P-S-577C
November 29, 1974
SUPERSEDING
Int. Fed. Spec. P-S-00577B(GSA-FSS)
December 14, 1970, and
Fed. Spec. P-S-577A
October 20, 1964

FEDERAL SPECIFICATION

SOAP, GRIT (PASTE WITH MINERAL SCRUBBER, AND POWDER WITH VEGETABLE SCRUBBER)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a paste soap with mineral scrubber, and a powdered soap with vegetable scrubber and lanolin (see 6.1).

1.2 Classification. The grit soap shall be of the following types, as specified (see 6.2 and 6.3).

Type I - Paste soap with mineral scrubber.

Type III - Powdered soap with vegetable scrubber and lanolin.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

FF-D-396 - Dispensers, Soap.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-C-96 - Cans, Metal, 28 Gage and lighter.
PPP-P-45 - Packaging of Bulk Quantities of Soaps, Detergents and Related Products (Chip, Powdered or Granular Form) For Domestic And Overseas Shipment.

Federal Standards.

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).
Fed. Test Method Std. No. 536 - Soap and Soap-Products (Including Synthetic Detergents), Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standards.

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

D 460 - Sampling and Chemical Analysis of Soaps and Soap Products.
E 70 - pH of Aqueous Solutions With the Glass Electrode.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

U.S. Pharmacopeial Convention, Inc..

Pharmacopeia of the United States (USP).

(Application for copies should be addressed to the Mack Publishing Company, Easton, PA 18042.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Tarriff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

3. REQUIREMENTS

3.1 Composition. Grit soaps furnished under this specification shall be a product manufactured commercially by the supplier except as herein modified.

3.1.1 Type I. Type I soap shall be a uniform blend of soap and mineral abrasive or scrubber in paste form, having the physical and chemical characteristics shown in table I.

3.1.2 Type III. The type III soap shall be a uniform blend of soap, vegetable scrubber, and lanolin in powder form. The product shall be free-flowing, non-stratifying and non-caking, and shall have the physical and chemical characteristics shown in table I. No mineral abrasives shall be used in the formulation.

TABLE I. Physical and chemical requirements

Characteristic	Requirement (Percent by weight)			
	Type I		Type III	
	Min.	Max.	Min.	Max.
Matter volatile at 105° ± 2° C	-	55.0	-	12 0
Alkaline salts (calculated as sodium carbonate)	-	3.0	-	7.7

TABLE I. Physical and chemical requirements (cont.)

Characteristic	Requirement (Percent by weight)			
	Type I		Type III	
	Min.	Max.	Min.	Max.
Free alkali (calculated as sodium hydroxide)	-	0.1	-	0.1
Free acid (calculated at oleic acid)	-	0.5	-	1.0*
Anhydrous soda soap	8.0	-	24.5	-
Lanolin (USP anhydrous)	-	-	3.0	-
Matter insoluble in water	25.0	50.0	45.0	55.0
Fineness ** - percent retained on:				
No. 20 sieve	-	-	-	10.0***
No. 40 sieve	-	1.0	-	-
No. 60 sieve	10.0	20.0	-	-
No. 80 sieve	30.0	45.0	-	-
No. 100 sieve	35.0	55.0	80.0	-
No. 200 sieve	60.0	-	-	-
Rosin	-	None	-	None
Sugar	-	None	-	None

* If unprocessed corn meal is used, the free acid content shall be not greater than 2.5 percent.
** For type I grit soap, the fineness requirements are for the water insoluble matter. For type III grit soap, the fineness requirements are for the finished product.
*** Particles shall be soft and friable, not solid or hard.

3.2 Materials.

3.2.1 Soap. The soap shall be a thoroughly saponified soda soap.

3.2.2 Mineral scrubber. The mineral scrubber shall be lava, pumice, sand, or quartz conforming to the fineness requirements of table I.

3.2.3 Vegetable scrubber. The vegetable scrubber shall be degerminated or non-degerminated corn meal or combinations of corn meal, corn cob meal, and rice hulls. If non-degerminated corn meal is used, an organic oxidation inhibitor in an amount of not less than 0.01 percent by weight shall be uniformly dispersed in the scrubber. Diphenylamine, orthodiphenyl biguanidine, para-tertiary amyl phenol and para-tertiary butyl phenol are acceptable inhibitors.

3.2.4 Lanolin. Lanolin shall be a USP grade lanolin.

3.3 Odor. The grit soaps shall be mildly perfumed. After washing the hands with the grit soap and rinsing with water, there shall be no objectionable residual odor on the skin.

3.4 Suds volume. The grit soaps shall produce not less than 100 milliliters of foam when tested as specified in 4.3.3.

3.5 pH and buffer capacity (type III only). A one percent solution of the grit soap by weight in distilled water shall have a pH between 9.0 and 10.5 at 25° C. Addition of 2 ml of 0.1N hydrochloric acid to 100 ml of the one percent solution shall not reduce the pH below 9.0.

3.6 Free flowing characteristics (type III only). When tested as specified in 4.3.1, the type III grit soap shall flow freely from the dispenser.

3.7 Shelf life.

3.7.1 Type I. The type I grit soap, packaged as specified in 5.1.1, shall not separate into components, become rancid or deteriorate in cleaning efficiency when stored for a period of one year under general warehouse conditions.

3.7.2 Type III. The type III grit soap, packaged as specified in 5.1.1, shall not turn rancid, become infested with insects or deteriorate in cleaning efficiency when stored for a period of six months under general warehouse conditions.

3.8 Workmanship. The finished product shall be clean and thoroughly and uniformly mixed.

3.9 Net weight. The net weight of the contents of the unit containers shall not be less than the weight specified (see 5.1 and 6.2).

3.10 Certificate of compliance. The manufacturer shall certify that his product meets the requirements of 3.2.3 (for organic oxidation inhibitor when required) and 3.7 (see 4.2.1.1).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Certificates of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Quality conformance inspection.

4.2.1 Inspection of the end item. In accordance with 4.1 above, components and materials shall be inspected and tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase documents.

4.2.1.1 Review of certificate of compliance. A certificate of compliance (see 3.10) supplied by the manufacturer shall be reviewed to determine if the lot complies with the requirements of 3.2.3 (type III only) and 3.7.

4.2.1.2 Examination of preparation for delivery. Packaging, packing, and marking shall be examined to determine if they comply with the requirements of section 5. Defects shall be scored as in table II. The sample unit shall be one shipping container fully prepared for delivery. The lot size shall be the number of shipping containers in the lot (see 6.4 and 6.5). Sampling and inspection shall be in accordance with MIL-STD-105, inspection level S-2, acceptable quality level (AQL) 4.0 defects per hundred units.

TABLE II. Examination of preparation for delivery

Examine	Defect
Containers	Not as specified.
Contents	Not as specified.
Markings	Omitted, incorrect, illegible, improper size, location, sequence or method of applications.
Materials	Component missing or damaged. Bulging or distortion of containers.
Workmanship	Cushioning inadequate, improper or missing.

4.2.1.2.1 Examination for closure, waterproofing, and banding of containers. When shipping containers are required to comply with PPP-B-636, examination for defects in closure, waterproofing, and banding, shall be in accordance with the appendix of that specification.

4.2.1.3 Examination of the end item. The end item shall be examined for defects listed in table III. The sample unit shall be one unit package (see 5.1). The lot size shall be the number of unit packages in the lot (see 6.4 and 6.5). Sampling and inspection shall be in accordance with MIL-STD-105, inspection level II, AQL 2.5 defects per hundred units.

TABLE III. Examination of the end item

Examine	Defect
Type I - Paste soap	Color not uniform. Not homogeneous paste. Not mildly perfumed. Evidence of component separation or deterioration.
Type III - Powdered soap	Not a free-flowing powder. Not uniform. Lumpy or caked. Not mildly perfumed. Evidence of germination. Insect infestation. Moldy or rancid
Content	Each sample unit shall be weighed to determine net content. Any package in the sample size having less than the amount specified on the label shall be scored as a defect.

4.2.1.4 Testing of the end item. The end item shall be tested for the characteristics listed in table IV. The sample unit for testing shall be one pound of soap for type I and two pounds of soap for type III. The lot size shall be the number of sample units in the lot (see 6.4 and 6.5). Sampling shall be in accordance with MIL-STD-105, inspection level S-1. The sample units shall be thoroughly mixed to form a composite sample. Failure of the composite sample to pass any of the tests specified in table IV shall be cause for rejection of the lot. A four ounce sample of each component used in the type III soap shall be furnished with the composite sample.

TABLE IV. Instructions for testing the end item

Characteristic	Specification reference Requirement	Test Method	Results reported
Matter volatile at 105° ± 2° C	3.3	D 460 #11 *	Average of two determinations
Alkaline salts (calculated as sodium carbonate)	3.3	D 460 #20 *	"
Free alkali (calculated as sodium hydroxide)	3.3	D 460 #18 *	"
Free acid (calculated as oleic acid)	3.3	D 460 #18 *	"
Anhydrous soda soap	3.3	D 460 #21, 22 *	
Matter insoluble in water	3.3	4.3.5	"
Rosin	3.3	D 460 #37-40 *	"
Sugar	3.3	4.3.7	"
Fineness	3.3	4.3.6	"
Lanolin	3.3	4.3.2	"
Suds volume	3.5	4.3.3	"
pH and buffer capacity	3.6	4.3.4	"
Free flowing characteristics	3.3.2	4.3.1	pass/fail

* ASTM test method

4.3 Test methods.

4.3.1 Free flowing characteristics, (type III). A powdered-soap dispenser conforming to type III, class B of FF-D-396 shall be filled with the soap powder and portions withdrawn until the dispenser is empty. The portions shall be examined to determine whether the powder is free-flowing and noncaking and that it is uniform in texture. The dispenser shall be examined for caked residues

4.3.2 Percent lanolin. The percent lanolin is determined colorimetrically based on the cholesterol present in lanolin Cholesterol in chloroform solution in the

presence of acetic anhydride and concentrated sulfuric acid produces a color which varies in intensity with the cholesterol concentration. Total cholesterol in the sample is determined, corrected for the cholesterol present in the soap and abrasive and the percent lanolin in the sample calculated.

4.3.2.1 Apparatus. A Klett-Summerson photoelectric colorimeter may be used with a K.S. No. 66 glass filter (having an approximate spectral range of 640 to 700 millimicrons) and a 12.5-mm standard colorimeter test tube cell. The instrument shall be adjusted to zero using all reagents except samples as a blank. Any other instrument capable of the necessary colorimetric measurements may be used.

4.3.2.2 Standard lanolin calibration curve

4.3.2.2.1 Lanolin sample. The sample of USP lanolin submitted with the composite sample in accordance with 4.2.2.3 shall be used to prepare the standard lanolin solution. Should the sample not be available, a good grade of anhydrous USP lanolin may be substituted for the sample.

4.3.2.2.2 Preparation of the standard lanolin solution. Weigh accurately 0.200 gram of anhydrous USP lanolin into a 50-ml beaker Dissolve the lanolin in chloroform and transfer to a 200-ml volumetric flask. Rinse the beaker with several portions of chloroform, add the rinsings to the volumetric flask, and then make up to the mark with chloroform. Each milliliter of the standard solution contains 1.0 milligram of lanolin.

4.3.2.2.3 Calibration curve. Pipet exactly 3, 6, 9, 12, and 15 ml quantities of the standard lanolin solution prepared as specified in 4.3.2.2.2 into separate 50 ml glass stoppered graduated cylinders. Add chloroform to each cylinder to yield 25 ml of solution in each and develop the color as specified in 4.3 2.3.2. Prepare a standard curve by plotting colorimeter readings versus the milligrams of lanolin in the graduate cylinder.

4.3.2.3 Sample analysis

4.3.2.3.1 Accurately weigh 10 grams of the well mixed soap into a Soxhlet extraction thimble and extract with petroleum ether in a Soxhlet apparatus for 3 hours Evaporate the petroleum ether solution to dryness on a steam bath. Dissolve the residue in chloroform and transfer quantitatively to a 250-ml volumetric flask. Make up to the mark with chloroform.

4.3.2.3.2 Color development. Pipet 10 ml of the chloroform solution into a 50-ml glass-stoppered graduated cylinder. Add chloroform to the 25-ml mark and cool the cylinder in an ice bath for 5 minutes Pipet 10 ml of acetic anhydride into the cylinder and then add concentrated sulfuric acid dropwise from a 1-ml graduated pipet at a rate of 2 drops per minute for 7 minutes and 3 drops per minute for the next 3 minutes, stoppering the cylinder after each acid addition and mixing thoroughly by inverting the cylinder several times. Keep the cylinder in the ice bath between additions of acid. Remove the cylinder from the bath and store in a dark place for exactly 20 minutes and then determine the color intensity in the colorimeter.

4.3.2.3.3 Repeat the entire procedure on accurately weighed separate 10 gram samples of the vegetable abrasive and the soap component. All determinations on the finished product, the abrasive and the soap, shall be made in duplicate.

4.3.2.4 Calculation.

4.3.2.4.1 For every sample of the finished product, abrasive and soap, calculate the "equivalent percent lanolin" as follows.

"Equivalent percent lanolin" = 2.5(A/B)

where:

A = the milligrams of lanolin from the standard curve equivalent to the measured color intensity of the sample.

B = the weight in grams of the samples.

4.3.2.4.2 Percent lanolin. Calculate the percent lanolin in the finished product as follows

Percent lanolin = C - DxE/100 - FxG/100

where.

C = the average "equivalent percent lanolin" (see 4.3.2.4.1) in the finished product.

D = the average "equivalent percent lanolin" in the soap.

E = the percent soap in the finished product (determined as specified in table IV)

F = the average "equivalent percent lanolin" in the abrasive

G = the percent abrasive in the finished product (determined as "matter insoluble in water" as specified in table IV).

4.3.3 Suds volume. Dissolve 2.5 + 0.02 grams of the sample in 250 ml of distilled water at 20° + 2°C. Place 50 ml of the solution in a 250 ml cylinder. Stopper the cylinder and shake by inversion, rotating the cylinder about its mid-point without translational motion for one minute at such a rate that 60 inversions are completed, that is, moving the graduated cylinder top to bottom and bottom to top 60 times each minute. Place the cylinder in an upright position on a table, remove the stopper, wait 5 seconds, and read the net volume of foam (total volume minus volume of liquid).

4.3.4 pH and buffer capacity. Dissolve 1 gram of the sample in 100 ml of distilled water. Agitate the solution and determine its pH using a glass electrode that has been previously standardized with a buffer of pH 10.0. Add 2 ml of 0.1 N Hydrochloric acid to the 100 ml of solution, stir and again determine the pH.

4.3.5 atter insoluble in water Determine the percent by weight of matter insoluble in water by ASTM Method D 460, Section 19 as modified. In the analysis of samples containing organic scrubbers or bentonite, or both, for matter insoluble in water, modify the procedure outlined in Section 19 of ASTM Method D 460 as specified in 4.3.5.1 thru 4.3.1.4.

4.3.5.1 After determining the percent matter insoluble in alcohol (% MIA), place the dried crucible containing the matter insoluble in alcohol on a porcelain-covered triangle on a tripod in a hood and then heat slowly with a small flame from a Meker burner. Continue the charring until the matter insoluble in alcohol is well carbonized and has a dark gray or black appearance. Do no ignite to a dull red. If bentonite is present, considerably more carbonization must take place to destroy gelling tendency. Continue heating until the charred material has a decided gray cast. Place the crucible in a desiccator until cool. Weigh and record as "Weight of Crucible + Charred Matter Insoluble in Alcohol" or "Weight of Crucible + Charred MIA."

4.3.5.2 Place the crucible containing the charred matter insoluble in alcohol in the holder on a suction-filter flask. Add successive, small portions of hot, distilled water until all the water-soluble matter has been leached out or extracted. Add a drop or two of phenolphthalein indicator solution from time to time to the contents in the crucible to ensure that the crucible is free from water-soluble alkaline salts. Continue the extraction with hot water until the filtrate no longer shows evidence of a pink color, but do not use over 200 ml of water. Dry the crucible containing the water-insoluble residue in an air oven for 1 hour at 100 to 105° C. Cool to room temperature in a desiccator and weigh. Continue the drying, cooling, and weighing until constant weight is obtained to + 0.010 g. Record as "Weight of Crucible + Charred Matter Insoluble in Water" or "Weight of Crucible + Charred MIW.

4.3.5.3 Calculate the matter soluble in water (MSW) as follows:

$$\% \text{ MSW} = [(A-W)/S] \times 100$$

where.

A = mass of crucible + charred MIA.
W = mass of crucible + charred MIW.
S = mass of sample.

4.3.5.4 Calculate the matter insoluble in water (MIW) as follows:

$$\% \text{ MIW} = \% \text{ MIA} - \% \text{ MSW}$$

4.3.6 Fineness. Type I grit soap shall be tested in accordance with Fed. Test Method Std. No. 536, Method 2101, Section 3. Type III grit soaps shall be tested in accordance with Fed. Test Method Std. No. 536, Method 2101, Section 2.

4.3.7 Qualitative test for sugar. Make qualitative test for sugar in accordance with Fed. Test Method Std. No. 536, Method 1701. For type III grit soaps, filter the vegetable scrubber from a mixture of the grit soap in water before proceding with paragraph 2.1 in Method 1701.

5. PREPARATION FOR DELIVERY

5.1 Packaging Packaging shall be level A, B, or C, as specified (see 6.2).

5.1.1 Levels A and B. Type I grit soap in 1 or 3 pound quantities and type III grit soap in 2 or 100 pound quantities, as specified (see 6 2), shall be packaged in unit containers as specified in table V.

TABLE V. Packaging and packing requirements

Type and Quantity	Unit packaging requirement paragraph	Number of unit packages per shipping container
Type I:		
Quantity - 1 pound	5.1.1.1	24
3 pounds	5.1.1.1	12
Type III		
Quantity - 2 pounds	5.1 1.2	18
100 pounds	5.1.1.3	No packing required

5.1.1.1 Type I grit soap shall be packaged in cans conforming to PPP-C-96; type V, class 2, or type VI. The cans shall be closed in accordance with that specification.

5.1.1.2 The 2 pound size of type III grit soap shall be packaged in a paperboard carton or a composite can.

5.1.1.2.1 Paperboard carton. The carton shall be fabricated from paperboard-wax, paperboard-plastic, paperboard-aluminum foil laminate. The carton shall have an approximately one-half inch high pouring spout located on one of the small side panels with the hinge of the spout placed approximately one inch from the top of the carton. The spout shall be secured in place by any suitable means that will pervent accidental opening.

5.1.1.2.2 Composite can. The composite can shall consist of a spirally wound paper-board body coated, lined or laminated with wax or plastic or wrapped with aluminum foil fitted with metal or plastic ends. One can end shall be provided with a reclosable dispenser feature which is of such size and shape to allow the soap powder to be dispensed from the container.

5.1.1.3 The 100 pound size of type III grit soap shall be packaged in a fiber drum conforming to PPP-P-45.

5.1.2 Level C. Soap shall be packaged to afford adequate protection against damage during shipment from the supply source to the first receiving activity.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.2.1 Level A. One pound, two pound, and three pound sizes of grit soap, packaged as specified in 5.1, in quantities specified in table V, shall be packed in a box conforming to PPP-B-636, class weather resistant. A fiberboard pad shall be provided between layers. The box shall be closed, waterproofed and banded in accordance with the appendix to that specification. Drums do not require packing.

5 2 2 Level B. One pound, two pound, and three pound sizes of grit soap, packaged as specified in 5.1, in quantities specified in table V, shall be packed in a box conforming to PPP-B-636, class domestic. The box shall be closed in accordance with the appendix to that specification Drums do not require packing.

5.2.3 Level C. Grit soap in quantities as specified (see 6.2) packaged as specified in 5.1 shall be packed in containers to assure carrier acceptance and safe arrival at destination. Containers shall comply with Uniform Freight Classification or National Motor Freight Classification, as applicable.

5.3 Marking. In addition to any special markings required by the contract or order, marking of the unit containers and shipping containers shall be in accordance with Fed. Std. No. 123 for civil agencies or MIL-STD-129 for military agencies, as applicable (see 6.2).

6. NOTES

6.1 Intended use Soaps covered by this specification are intended for washroom use as a hand soap, to remove oils, greases and industrial soils.

6 2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Type required (see 1.2)
(c) Applicable level of packaging and packing (see 5.1 and 5.2).
(d) Quantity required (see 5.1 and 5.2).
(e) Marking document required (see 5.3).

6.3 Classification change Type II has been canceled.

6.4 Inspection lot. An inspection lot shall consist of all grit soap of one type which has been manufactured in the same batch, packaged in unit containers from the same conta ner lot and offered for delivery at the same time.

6.5 Batch. A batch is defined as that quantity of material manufactured under the same processing conditions using the same raw material lots

6.6 Suggestions for improvement Suggestions for improvement of this specification should be addressed to General Services Administration, Federal Supply Service, FMBC, Washington, DC 20406.

6.7 The Department of Defense has waived coordination of this document until further notice.

MILITARY INTERESTS:

User Activities.

Army - GL
Marine Corps - MC

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS
GSA - PBS

PREPARING ACTIVITY GSA - FSS

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents See Section 2 of this specification to obtain extra copies and other documents referenced herein. Price 35 cents each.