

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

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CIRCULAR OF THE BUREAU OF STANDARDS, No. 200

[Issued February 7, 1925]

UNITED STATES GOVERNMENT MASTER SPECIFICATION
FOR HEAVY RUST-PREVENTIVE COMPOUND

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 239

This specification was officially promulgated by the Federal Specifications Board on November 5, 1924, for the use of the Departments and Independent Establishments of the Government in the purchase of heavy rust-preventive compound

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I. GRADE

Heavy rust-preventive compound shall be of the grade designated as heavy or semisolid; that is, of the consistency of grease.

II. MATERIAL AND WORKMANSHIP

The manufacturer is given wide latitude in the selection of raw materials and in processes of manufacture, so that he may produce a product of the highest quality.

III. GENERAL REQUIREMENTS

Heavy rust-preventive compound must be of such a nature that it can be applied to metal parts by brushing, dipping, or spraying at temperatures not above 71° C. (160° F.) to form an adherent protective coating even under the most severe conditions, but which will remain in a nondrying easily removable condition. The material must contain no abrasive substances, must remain homogeneous when heated, must adhere firmly to all metal surfaces, and must remain as a continuous, complete, and protective film at all temperatures at which such surfaces might be exposed under normal conditions in all climates.

IV. DETAIL REQUIREMENTS

1. MELTING POINT.—Must not be over 55° C. (131° F.).
2. HOMOGENEITY.—Must be a homogeneous mixture or compound.
3. ABRASIVE SUBSTANCES.—Must be absent.
4. STABILITY ON HEATING.—Must remain homogeneous at 71° C. (160° F.).
5. CORROSION.—Must show no evidence of corroding steel, brass, copper, or aluminum.
6. ADHESION AND PROTECTION.—Must pass the "Oven salt-spray rain test." (See v. 2 (f) p. 3.)

V. METHODS OF INSPECTION AND TESTING

Deliveries will, in general, be sampled and tested by the following methods, but the purchaser reserves the right to use any additional available information to ascertain whether the material meets the specification.

1. SAMPLING.—It is mutually agreed by buyer and seller that a single package out of each lot of not more than 1,000 packages shall be taken as representative of the whole. Whenever possible an original unopened container shall be sent to the laboratory, and when for any reason this is not done the inspector shall thoroughly mix the contents of the container sampled, transfer not less than 1 quart to a clean, dry glass jar or tin can, which must be nearly filled with the sample, securely stoppered with a new, clean cork or well-fitting cover or cap, sealed, and distinctly labeled by the inspector. The inspector should take a duplicate from the container sampled to be held for check in case of dispute, and, when requested, should take a sample for the seller.

2. LABORATORY EXAMINATION.—Except where otherwise stated in the following directions, the tests shall be made in a room at ordinary temperature (not below 15.5° C. (60° F.)) and free from laboratory or other corrosive fumes.

(a) *Melting point.*—Determine by the method used for petrolatum, Federal Specifications Board Specification No. 2c (Bureau of Mines Technical Paper 323A), method 40.3.

(b) *Homogeneity.*—Portions shall be taken from the top, bottom, and intermediate parts of the sample and examined visually to determine whether there is any apparent difference in appearance or consistency.

(c) *Abrasive substances.*—Heat 50 g of the sample with 100 cc of benzol (C_6H_6) on the steam bath to about $75^\circ C.$ ($167^\circ F.$) and stir until all soluble matter is in solution. While still hot, filter through a clean, dry filter paper. If any residue remains on the paper wash with 25 cc of benzol, transfer a portion of the residue to a clean piece of polished glass and rub vigorously with a clean finger. Wash the residue from the glass, dry, and examine the dry clean glass. Scratches produced on the glass by this treatment indicate the presence of abrasive substances.

(d) *Stability on heating.*—Transfer about 25 g of the sample to a test tube about 13 mm in diameter and 250 mm long (one-half inch by 10 inches), heat in a water bath maintained at 70 to $72^\circ C.$ (158 to $162^\circ F.$) for one hour. Remove from the bath and examine while hot and after cooling for any visible separation into layers of different appearance or separation of solid or liquid matter at the bottom of the tube.

(e) *Corrosion.*—Clean, well-polished sheets of steel, brass, copper, and aluminum shall be used for this test. In general, pieces about 25 mm (1 inch) square will be found most convenient. Place a small portion of the material to be tested on each of the metal plates taking care not to cover the whole surface. Cover each plate with an inverted watch glass and let stand for five days. There must be no evidence of corrosion on any of the metal plates, either when examined with the sample in place or after removing it by washing with benzol. While it is important to apply this test with all the metals mentioned it will generally be found that the test with copper is most valuable. Either the development of a green color in the material on the copper or a stain remaining on the copper after washing with benzol, is evidence of corrosion.

(f) *Adhesion and protection.*—Four mechanically polished bright steel plates approximately 4 by 6 inches by $\frac{1}{8}$ inch shall be tacked to separate boards and thoroughly cleaned by the use of benzol. The material to be examined shall be heated to $70^\circ C.$ ($158^\circ F.$) and an excess flowed over the plates. One of the plates shall be kept in a vertical position in the laboratory for 24 hours and then placed in a rack exposed to the weather in an unshaded location, so that the plate shall be inclined at an angle of 45° to the vertical, facing south. The plate shall be sprayed lightly with a 3 per cent salt solution on

the first day and left exposed to the weather for not less than five nor more than 60 days. The other three plates shall be hung in a vertical position in an oven and maintained at a temperature of 45 to 50° C. (113 to 122° F.) for at least 48 hours. The plates shall be removed from the oven, allowed to cool, and one plate exposed in the rack described above. Another plate shall be kept in a horizontal position and lightly sprayed with a 3 per cent salt solution once every day for a period of five days. The fourth plate shall be placed under an intermittent shower, a vigorous shower being applied for approximately three to four minutes, then no water for about the same length of time. The shower may be formed by allowing water to siphon at intervals from a 5-gallon tank into a metal trough, the bottom of which has three or four parallel rows of small holes (about one-sixteenth inch in diameter). The water should fall about 2 feet from the trough to the plate, which is held in a position about 60° to the vertical immediately under the falling water. At the end of five hours of this intermittent showering, the plate shall be placed in a horizontal position and allowed to remain with any adhering water for at least 24 hours. No rust shall be in evidence on any of the four plates after the completion of the test and the coating on all the plates shall be easily removed with waste wet with kerosene.

VI. PACKING AND MARKING

No details.

VII. ADDITIONAL INFORMATION

Rust-preventive compounds conforming to this specification are the most satisfactory easily removable materials for the protection of metal. However, owing to its heavy consistency it is sometimes advisable to use more fluid material on bearing surfaces that must be moved from time to time without removing the coating.

Rust-preventive compounds are frequently called "slushing grease" or "slushing oil," but these terms have no fixed meaning and their use is to be discouraged.

VIII. GENERAL SPECIFICATIONS

No details.

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