TRA Workers 3.0)	0.725
Dermal, systemic, long term	0.34 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.211

1.3.29. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.24 mg/m³ (ART)	0.097
Inhalation, local, long term	0.24 mg/m³ (ART)	0.348
Dermal, systemic, long term	13.71 mg/kg bw/day (ECETOC TRA Workers)	0.386
Combined, systemic, long term		0.483

1.3.30. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.04 mg/m³ (ART)	0.016
Inhalation, local, long term	0.04 mg/m³ (ART)	0.058
Dermal, systemic, long term	13.71 mg/kg bw/day (ECETOC TRA Workers)	0.386
Combined, systemic, long term		0.402

1.3.31. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.01 mg/m³ (TRA Workers 3.0)	0.012
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.32. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.01 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.01 mg/m³ (TRA Workers 3.0)	0.012
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.33. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (TRA Workers 3.0)	0.015
Inhalation, local, long term	0.1 mg/m³ (TRA Workers 3.0)	0.123
Dermal, systemic, long term	1.37 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.018

1.3.34. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.044 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.044 mg/m³ (ART)	0.054
Dermal, systemic, long term	1.37 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.01

1.3.35. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (TRA Workers 3.0)	0.015
Inhalation, local, long term	0.1 mg/m³ (TRA Workers 3.0)	0.123
Dermal, systemic, long term	0.69 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.016

1.3.36. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.044 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.044 mg/m³ (ART)	0.054
Dermal, systemic, long term	0.69 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

1.3.37. Worker exposure: *Chemical production where opportunity for exposure arises - powder - zinc borate hydrate* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.081

1.3.38. Worker exposure: *Chemical production where opportunity for exposure arises - liquid formulation - zinc borate hydrate* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.082

1.3.39. Worker exposure: *Mixing or blending in batch processes - powder - zinc borate hydrate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.65 mg/m³ (ART)	0.096
Inhalation, local, long term	0.65 mg/m³ (ART)	0.802
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.131

1.3.40. Worker exposure: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.1

1.3.41. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.099

1.3.42. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - granules/pellets - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.099

1.3.43. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.1

1.3.44. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.071
Inhalation, local, long term	0.48 mg/m³ (ART)	0.593
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.106

1.3.45. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - granules/pellets - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.078

1.3.46. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.15 mg/m³ (ART)	0.022
Inhalation, local, long term	0.15 mg/m³ (ART)	0.185
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.058

1.3.47. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.081

1.3.48. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - granules/pellets - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.081

1.3.49. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.059
Inhalation, local, long term	0.4 mg/m³ (ART)	0.494
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.077

1.3.50. Worker exposure: *Use of blowing agents in manufacture of foam - zinc borate hydrate* (PROC 12)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	0.34 mg/kg bw/day (ECETOC TRA Workers)	< 0.01
Combined, systemic, long term		0.066

1.3.51. Worker exposure: *Tabletting, compression, extrusion, pelletisation, granulation - zinc borate hydrate* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	3.43 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.072

1.3.52. Worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m³ (TRA Workers 3.0)	0.074
Inhalation, local, long term	0.5 mg/m³ (TRA Workers 3.0)	0.617
Dermal, systemic, long term	0.34 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.074

1.3.53. Worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m³ (TRA Workers 3.0)	0.074
Inhalation, local, long term	0.5 mg/m³ (TRA Workers 3.0)	0.617
Dermal, systemic, long term	0.34 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.074

1.3.54. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.24 mg/m³ (ART)	0.035
Inhalation, local, long term	0.24 mg/m³ (ART)	0.296
Dermal, systemic, long term	13.71 mg/kg bw/day (ECETOC TRA Workers)	0.036

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.071

1.3.55. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.04 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.04 mg/m³ (ART)	0.049
Dermal, systemic, long term	13.71 mg/kg bw/day (ECETOC TRA Workers)	0.036
Combined, systemic, long term		0.041

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure for most of the PROCs is assessed using ART v1.5. Only for some PROCs the inhalation exposure is assessed using TRA Workers 3.0 as implemented in CHESAR. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of Eurometaux SpERC 3.1v3 for ERC 3. The releases to air and water for ERC 2 are based on site specific information.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Quantity of product in the movement and agitation of powders, Transfer rate, Open surface area, Drop height, Transfer loading type, Level of contamination, Surface area treated/contaminated, Level of agitation in the movement and agitation of powders, Compressing rate of powders, Type of application of falling liquid products, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Daily use amount, Annual use amount, Number of emission days, Release factors, Discharge rate of STP, Receiving surface water flow rate.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 1.3.

2. ES 2: Use at industrial sites; Various products (PC 1, PC 9a, PC 32); Other (SU 0)

2.1. Use descriptors

ES name: *Industrial use of zinc borate or formulations containing zinc borate*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a), Polymer Preparations and Compounds (PC 32)
Sector of use: Other (SU 0)

Environment	
1: *Use at industrial site leading to inclusion into/onto article - Zinc*	ERC 5
2: *Use at industrial site leading to inclusion into/onto article - Boron*	ERC 5
Worker	
3: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 1
4: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 1
5: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 2
6: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 2
7: *Mixing or blending in batch processes - powder - anhydrous zinc borate*	PROC 5
8: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate*	PROC 5
9: *Calendering operations - powder - anhydrous zinc borate*	PROC 6
10: *Calendering operations - liquid formulation - anhydrous zinc borate*	PROC 6
11: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate*	PROC 8a
12: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8a
13: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate*	PROC 8b
14: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8b
15: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate*	PROC 9
16: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate*	PROC 9
17: *Industrial spraying - powder - anhydrous zinc borate*	PROC 7
18: *Industrial spraying - liquid formulation - anhydrous zinc borate*	PROC 7
19: *Roller application or brushing - powder - anhydrous zinc borate*	PROC 10
20: *Roller application or brushing - liquid formulation - anhydrous zinc borate*	PROC 10
21: *Non industrial spraying - powder - anhydrous zinc borate*	PROC 11
22: *Non industrial spraying - liquid formulation - anhydrous zinc borate*	PROC 11
23: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate*	PROC 13
24: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate*	PROC 13

25: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate*	PROC 28
26: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate*	PROC 28
27: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 1
28: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 1
29: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 2
30: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 2
31: *Mixing or blending in batch processes - powder - zinc borate hydrate*	PROC 5
32: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate*	PROC 5
33: *Calendering operations - powder - zinc borate hydrate*	PROC 6
34: *Calendering operations - liquid formulation - zinc borate hydrate*	PROC 6
35: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate*	PROC 8a
36: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8a
37: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate*	PROC 8b
38: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8b
39: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate*	PROC 9
40: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate*	PROC 9
41: *Industrial spraying - powder - zinc borate hydrate*	PROC 7
42: *Industrial spraying - liquid formulation - zinc borate hydrate*	PROC 7
43: *Roller application or brushing - powder - zinc borate hydrate*	PROC 10
44: *Roller application or brushing - liquid formulation - zinc borate hydrate*	PROC 10
45: *Non industrial spraying - powder - zinc borate hydrate*	PROC 11
46: *Non industrial spraying - liquid formulation - zinc borate hydrate*	PROC 11
47: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate*	PROC 13
48: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate*	PROC 13
49: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate*	PROC 28
50: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate*	PROC 28
Subsequent service life exposure scenario(s)	
ES 10: Service life (professional worker); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	
ES 11: Service life (consumers); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: *Use at industrial site leading to inclusion into/onto article - Zinc* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.22 tonnes/day
Annual amount per site ≤ 50 tonnes/year
Technical and organisational conditions and measures
Smaller users (see IED) – none Larger users (see IED)– abatement or use of solvent management plan
Conditions and measures related to external treatment of waste (including article waste)
Process waste may be recycled or incinerated by waste disposal company
Other conditions affecting environmental exposure
Indoor use
Assumed effluent discharge flow from site ≥ 2E3 m3/day

2.2.2. Control of environmental exposure: *Use at industrial site leading to inclusion into/onto article - Boron* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.22 tonnes/day
Annual amount per site ≤ 50 tonnes/year
Technical and organisational conditions and measures
Smaller users (see IED) – none Larger users (see IED)– abatement or use of solvent management plan
Conditions and measures related to external treatment of waste (including article waste)
Process waste may be recycled or incinerated by waste disposal company
Other conditions affecting environmental exposure
Indoor use
Assumed effluent discharge flow from site ≥ 2E3 m3/day

2.2.3. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.4. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.5. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

2.2.6. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

2.2.7. Control of worker exposure: *Mixing or blending in batch processes - powder - anhydrous zinc borate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

2.2.8. Control of worker exposure: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

2.2.9. Control of worker exposure: *Calendering operations - powder - anhydrous zinc borate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 10 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 300 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

2.2.10. Control of worker exposure: *Calendering operations - liquid formulation - anhydrous zinc borate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Use suitable eye protection.
Other conditions affecting workers exposure
Assumes process temperature up to 300 °C
Indoor use

2.2.11. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

2.2.12. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

2.2.13. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

2.2.14. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

2.2.15. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

2.2.16. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

2.2.17. Control of worker exposure: *Industrial spraying - powder - anhydrous zinc borate* (PROC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers powder spraying.
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that direction of application is only horizontal or downward.

2.2.18. Control of worker exposure: *Industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Spraying with no or low compressed air use
Ensure that direction of application is only horizontal or downward.

2.2.19. Control of worker exposure: *Roller application or brushing - powder - anhydrous zinc borate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.20. Control of worker exposure: *Roller application or brushing - liquid formulation - anhydrous zinc borate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

2.2.21. Control of worker exposure: *Non industrial spraying - powder - anhydrous zinc borate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers powder spraying.
Ensure that direction of application is only horizontal or downward.

2.2.22. Control of worker exposure: *Non industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume > 1000 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Spraying with no or low compressed air use
Ensure that direction of application is only horizontal or downward.

2.2.23. Control of worker exposure: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.24. Control of worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

2.2.25. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Assumes regular work procedures
Covers handling of objects with limited visible residual dust (thin layer visible).

2.2.26. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

2.2.27. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.28. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.29. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.30. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.31. Control of worker exposure: *Mixing or blending in batch processes - powder - zinc borate hydrate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

2.2.32. Control of worker exposure: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate* (PROC 5)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

2.2.33. Control of worker exposure: *Calendering operations - powder - zinc borate hydrate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 10 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

2.2.34. Control of worker exposure: *Calendering operations - liquid formulation - zinc borate hydrate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.

2.2.35. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

2.2.36. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

2.2.37. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

2.2.38. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

2.2.39. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers height during transfer < 0.5 m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).

2.2.40. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

2.2.41. Control of worker exposure: *Industrial spraying - powder - zinc borate hydrate* (PROC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers powder spraying.
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that direction of application is only horizontal or downward.

2.2.42. Control of worker exposure: *Industrial spraying - liquid formulation - zinc borate hydrate* (PROC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that direction of application is only horizontal or downward.

2.2.43. Control of worker exposure: *Roller application or brushing - powder - zinc borate hydrate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.44. Control of worker exposure: *Roller application or brushing - liquid formulation - zinc borate hydrate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

2.2.45. Control of worker exposure: *Non industrial spraying - powder - zinc borate hydrate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers powder spraying.
Ensure that direction of application is only horizontal or downward.

2.2.46. Control of worker exposure: *Non industrial spraying - liquid formulation - zinc borate hydrate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume > 1000 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Spraying with no or low compressed air use
Ensure that direction of application is only horizontal or downward.

2.2.47. Control of worker exposure: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.48. Control of worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide specifically designed and maintained LEV (fixed capturing hood type, on-tool extraction or enclosing hood type). Ensure effectiveness is at least 90%.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

2.2.49. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Assumes regular work procedures
Covers handling of objects with limited visible residual dust (thin layer visible).

2.2.50. Control of worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate* (PROC 28)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: *Use at industrial site leading to inclusion into/onto article - Zinc* (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	3.3 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.76E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.24 mg/kg dw (EUSES 2.1.2)	0.257
Marine water	4.36E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.783 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.297 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.71E-4 mg/m³ (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Man via environment - Oral	0.032 mg/kg bw/day (EUSES 2.1.2)	0.039
Man via environment - combined routes		0.039

2.3.2. Environmental release and exposure: *Use at industrial site leading to inclusion into/onto article - Boron* (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	3.3 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	6.65E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.71E-4 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.086 mg/kg bw/day (EUSES 2.1.2)	0.504
Man via environment - combined routes		0.505

2.3.3. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.4. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.5. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.197

2.3.6. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4.4E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.025

2.3.7. Worker exposure: *Mixing or blending in batch processes - powder - anhydrous zinc borate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.405

2.3.8. Worker exposure: *Mixing or blending in batch processes - liquid formulation - anhydrous zinc borate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.409

2.3.9. Worker exposure: *Calendering operations - powder - anhydrous zinc borate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.581

2.3.10. Worker exposure: *Calendering operations - liquid formulation - anhydrous zinc borate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.09 mg/m³ (TRA Workers 3.0)	0.036
Inhalation, local, long term	0.09 mg/m³ (TRA Workers 3.0)	0.13
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.5

2.3.11. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.405

2.3.12. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.409

2.3.13. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.349

2.3.14. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.015 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.015 mg/m³ (ART)	0.022
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.238

2.3.15. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.24 mg/m³ (ART)	0.097
Inhalation, local, long term	0.24 mg/m³ (ART)	0.348
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.213

2.3.16. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.149
Inhalation, local, long term	0.37 mg/m³ (ART)	0.536
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.265

2.3.17. Worker exposure: *Industrial spraying - powder - anhydrous zinc borate* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.194
Inhalation, local, long term	0.48 mg/m³ (ART)	0.696

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	2.572 mg/kg bw/day (TRA Workers 3.0)	0.072
Combined, systemic, long term		0.266

2.3.18. Worker exposure: *Industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	2.572 mg/kg bw/day (TRA Workers 3.0)	0.072
Combined, systemic, long term		0.25

2.3.19. Worker exposure: *Roller application or brushing - powder - anhydrous zinc borate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.169
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.609
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.633

2.3.20. Worker exposure: *Roller application or brushing - liquid formulation - anhydrous zinc borate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.41 mg/m³ (ART)	0.165
Inhalation, local, long term	0.41 mg/m³ (ART)	0.594
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.629

2.3.21. Worker exposure: *Non industrial spraying - powder - anhydrous zinc borate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.194
Inhalation, local, long term	0.48 mg/m³ (ART)	0.696
Dermal, systemic, long term	6.428 mg/kg bw/day (TRA Workers 3.0)	0.181
Combined, systemic, long term		0.375

2.3.22. Worker exposure: *Non industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.149
Inhalation, local, long term	0.37 mg/m³ (ART)	0.536
Dermal, systemic, long term	6.428 mg/kg bw/day (TRA Workers 3.0)	0.181
Combined, systemic, long term		0.33

2.3.23. Worker exposure: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.3 mg/m³ (TRA Workers 3.0)	0.121
Inhalation, local, long term	0.3 mg/m³ (TRA Workers 3.0)	0.435
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.353

2.3.24. Worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.3 mg/m³ (TRA Workers 3.0)	0.121
Inhalation, local, long term	0.3 mg/m³ (TRA Workers 3.0)	0.435
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.353

2.3.25. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - anhydrous zinc borate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.26 mg/m³ (ART)	0.105
Inhalation, local, long term	0.26 mg/m³ (ART)	0.377
Dermal, systemic, long term	8.226 mg/kg bw/day (ECETOC TRA Workers)	0.232
Combined, systemic, long term		0.337

2.3.26. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - anhydrous zinc borate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	8.226 mg/kg bw/day (ECETOC TRA Workers)	0.232
Combined, systemic, long term		0.233

2.3.27. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.28. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.29. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (TRA Workers 3.0)	0.088
Inhalation, local, long term	0.6 mg/m³ (TRA Workers 3.0)	0.741
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.09

2.3.30. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (TRA Workers 3.0)	0.088
Inhalation, local, long term	0.6 mg/m³ (TRA Workers 3.0)	0.741
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.09

2.3.31. Worker exposure: *Mixing or blending in batch processes - powder - zinc borate hydrate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.085

2.3.32. Worker exposure: *Mixing or blending in batch processes - liquid formulation - zinc borate hydrate* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.086

2.3.33. Worker exposure: *Calendering operations - powder - zinc borate hydrate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.085

2.3.34. Worker exposure: *Calendering operations - liquid formulation - zinc borate hydrate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.15 mg/m³ (ART)	0.022
Inhalation, local, long term	0.15 mg/m³ (ART)	0.185
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.065

2.3.35. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.085

2.3.36. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.086

2.3.37. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.064

2.3.38. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.015 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.015 mg/m³ (ART)	0.019
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.024

2.3.39. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.24 mg/m³ (ART)	0.035
Inhalation, local, long term	0.24 mg/m³ (ART)	0.296
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.046

2.3.40. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.054
Inhalation, local, long term	0.37 mg/m³ (ART)	0.457
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011
Combined, systemic, long term		0.065

2.3.41. Worker exposure: *Industrial spraying - powder - zinc borate hydrate* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.071
Inhalation, local, long term	0.48 mg/m³ (ART)	0.593
Dermal, systemic, long term	25.71 mg/kg bw/day (TRA Workers 3.0)	0.067
Combined, systemic, long term		0.137

2.3.42. Worker exposure: *Industrial spraying - liquid formulation - zinc borate hydrate* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	25.71 mg/kg bw/day (TRA Workers 3.0)	0.067
Combined, systemic, long term		0.131

2.3.43. Worker exposure: *Roller application or brushing - powder - zinc borate hydrate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.062
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.519
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.104

2.3.44. Worker exposure: *Roller application or brushing - liquid formulation - zinc borate hydrate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.41 mg/m³ (ART)	0.06
Inhalation, local, long term	0.41 mg/m³ (ART)	0.506
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.103

2.3.45. Worker exposure: *Non industrial spraying - powder - zinc borate hydrate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.071
Inhalation, local, long term	0.48 mg/m³ (ART)	0.593

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	64.28 mg/kg bw/day (TRA Workers 3.0)	0.167
Combined, systemic, long term		0.237

2.3.46. Worker exposure: *Non industrial spraying - liquid formulation - zinc borate hydrate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.054
Inhalation, local, long term	0.37 mg/m³ (ART)	0.457
Dermal, systemic, long term	64.28 mg/kg bw/day (TRA Workers 3.0)	0.167
Combined, systemic, long term		0.221

2.3.47. Worker exposure: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.3 mg/m³ (TRA Workers 3.0)	0.044
Inhalation, local, long term	0.3 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.065

2.3.48. Worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.3 mg/m³ (TRA Workers 3.0)	0.044
Inhalation, local, long term	0.3 mg/m³ (TRA Workers 3.0)	0.37
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.065

2.3.49. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - powder - zinc borate hydrate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.26 mg/m³ (ART)	0.038
Inhalation, local, long term	0.26 mg/m³ (ART)	0.321
Dermal, systemic, long term	8.226 mg/kg bw/day (ECETOC TRA Workers)	0.021
Combined, systemic, long term		0.06

2.3.50. Worker exposure: *Manual maintenance (cleaning and repair) of machinery - liquid formulation - zinc borate hydrate* (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	8.226 mg/kg bw/day (ECETOC TRA Workers)	0.021
Combined, systemic, long term		0.022

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure for most of the PROCs is assessed using ART v1.5. Only for some PROCs the inhalation exposure is assessed using TRA Workers 3.0 as implemented in CHESAR. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of CEPE SpERC 5.1a.v2.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Quantity of product in the movement and agitation of powders:, Transfer rate, Drop height, Transfer loading type, Open surface area, Type of spraying application , Direction for spraying, Application rate, Technique for spraying of liquid to surfaces, Level of contamination, Surface area treated/ontaminated, Level of agitation in the movement and agitation of powders, Compressing rate of powders, Type of application of falling liquid products, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Daily use amount, Annual use amount, Number of emission days, Release factors, Discharge rate of STP, Receiving surface water flow rate.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 2.3.

3. ES 3: Use at industrial sites; Various products (PC 16, PC 17, PC 24); Other (SU 0)

3.1. Use descriptors

ES name: *Industrial use of lubricants containing zinc borate in vehicles and machinery (ATIEL-ATC Use Group B(i))*
Product category: Heat Transfer Fluids (PC 16), Hydraulic Fluids (PC 17), Lubricants, Greases, Release Products (PC 24)
Sector of use: Other (SU 0)

Environment	
1: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Zinc*	ERC 4
2: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Boron*	ERC 4
3: *Use of functional fluid at industrial site - Zinc*	ERC 7
4: *Use of functional fluid at industrial site - Boron*	ERC 7
Worker	
5: *Initial factory fill from header tank; lubricating oil - anhydrous zinc borate*	PROC 9
6: *Initial factory fill by pouring from containers; lubricating oil - anhydrous zinc borate*	PROC 8b
7: *Initial factory fill by injection of greases - anhydrous zinc borate*	PROC 2
8: *Initial factory fill by injection of greases - anhydrous zinc borate*	PROC 9
9: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate*	PROC 1
10: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate*	PROC 1
11: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - anhydrous zinc borate*	PROC 8b
12: *Material storage - indoor - anhydrous zinc borate*	PROC 1
13: *Material storage - outdoor - anhydrous zinc borate*	PROC 1
14: *Material storage - indoor - anhydrous zinc borate*	PROC 2
15: *Material storage - outdoor - anhydrous zinc borate*	PROC 2
16: *Initial factory fill from header tank; lubricating oil - zinc borate hydrate*	PROC 9
17: *Initial factory fill by pouring from containers; lubricating oil - zinc borate hydrate*	PROC 8b
18: *Initial factory fill by injection of greases - zinc borate hydrate*	PROC 2
19: *Initial factory fill by injection of greases - zinc borate hydrate*	PROC 9
20: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate*	PROC 1
21: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate*	PROC 1
22: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - zinc borate hydrate*	PROC 8b
23: *Material storage - indoor - zinc borate hydrate*	PROC 1
24: *Material storage - outdoor - zinc borate hydrate*	PROC 1
25: *Material storage - indoor - zinc borate hydrate*	PROC 2
26: *Material storage - outdoor - zinc borate hydrate*	PROC 2

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Zinc* (ERC 4)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 25 tonnes/day
Annual amount per site ≤ 500 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Negligible wastewater emissions as process operates without water contact.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
No water contact during use.
Receiving surface water flow ≥ 1.8E4 m3/day

3.2.2. Control of environmental exposure: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Boron* (ERC 4)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 25 tonnes/day
Annual amount per site ≤ 500 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Negligible wastewater emissions as process operates without water contact.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
No water contact during use.
Receiving surface water flow ≥ 1.8E4 m3/day

3.2.3. Control of environmental exposure: *Use of functional fluid at industrial site - Zinc* (ERC 7)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 25 tonnes/day
Annual amount per site ≤ 500 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Negligible wastewater emissions as process operates without water contact.

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
No water contact during use.
Receiving surface water flow ≥ 1.8E4 m3/day

3.2.4. Control of environmental exposure: *Use of functional fluid at industrial site - Boron* (ERC 7)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 25 tonnes/day
Annual amount per site ≤ 500 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow ≥ 2E3 m3/day
No application of sewage sludge to soil
Negligible wastewater emissions as process operates without water contact.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
No water contact during use.
Receiving surface water flow ≥ 1.8E4 m3/day

3.2.5. Control of worker exposure: *Initial factory fill from header tank; lubricating oil - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.6. Control of worker exposure: *Initial factory fill by pouring from containers; lubricating oil - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.7. Control of worker exposure: *Initial factory fill by injection of greases - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.8. Control of worker exposure: *Initial factory fill by injection of greases - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.9. Control of worker exposure: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.10. Control of worker exposure: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.2.11. Control of worker exposure: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.12. Control of worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.13. Control of worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.2.14. Control of worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.15. Control of worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.2.16. Control of worker exposure: *Initial factory fill from header tank; lubricating oil - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.17. Control of worker exposure: *Initial factory fill by pouring from containers; lubricating oil - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.18. Control of worker exposure: *Initial factory fill by injection of greases - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.19. Control of worker exposure: *Initial factory fill by injection of greases - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.20. Control of worker exposure: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.21. Control of worker exposure: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.2.22. Control of worker exposure: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

3.2.23. Control of worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.24. Control of worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.2.25. Control of worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.26. Control of worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personal operating under supervision.; Ensure regular inspection, cleaning and maintenance of equipment and machines.; Clear spills immediately.; Ensure daily cleaning of the equipment.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Zinc* (ERC 4)

Release route	Release rate	Release estimation method
Water	5E-7 kg/day	SPERC
Air	1.25 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.76E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.25 mg/kg dw (EUSES 2.1.2)	0.257
Marine water	4.36E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.783 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	2.47E-7 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.92E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.17E-3 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.2. Environmental release and exposure: *Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - Boron* (ERC 4)

Release route	Release rate	Release estimation method
Water	5E-7 kg/day	SPERC
Air	1.25 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	2.5E-7 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.34E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.9E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.97E-3 mg/kg bw/day (EUSES 2.1.2)	0.017
Man via environment - combined routes		0.017

3.3.3. Environmental release and exposure: *Use of functional fluid at industrial site - Zinc* (ERC 7)

Release route	Release rate	Release estimation method
Water	5E-7 kg/day	SPERC
Air	1.25 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.76E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.25 mg/kg dw (EUSES 2.1.2)	0.257
Marine water	4.36E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.783 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	2.47E-7 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.92E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.17E-3 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.4. Environmental release and exposure: *Use of functional fluid at industrial site - Boron* (ERC 7)

Release route	Release rate	Release estimation method
Water	5E-7 kg/day	SPERC
Air	1.25 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	2.5E-7 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.34E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.9E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.97E-3 mg/kg bw/day (EUSES 2.1.2)	0.017
Man via environment - combined routes		0.017

3.3.5. Worker exposure: *Initial factory fill from header tank; lubricating oil - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (ART)	0.04
Inhalation, local, long term	0.1 mg/m³ (ART)	0.145
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.156

3.3.6. Worker exposure: *Initial factory fill by pouring from containers; lubricating oil - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.033 mg/m³ (ART)	0.013
Inhalation, local, long term	0.033 mg/m³ (ART)	0.048
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.245

3.3.7. Worker exposure: *Initial factory fill by injection of greases - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.169
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.609
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.193

3.3.8. Worker exposure: *Initial factory fill by injection of greases - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (ART)	0.04
Inhalation, local, long term	0.1 mg/m³ (ART)	0.145
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.156

3.3.9. Worker exposure: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.10. Worker exposure: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.11. Worker exposure: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.033 mg/m³ (ART)	0.013
Inhalation, local, long term	0.033 mg/m³ (ART)	0.048
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.245

3.3.12. Worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		< 0.01

3.3.13. Worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.14. Worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.169
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.609
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.193

3.3.15. Worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.169
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.609
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.193

3.3.16. Worker exposure: *Initial factory fill from header tank; lubricating oil - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (ART)	0.015
Inhalation, local, long term	0.1 mg/m³ (ART)	0.123
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011
Combined, systemic, long term		0.025

3.3.17. Worker exposure: *Initial factory fill by pouring from containers; lubricating oil - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.033 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.033 mg/m³ (ART)	0.041
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.026

3.3.18. Worker exposure: *Initial factory fill by injection of greases - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (TRA Workers 3.0)	0.088
Inhalation, local, long term	0.6 mg/m³ (TRA Workers 3.0)	0.741
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.09

3.3.19. Worker exposure: *Initial factory fill by injection of greases - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.1 mg/m³ (ART)	0.015
Inhalation, local, long term	0.1 mg/m³ (ART)	0.123
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011
Combined, systemic, long term		0.025

3.3.20. Worker exposure: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.21. Worker exposure: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.22. Worker exposure: *Maintenance activities industrial settings, General exposure during maintenance work including draining, refilling and R&D - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.033 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.033 mg/m³ (ART)	0.041
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.026

3.3.23. Worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	6E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.24. Worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	4.2E-3 mg/m³ (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.25. Worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (TRA Workers 3.0)	0.088
Inhalation, local, long term	0.6 mg/m³ (TRA Workers 3.0)	0.741
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.09

3.3.26. Worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.42 mg/m³ (TRA Workers 3.0)	0.062
Inhalation, local, long term	0.42 mg/m³ (TRA Workers 3.0)	0.519
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.064

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. To estimate the workers' inhalation exposure TRA Workers 3.0 or ART 1.5 are used. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of ATIEL ATC SpERC 4.Bi.v1.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Transfer rate, Transfer loading type, Type of application of falling liquid products, Open surface area, Level of contamination, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Daily use amount, Annual use amount, Number of emission days, Release factors, Discharge rate of STP, Receiving surface water flow rate.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 3.3.

4. ES 4: Widespread use by professional workers; Fertilizers (PC 12); Agriculture, forestry, fishery (SU 1)

4.1. Use descriptors

ES name: *Professional use of fertilisers containing zinc borate*
Product category: Fertilizers (PC 12)
Sector of use: Agriculture, forestry, fishery (SU 1)

Environment	
1: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Zinc*	ERC 8d, ERC 8a
2: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Boron*	ERC 8d, ERC 8a
Worker	
3: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %*	PROC 5
4: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 3 %*	PROC 5
5: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %*	PROC 8a
6: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %*	PROC 8a
7: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %*	PROC 8b
8: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %*	PROC 8b
9: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %*	PROC 9
10: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %*	PROC 9
11: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 3 %*	PROC 11
12: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 3 %*	PROC 11
13: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %*	PROC 11
14: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 3 %*	PROC 15
15: *Handling of solid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %*	PROC 5
16: *Handling of solid fertiliser in stages with significant contact - outdoor - zinc borate hydrate 3 %*	PROC 5
17: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %*	PROC 8a
18: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %*	PROC 8a
19: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %*	PROC 8b
20: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling*	PROC 8b

and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %	
21: *Packing solids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %*	PROC 9
22: *Packing solids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %*	PROC 9
23: *Air-dispersive application of solid fertilisers - indoor - zinc borate hydrate - 3 %*	PROC 11
24: *Air-dispersive application of solid fertilisers - outdoor - zinc borate hydrate - 3 %*	PROC 11
25: *Air-dispersive application of solid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %*	PROC 11
26: *Chemical analyses of solid fertilisers - zinc borate hydrate - 3 %*	PROC 15
27: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate - 50 %*	PROC 5
28: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 50 %*	PROC 5
29: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %*	PROC 8a
30: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %*	PROC 8a
31: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %*	PROC 8b
32: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %*	PROC 8b
33: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 50 %*	PROC 9
34: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 50 %*	PROC 9
35: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 50 %*	PROC 11
36: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 50 %*	PROC 11
37: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 50 %*	PROC 11
38: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 50 %*	PROC 15

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Zinc* (ERC 8d, ERC 8a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Drift should be minimised.
In line with the requirements of good agricultural practice, agricultural soil should be assessed prior to application of zinc borate and the application rate should be adjusted according to the results of the assessment and crop requirements

4.2.2. Control of environmental exposure: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Boron* (ERC 8d, ERC 8a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Drift should be minimised.
In line with the requirements of good agricultural practice, agricultural soil should be assessed prior to application of zinc borate and the application rate should be adjusted according to the results of the assessment and crop requirements

4.2.3. Control of worker exposure: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface > 3 m2

4.2.4. Control of worker exposure: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 3 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers open baths or reservoirs with surface < 3 m2

4.2.5. Control of worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

4.2.6. Control of worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min

Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers splash loading.

4.2.7. Control of worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

4.2.8. Control of worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers submerged loading.

4.2.9. Control of worker exposure: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 100 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

4.2.10. Control of worker exposure: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 100 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

4.2.11. Control of worker exposure: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Spraying with no or low compressed air use
Ensure that direction of application is only downward.

4.2.12. Control of worker exposure: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Outdoors, not close to buildings
Spraying with no or low compressed air use
Ensure that direction of application is only downward.

4.2.13. Control of worker exposure: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Outdoors, not close to buildings
Ensure that direction of application is only downward.

4.2.14. Control of worker exposure: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 3 %* (PROC 15)

Product (article) characteristics
Covers concentrations up to 3 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use
Covers open baths or reservoirs with surface < 0.3 m2

4.2.15. Control of worker exposure: *Handling of solid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 kg
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers handling with low level of agitation (e.g. manual mixing).
Ensure that the handling reduces contact between product and adjacent air (e.g. enclosed tabletting machine (relatively small openings are possible)).

4.2.16. Control of worker exposure: *Handling of solid fertiliser in stages with significant contact - outdoor - zinc borate hydrate 3 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 2 h/day
Covers quantities < 100 kg
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers handling with low level of agitation (e.g. manual mixing).
Ensure that the handling reduces contact between product and adjacent air (e.g. enclosed tabletting machine (relatively small openings are possible)).

4.2.17. Control of worker exposure: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

4.2.18. Control of worker exposure: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers height during transfer < 0.5 m.

4.2.19. Control of worker exposure: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

4.2.20. Control of worker exposure: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders dissolved in a liquid or incorporated in a liquid matrix
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers height during transfer < 0.5 m.

4.2.21. Control of worker exposure: *Packing solids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers height during transfer < 0.5 m.

4.2.22. Control of worker exposure: *Packing solids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

4.2.23. Control of worker exposure: *Air-dispersive application of solid fertilisers - indoor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers dry product with <5 % moisture content.
Covers the use of fine dust materials.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers dusting using blower.
Ensure that direction of application is only downward.

4.2.24. Control of worker exposure: *Air-dispersive application of solid fertilisers - outdoor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers dry product with <5 % moisture content.
Covers the use of fine dust materials.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Outdoors, not close to buildings
Covers dusting using blower.
Ensure that direction of application is only downward.

4.2.25. Control of worker exposure: *Air-dispersive application of solid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers dry product with <5 % moisture content.
Covers the use of fine dust materials.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Outdoors, not close to buildings
Covers powder spraying.
Ensure that direction of application is only downward.

4.2.26. Control of worker exposure: *Chemical analyses of solid fertilisers - zinc borate hydrate - 3 %* (PROC 15)

Product (article) characteristics
Covers concentrations up to 3 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 g
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use
Covers handling with low level of agitation (e.g. manual mixing).

4.2.27. Control of worker exposure: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate - 50 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 2 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface < 3 m2

4.2.28. Control of worker exposure: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 50 %* (PROC 5)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 1 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers open baths or reservoirs with surface < 3 m2

4.2.29. Control of worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

4.2.30. Control of worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers splash loading.

4.2.31. Control of worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers submerged loading.
Ensure that distance between the source of emission and the worker is at least 1m.

4.2.32. Control of worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Covers submerged loading.

4.2.33. Control of worker exposure: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 50 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 100 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

4.2.34. Control of worker exposure: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 50 %* (PROC 9)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 100 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.
Ensure that the handling reduces contact between product and adjacent air (e.g. transfer of liquid through a small filling opening, such as refuelling of vehicles).

4.2.35. Control of worker exposure: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 50 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Spraying with no or low compressed air use
Ensure that direction of application is only downward.

4.2.36. Control of worker exposure: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 50 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Outdoors, not close to buildings
Spraying with no or low compressed air use
Ensure that direction of application is only downward.

4.2.37. Control of worker exposure: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 50 %* (PROC 11)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Ensure that worker is in a cabin or separate room.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Outdoors, not close to buildings
Covers the outdoor application where the worker is not located further than 4 meters from the emission source
Ensure that direction of application is only downward.

4.2.38. Control of worker exposure: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 50 %* (PROC 15)

Product (article) characteristics
Covers concentrations up to 50 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use
Covers open baths or reservoirs with surface < 0.3 m2

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Zinc* (ERC 8d)

Release route	Release rate	Release estimation method
Water	8.64E-3 kg/day	Estimated release factor
Air	0 kg/day	Estimated release factor
Soil	0.55 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	4.39E-4 mg/L (EUSES 2.1.2)	0.021
Sediment (freshwater)	48.13 mg/kg dw (EUSES 2.1.2)	0.409
Marine water	5.99E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	6.572 mg/kg dw (EUSES 2.1.2)	0.116
Sewage Treatment Plant	4.31E-3 mg/L (EUSES 2.1.2)	0.043
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.32E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.2. Environmental release and exposure: *Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor/outdoor) - Boron* (ERC 8d)

Release route	Release rate	Release estimation method
Water	8.64E-3 kg/day	Estimated release factor
Air	0 kg/day	Estimated release factor
Soil	0.55 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	3.42E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.37E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.32E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.24E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.34E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.34E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.3. Worker exposure: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (ART)	0.088
Inhalation, local, long term	0.6 mg/m³ (ART)	0.741
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.095

4.3.4. Worker exposure: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 3 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.24 mg/m³ (ART)	0.035
Inhalation, local, long term	0.24 mg/m³ (ART)	0.296
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.042

4.3.5. Worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.12 mg/m³ (ART)	0.018
Inhalation, local, long term	0.12 mg/m³ (ART)	0.148
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

4.3.6. Worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.5E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	4.5E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.7. Worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.8. Worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5E-4 mg/m³ (ART)	< 0.01
Inhalation, local, long term	5E-4 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.9. Worker exposure: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (ART)	0.074
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.012

4.3.10. Worker exposure: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.071 mg/m³ (ART)	0.01
Inhalation, local, long term	0.071 mg/m³ (ART)	0.088
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.014

4.3.11. Worker exposure: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.054
Inhalation, local, long term	0.37 mg/m³ (ART)	0.457
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.11

4.3.12. Worker exposure: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.19 mg/m³ (ART)	0.028
Inhalation, local, long term	0.19 mg/m³ (ART)	0.235
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.083

4.3.13. Worker exposure: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.044 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.044 mg/m³ (ART)	0.054
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.062

4.3.14. Worker exposure: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 3 %* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.044 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.044 mg/m³ (ART)	0.054
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

4.3.15. Worker exposure: *Handling of solid fertiliser in stages with significant contact - indoor - zinc borate hydrate 3 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.38 mg/m³ (ART)	0.056
Inhalation, local, long term	0.38 mg/m³ (ART)	0.469
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.063

4.3.16. Worker exposure: *Handling of solid fertiliser in stages with significant contact - outdoor - zinc borate hydrate 3 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.34 mg/m³ (ART)	0.05
Inhalation, local, long term	0.34 mg/m³ (ART)	0.42
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.057

4.3.17. Worker exposure: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.07

4.3.18. Worker exposure: *Unloading and loading of solid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.32 mg/m³ (ART)	0.047
Inhalation, local, long term	0.32 mg/m³ (ART)	0.395
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.054

4.3.19. Worker exposure: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 3 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.07

4.3.20. Worker exposure: *Unloading and loading of solid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 3 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.096 mg/m³ (ART)	0.014
Inhalation, local, long term	0.096 mg/m³ (ART)	0.119
Dermal, systemic, long term	2.742 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.021

4.3.21. Worker exposure: *Packing solids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 3 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.64 mg/m³ (ART)	0.094
Inhalation, local, long term	0.64 mg/m³ (ART)	0.79
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.098

4.3.22. Worker exposure: *Packing solids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 3 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.46 mg/m³ (ART)	0.068
Inhalation, local, long term	0.46 mg/m³ (ART)	0.568
Dermal, systemic, long term	1.372 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.071

4.3.23. Worker exposure: *Air-dispersive application of solid fertilisers - indoor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.58 mg/m³ (ART)	0.085
Inhalation, local, long term	0.58 mg/m³ (ART)	0.716
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.141

4.3.24. Worker exposure: *Air-dispersive application of solid fertilisers - outdoor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.37 mg/m³ (ART)	0.054
Inhalation, local, long term	0.37 mg/m³ (ART)	0.457
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.11

4.3.25. Worker exposure: *Air-dispersive application of solid fertilisers - outdoor, tractor - zinc borate hydrate - 3 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.032 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.032 mg/m³ (ART)	0.04
Dermal, systemic, long term	21.42 mg/kg bw/day (TRA Workers 3.0)	0.056
Combined, systemic, long term		0.06

4.3.26. Worker exposure: *Chemical analyses of solid fertilisers - zinc borate hydrate - 3 %* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	0.068 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.043

4.3.27. Worker exposure: *Handling of liquid fertiliser in stages with significant contact - indoor - zinc borate hydrate - 50 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.5 mg/m³ (ART)	0.074
Inhalation, local, long term	0.5 mg/m³ (ART)	0.617
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.109

4.3.28. Worker exposure: *Handling of liquid fertiliser in stages with significant contact - outdoor - zinc borate hydrate - 50 %* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.49 mg/m³ (ART)	0.072
Inhalation, local, long term	0.49 mg/m³ (ART)	0.605
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.108

4.3.29. Worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.33 mg/m³ (ART)	0.049
Inhalation, local, long term	0.33 mg/m³ (ART)	0.407
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.084

4.3.30. Worker exposure: *Unloading and loading of liquid fertiliser in non-dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.075 mg/m³ (ART)	0.011
Inhalation, local, long term	0.075 mg/m³ (ART)	0.093
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.047

4.3.31. Worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - indoor - zinc borate hydrate - 50 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.22 mg/m³ (ART)	0.032
Inhalation, local, long term	0.22 mg/m³ (ART)	0.272
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.068

4.3.32. Worker exposure: *Unloading and loading of liquid fertiliser in dedicated facilities, including sampling and cleaning fertiliser residues from the equipment - outdoor - zinc borate hydrate - 50 %* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.4E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	8.4E-3 mg/m³ (ART)	0.01
Dermal, systemic, long term	13.71 mg/kg bw/day (TRA Workers 3.0)	0.036
Combined, systemic, long term		0.037

4.3.33. Worker exposure: *Packing liquids in a dedicated filling line, including weighing - indoor - zinc borate hydrate - 50 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (ART)	0.088
Inhalation, local, long term	0.6 mg/m³ (ART)	0.741
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.106

4.3.34. Worker exposure: *Packing liquids in a dedicated filling line, including weighing - outdoor - zinc borate hydrate - 50 %* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.36 mg/m³ (ART)	0.053
Inhalation, local, long term	0.36 mg/m³ (ART)	0.444
Dermal, systemic, long term	6.86 mg/kg bw/day (TRA Workers 3.0)	0.018
Combined, systemic, long term		0.071

4.3.35. Worker exposure: *Air-dispersive application of liquid fertilisers - indoor - zinc borate hydrate - 50 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.31 mg/m³ (ART)	0.046
Inhalation, local, long term	0.31 mg/m³ (ART)	0.383
Dermal, systemic, long term	107.1 mg/kg bw/day (TRA Workers 3.0)	0.278
Combined, systemic, long term		0.323

4.3.36. Worker exposure: *Air-dispersive application of liquid fertilisers - outdoor - zinc borate hydrate - 50 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.16 mg/m³ (ART)	0.024
Inhalation, local, long term	0.16 mg/m³ (ART)	0.198
Dermal, systemic, long term	107.1 mg/kg bw/day (TRA Workers 3.0)	0.278
Combined, systemic, long term		0.301

4.3.37. Worker exposure: *Air-dispersive application of liquid fertilisers - outdoor, tractor - zinc borate hydrate - 50 %* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.53 mg/m³ (ART)	0.078
Inhalation, local, long term	0.53 mg/m³ (ART)	0.654
Dermal, systemic, long term	107.1 mg/kg bw/day (TRA Workers 3.0)	0.278
Combined, systemic, long term		0.355

4.3.38. Worker exposure: *Chemical analyses of liquid fertilisers - zinc borate hydrate - 50 %* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	0.34 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.066

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure is assessed using ART v1.5. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate. However for this use only zinc borate hydrate is identified as relevant.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of Fertilizers Europe SpERC 8e.4.v3.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, local exhaust ventilation, Operating temperature, Workroom size, Distance of the source to buildings, Quantity of product in the movement and agitation of powders, Transfer rate, Drop height, Open surface area, Transfer loading type, Type of application of falling liquid products, Type of spraying application, Direction for spraying, Technique for spraying of liquid to surfaces, Application rate, Level of contamination, Level of agitation in the movement and agitation of powders, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well

as in ECHA’s Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 4.3.

5. ES 5: Widespread use by professional workers; Various products (PC 16, PC 17, PC 24); Other (SU 0)

5.1. Use descriptors

ES name: *Professional use of lubricants containing zinc borate in vehicles and machinery (ATIEL-ATC Use Group B(p))*
Product category: Heat Transfer Fluids (PC 16), Hydraulic Fluids (PC 17), Lubricants, Greases, Release Products (PC 24)
Sector of use: Other (SU 0)

Environment	
1: *Widespread use of functional fluid (indoor/outdoor) - Zinc*	ERC 9b, ERC 9a
2: *Widespread use of functional fluid (indoor/outdoor) - Boron*	ERC 9b, ERC 9a
Worker	
3: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate*	PROC 1
4: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate*	PROC 1
5: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate*	PROC 8a
6: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate*	PROC 8a
7: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate*	PROC 8b
8: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate*	PROC 8b
9: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate*	PROC 20
10: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate*	PROC 20
11: *Material storage - indoor - anhydrous zinc borate*	PROC 1
12: *Material storage - outdoor - anhydrous zinc borate*	PROC 1
13: *Material storage - indoor - anhydrous zinc borate*	PROC 2
14: *Material storage - outdoor - anhydrous zinc borate*	PROC 2
15: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate*	PROC 1
16: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate*	PROC 1
17: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate*	PROC 8a
18: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate*	PROC 8a
19: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate*	PROC 8b
20: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate*	PROC 8b
21: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate*	PROC 20
22: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate*	PROC 20
23: *Material storage - indoor - zinc borate hydrate*	PROC 1
24: *Material storage - outdoor - zinc borate hydrate*	PROC 1
25: *Material storage - indoor - zinc borate hydrate*	PROC 2

26: *Material storage - outdoor - zinc borate hydrate*	PROC 2

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: *Widespread use of functional fluid (indoor/outdoor) - Zinc* (ERC 9b, ERC 9a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Indoor or outdoor use

5.2.2. Control of environmental exposure: *Widespread use of functional fluid (indoor/outdoor) - Boron* (ERC 9b, ERC 9a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Indoor or outdoor use

5.2.3. Control of worker exposure: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 150 °C

5.2.4. Control of worker exposure: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 150 °C

5.2.5. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.6. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.7. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.8. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.9. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 20)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.10. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 20)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.11. Control of worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.12. Control of worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

5.2.13. Control of worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

5.2.14. Control of worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

5.2.15. Control of worker exposure: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 150 °C

5.2.16. Control of worker exposure: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 150 °C

5.2.17. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.18. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.19. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.20. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.21. Control of worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 20)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

5.2.22. Control of worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 20)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Covers splash loading.

5.2.23. Control of worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.24. Control of worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Outdoor use
Assumes process temperature up to 40 °C

5.2.25. Control of worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

5.2.26. Control of worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Outdoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: *Widespread use of functional fluid (indoor/outdoor) - Zinc* (ERC 9b)

Release route	Release rate	Release estimation method
Water	1.37E-4 kg/day	SPERC
Air	6.85E-4 kg/day	SPERC

Release route	Release rate	Release estimation method
Soil	1.37E-4 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.78E-4 mg/L (EUSES 2.1.2)	0.014
Sediment (freshwater)	30.53 mg/kg dw (EUSES 2.1.2)	0.259
Marine water	4.39E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.812 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	6.84E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.28E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

5.3.2. Environmental release and exposure: *Widespread use of functional fluid (indoor/outdoor) - Boron* (ERC 9b)

Release route	Release rate	Release estimation method
Water	1.37E-4 kg/day	SPERC
Air	6.85E-4 kg/day	SPERC
Soil	1.37E-4 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.95E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	6.85E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.22E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.16E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.21E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

5.3.3. Worker exposure: *Use as lubricant/grease in a closed system - indoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

5.3.4. Worker exposure: *Use as lubricant/grease in a closed system - outdoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.042 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, local, long term	0.042 mg/m³ (TRA Workers 3.0)	0.061
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.018

5.3.5. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.409

5.3.6. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.53 mg/m³ (ART)	0.214
Inhalation, local, long term	0.53 mg/m³ (ART)	0.768
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.445

5.3.7. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.15 mg/m³ (ART)	0.06
Inhalation, local, long term	0.15 mg/m³ (ART)	0.217
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.292

5.3.8. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.18 mg/m³ (ART)	0.073
Inhalation, local, long term	0.18 mg/m³ (ART)	0.261
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.304

5.3.9. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - anhydrous zinc borate* (PROC 20)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	1.026 mg/kg bw/day (TRA Workers 3.0)	0.029
Combined, systemic, long term		0.206

5.3.10. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - anhydrous zinc borate* (PROC 20)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.53 mg/m³ (ART)	0.214
Inhalation, local, long term	0.53 mg/m³ (ART)	0.768
Dermal, systemic, long term	1.026 mg/kg bw/day (TRA Workers 3.0)	0.029
Combined, systemic, long term		0.243

5.3.11. Worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

5.3.12. Worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.042 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, local, long term	0.042 mg/m³ (TRA Workers 3.0)	0.061
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.018

5.3.13. Worker exposure: *Material storage - indoor - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.9E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	9.9E-3 mg/m³ (ART)	0.014
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.027

5.3.14. Worker exposure: *Material storage - outdoor - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.7E-4 mg/m³ (ART)	< 0.01
Inhalation, local, long term	3.7E-4 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.023

5.3.15. Worker exposure: *Use as lubricant/grease in a closed system - indoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.16. Worker exposure: *Use as lubricant/grease in a closed system - outdoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.042 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.042 mg/m³ (TRA Workers 3.0)	0.052
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.17. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.086

5.3.18. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.53 mg/m³ (ART)	0.078
Inhalation, local, long term	0.53 mg/m³ (ART)	0.654
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.099

5.3.19. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.15 mg/m³ (ART)	0.022
Inhalation, local, long term	0.15 mg/m³ (ART)	0.185
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.043

5.3.20. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.18 mg/m³ (ART)	0.026
Inhalation, local, long term	0.18 mg/m³ (ART)	0.222
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.048

5.3.21. Worker exposure: *General exposure during maintenance work including draining, refilling - indoor - zinc borate hydrate* (PROC 20)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	1.026 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.067

5.3.22. Worker exposure: *General exposure during maintenance work including draining, refilling - outdoor - zinc borate hydrate* (PROC 20)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.53 mg/m³ (ART)	0.078
Inhalation, local, long term	0.53 mg/m³ (ART)	0.654
Dermal, systemic, long term	1.026 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.081

5.3.23. Worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.24. Worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.042 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.042 mg/m³ (TRA Workers 3.0)	0.052
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.25. Worker exposure: *Material storage - indoor - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.9E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	9.9E-3 mg/m³ (ART)	0.012
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.3.26. Worker exposure: *Material storage - outdoor - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.7E-4 mg/m³ (ART)	< 0.01
Inhalation, local, long term	3.7E-4 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure for most of the PROCs is assessed using ART v1.5. Only for some PROCs the inhalation exposure is assessed using TRA Workers 3.0 as implemented in CHESAR. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of SPERC ESVOC SpERC 9.6b.v2.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Transfer rate, Transfer loading type, Type of application of falling liquid products, Open surface area, Level of contamination, Distance of the source to buildings, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 5.3.

6. ES 6: Widespread use by professional workers; Coatings and Paints, Thinners, paint removers (PC 9a); Other (SU 0)

6.1. Use descriptors

ES name: *Professional use of coatings containing zinc borate*
Product category: Coatings and Paints, Thinners, paint removers (PC 9a)
Sector of use: Other (SU 0)

Environment	
1: *Widespread use leading to inclusion into/onto article (indoor) - Zinc*	ERC 8c
2: *Widespread use leading to inclusion into/onto article (indoor) - Boron*	ERC 8c
3: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc*	ERC 8f
4: *Widespread use leading to inclusion into/onto article (outdoor) - Boron*	ERC 8f
Worker	
5: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 1
6: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 1
7: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 2
8: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 2
9: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate*	PROC 3
10: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate*	PROC 3
11: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate*	PROC 8a
12: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8a
13: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate*	PROC 8b
14: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8b
15: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate*	PROC 9
16: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate*	PROC 9
17: *Roller application or brushing - powder - anhydrous zinc borate*	PROC 10
18: *Roller application or brushing - liquid formulation - anhydrous zinc borate*	PROC 10
19: *Non industrial spraying - powder - anhydrous zinc borate*	PROC 11
20: *Non industrial spraying - liquid formulation - anhydrous zinc borate*	PROC 11
21: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate*	PROC 13
22: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate*	PROC 13

23: *Use as laboratory reagent - powder - anhydrous zinc borate*	PROC 15
24: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate*	PROC 15
25: *Manual activities - anhydrous zinc borate*	PROC 19
26: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 1
27: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 1
28: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 2
29: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 2
30: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate*	PROC 3
31: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate*	PROC 3
32: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate*	PROC 8a
33: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8a
34: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate*	PROC 8b
35: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8b
36: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate*	PROC 9
37: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate*	PROC 9
38: *Roller application or brushing - powder - zinc borate hydrate*	PROC 10
39: *Roller application or brushing - liquid formulation - zinc borate hydrate*	PROC 10
40: *Non industrial spraying - powder - zinc borate hydrate*	PROC 11
41: *Non industrial spraying - liquid formulation - zinc borate hydrate*	PROC 11
42: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate*	PROC 13
43: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate*	PROC 13
44: *Use as laboratory reagent - powder - zinc borate hydrate*	PROC 15
45: *Use as laboratory reagent - liquid formulation - zinc borate hydrate*	PROC 15
46: *Manual activities - zinc borate hydrate*	PROC 19
Subsequent service life exposure scenario(s)	
ES 10: Service life (professional worker); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	
ES 11: Service life (consumers); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Waste water from equipment cleaning discharged to standard municipal sewage treatment plant Process waste may be recycled or incinerated by local authority or waste disposal company
Other conditions affecting environmental exposure
Indoor use

6.2.2. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Waste water from equipment cleaning discharged to standard municipal sewage treatment plant Process waste may be recycled or incinerated by local authority or waste disposal company
Other conditions affecting environmental exposure
Indoor use

6.2.3. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

6.2.4. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

6.2.5. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.6. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.7. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg

Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

6.2.8. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

6.2.9. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

6.2.10. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

6.2.11. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

6.2.12. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

6.2.13. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

6.2.14. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

6.2.15. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

6.2.16. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 10 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

6.2.17. Control of worker exposure: *Roller application or brushing - powder - anhydrous zinc borate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

6.2.18. Control of worker exposure: *Roller application or brushing - liquid formulation - anhydrous zinc borate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

6.2.19. Control of worker exposure: *Non industrial spraying - powder - anhydrous zinc borate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 20 (APF ≥ 20). For further specification, refer to section 8 of the SDS
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers powder spraying.
Ensure that direction of application is only horizontal or downward.

6.2.20. Control of worker exposure: *Non industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Spraying with no or low compressed air use
Ensure that direction of application is only horizontal or downward.

6.2.21. Control of worker exposure: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.22. Control of worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface > 3 m2

6.2.23. Control of worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders dissolved in a liquid or incorporated in a liquid matrix
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 g
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers handling with low level of agitation (e.g. manual mixing).

6.2.24. Control of worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface < 0.3 m2

6.2.25. Control of worker exposure: *Manual activities - anhydrous zinc borate* (PROC 19)

Product (article) characteristics
Covers concentrations up to 26 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

6.2.26. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.27. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.28. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

6.2.29. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

6.2.30. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

6.2.31. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate* (PROC 3)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

6.2.32. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

6.2.33. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

6.2.34. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 1000 kg/min

Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

6.2.35. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

6.2.36. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

6.2.37. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 10 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

6.2.38. Control of worker exposure: *Roller application or brushing - powder - zinc borate hydrate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

6.2.39. Control of worker exposure: *Roller application or brushing - liquid formulation - zinc borate hydrate* (PROC 10)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3

6.2.40. Control of worker exposure: *Non industrial spraying - powder - zinc borate hydrate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 20 (APF ≥ 20). For further specification, refer to section 8 of the SDS
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers powder spraying.
Ensure that direction of application is only horizontal or downward.

6.2.41. Control of worker exposure: *Non industrial spraying - liquid formulation - zinc borate hydrate* (PROC 11)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Moderate application rate (0.3 - 3 l/minute)
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Spraying with no or low compressed air use
Ensure that direction of application is only horizontal or downward.

6.2.42. Control of worker exposure: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator which reduces the air impurities by at least a factor of 10 (APF ≥ 10). For further specification, refer to section 8 of the SDS
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

6.2.43. Control of worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate* (PROC 13)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface > 3 m2

6.2.44. Control of worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 g
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers handling with low level of agitation (e.g. manual mixing).

6.2.45. Control of worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface < 0.3 m2

6.2.46. Control of worker exposure: *Manual activities - zinc borate hydrate* (PROC 19)

Product (article) characteristics
Covers concentrations up to 26 %
Liquid
Covers liquids with medium to high viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Covers room volume ≥ 100 m3
Assumes process temperature up to 40 °C

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	0 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.76E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.24 mg/kg dw (EUSES 2.1.2)	0.257
Marine water	4.36E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.783 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.28E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.2. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	SPERC
Air	0 kg/day	SPERC
Soil	0 kg/day	SPERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.22E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.14E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.2E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.3. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	ERC
Air	0.029 kg/day	ERC
Soil	9.62E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	4.58E-4 mg/L (EUSES 2.1.2)	0.022
Sediment (freshwater)	50.18 mg/kg dw (EUSES 2.1.2)	0.426
Marine water	6.18E-5 mg/L (EUSES 2.1.2)	0.01
Sediment (marine water)	6.777 mg/kg dw (EUSES 2.1.2)	0.12
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	0.048
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.33E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.4. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	ERC
Air	0.029 kg/day	ERC
Soil	9.62E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.47E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.42E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.24E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.48E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.35E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.5. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

6.3.6. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

6.3.7. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.14

6.3.8. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.019
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.028

6.3.9. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - anhydrous zinc borate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.129

6.3.10. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - anhydrous zinc borate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.019
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.017

6.3.11. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.405

6.3.12. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.161
Inhalation, local, long term	0.4 mg/m³ (ART)	0.58
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.393

6.3.13. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.194
Inhalation, local, long term	0.48 mg/m³ (ART)	0.696
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.425

6.3.14. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.019
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.237

6.3.15. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.39 mg/m³ (ART)	0.157
Inhalation, local, long term	0.39 mg/m³ (ART)	0.565
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.273

6.3.16. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (ART)	0.024
Inhalation, local, long term	0.06 mg/m³ (ART)	0.087
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.14

6.3.17. Worker exposure: *Roller application or brushing - powder - anhydrous zinc borate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.36 mg/m³ (TRA Workers 3.0)	0.145
Inhalation, local, long term	0.36 mg/m³ (TRA Workers 3.0)	0.522
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.609

6.3.18. Worker exposure: *Roller application or brushing - liquid formulation - anhydrous zinc borate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.33 mg/m³ (ART)	0.133
Inhalation, local, long term	0.33 mg/m³ (ART)	0.478
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.597

6.3.19. Worker exposure: *Non industrial spraying - powder - anhydrous zinc borate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.55 mg/m³ (ART)	0.222
Inhalation, local, long term	0.55 mg/m³ (ART)	0.797
Dermal, systemic, long term	6.428 mg/kg bw/day (TRA Workers 3.0)	0.181
Combined, systemic, long term		0.403

6.3.20. Worker exposure: *Non industrial spraying - liquid formulation - anhydrous zinc borate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.2 mg/m³ (ART)	0.081
Inhalation, local, long term	0.2 mg/m³ (ART)	0.29
Dermal, systemic, long term	6.428 mg/kg bw/day (TRA Workers 3.0)	0.181
Combined, systemic, long term		0.262

6.3.21. Worker exposure: *Treatment of articles by dipping and pouring - powder - anhydrous zinc borate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.18 mg/m³ (TRA Workers 3.0)	0.073
Inhalation, local, long term	0.18 mg/m³ (TRA Workers 3.0)	0.261
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.304

6.3.22. Worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - anhydrous zinc borate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.6E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	6.6E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.234

6.3.23. Worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.27 mg/m³ (ART)	0.109
Inhalation, local, long term	0.27 mg/m³ (ART)	0.391
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.115

6.3.24. Worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.066 mg/m³ (ART)	0.027
Inhalation, local, long term	0.066 mg/m³ (ART)	0.096
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.032

6.3.25. Worker exposure: *Manual activities - anhydrous zinc borate* (PROC 19)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.32 mg/m³ (ART)	0.129
Inhalation, local, long term	0.32 mg/m³ (ART)	0.464
Dermal, systemic, long term	14.14 mg/kg bw/day (TRA Workers 3.0)	0.399
Combined, systemic, long term		0.528

6.3.26. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		< 0.01

6.3.27. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

6.3.28. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.045

6.3.29. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

6.3.30. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - powder - zinc borate hydrate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.044

6.3.31. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition - liquid formulation - zinc borate hydrate* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

6.3.32. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.085

6.3.33. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.059
Inhalation, local, long term	0.4 mg/m³ (ART)	0.494
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.08

6.3.34. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.071
Inhalation, local, long term	0.48 mg/m³ (ART)	0.593
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.092

6.3.35. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.023

6.3.36. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.39 mg/m³ (ART)	0.057
Inhalation, local, long term	0.39 mg/m³ (ART)	0.481
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011
Combined, systemic, long term		0.068

6.3.37. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (ART)	0.074
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.019

6.3.38. Worker exposure: *Roller application or brushing - powder - zinc borate hydrate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.36 mg/m³ (TRA Workers 3.0)	0.053
Inhalation, local, long term	0.36 mg/m³ (TRA Workers 3.0)	0.444
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.096

6.3.39. Worker exposure: *Roller application or brushing - liquid formulation - zinc borate hydrate* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.33 mg/m³ (ART)	0.049
Inhalation, local, long term	0.33 mg/m³ (ART)	0.407
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.091

6.3.40. Worker exposure: *Non industrial spraying - powder - zinc borate hydrate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.55 mg/m³ (ART)	0.081
Inhalation, local, long term	0.55 mg/m³ (ART)	0.679
Dermal, systemic, long term	64.28 mg/kg bw/day (TRA Workers 3.0)	0.167
Combined, systemic, long term		0.247

6.3.41. Worker exposure: *Non industrial spraying - liquid formulation - zinc borate hydrate* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.2 mg/m³ (ART)	0.029
Inhalation, local, long term	0.2 mg/m³ (ART)	0.247
Dermal, systemic, long term	64.28 mg/kg bw/day (TRA Workers 3.0)	0.167
Combined, systemic, long term		0.196

6.3.42. Worker exposure: *Treatment of articles by dipping and pouring - powder - zinc borate hydrate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.18 mg/m³ (TRA Workers 3.0)	0.026
Inhalation, local, long term	0.18 mg/m³ (TRA Workers 3.0)	0.222
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.048

6.3.43. Worker exposure: *Treatment of articles by dipping and pouring - liquid formulation - zinc borate hydrate* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	6.6E-3 mg/m³ (ART)	< 0.01
Inhalation, local, long term	6.6E-3 mg/m³ (ART)	< 0.01
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.022

6.3.44. Worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.27 mg/m³ (ART)	0.04
Inhalation, local, long term	0.27 mg/m³ (ART)	0.333
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.04

6.3.45. Worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.066 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.066 mg/m³ (ART)	0.081
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.01

6.3.46. Worker exposure: *Manual activities - zinc borate hydrate* (PROC 19)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.32 mg/m³ (ART)	0.047
Inhalation, local, long term	0.32 mg/m³ (ART)	0.395
Dermal, systemic, long term	141.4 mg/kg bw/day (TRA Workers 3.0)	0.366
Combined, systemic, long term		0.413

6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure for most of the PROCs is assessed using ART v1.5. Only for some PROCs the inhalation exposure is assessed using TRA Workers 3.0 as implemented in CHESAR. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of SPERC CEPE SPERC

8c.3a.v2 for ERC 8c whereas for ERC 8f the default release factors as given by ECHA Guidance R.16 are applied.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Quantity of product in the movement and agitation of powders, Transfer rate, Drop height, Transfer loading type, Type of application of falling liquid products, Open surface area, Type of spraying applications, Direction for spraying, Technique for spraying of liquid to surfaces, Application rate, Level of contamination, Level of agitation in the movement and agitation of powders, RPE.
  Remark: ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 6.3.

7. ES 7: Widespread use by professional workers; Polymer Preparations and Compounds (PC 32); Other (SU 0)

7.1. Use descriptors

ES name: *Professional use of zinc borates in polymers*
Product category: Polymer Preparations and Compounds (PC 32)
Sector of use: Other (SU 0)

Environment	
1: *Widespread use leading to inclusion into/onto article (indoor) - Zinc*	ERC 8c
2: *Widespread use leading to inclusion into/onto article (indoor) - Boron*	ERC 8c
3: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc*	ERC 8f
4: *Widespread use leading to inclusion into/onto article (outdoor) - Boron*	ERC 8f
Worker	
5: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 1
6: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 1
7: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate*	PROC 2
8: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate*	PROC 2
9: *Calendering operations - powder - anhydrous zinc borate*	PROC 6
10: *Calendering operations - liquid formulation - anhydrous zinc borate*	PROC 6
11: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate*	PROC 8a
12: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8a
13: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate*	PROC 8b
14: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate*	PROC 8b
15: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate*	PROC 9
16: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate*	PROC 9
17: *Use as laboratory reagent - powder - anhydrous zinc borate*	PROC 15
18: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate*	PROC 15
19: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 1
20: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate*	PROC 1
21: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate*	PROC 2
22: *Chemical production or refinery in closed continuous process with occasional*	PROC 2

controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate	
23: *Calendering operations - powder - zinc borate hydrate*	PROC 6
24: *Calendering operations - liquid formulation - zinc borate hydrate*	PROC 6
25: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate*	PROC 8a
26: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8a
27: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate*	PROC 8b
28: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate*	PROC 8b
29: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate*	PROC 9
30: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate*	PROC 9
31: *Use as laboratory reagent - powder - zinc borate hydrate*	PROC 15
32: *Use as laboratory reagent - liquid formulation - zinc borate hydrate*	PROC 15
Subsequent service life exposure scenario(s)	
ES 10: Service life (professional worker); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	
ES 11: Service life (consumers); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

7.2.2. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

7.2.3. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

7.2.4. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

7.2.5. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

7.2.6. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

7.2.7. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

7.2.8. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

7.2.9. Control of worker exposure: *Calendering operations - powder - anhydrous zinc borate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

7.2.10. Control of worker exposure: *Calendering operations - liquid formulation - anhydrous zinc borate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.

7.2.11. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

7.2.12. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

7.2.13. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

7.2.14. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

7.2.15. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

7.2.16. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 10 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

7.2.17. Control of worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders dissolved in a liquid or incorporated in a liquid matrix
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 g
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers handling with low level of agitation (e.g. manual mixing).

7.2.18. Control of worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface < 0.3 m2

7.2.19. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

7.2.20. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

7.2.21. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 1000 kg
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers handling with no use of compressed air.

7.2.22. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Use in contained systems; Transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers open baths or reservoirs with surface > 3 m2

7.2.23. Control of worker exposure: *Calendering operations - powder - zinc borate hydrate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers compressing of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. contained sieving of big bags with only small opening).

7.2.24. Control of worker exposure: *Calendering operations - liquid formulation - zinc borate hydrate* (PROC 6)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day

Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 150 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.

7.2.25. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 100 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

7.2.26. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use
Ensure that distance between the source of emission and the worker is at least 1m.
Covers splash loading.

7.2.27. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 4 h/day
Covers transfer of powders < 1000 kg/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers height during transfer < 0.5 m.

7.2.28. Control of worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 1000 l/min
Technical and organisational conditions and measures
Process contained with a loose lid or cover, not airtight.; The enclosure is not opened during the activity.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that distance between the source of emission and the worker is at least 1m.
Covers submerged loading.

7.2.29. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of powders < 10 kg/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.

Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Ensure that the handling reduces contact between product and adjacent air (e.g. dumping powders in a big bag through a small opening).
Covers height during transfer < 0.5 m.

7.2.30. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers transfer of liquid < 10 l/min
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers splash loading.

7.2.31. Control of worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Solid; High dustiness: Handling the product in its dry form results in a dust cloud that is clearly visible for some time. For example, talcum powder.
Powders, granules or pelletised material
Covers the use of fine dust materials.
Covers dry product with <5 % moisture content.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers quantities < 100 g
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.

Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers handling with low level of agitation (e.g. manual mixing).

7.2.32. Control of worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Product (article) characteristics
Covers concentrations up to 10 %
Liquid
Covers liquids with low to medium viscosity.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Effective housekeeping practices (e.g. daily cleaning using appropriate methods, preventive maintenance of machinery, use of protective clothing that will repel spills and reduce personal cloud) in place.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Covers room volume ≥ 100 m3
Covers open baths or reservoirs with surface < 0.3 m2

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	Estimated release factor
Air	0.029 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	4.58E-4 mg/L (EUSES 2.1.2)	0.022
Sediment (freshwater)	50.18 mg/kg dw (EUSES 2.1.2)	0.426
Marine water	6.18E-5 mg/L (EUSES 2.1.2)	0.01
Sediment (marine water)	6.777 mg/kg dw (EUSES 2.1.2)	0.12
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	0.048

Protection target	Exposure estimate	RCR
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.33E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.2. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	Estimated release factor
Air	0.029 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.47E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.42E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.24E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.48E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.35E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.3. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	ERC
Air	0.029 kg/day	ERC
Soil	9.62E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	4.58E-4 mg/L (EUSES 2.1.2)	0.022
Sediment (freshwater)	50.18 mg/kg dw (EUSES 2.1.2)	0.426
Marine water	6.18E-5 mg/L (EUSES 2.1.2)	0.01
Sediment (marine water)	6.777 mg/kg dw (EUSES 2.1.2)	0.12
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	0.048
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.33E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.4. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Release route	Release rate	Release estimation method
Water	9.62E-3 kg/day	ERC
Air	0.029 kg/day	ERC
Soil	9.62E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.47E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.42E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.81E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.24E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.48E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.35E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.5. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

7.3.6. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	0.024
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.087
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.025

7.3.7. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.14

7.3.8. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - anhydrous zinc borate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.019
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	0.023
Combined, systemic, long term		0.028

7.3.9. Worker exposure: *Calendering operations - powder - anhydrous zinc borate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.117
Inhalation, local, long term	0.29 mg/m³ (ART)	0.42
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.581

7.3.10. Worker exposure: *Calendering operations - liquid formulation - anhydrous zinc borate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.177
Inhalation, local, long term	0.44 mg/m³ (ART)	0.638
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.464
Combined, systemic, long term		0.641

7.3.11. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.173
Inhalation, local, long term	0.43 mg/m³ (ART)	0.623
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.405

7.3.12. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.161
Inhalation, local, long term	0.4 mg/m³ (ART)	0.58
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.393

7.3.13. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.194
Inhalation, local, long term	0.48 mg/m³ (ART)	0.696
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.425

7.3.14. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - anhydrous zinc borate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.019
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.232
Combined, systemic, long term		0.237

7.3.15. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.39 mg/m³ (ART)	0.157
Inhalation, local, long term	0.39 mg/m³ (ART)	0.565
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.273

7.3.16. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - anhydrous zinc borate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (ART)	0.024
Inhalation, local, long term	0.06 mg/m³ (ART)	0.087
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.116
Combined, systemic, long term		0.14

7.3.17. Worker exposure: *Use as laboratory reagent - powder - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.27 mg/m³ (ART)	0.109
Inhalation, local, long term	0.27 mg/m³ (ART)	0.391
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.115

7.3.18. Worker exposure: *Use as laboratory reagent - liquid formulation - anhydrous zinc borate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.066 mg/m³ (ART)	0.027
Inhalation, local, long term	0.066 mg/m³ (ART)	0.096
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.032

7.3.19. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

7.3.20. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (TRA Workers 3.0)	0.074
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

7.3.21. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - powder - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.045

7.3.22. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - liquid formulation - zinc borate hydrate* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	0.822 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

7.3.23. Worker exposure: *Calendering operations - powder - zinc borate hydrate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.29 mg/m³ (ART)	0.043
Inhalation, local, long term	0.29 mg/m³ (ART)	0.358
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.085

7.3.24. Worker exposure: *Calendering operations - liquid formulation - zinc borate hydrate* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.44 mg/m³ (ART)	0.065
Inhalation, local, long term	0.44 mg/m³ (ART)	0.543
Dermal, systemic, long term	16.45 mg/kg bw/day (TRA Workers 3.0)	0.043
Combined, systemic, long term		0.107

7.3.25. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - powder - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.43 mg/m³ (ART)	0.063
Inhalation, local, long term	0.43 mg/m³ (ART)	0.531
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.085

7.3.26. Worker exposure: *Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.4 mg/m³ (ART)	0.059
Inhalation, local, long term	0.4 mg/m³ (ART)	0.494
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.08

7.3.27. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - powder - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.48 mg/m³ (ART)	0.071
Inhalation, local, long term	0.48 mg/m³ (ART)	0.593
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.092

7.3.28. Worker exposure: *Transfer of substance or mixture (charging and discharging) at dedicated facilities - liquid formulation - zinc borate hydrate* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.013 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.013 mg/m³ (ART)	0.016
Dermal, systemic, long term	8.226 mg/kg bw/day (TRA Workers 3.0)	0.021
Combined, systemic, long term		0.023

7.3.29. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - powder - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.39 mg/m³ (ART)	0.057
Inhalation, local, long term	0.39 mg/m³ (ART)	0.481
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.068

7.3.30. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - liquid formulation - zinc borate hydrate* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.06 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.06 mg/m³ (ART)	0.074
Dermal, systemic, long term	4.116 mg/kg bw/day (TRA Workers 3.0)	0.011
Combined, systemic, long term		0.019

7.3.31. Worker exposure: *Use as laboratory reagent - powder - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.27 mg/m³ (ART)	0.04
Inhalation, local, long term	0.27 mg/m³ (ART)	0.333
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.04

7.3.32. Worker exposure: *Use as laboratory reagent - liquid formulation - zinc borate hydrate* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.066 mg/m³ (ART)	< 0.01
Inhalation, local, long term	0.066 mg/m³ (ART)	0.081
Dermal, systemic, long term	0.204 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.01

7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. The workers' inhalation exposure for most of the PROCs is assessed using ART v1.5. Only for some PROCs the inhalation exposure is assessed using TRA Workers 3.0 as implemented in CHESAR. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases to the air and soil have been estimated on the default release factors for ERC 8c. The release factor for the release to water is adapted to 5% based on ECHA Guidance R.16 since the substance is not dissolved/dispersed in a surplus of water. For ERC 8f the default release factors as given by ECHA Guidance R.16 are applied.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are “equivalent” to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Workers:**
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, PPE.

  ART v1.5: Duration of activity, Percentage of substance in mixture/article, General ventilation, Local exhaust ventilation, Operating temperature, Workroom size, Transfer rate, Transfer loading type, Type of application of falling liquid products, Drop height, Level of agitation in the movement and agitation of powders, Open surface area, Level of contamination, RPE.
  Remark: ART predicts air concentrations in a worker’s personal breathing zone outside of any Respiratory Protection Equipment (RPE). Therefore, the use of RPE has to be considered separately.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA’s Guidance for downstream users v2.1 (October 2014) as well as in ECHA’s Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 7.3.

8. ES 8: Consumer use; Lubricants, Greases, Release Products (PC 24)

8.1. Use descriptors

ES name: *Consumer use of lubricants containing zinc borate in cars (ATIEL-ATC Use Group B(c))*
Product category: Lubricants, Greases, Release Products (PC 24)

Environment	
1: *Widespread use of functional fluid (indoor/outdoor) - Zinc*	ERC 9b, ERC 9a
2: *Widespread use of functional fluid (indoor/outdoor) - Boron*	ERC 9b, ERC 9a
Consumer	
3: *Lubricants, greases, release products - anhydrous zinc borate*	PC 24
4: *Lubricants, greases, release products - zinc borate hydrate*	PC 24

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: *Widespread use of functional fluid (indoor/outdoor) - Zinc* (ERC 9b, ERC 9a)

Amount used, frequency and duration of use (or from service life)
Daily amount per site = tonnes/day
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.
Indoor or outdoor use

8.2.2. Control of environmental exposure: *Widespread use of functional fluid (indoor/outdoor) - Boron* (ERC 9b, ERC 9a)

Amount used, frequency and duration of use (or from service life)
Daily amount per site = tonnes/day
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.
Indoor or outdoor use

8.2.3. Control of consumer exposure: *Lubricants, greases, release products - anhydrous zinc borate* (PC 24)

[ECETOC TRA: *Liquids*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 5E3 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

8.2.4. Control of consumer exposure: *Lubricants, greases, release products - zinc borate hydrate* (PC 24)

[ECETOC TRA: *Liquids*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 5E3 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure: *Widespread use of functional fluid (indoor/outdoor) - Zinc* (ERC 9b)

Release route	**Release rate**	**Release estimation method**
Water	6.85E-5 kg/day	SPERC
Air	3.43E-4 kg/day	SPERC
Soil	6.85E-5 kg/day	SPERC

Protection target	**Exposure estimate**	**RCR**
Fresh water	2.77E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.39 mg/kg dw (EUSES 2.1.2)	0.258
Marine water	4.38E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.797 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	3.42E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.28E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

8.3.2. Environmental release and exposure: *Widespread use of functional fluid (indoor/outdoor) - Boron* (ERC 9b)

Release route	**Release rate**	**Release estimation method**
Water	6.85E-5 kg/day	SPERC
Air	3.43E-4 kg/day	SPERC
Soil	6.85E-5 kg/day	SPERC

Protection target	**Exposure estimate**	**RCR**
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	3.42E-5 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Agricultural soil	3.22E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.14E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.21E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

8.3.3. Consumer exposure: *Lubricants, greases, release products - anhydrous zinc borate* (PC 24)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Consumers 3.1)	0.016
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.016

8.3.4. Consumer exposure: *Lubricants, greases, release products - zinc borate hydrate* (PC 24)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
This exposure scenario for consumer users is addressed to formulators so that they can use the herein provided information in the design of consumer products. The conditions of use may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and the use of your products by consumers it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed “scaling”. Scaling instructions are given below.

Human health: The consumer exposure is estimated using TRA Consumers 3.1 as implemented in CHESAR v3.7. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases have been estimated on the basis of SPERC ESVOC SpERC 9.6d.v2.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether the consumers’ conditions are “equivalent” to the conditions defined in the exposure scenario. If the conditions of use differ slightly from those indicated in the respective exposure scenario

you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Consumers:**
  Percentage of substance in mixture/article, Amount of product used per application, Exposure time per event, Frequency of use over a day.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 8.3.

9. ES 9: Consumer use; Various products (PC 1, PC 9a)

9.1. Use descriptors

ES name: *Consumer use of formulated products containing zinc borate*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a)

Environment	
1: *Widespread use leading to inclusion into/onto article (indoor) - Zinc*	ERC 8c
2: *Widespread use leading to inclusion into/onto article (indoor) - Boron*	ERC 8c
3: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc*	ERC 8f
4: *Widespread use leading to inclusion into/onto article (outdoor) - Boron*	ERC 8f
Consumer	
5: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - anhydrous zinc borate*	PC 1
6: *Adhesives, Sealants - Sealants - anhydrous zinc borate*	PC 1
7: *Adhesives, Sealants - Glues, hobby use - anhydrous zinc borate*	PC 1
8: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - anhydrous zinc borate*	PC 9a
9: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - anhydrous zinc borate*	PC 9a
10: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - anhydrous zinc borate*	PC 9a
11: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - zinc borate hydrate*	PC 1
12: *Adhesives, Sealants - Sealants - zinc borate hydrate*	PC 1
13: *Adhesives, Sealants - Glues, hobby use - zinc borate hydrate*	PC 1
14: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - zinc borate hydrate*	PC 9a
15: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - zinc borate hydrate*	PC 9a
16: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - zinc borate hydrate*	PC 9a
Subsequent service life exposure scenario(s)	
ES 11: Service life (consumers); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)	

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

9.2.2. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

9.2.3. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

9.2.4. Control of environmental exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

9.2.5. Control of consumer exposure: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - anhydrous zinc borate* (PC 1)

[ECETOC TRA: *Glues DIY-use (carpet glue, tile glue, wood parquet glue)*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 1.5E4 g/event
Exposure duration = 6 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.6. Control of consumer exposure: *Adhesives, Sealants - Sealants - anhydrous zinc borate* (PC 1)

[ECETOC TRA: *Sealants*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 390 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day

Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

9.2.7. Control of consumer exposure: *Adhesives, Sealants - Glues, hobby use - anhydrous zinc borate* (PC 1)

[ECETOC TRA: *Glues, hobby use*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 9 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

9.2.8. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - anhydrous zinc borate* (PC 9a)

[ECETOC TRA: *Waterborne latex wall paint*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3.75E3 g/event
Exposure duration = 2.2 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.9. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - anhydrous zinc borate* (PC 9a)

[ECETOC TRA: *Solvent rich, high solid, water borne paint*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 1.3E3 g/event
Exposure duration = 2.2 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.10. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - anhydrous zinc borate* (PC 9a)

[ECETOC TRA: *Removers (paint-, glue-, wall paper-, sealant-remover)*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 2E3 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

9.2.11. Control of consumer exposure: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - zinc borate hydrate* (PC 1)

[ECETOC TRA: *Glues DIY-use (carpet glue, tile glue, wood parquet glue)*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 1.5E4 g/event
Exposure duration = 6 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.12. Control of consumer exposure: *Adhesives, Sealants - Sealants - zinc borate hydrate* (PC 1)

[ECETOC TRA: *Sealants*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 390 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

9.2.13. Control of consumer exposure: *Adhesives, Sealants - Glues, hobby use - zinc borate hydrate* (PC 1)

[ECETOC TRA: *Glues, hobby use*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 9 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

9.2.14. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - zinc borate hydrate* (PC 9a)

[ECETOC TRA: *Waterborne latex wall paint*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3.75E3 g/event
Exposure duration = 2.2 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.15. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - zinc borate hydrate* (PC 9a)

[ECETOC TRA: *Solvent rich, high solid, water borne paint*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 1.3E3 g/event
Exposure duration = 2.2 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

9.2.16. Control of consumer exposure: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - zinc borate hydrate* (PC 9a)

[ECETOC TRA: *Removers (paint-, glue-, wall paper-, sealant-remover)*]

Product (article) characteristics
Covers concentrations up to 0.29 %
Oral exposure is considered to be not relevant.
No spraying
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 2E3 g/event
Exposure duration = 4 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to hands.

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Zinc* (ERC 8c)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	Estimated release factor
Air	4.12E-3 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.02E-4 mg/L (EUSES 2.1.2)	0.015
Sediment (freshwater)	33.09 mg/kg dw (EUSES 2.1.2)	0.281
Marine water	4.62E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.068 mg/kg dw (EUSES 2.1.2)	0.09
Sewage Treatment Plant	6.87E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.29E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

9.3.2. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (indoor) - Boron* (ERC 8c)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	Estimated release factor
Air	4.12E-3 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.06E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.01E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	6.87E-4 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Agricultural soil	3.23E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.33E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.23E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

9.3.3. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Zinc* (ERC 8f)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.12E-3 kg/day	ERC
Soil	1.37E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.02E-4 mg/L (EUSES 2.1.2)	0.015
Sediment (freshwater)	33.09 mg/kg dw (EUSES 2.1.2)	0.281
Marine water	4.62E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.068 mg/kg dw (EUSES 2.1.2)	0.09
Sewage Treatment Plant	6.87E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.29E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

9.3.4. Environmental release and exposure: *Widespread use leading to inclusion into/onto article (outdoor) - Boron* (ERC 8f)

Release route	Release rate	Release estimation method
Water	1.37E-3 kg/day	ERC
Air	4.12E-3 kg/day	ERC
Soil	1.37E-4 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	3.06E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	3.01E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	6.87E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.23E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.33E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.23E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

9.3.5. Consumer exposure: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - anhydrous zinc borate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.6. Consumer exposure: *Adhesives, Sealants - Sealants - anhydrous zinc borate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.7. Consumer exposure: *Adhesives, Sealants - Glues, hobby use - anhydrous zinc borate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.8. Consumer exposure: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - anhydrous zinc borate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.9. Consumer exposure: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - anhydrous zinc borate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.10. Consumer exposure: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - anhydrous zinc borate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Consumers 3.1)	0.016
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.016

9.3.11. Consumer exposure: *Adhesives, Sealants - Glues DIY-use (carpet glue, tile glue, wood parquet,...) - zinc borate hydrate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.12. Consumer exposure: *Adhesives, Sealants - Sealants - zinc borate hydrate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.13. Consumer exposure: *Adhesives, Sealants - Glues, hobby use - zinc borate hydrate* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.017 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.14. Consumer exposure: *Coatings and paints, thinners, paint removers - Waterborne latex wall paint - zinc borate hydrate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.15. Consumer exposure: *Coatings and paints, thinners, paint removers - Solvent rich, high solid, water borne paint - zinc borate hydrate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.207 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.3.16. Consumer exposure: *Coatings and paints, thinners, paint removers - Removers (paint-, glue-, wall paper-, sealant-remover) - zinc borate hydrate* (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.414 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
This exposure scenario for consumer users is addressed to formulators so that they can use the herein provided information in the design of consumer products. The conditions of use may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and the use of your products by consumers it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed “scaling”. Scaling instructions are given below.

Human health: The consumer exposure is estimated using TRA Consumers 3.1 as implemented in CHESAR v3.7. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. The releases to the air and soil have been estimated on the default release factors for ERC 8c. The release factor for a release to water is adapted to 5% based on ECHA Guidance R.16 since the substance is not dissolved/dispersed in a surplus of water. For ERC 8f the default release factors as given by ECHA Guidance R.16 are applied.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether the consumers’ conditions are “equivalent” to the conditions defined in the exposure scenario. If the conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Consumers:**
  Percentage of substance in mixture/article, Amount of product used per application, Exposure time per event, Frequency of use over a day.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 9.3.

10. ES 10: Service life (professional worker); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)

10.1. Use descriptors

ES name: *Professional use of products containing zinc borate*
Article category: Machinery, mechanical appliances, electrical/electronic articles (AC 2), Stone, plaster, cement, glass and ceramic articles (AC 4), Metal articles (AC 7), Paper articles (AC 8), Wood articles (AC 11), Plastic articles (AC 13)

Environment	
1: *Widespread use of articles with low release (indoor/outdoor) - Zinc*	ERC 10a, ERC 11a
2: *Widespread use of articles with low release (indoor/outdoor) - Boron*	ERC 10a, ERC 11a
Worker	
3: *Low energy manipulation and handling of substances bound in/on materials or articles - anhydrous zinc borate*	PROC 21
4: *Low energy manipulation and handling of substances bound in/on materials or articles - zinc borate hydrate*	PROC 21
Exposure scenario of the uses leading to the inclusion of the substance into the article	
ES 2: Use at industrial sites; Various products (PC 1, PC 9a, PC 32); Other (SU 0)	
ES 6: Widespread use by professional workers; Coatings and Paints, Thinners, paint removers (PC 9a); Other (SU 0)	
ES 7: Widespread use by professional workers; Polymer Preparations and Compounds (PC 32); Other (SU 0)	

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: *Widespread use of articles with low release (indoor/outdoor) - Zinc* (ERC 10a, ERC 11a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

10.2.2. Control of environmental exposure: *Widespread use of articles with low release (indoor/outdoor) - Boron* (ERC 10a, ERC 11a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.

10.2.3. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials or articles - anhydrous zinc borate* (PROC 21)

Product (article) characteristics
Covers concentrations up to 10 %
Massive object
Covers concentrations ≤ 25 %.

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers use of > 4 h/day.
Technical and organisational conditions and measures
Assumes that there are no adjacent workplaces contributing to exposure of the substance.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Assumes occasional general cleaning operations at the workplace.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

10.2.4. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials or articles - zinc borate hydrate* (PROC 21)

Product (article) characteristics
Covers concentrations up to 10 %
Massive object
Covers concentrations ≤ 25 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Covers use of > 4 h/day.
Technical and organisational conditions and measures
Assumes that there are no adjacent workplaces contributing to exposure of the substance.
Please also refer to section 0. for technical and organisational conditions and measures to ensure that the risk is adequately controlled.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Assumes occasional general cleaning operations at the workplace.
Please also refer to section 0. for conditions and measures related to personal protection and hygiene to ensure that the risk is adequately controlled.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C
Indoor use

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: *Widespread use of articles with low release (indoor/outdoor) - Zinc* (ERC 10a)

Release route	Release rate	Release estimation method
Water	4.4E-5 kg/day	Estimated release factor
Air	2.2E-4 kg/day	ERC
Soil	0.014 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	2.77E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.34 mg/kg dw (EUSES 2.1.2)	0.258
Marine water	4.37E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.792 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	2.2E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.28E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

10.3.2. Environmental release and exposure: *Widespread use of articles with low release (indoor/outdoor) - Boron* (ERC 10a)

Release route	Release rate	Release estimation method
Water	4.4E-5 kg/day	Estimated release factor
Air	2.2E-4 kg/day	ERC
Soil	0.014 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	2.2E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.22E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.14E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.21E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

10.3.3. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials or articles - anhydrous zinc borate* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9E-3 mg/m³ (MEASE)	< 0.01
Inhalation, local, long term	9E-3 mg/m³ (MEASE)	0.013
Dermal, systemic, long term	1.698 mg/kg bw/day (TRA Workers 3.0)	0.048
Combined, systemic, long term		0.051

10.3.4. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials or articles - zinc borate hydrate* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9E-3 mg/m³ (MEASE)	< 0.01
Inhalation, local, long term	9E-3 mg/m³ (MEASE)	0.011
Dermal, systemic, long term	1.698 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
The conditions of use at downstream users' sites may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and your own practice it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed "scaling". Scaling instructions are given below.

Human health: The workers' dermal exposure is assessed using TRA Workers 3.0 as implemented in CHESAR v.3.7. To estimate the workers' inhalation exposure MEASE2 2.0 is used. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. Thereby specific information is used to estimate the release to the water compartment. The release to air and soil is estimated based on the default release factors for ERC 10a.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether your conditions are "equivalent" to the conditions defined in the exposure scenario. If your conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- Workers:
  TRA Workers 3.0: Duration of activity, Percentage of substance in mixture/article, Operating temperature, PPE.

  MEASE2 2.0: Duration of activity, Concentration of the substance in handled material, , General ventilation, Local exhaust ventilation, Level of automation, Cleaning activities, Dust suppression technique, Unintended low abrasion.

  Remark regarding RMMs: Effectiveness is the key information related to risk management measures. You can be sure that your risk management measures are covered if their effectiveness is equal to, or higher than, what is specified in the exposure scenario.

  Environment:
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 10.3.

11. ES 11: Service life (consumers); Various articles (AC 2, AC 4, AC 7, AC 8, AC 11, AC 13)

11.1. Use descriptors

ES name: *Consumer service life of products containing zinc borate*
Article category: Machinery, mechanical appliances, electrical/electronic articles (AC 2), Stone, plaster, cement, glass and ceramic articles (AC 4), Metal articles (AC 7), Paper articles (AC 8), Wood articles (AC 11), Plastic articles (AC 13)

Environment	
1: *Widespread use of articles with low release (indoor/outdoor) - Zinc*	ERC 10a, ERC 11a
2: *Widespread use of articles with low release (indoor/outdoor) - Boron*	ERC 10a, ERC 11a
Consumer	
3: *Machinery, mechanical appliances, electrical/electronic articles - anhydrous zinc borate*	AC 2
4: *Stone, plaster, cement, glass and ceramic articles - anhydrous zinc borate*	AC 4
5: *Metal articles - anhydrous zinc borate*	AC 7
6: *Paper articles - anhydrous zinc borate*	AC 8
7: *Wood articles; Walls and flooring - anhydrous zinc borate*	AC 11
8: *Plastic articles; Plastic, larger articles - anhydrous zinc borate*	AC 13
9: *Plastic articles; Plastic, small articles - anhydrous zinc borate*	AC 13
10: *Machinery, mechanical appliances, electrical/electronic articles - zinc borate hydrate*	AC 2
11: *Stone, plaster, cement, glass and ceramic articles - zinc borate hydrate*	AC 4
12: *Metal articles - zinc borate hydrate*	AC 7
13: *Paper articles - zinc borate hydrate*	AC 8
14: *Wood articles; Walls and flooring - zinc borate hydrate*	AC 11
15: *Plastic articles; Plastic, larger articles - zinc borate hydrate*	AC 13
16: *Plastic articles; Plastic, small articles - zinc borate hydrate*	AC 13
Exposure scenario of the uses leading to the inclusion of the substance into the article	
ES 2: Use at industrial sites; Various products (PC 1, PC 9a, PC 32); Other (SU 0)	
ES 6: Widespread use by professional workers; Coatings and Paints, Thinners, paint removers (PC 9a); Other (SU 0)	
ES 7: Widespread use by professional workers; Polymer Preparations and Compounds (PC 32); Other (SU 0)	
ES 9: Consumer use; Various products (PC 1, PC 9a)	

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: *Widespread use of articles with low release (indoor/outdoor) - Zinc* (ERC 10a, ERC 11a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

11.2.2. Control of environmental exposure: *Widespread use of articles with low release (indoor/outdoor) - Boron* (ERC 10a, ERC 11a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

11.2.3. Control of consumer exposure: *Machinery, mechanical appliances, electrical/electronic articles - anhydrous zinc borate* (AC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.4. Control of consumer exposure: *Stone, plaster, cement, glass and ceramic articles - anhydrous zinc borate* (AC 4)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.5. Control of consumer exposure: *Metal articles - anhydrous zinc borate* (AC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.6. Control of consumer exposure: *Paper articles - anhydrous zinc borate* (AC 8)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.7. Control of consumer exposure: *Wood articles; Walls and flooring - anhydrous zinc borate* (AC 11)

[ECETOC TRA: *Walls and flooring (also applicable to non-wood materials)*]

Product (article) characteristics
Covers concentrations up to 10 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.8. Control of consumer exposure: *Plastic articles; Plastic, larger articles - anhydrous zinc borate* (AC 13)

[ECETOC TRA: *Plastic, larger articles (plastic chair, PVC-flooring, lawn mower, PC)*]

Product (article) characteristics
Covers concentrations up to 10 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 8E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to upper part of the body.

11.2.9. Control of consumer exposure: *Plastic articles; Plastic, small articles - anhydrous zinc borate* (AC 13)

[ECETOC TRA: *Plastic, small articles (ball pen, mobile phone)*]

Product (article) characteristics
Covers concentrations up to 10 %

Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 75 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

11.2.10. Control of consumer exposure: Machinery, mechanical appliances, electrical/electronic articles - zinc borate hydrate (AC 2)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.11. Control of consumer exposure: Stone, plaster, cement, glass and ceramic articles - zinc borate hydrate (AC 4)

Product (article) characteristics
Covers concentrations up to 9.999 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.12. Control of consumer exposure: *Metal articles - zinc borate hydrate* (AC 7)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.13. Control of consumer exposure: *Paper articles - zinc borate hydrate* (AC 8)

Product (article) characteristics
Covers concentrations up to 10 %
Covers the use of solid, non or low-dusty materials.
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.14. Control of consumer exposure: Wood articles; Walls and flooring - zinc borate hydrate (AC 11)

[ECETOC TRA: *Walls and flooring (also applicable to non-wood materials)*]

Product (article) characteristics
Covers concentrations up to 10 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 3E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.

11.2.15. Control of consumer exposure: Plastic articles; Plastic, larger articles - zinc borate hydrate (AC 13)

[ECETOC TRA: *Plastic, larger articles (plastic chair, PVC-flooring, lawn mower, PC)*]

Product (article) characteristics
Covers concentrations up to 10 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 8E3 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to upper part of the body.

11.2.16. Control of consumer exposure: Plastic articles; Plastic, small articles - zinc borate hydrate (AC 13)

[ECETOC TRA: *Plastic, small articles (ball pen, mobile phone)*]

Product (article) characteristics
Covers concentrations up to 10 %

Amount used (or contained in articles), frequency and duration of use/exposure
For each use event, covers use amounts up to 75 g/event
Exposure duration = 8 h/event
Covers use up to 1 events per day
Other conditions affecting consumers exposure
Assumes that potential dermal contact is limited to fingertips.

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: *Widespread use of articles with low release (indoor/outdoor) - Zinc* (ERC 10a)

Release route	Release rate	Release estimation method
Water	5.5E-6 kg/day	Estimated release factor
Air	2.75E-5 kg/day	ERC
Soil	1.76E-3 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	2.76E-4 mg/L (EUSES 2.1.2)	0.013
Sediment (freshwater)	30.26 mg/kg dw (EUSES 2.1.2)	0.257
Marine water	4.36E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	4.784 mg/kg dw (EUSES 2.1.2)	0.085
Sewage Treatment Plant	2.75E-6 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.282 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	1.62E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	9.28E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

11.3.2. Environmental release and exposure: *Widespread use of articles with low release (indoor/outdoor) - Boron* (ERC 10a)

Release route	Release rate	Release estimation method
Water	5.5E-6 kg/day	Estimated release factor
Air	2.75E-5 kg/day	ERC
Soil	1.76E-3 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	2.99E-3 mg/L (EUSES 2.1.2)	< 0.01
Marine water	2.94E-4 mg/L (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	2.75E-6 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.22E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	4.14E-13 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.2E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

11.3.3. Consumer exposure: *Machinery, mechanical appliances, electrical/electronic articles - anhydrous zinc borate* (AC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.282
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.282

11.3.4. Consumer exposure: *Stone, plaster, cement, glass and ceramic articles - anhydrous zinc borate* (AC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.282
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.282

11.3.5. Consumer exposure: *Metal articles - anhydrous zinc borate* (AC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.282
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.282

11.3.6. Consumer exposure: *Paper articles - anhydrous zinc borate* (AC 8)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.282
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.282

11.3.7. Consumer exposure: *Wood articles; Walls and flooring - anhydrous zinc borate* (AC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.715 mg/kg bw/day (TRA Consumers 3.1)	0.028
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.028

11.3.8. Consumer exposure: *Plastic articles; Plastic, larger articles - anhydrous zinc borate* (AC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	14.58 mg/kg bw/day (TRA Consumers 3.1)	0.575
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.575

11.3.9. Consumer exposure: *Plastic articles; Plastic, small articles - anhydrous zinc borate* (AC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.059 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0.167 mg/kg bw/day (TRA Consumers 3.1)	0.329
Combined, systemic, long term		0.331

11.3.10. Consumer exposure: *Machinery, mechanical appliances, electrical/electronic articles - zinc borate hydrate* (AC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.052
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.052

11.3.11. Consumer exposure: *Stone, plaster, cement, glass and ceramic articles - zinc borate hydrate* (AC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.146 mg/kg bw/day (TRA Consumers 3.1)	0.052
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.052

11.3.12. Consumer exposure: *Metal articles - zinc borate hydrate* (AC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.052
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.052

11.3.13. Consumer exposure: *Paper articles - zinc borate hydrate* (AC 8)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	7.147 mg/kg bw/day (TRA Consumers 3.1)	0.052
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.052

11.3.14. Consumer exposure: Wood articles; *Walls and flooring - zinc borate hydrate* (AC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.715 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		< 0.01

11.3.15. Consumer exposure: *Plastic articles; Plastic, larger articles - zinc borate hydrate* (AC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	14.58 mg/kg bw/day (TRA Consumers 3.1)	0.106
Oral, systemic, long term	0 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Combined, systemic, long term		0.106

11.3.16. Consumer exposure: *Plastic articles; Plastic, small articles - zinc borate hydrate* (AC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Inhalation, local, long term	0 mg/m³ (TRA Consumers 3.1)	< 0.01
Dermal, systemic, long term	0.059 mg/kg bw/day (TRA Consumers 3.1)	< 0.01
Oral, systemic, long term	0.167 mg/kg bw/day (TRA Consumers 3.1)	0.242
Combined, systemic, long term		0.242

11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance:
This exposure scenario for consumer users is addressed to formulators so that they can use the herein provided information in the design of consumer products. The conditions of use may differ in some way from those described in the exposure scenario. In case of differences between the description of conditions of use in the exposure scenario and the use of your products by consumers it does not mean that the use is not covered. The risk may still be adequately controlled. The way in which you determine if your conditions are equivalent or lower is termed “scaling”. Scaling instructions are given below.

Human health: The consumer exposure is estimated using TRA Consumers 3.1 as implemented in CHESAR v3.7. Thereby it was differentiated between anhydrous zinc borate and zinc borate hydrate.

Environment: Emissions to the environment are estimated using EUSES v.2.1.2 as implemented in CHESAR v3.7. For environmental modelling it is assumed as worst case that zinc borate completely dissolves in water into Zn and B ions which drive the toxicity. Although anhydrous zinc borate contains 35.19% of Zn and 17.45% of B (in case of hydrated forms those concentrations will be lower) the emissions to the environment are estimated assuming the equal amount of Zn and B. Thereby specific information is used to estimate the release to the water compartment. The release to air and soil is estimated based on the default release factors for ERC 10a.

Scaling tool:
Please use the above indicated publicly available modelling tools for scaling.

Scaling instructions:
Scaling can be used to check whether the consumers' conditions are "equivalent" to the conditions defined in the exposure scenario. If the conditions of use differ slightly from those indicated in the respective exposure scenario you might be able to demonstrate that, under your conditions of use, the exposure levels are equivalent or lower than under the described conditions. It may be possible to demonstrate this by compensating a variation in one particular condition with a variation in other conditions.

Scalable parameters:
In the following, the key determinants which are likely to vary in the actual use situation are given to be used for scaling.

- **Consumers:**
  Percentage of substance in mixture/article, Amount of product used per application, Exposure time per event, Frequency of use over a day.

- **Environment:**
  Release factors.

Further details on scaling are provided in ECHA's Guidance for downstream users v2.1 (October 2014) as well as in ECHA's Practical Guide 13 (June 2012).

Boundaries of scaling:
RCRs not to be exceeded are described in Section 11.3.