

Borates in powdered hand soap

1. Introduction

Abrasive hand cleaners have been in use since pre-historic man first cleaned his hands with sand and sea water. Powdered hand soaps have undergone much refinement since that time and today they enjoy a considerable share of the industrial hand cleaning market. Typically, a powdered cleaning preparation consists of a high-grade soap together with an abrasive material generally referred to as a “scrubber.” Refined versions also contain builders to improve detergency, fatty materials to impart softness, and perfumes and dyes for aesthetic reasons.

The prime purpose of a powdered hand soap is to remove medium to heavy soils such as are encountered in industrial operations. For this reason, the “scrubber” is perhaps the most important component in the formulation. The basic requirements for an effective scrubber are:

- Should quickly and efficiently remove industrial soil
- Should contribute to detergency
- Should not be unpleasant to use
- Should not abrade skin
- Should not be a skin sensitizer
- Should not be susceptible to degradation
- Should not clog plumbing

2. Comparison of borax and other scrubbers

Many scrubbers are available for use in powdered hand soaps and they can be broadly classified into two categories: Soluble and insoluble. The soluble scrubber is generally a granular material which, before it dissolves, scrubs and lessens the soil. The most widely used and most efficient soluble scrubber is borax decahydrate.

Insoluble scrubbers contain either vegetable or mineral materials such as, ground cornmeal, corncob flour, wood flour, rice hulls, peanut hulls, pumice, silica, or finely ground sand. The last three mentioned scrubbers are minerals which may abrade the skin and eventually clog plumbing. The former group are vegetable in nature and susceptible to degradation and may also cause plumbing difficulties. Borax—an inorganic soluble scrubber—possesses none of these difficulties.

3. Advantages of borax decahydrate

The advantages of borax decahydrate used in powdered hand soaps are summarized as follows:

- Borax decahydrate is available in a range of particle sizes which enables the formulator to tailor the abrasive quality of the formulation to meet the demands of the market
- Borax decahydrate improves detergency by offering pH control and contributes to the cleaning process such as enhanced removal of pigment and oily soils
- Borax decahydrate aids water softening by binding with calcium ions to form soluble complexes
- Borax decahydrate provides quick cleaning and free rinsing because it is soluble
- Borax decahydrate is gentle to the skin yet highly effective in removing embedded dirt
- Borax decahydrate is not a skin sensitizer.
- Borax decahydrate is not susceptible to degradation allowing longer shelf life.
- Borax decahydrate is soluble, therefore, no clogged drains.

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4. Specifications

Many state and federal specifications have been developed for powdered hand soaps. The most widely know specification is Federal Specification #P-S-625E and its subsequent revisions and amendments. Each of these specifications impose rather strict particle size requirements on the Borax employed.

In May 1982, the General Service Administration authorized the use of the commercial item description for Borax soap (A-A-1543A) in preference to Federal Specification P-S-625 (A-A-1543A, 5/14/92). The description covers a powdered hand cleaner product, consisting of soap and Borax for use in washroom dispensers to remove heavy occupational oils such as oils and greases. The powdered hand cleaner, Class 1 (plain) and Class 2 (with lanolin) shall conform to ASTM D 3046 specification.

5. Chemical composition and finesses requirement

The hand cleaner finished product has to comply with the following requirements:

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	Type A (Plain Borax Soap)	Type B (Borax Soap with Lanolin)
Borax Decahydrate	72 - 77%	57 - 75%
Anhydrous Soda Soap	23 - 27%	23 - 39%
Anhydrous Lanolin	none	0 - 1%
Borax Decahydrate 40/200 Mesh		
+ 12 Mesh	nil	nil
+ 40 Mesh	0 - 0.1%	0 - 0.1%
+ 200 Mesh	≥75.0 %	≥75.0 %



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About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 500 customers with more than 1,700 delivery locations globally. We supply 30% of the world's need for refined borates from our world-class mine in Boron, California, about 100 miles northeast of Los Angeles. We pioneer the elements of modern living, including:

- **Minerals that make a difference:** Consistent product quality secured by ISO 9001:2015 registration of its integrated quality management systems
- **People who make a difference:** Experts in borate chemistry, technical support, and customer service
- **Solutions that make a difference:** Strategic inventory placement and long-term contracts with shippers to ensure supply reliability

About 20 Mule Team® products

20 Mule Team borates are produced from naturally occurring minerals and have an excellent reputation for safety when used as directed. Borates are essential nutrients for plants and key ingredients in fiberglass, glass, ceramics, detergents, fertilizers, wood preservatives, flame retardants, and personal care products.



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