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29 January 1954
CANCELLATION
10 June 1960

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Provisional Specification
for

SOAP TYPE CLEANERS FOR USE ON ASPHALT TILE FLOORS

Provisional specification 2-GP-40P, dated 29 January 1954, is cancelled as of 10 June 1960. Specifications 2-GP-4a, 2-GP-7a or 2-GP-107a should be considered as replacement specifications. See CGSB Schedule 2-GP-34 for guidance on the correct choice of soaps and detergents.

2-GP-40P*
29 January 1954

CANADIAN GOVERNMENT SPECIFICATIONS BOARD

*Provisional Specification
for

SOAP TYPE CLEANERS FOR USE ON ASPHALT TILE FLOORS

Withdrawn/Retirée

1. DEFINITION

1.1 This specification applies to asphalt tile floor cleaners of the potash soap type, either in liquid or paste form.

2. GENERAL REQUIREMENTS

2.1 The cleaner shall contain no solvents, oils, or other materials that have an injurious effect on asphalt tile.

2.2 It shall not be irritating to the skin.

2.3 The cleaner shall be free from offensive odors and shall contain no high toxic materials.

2.4 Condition in Container - The liquid cleaner shall show no trace of sediment, shall not gel, and shall pour easily from the container at room temperature. The paste cleaner shall show no separation of the liquid portion as evidenced by liquid on the surface. It shall be easily removed from the container at room temperature.

2.5 The cleaner shall be stable and not lose effectiveness or otherwise deteriorate when stored in a closed container at normal temperatures.

2.6 The cleaner shall be free-rinsing and shall leave no deposits of dirt, grease, or sediment on the tile.

2.7 The manufacturer shall provide with each package a complete set of clear and concise instructions for use of the cleaner.

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*This provisional specification has been issued for interim procurement. It has not been formally approved by the Committee on Specifications for Soaps and Detergents nor the Canadian Government Specifications Board. The specification has been based on the latest recommendations of the Asphalt Tile Institute.

3. DETAIL REQUIREMENTS

3.1 Soap Content - The anhydrous soap content of the cleaner shall be a minimum of 20 per cent for liquid and 43 per cent for paste soap (by weight) calculated as potash soap, when tested in accordance with Section 4.3.1.

3.2 Hydrogen Ion Concentration - The pH value of a solution containing 1.0 per cent of anhydrous soap shall be not less than 8.5 or more than 11.6 when tested in accordance with Section 4.3.2.

3.3 Free Alkali - The free alkali, calculated as KOH, shall not exceed 0.1 per cent when tested in accordance with Section 4.3.3.

3.4 Free Oil - The total free oil shall not exceed 1.0 per cent (by weight) when tested in accordance with Section 4.3.4.

3.5 Free Ammonia - Free ammonia, calculated as NH_3, shall not exceed 0.50 per cent by weight of the solution of the maximum concentration recommended for use, when tested in accordance with Section 4.3.5.

3.6 Solubility - The cleaner shall be free from abrasives and shall be completely soluble in distilled water when tested in accordance with Section 4.3.6.

3.7 Deleterious Action on Tile

3.7.1 Softening of Tile - The cleaner, when applied to asphalt tile and tested in accordance with Section 4.3.7, shall not cause an increase in scratch width of more than 40 per cent.

3.7.2 Color Spreading and Change in Color - During application, the cleaner shall show no tendency to remove the color from asphalt tile or to spread the color from one tile to another. After thorough rinsing and drying, the tile shall show no objectionable change in color.

4. SAMPLING AND TESTING

4.1 Sampling - For routine laboratory examination for the acceptability of a shipment the cleaner shall be sampled as follows:

4.1.1 Liquid Soap - A sample of not less than 0.5 pint shall be taken at random from not less than 1.0 per cent of the shipping containers, provided such containers contain not less than 10 gallons each. In the case of smaller containers, a sample of not less than 0.5 pint shall be taken at random from each lot of containers totalling not more than 1,000 gallons. The gross sample shall in all cases consist of not less than

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three portions of 0.5 pint each taken at random from separate containers.

Before drawing the sample from the container selected, the contents of the container shall be thoroughly agitated. The gross sample drawn shall be thoroughly mixed, placed in clean, dry cans or bottles, which shall be completely filled and securely stoppered with clean corks or caps, then sealed, marked, and sent to the laboratory for test.

4.1.2 Paste Soap - (When packed in cans or cartons of 5 pounds or less) one can or carton shall be taken at random from not less than 1 per cent of the shipping containers, provided such containers contain not less than 50 pounds. In case of smaller containers, a can or carton shall be taken at random from each lot of containers, totalling not more than 5,000 pounds or fraction thereof. The gross sample shall in all cases consist of not less than 3 cans or cartons taken at random from separate containers.

The sample cans or cartons shall be wrapped, sealed, marked, and sent to the laboratory for test.

4.2 Preparation of Samples for Testing - The samples of cleaner taken above shall be prepared for test in the following manner:

4.2.1 Liquid Soap - No preparation of the sample, other than thorough mixing, is necessary unless it is received during very cold weather, when it should be allowed to stand at least one hour after it has warmed up to room temperature before it is tested.

4.2.2 Paste Soap - Mix thoroughly by kneading and quarter down to about one pound. Weigh out all portions for analysis promptly, and preserve remainder in an airtight container in a cool place.

4.3 Methods of Test

4.3.1 Soap Content - Dissolve sufficient sample in 100 ml. of distilled water in a 250 ml. Erlenmeyer flask, to give about 5 grams of anhydrous soap. When the solution is complete, add diluted H_2SO_4 (1:1) in slight excess, insert a small funnel in the neck of the flask, and heat the flask to a temperature not exceeding 60°C. until the fatty acids separate as a clear layer. Cool and transfer to a separatory funnel, washing out the flask with ethyl ether and adding this to the contents of the funnel. Draw off the acid layer into another separatory funnel and extract it with two 20 ml. portions of ethyl ether. Dissolve the fatty acids in the first separatory funnel in this ether and wash with 10 ml. portions of water until they are no longer acid to methyl orange. Unite the water portions used for washing, and shake with 20 ml. of ether. Wash this ether until the wash water is neutral to methyl orange.

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Unite the ether solutions, and, if necessary, filter through a dry paper, washing the paper with ether into a suitable weighed vessel. Add 100 ml. of neutral, freshly boiled alcohol. Add phenolphthalein and titrate to exact neutrality with dilute KOH solution. Evaporate to dryness on a steam bath and dry to constant weight in an oven at 105°C.

Subtract the weight of free oil in the sample (determined by the method in Section 4.3.4) from the weight of neutral potash soap in the previous paragraph found and report the remainder as per cent of anhydrous soap.

4.3.2 Hydrogen Ion Concentration - Dissolve sufficient cleaner in freshly boiled distilled water so as to produce a solution containing 1.0 per cent of anhydrous soap. Determine the pH value of this solution, or a portion of it, to the nearest 0.1 unit at 25°C. by means of a suitable pH meter which employs the appropriate glass electrode. No correction for sodium ion concentration shall be made.

4.3.3 Free Alkali - Dilute 10 grams of cleaner with 200 ml. of neutralized, freshly boiled absolute alcohol. Add 0.5 ml. of a 1 per cent solution of phenolphthalein and titrate with 0.1 N acid. The titration will include not only the free alkali, but ammonia (NH_3) as well. Therefore, calculate the NH_3 found in Section 4.3.5 to potassium hydroxide and subtract from the total titration.

$$\frac{\text{(Ml. acid consumed x acid normality x 5.61)}}{\text{Sample weight}} - \text{(per cent } NH_3 \text{ as per cent KOH)} = \text{Per cent free alkali as KOH}$$

4.3.4 Free Oil - Place 100 grams of the cleaner (in the case of paste, dissolve in 200 ml. of water) in a separatory funnel and dilute with 100 ml. of water. Extract with 50 ml. of petroleum ether which is free from non-volatile matter and has a boiling range between 30 and 60°C. Avoid too violent shaking and add a little alcohol around the edge of the funnel with a fine-stream wash bottle to help break the emulsion. Allow to stand until there is a clean separation of the layers and draw off the lower layer into a second separatory funnel and re-extract with another 50 ml. portion of ether. Combine the two extracts in one funnel and wash by shaking with 250 ml. portions of water until the wash is clear. Draw off the water, filter if necessary, and evaporate the ether on a steam bath in a weighed beaker or flask. Add 10 ml. of absolute alcohol and evaporate. Dry to constant weight in an oven at 105°C.

4.3.5 Free Ammonia - Dilute the cleaner sample with distilled water to the maximum concentration recommended by the manufacturer. Transfer 10 grams of the diluted sample

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to a 500 ml. Kjeldahl Flask. Add 200 ml. of distilled water, a few pieces of anti-bump stones and drop of Dow-Corning Anti-Foam A emulsion. Connect the flask through a spray trap to a vertical condenser. The condenser is set up with an adapter which just dips below the surface of a solution containing about 50 ml. of a 0.5 N HCl (or H_2SO_4) acid solution. Distill about 100 ml. of the diluted sample. Remove the heat and lower the receiver. Wash out the condenser with distilled water and add it to the distillate and titrate the combined solution with 0.5 N NaOH using methyl red as an indicator.

Per cent Free Ammonia =

$$\left[\frac{(50 \text{ ml. HCl} \times \text{Normality HCl}) - (\text{ml. NaOH} \times \text{Normality NaOH})}{\text{Weight of sample}}\right] \times 1.703$$

4.3.6 Solubility - Dilute about 5 grams of the cleaner with 100 ml. of distilled water. Stir vigorously for 5 minutes at room temperature. Centrifuge the solution in a clear glass tube and inspect for abrasive or other undissolved material either in the bottom of the tube or at the surface of the liquid.

4.3.7 Softening of Tile - A solution of the cleaning agent to be tested shall be prepared according to the manufacturer's instructions. Use distilled water and weigh the proportions to plus or minus 0.5 per cent.

Five samples of asphalt tile, each 4 inches square, shall be cut, one sample from each of five 9" x 9" tile complying with CSA A100-1949: Specification for Asphalt Floor Tile (A100-1949). The samples shall then be sawed, or otherwise cut in half, each half (or specimen) being marked for identification as follows: 1a, 1b; 2a, 2b; etc.

The five specimens marked 1a, 2a, etc., shall be placed in a bath containing 500 to 800 milliliters of the cleaning solution. The five specimens marked 1b, 2b, etc., shall be placed in bath containing a similar amount of distilled water. Separation of at least 1/8" shall be provided between each specimen. The specimens shall be immersed for a period of 24 hours. The solution shall be agitated by means of a stirrer during immersion and shall be maintained at 70°F. to 75°F. during the entire period.

After 24 hours of immersion, remove each pair of specimens and blot with a paper towel. Place halves 1a (cleaner immersed) and 1b (water immersed) on the table of a Taber Abraser and make a three inch long scratch on each specimen with the Shear Tool under a load of 500 grams. The width of the three inch long scratch on each half shall immediately be read to 0.001 inch in three places, and the average recorded. The measurement should not be taken on the first part of the scratch where the tool may dig deeper at the start. Repeat the procedure for 2a and b, 3a and b, etc.

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Preparation of scratch tool - The scratch tool used shall produce a scratch on the tile before immersion of 0.050 ± 0.005 inch when unexposed specimens are tested as described in the preceding paragraphs. If the width of scratch obtained by the tool on the unexposed specimens is greater than 0.055 inch, the tool shall be dulled to produce the required width by drawing it across exposed tile. If after having dulled the tool as above, the tool is still shaving the material being tested, continue to dull the tool until it no longer cuts the surface of the unexposed tile. In any case, the mark shall not be less than 0.045 inches. This may happen especially in the pre-dulling of a new tool. Care should be taken in handling and storing the tool so that the cutting edge will not be damaged.

The percentage increase in scratch width from the water immersed to the cleaner immersed specimens shall be calculated as follows:

$$\text{Per cent increase} = \frac{\text{Width (cleaner immersed)} - \text{Width (water immersed)}}{\text{Width (water immersed)}} \times 100$$

If the increase in scratch width, as determined above, falls between 30 per cent and 50 per cent, two more tests shall be run and the average of all three tests shall be taken as the final figure. If this average is more than that specified in the specification, the cleaner shall be rejected.

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Correspondence regarding this specification should be addressed to the Secretary, Canadian Government Specifications Board, National Research Council, Ottawa, Canada.