SAE International™ SURFACE VEHICLE STANDARD

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Corrosion Preventive Compound, Underbody Vehicle Corrosion Protection

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. Scope—This specification covers underbody corrosion preventive compounds for application to vehicle underbodies.

2. References

2.1 Applicable Publications—This document contains reference to certain automotive industry tests, it only reflects interest in selecting what is felt to be the easiest and most useful tests for evaluation of rust corrosion preventatives, and does not suggest that the tests of other vehicle manufacturers are of lesser value or validity.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J400 JAN85—Test for Chip Resistance of Surface Coatings

2.1.2 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 117-85—Method of Salt Spray (Fog) Testing
ASTM D 609—Method for Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products
ASTM D 1654—Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 2243—Test Method for Freeze-Thaw Resistance of Latex and Emulsion Paints
ASTM D 4585-86a—Practice for Testing the Water Resistance of Coatings Using Controlled Condensation

2.1.3 FEDERAL AND MILITARY PUBLICATION—U. S. Government, DOD SSP, Subscription Service Division, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-C-52218A—Corrosion Preventative Compound, Cold Application

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3. *Requirements*

3.1 Qualification—Underbody corrosion preventive compounds furnished under this specification shall meet all the performance requirements herein. These compounds are likely to contact products used in the manufacture of the vehicle. These compounds shall not have an undesirable effect on the performance of the products.

3.1.1 Any change in formulation shall necessitate requalification.

3.2 Material—The corrosion preventive compound may be a water-based or solvent-based product which is fluid, homogeneous, free from extraneous grit and abrasives, and nontoxic.

3.3 Film Characteristic—The corrosion preventive compound shall readily adhere to surfaces commonly encountered in underbody of vehicles. The film shall not exhibit evidence of alligatoring, cracking, peeling, blistering, or other degradation.

3.4 Color—None specified.

3.5 Sprayability and Low Temperature Fluidity—The underbody corrosion preventive compound shall be sprayable from 10 – 38 °C (50 – 100 °F).

3.6 Condition in Container—The compound shall exhibit no settling, separation, skinning, or lumpiness.

3.7 Low Temperature Stability

3.7.1 The solvent-based compounds shall show no evidence of separation or nonhomogeneity at a temperature as low as –29 °C (–20 °F) according to MIL-C-62218A, 4.7.13.

3.7.2 The water-based compounds shall show no evidence of separation or nonhomogeneity after five freeze/thaw cycles according to ASTM D 2243.

3.8 Manufacturers' or suppliers' recommended application procedure(s) shall ensure that the film thickness required for performance compliance with this specification be achieved in field application.

3.9 When tested as specified, the compound shall conform to the following requirements at the manufacturers' recommended film thickness for actual field application:

TEST	TEST METHOD	REQUIREMENT
Salt Spray	ASTM B 117–85	1) No more than three corrosion dots, each no larger than 1 mm (0.04 in) in diameter. 2) Scribe rating of 8 per ASTM D 1654.
SCAB	Refer to 3.12	1) Rating of 8 minimum. 2) No more than three corrosion dots, each no larger than 1 mm (0.04 in) in diameter.
Cleveland Condensing Humidity	ASTM D 4585–86a (formerly D 2247–68)	1) No more than three corrosion dots, each no larger than 1 mm (0.04 in) in diameter. 2) No film degradation such as alligatoring, cracking, peeling or blistering.
Gravelometer/Salt Spray	SAE J400/ASTM B 117–85	1) Less than 5% face corrosion.

3.10 Panel Preparation—The panels used for evaluation of underbody corrosion preventives against this specification shall conform to ASTM D 609, Type 1, and shall be prepared by Methods B or D according to that standard.

3.11 Salt Spray—Salt spray resistance shall be run in accordance with ASTM B 117-85.

3.11.1 SCOPE—This test provides a method for measuring the corrosion resistance of a coating.

3.11.2 Two steel panels, 100 x 300 x 0.8 mm (4 x 12 x 0.032 in) conforming to and cleaned as described in 3.10, shall be used for each scribed and unscribed set.

3.11.3 The test surface of each panel shall be coated to the film thickness specified by the corrosion preventive manufacturers' or suppliers' application procedure.

3.11.4 The panel edges and backside of each panel shall be coated with the product under test.

3.11.5 The coated panels shall be permitted to air dry for seven days at 25 °C ± 2 (77 °F ± 5).

3.11.6 One set each of coated scribed and unscribed panels shall be exposed in salt spray for 1000 h as described in 3.11.

3.11.7 After exposure, the coating shall be stripped from the panels using an appropriate solvent and the surface examined for compliance with the requirement in 3.9. Corrosion at the outer 6.35 mm (0.25 in) of the panel shall not be included in the panel rating.

The test panels shall be evaluated in accordance with ASTM D 1654 and shall have a rating number of not less than 8 in both scribed and unscribed areas.

3.12 SCAB Test

3.12.1 SCOPE—This test provides a method of measuring the corrosion resistance of a coating.

3.12.2 Two steel panels as described in 3.11.2 shall be coated as described in 3.11.3 and 3.11.4 and conditioned as described in 3.11.5.

3.12.3 After conditioning panel as described in 3.11.5 and prior to exposure, each test surface shall be diagonally scribed to 25 mm (1 in) from either corner. A straight edge shall be used to guide the scribing instrument, which shall be a sharp knife, made with sufficient pressure to cut completely through the coating and actually cut into the metal, exposing a bright line of bare metal.

3.12.4 Place the test panels with the 300 mm (12 in) dimension horizontal in a suitable wood or plastic rack. The rack shall hold panels at a 0 – 15 deg angle from the vertical and the panels shall be spaced a minimum of 13 mm (0.5 in) apart.

3.12.5 The racked panels shall be placed in test and the following procedures performed on a weekly basis:

a. Monday Only

- 1 h in a 60 °C ± 1 (140 °F ± 2) oven
- 30 min in a –23 °C (–10 °F) cold cabinet
- 15 min immersion in 5% by weight sodium chloride solution
- 1 h 15 min drain at room temperature
- 21 h in a controlled humidity cabinet operating at 60 °C ± 1 (140 °F ± 2) and 85% RH

b. Tuesday through Friday

- 15 min immersion in 5% by weight sodium chloride solution
- 1 h 15 min drain at room temperature
- 22 1/2 h in a controlled humidity cabinet operating at 60 °C ± 1 (140 °F ± 2) and 85% RH

c. Saturday/Sunday

- Samples remain in the humidity cabinet operating as above

3.12.6 The test panels shall be exposed to 30 cycles in the exposure described in 3.12.5. a + b + c constitutes five cycles.

3.12.7 After completion of the 30 cycles, the panels shall immediately be rinsed with warm flowing water not exceeding 38 °C (100 °F).

3.12.8 Within 15 min of removal from the exposure test, the test panel shall be air blown along the entire scribe line and any other points of indicated failure with a nozzle held lightly against and approximately 45 deg to the surface. The air supply shall be capable of obtaining an open line pressure of 550 kPa (80 lb/in^2) through a nozzle with a 3.0 mm (0.12 in) orifice. The length of hose between the nozzle and the air regulator shall be less than 3 m (10 ft) and it is recommended that the inside diameter of the hose shall be between 6 mm and 10 mm (0.25 and 0.375 in).

3.12.9 EVALUATION:

3.12.9.1 To evaluate the creepback, the distance between the unaffected coating on each side of the scribe line shall be measured to the nearest mm in several places. Each value shall be divided by two and then a mean value calculated. The number of measurements shall be dependent on the uniformity of corrosion creepback. A minimum rating of 8 shall constitute a pass using the following rating scale:

Rating	Corrosion Creepback (mm)
10	0
9	0 to less than 0.5
8	0.5 to less than 1.5
7	1.5 to less than 2.5
6	2.5 to less than 3.5
5	3.5 to less than 5.0
4	5.0 to less than 6.5
3	6.5 to less than 8.0
2	8.0 to less than 10.0
1	10.0 to less than 12.0
0	12.0 and greater

3.12.9.2 Field corrosion shall be evaluated in the same manner as in 3.11.7 and shall meet the same compliance requirement.

3.13 (Cleveland Condensing Humidity) or CCT

3.13.1 SCOPE—This test provides a measure of the resistance of the coating to cyclic conditions of condensing humidity and dry-off.

3.13.2 EQUIPMENT—Cleveland Condensing Humidity Cabinet.