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[METRIC]
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July 6, 1998
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A-A-2702A
January 25, 1996

COMMERCIAL ITEM DESCRIPTION
Sealing Compound (Liquid Protectant and "Beautifier")

The General Services Administration has authorized the use of this Commercial Item Description by all Federal Agencies

1. SCOPE. This description covers a one part, siloxane emulsion for temporary color restoration, "new look", "beautifying" and water repellence to plastic or painted surfaces.

2. APPLICABLE DOCUMENTS: (or latest revision)

ASTM D 3278-82 (Vol. 06.03), "Setaflash closed tester (for paints, enamels, varnishes, test"
ASTM E 70-77 (1986), (Vol. 15.05) "Test Method for pH of Aqueous Solutions with the Glass Electrode"
ASTM D 4339-84 (Vol. 15.06), "Test Method for the Determination of the Odor of Adhesives"
ASTM D 1791-82 (Vol. 15.04)(+GSA Exceptions) "Test Method for Accelerated Aging of liquid water Emulsion Floor Waxes"

3. SALIENT CHARACTERISTICS

The Contractor shall supply liquid protectant material in accordance with the characteristics and regulatory requirements. The Contractor shall provide test results for each of the following requirements on a "pass" or "fail" basis. The Government reserves the right to verify any or all of the following performance requirements.

3.1 Nonflammable. Material shall have no flash up to 71°C (160 °F) when tested in accordance with para. 4.1.

3.2 pH range: Material formulations shall have a pH within the range of 6.5 to 8.5 when tested in accordance with para. 4.2.

3.3 Chemical Composition: Test in accordance with para. 4.3.

(1) Dimethylpolysiloxane content: A minimum of 20.0% (liquid wt. basis).

(2) Animal, vegetable and paraffinic petroleum oil or wax additions are not allowed. The infrared spectrum shall match the attached GSA standard spectrogram and shall not exhibit broad band hydroxyl (-OH) stretching between 2.7 to 3.1 microns, nor broad hydrogen bonding between 3.0 to 3.7 microns. Carbon hydrogen deformations shall be sharp, narrow absorbance bands between 3.25 and 3.60 microns infrared wavelength, see attached standard spectrum of dimethylpolysiloxane.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data which may improve this document should be sent to: General Services Administration, GSA Center (10FTE), 400 15th St. SW, Auburn, WA 98001-6599

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3.4 *Total Nonvolatile: A maximum of 23.5% (based on original product weight.) when tested in accordance with para. 4.4.

3.5 *Homogenous: No visible residue when tested in accordance with para. 4.5.

3.6 Water-based: Shall be a stable water-based emulsion/dispersion when tested in accordance with para. 4.6.

3.7 Colorless: No discernible color other than a milky white, in liquid form, when tested in accordance with para. 4.7.

3.8 Odor: A slight non-persistent floral/fruity scent shall be present in the liquid product and shall be odorless as the dry film 8 hours after application when tested in accordance with para. 4.8.

3.9 Storage stability: No visible separation, agglomeration or sedimentation when tested in accordance with para. 4.9.

3.10 Color restoration: The color of any severely oxidized (milky or mottled white appearance), outdoor exposed, paint or fiberglass gel coat shall at least equal the color intensity of an adjacent area, water-wetted, at the moment of test evaluation, when tested in accordance with para. 4.10.

3.11 Ultraviolet protection: When tested as specified in para. 4.11, the product shall permit no more than 25% transmission of UV radiation intensity within the range of 290 to 315 mμ wavelength.

3.12 Water resistance. Water shall remain "beaded" for 30 minutes when tested in accordance with para. 4.12.

3.13 Sprayable. The product shall be sprayable when tested in accordance with para. 4.13.

4. TEST METHODS.

Note: The contractor may use his normal quality assurance procedures for manufacture of this product; however, should a disagreement arise between the Government and its customer or between the Government and the manufacturer concerning compliance to the salient characteristics of this commercial item description, the test methods and tests stated in this commercial item description will be used to determine compliance of the product.

4.1 Nonflammable: Test in accordance with ASTM D-3278-82, Volume 06.03 (or later revision).

4.2 pH range: Measure the product directly in accordance with ASTM E 70-77 (1986), (Vol. 15.05).

4.3 Dimethylpolysiloxane content:

4.3.1 Oven-dry a Petri dish at 105° C for 2 hours; cool in dessicator. Determine and record the weight (W1) of the Petri dish to the nearest .001 gram.

4.3.2 Into a 30 ml tall form vial, fitted with a threaded cap (with a polyethylene liner), add 8 mls of analytical grade methanol and 2.0 mls of distilled water. Shake to mix. Into this solution, weigh approximately 3.0 grams (W2) of liquid protectant to the nearest 0.001 gram, record this weight. Shake gently for 1-2 minutes.

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4.3.3 To the vial, add 8 mls of analytical grade hexane, seal the vial liquid-tight. Gently, shake the mixture for several minutes to extract the dimethylpolysiloxane into the hexane phase. Set the vial aside for a few minutes to allow phase separation. If a troublesome "cuff" layer prevents a clear phase separation between the hexane and methanol/water layer, the following procedures may be tried.

(1) Centrifuge the mixture for 5-10 minutes to encourage a clear interface phase break.

or

(2) The amount of distilled water may be increased or decreased to encourage a definite liquid phase separation.

or

(3) Warm the (open vial) extraction mixture in a water bath to 40°C (104° F) before extraction.

SAFETY PRECAUTION: **USE CARE TO VENT THE VIAL SLIGHTLY DURING THIS PROCEDURE TO PREVENT PRESSURE BUILD-UP AND BURSTING OF THE GLASS VIAL.**

4.3.4 With a pipette, draw off the hexane layer and transfer to the weighed Petri dish. Add another 8 mls of analytical grade hexane to the vial, reseal, and extract the alcohol/water layer again. Draw off the hexane layer and transfer to the weighed Petri dish.

4.3.5 Evaporate the hexane at room temperature in a forced draft hood to accelerate evaporation. When all hexane has evaporated (overnight), place the Petri dish in a 105 ° C (+/- 2° C) forced-air oven for 5 minutes. Cool the Petri dish in a desiccator before reweighing (W3) to the nearest 0.001 gram. Save the material in the Petri dish.

4.3.6 **Calculation** of the percent dimethylpolysiloxane (liquid wt. basis) is a two step procedure involving a gravimetric calculation and verification of the infrared spectrum:

$$\% \text{ dimethylpolysiloxane} = (W3 - W1)100/W2$$

where: W1 = weight of the empty Petri dish
W2 = actual weight of liquid protectant sample
W3 = weight of Petri dish with dried sample

4.3.7 **Infrared (IR) "fingerprint" verification**: Following the final weight determination above, add sufficient spectral carbon disulfide to the Petri dish and with a glass rod stir the dimethylpolysiloxane residue into solution. With a syringe, transfer a portion of this solution to a volumetric flask. (Adjust the sample concentration to yield an IR transmittance between 60% and 90%.)

Fill a NaCl liquid sample cell with sample prepared above, and place the test cell in a double-beam infrared spectrophotometer, against a carbon disulfide reference cell. Generate a printed IR fingerprint between 2.5 and 16.0 microns IR wavelength.

Between 2.5 to 16.0 microns wavelength, the sample spectrum shall contain all the IR spectral characteristics, wavelength absorbances and peak shapes contained in the attached "GSA Standard Spectrum" , (see Note 7.2.) Prohibited paraffinic wax and oil adulteration shall be evidenced, between 3.4 to 3.6 microns, if the ratio of the smaller C-H (carbon-hydrogen) absorbance to the larger C-H absorbance is greater than 80%. (Note: Carbon-hydrogen absorbance in this infrared region represents asymmetric C-H stretching @ 3.42 microns and symmetric C-H stretching @ (3.51 microns).

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4.4 **Total Nonvolatile** (NV) (Gravimetric analysis): Weigh 5.0 gms +/- 0.001 gram of liquid product into a tared 100 ml borosilicate glass beaker and dry for 2 hours at 105 degrees Centigrade in a vented forced-air oven. Cool in a desiccator and re-weigh the beaker and its contents. Determine the weight loss in grams. Calculate the %N.V. in accordance with the calculation below.

% Total N.V. = (gms of product)-(gms of weight loss) 100/gms product

example: N.V. = (3.000 gms - 2.310 gms)100/3.000 gms = 23.0% N.V.

4.5 **Homogeneous**: 25.0 mls of product shall be filtered through No. 40 Whatman (or equal) filter paper and then viewed with a 7X lens. No residue shall be visible.

4.6 **Waterbased**: 10.0 mls of product shall be diluted in a graduated cylinder to 50.0 mls with distilled water. After sitting 24 hours, no separation, precipitation or layering of any kind shall be visually detectable by a panel of three observers.

4.7 **Colorless**: 10 drops of protectant product shall be applied to No. 40 Whatman (or equal) filter paper and dried for 30 minutes in a convention oven @ 82 degrees Centigrade (180 degrees F). The color shall be the same as the original untreated filter paper, however, translucency is permitted.

4.8 **Odor**: Test in accordance with ASTM D 4339-84 (Vol. 15.06) or later revision.

4.9 **Storage stability**: Test in accordance with ASTM D 1791-82 (Vol. 15.04) or later revision, plus the following GSA exceptions: para 5.3, observe the test samples only after 30 days. GSA Exception Para. 6: delete ASTM para 6.0 requirements and substitute the following: Three test samples after 30 days at test temperature and note the following:

4.9.1 **Separation**: The material fails if there is any visible liquid phase separation.

4.9.2 **Agglomeration**: On a sheet of clear glass of plastic, draw two straight, 6" long, parallel lines, 10 inches apart, using a waterproof marker. Support the glass sheet in a shallow dish or tray at an angle between 10-15 degrees from horizontal. From the upper line, slowly pour the 30 day aged-protectant onto the inclined sheet at a rate to maintain a transparent film. There shall be no visible agglomerations or particles, of any kind, in the falling film.

4.9.3 **Sedimentation**: The protectant fails if there is any visible sedimentation remaining at the bottom of the stability test container or the spray bottle.

4.10 **Color restoration**: The tester shall select and outline a color restoration test patch area with a minimum of 36 square inches (any dimension) and an adjacent control (untreated) surface. (The test patch area selected shall be acceptable if the severely oxidized surface is milky white or gray and visually contrasts when water-wetted.) Treat the test patch area, in accordance with manufacturer's instructions. After 7 days, water-wet the adjacent control test area. If the protectant test patch area does not equal the water-wetted control area's color intensity, the product fails.

(Note: The roof area of most buildings is a good location to find severely oxidized paint or gel coat surfaces: HVAC sheetmetal vents, piping and flashing; other suggest sources: junk yard cars, painted outdoor signs, mail boxes, pleasure boat top-side decks (other than white).

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4.11 Ultraviolet transmission: Weigh 0.110 gram (+/- 0.001 gram) of the protectant into a 250 ml Erlenmeyer flask and dilute with 40 mls of grade 3A or CA denatured ethyl alcohol at 20 ° C, +/- 1 degree. Stir the flask contents on a magnetic stirrer for 30 minutes. Filter the flask contents into a 50 ml volumetric flask, thru alcohol pre-wetted No. 42 Whatman filter paper; dilute to mark with the denatured ethyl alcohol. Fill a 1.0 cm path length quartz cell and measure the UV transmission every 5 mμ (or scan) from 290 to 315 mμ (1 mμ= 10^{-7} cm) wavelength against a reference alcohol blank.

4.12 Water resistance: Apply test product to any non-woven rigid plastic or flexible vinyl test surface according to manufacturer's instructions. After 24 hours at room temperature, submerge the treated substrate under 1.0 inch of distilled or demineralized water at 18-21° C (65-70° F) for 24 hours. Remove the test specimen and allow to air dry overnight. Using a manual aerosol applicator, spray a fine mist of distilled or demineralized water onto the treated surface. All discrete water droplets shall remain beaded for not less than 30 minutes.

4.13 Sprayable: The undiluted protectant shall be cooled overnight to 3.0° C +/- 0.5 degrees (38° F +/- 1) in the delivered container/unit of issue. (If the unit-of-issue is not a spray applicator, transfer the protectant to a trigger or vertical pump-type spray bottle, such as "Windex".) The protectant fails if a minimum of 50.0 mls of protectant cannot be sprayed without plugging the spray nozzle orifice.

4.14.1 Master batch or Concentrate: Periodic contract orders which are fulfilled form a "master batch" or "concentrate" by any final modification, dilution or addition shall be a separate lot or batch. Full requirements shall be demonstrated on the first full production lot or batch. For subsequent lot or batches, only the requirements marked by an asterisk(*) shall be retested, lot-by-lot (batch-by-batch), provided "dilution" is the only final adjustment to master batches or concentrate, previously approved.

4.14.2 *Sampling: A total of six units-of issue shall be randomly selected from each lot or batch for all package sizes, except three units for gallon packages. Of the selected samples, two shall be tested in parallel for full compliance. If one sample fails, another sample from the selection shall be re-tested. If a minimum of two samples fail to meet all requirements herein, all batches, lots, master batches and concentrates shall be rejected.

4.14.3 *Fill: Those units-of-issue tested for compliance shall be checked for minimum package fill in accordance with the requirements of the contract or purchase order. No sample shall have less than the minimum number of fluid ounces required or the entire batch or lot is rejected. Fluid ounces shall be based on US measure @ 16.0 fluid ounces per pint (454.7 milliliters/pint) at 23°C (73.4°F).

4.14.4 Packaging, Packing and Palletization: Shall be in accordance with separate requirements within the solicitation/contract.

5. REGULATORY REQUIREMENTS.

5.1 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) shall be submitted in accordance with FED-STD-313C or later revision, if published.

5.2 Recovered Materials and Restricted Materials. The Contractor shall utilize recovered materials to the maximum extent possible. There shall be no lead, mercury or hexavalent chromium used in the formulation of the adhesive. Maximum background lead content shall be 0.06 (600 parts per million), ovendry weight basis determined in accordance with ASTM D 3335.

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6. QUALITY ASSURANCE PROVISIONS.

6.1 Product Conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices and be the same product offered for sale in the commercial market. The Government reserves the right to require proof of such conformance

6.2 ASTM. Use the latest method in effect on the date of the solicitation or order. ASTM standards and test methods are available from the Amercian Society for Testing Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

6.3 Essential Acceptance Tests. Essential acceptance tests are marked with an asterisk "*"

7.0 Notes.

7.1 Two (2) pints of liquid protectant are required to perform the above tests.

7.2 Dow Corning, General Electric and Rhone-Poulenc are known sources of *"standard" dimethylpolysiloxane polymers.*

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Coordinating activity:
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