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Laboratory Cyclic Corrosion Test		

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Foreword—This laboratory cyclic corrosion test procedure is based on a field-correlated Design of Experiment process conducted by the SAE Automotive Corrosion and Prevention Committee (SAE/ACAP) and the Auto/Steel Partnership (A/SP) Corrosion Task Force. Results from this test will provide excellent correlation to severe corrosive field environments with respect to cosmetic corrosion performance. For historical information on the development of this test, refer to 2.1.4.

A typical automotive paint system was used to develop this test. See 2.1.4, 1 to 5. If a different type of coating system is used, field correlation must be determined.

1. **Scope**—The SAE J2334 lab test procedure should be used when determining corrosion performance for a particular coating system, substrate, process, or design. Since it is a field-correlated test, it can be used as a validation tool as well as a development tool. If corrosion mechanisms other than cosmetic or general corrosion are to be examined using this test, field correlation must be established.

2. References

- 2.1 **Applicable Publications**—The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

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

SAE J1563—Guidelines for Laboratory Cyclic Corrosion Test Procedures for Painted Automotive Parts

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

ASTM D 1193—Specification for Reagent Water

ASTM D 1654—Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D 1735—Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus

ASTM D 2247—Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM E 70-90—Test Method for pH of Aqueous Solutions with the Glass Electrode

ASTM G 1—Recommended Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

2.1.3 GENERAL MOTORS PUBLICATIONS—Available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

GM 9540P— Accelerated Corrosion Test

2.1.4 OTHER PUBLICATIONS

1. Townsend, H. E., "Development of an Improved Laboratory Corrosion Test by the Automotive and Steel Industries," in *Advanced Coatings Technology, Proceedings of the fourth Annual ESD Advanced Coatings Conference*, The Engineering Society, Ann Arbor, MI, 1994, pp. 29-49.
2. Roudabush, L.A., Townsend, H.E., and McCune, D.C., "Update on the Development of an Improved Cosmetic Corrosion Test by the Automotive and Steel Industries," *Automotive Corrosion and Prevention Conference Proceedings, P-268*, Society of Automotive Engineers, Warrendale, PA, 1993, pp. 53-63.
3. Townsend, H.E., "Accelerated Corrosion Testing: A Cooperative Effort by the Automotive and Steel Industries," *Proceedings of the Symposium on Corrosion-Resistant Automotive Sheet Steels*, ASM Materials Congress, ASM International, Metals Park, OH, 1988, pp. 55-67.
4. Townsend, H.E., "Status of a Cooperative Effort by the Automotive and Steel Industries to Develop a Standard Accelerated Corrosion Test," *Automotive Corrosion and Prevention Conference Proceedings, P-228*, Society of Automotive Engineers, Warrendale, PA, 1989, pp. 133-145.
5. Townsend, H.E., Granata, R.D., McCune, D.C., Schumacher, W.A., and Neville, R.J., "Progress by the Automotive and Steel Industries Toward an Improved Laboratory Cosmetic Corrosion Test," *Automotive Corrosion and Prevention Conference Proceedings, P-250*, Society of Automotive Engineers, Warrendale, PA, 1991, pp. 73-97.
6. Stephens, M.L., "SAE ACAP Division 3 Project: Evaluation of Corrosion Test Methods," *Automotive Corrosion and Prevention Conference Proceedings, P-228*, Society of Automotive Engineers, Warrendale, PA, 1989, pp. 157-164.
7. Lutze, F.W., and Shaffer, R.J., "Accelerated Atmospheric Corrosion Testing of AISI Panels," *Automotive Corrosion and Prevention Conference Proceedings, P-250*, Society of Automotive Engineers, Warrendale, PA, 1991, pp. 115-127.
8. Petschel, M., "Statistical Evaluation of Accelerated Corrosion Tests and Correlation with Two-Year On-Vehicle Tests," *Automotive Corrosion and Prevention Conference Proceedings, P-250*, Society of Automotive Engineers, Warrendale, PA, 1991, pp. 179-203.
9. Davidson, D.D. and Schumacher, W.A., "An Evaluation and Analysis of Commonly Used Accelerated Cosmetic Corrosion Tests Using Direct Comparison with Actual Field Exposure," *Automotive Corrosion and Prevention Conference Proceedings, P-250*, Society of Automotive Engineers, Warrendale, PA, 1991, pp. 205-219.
10. Ostermiller, M.R., and Townsend, H.E., "On-Vehicle Cosmetic Corrosion Testing of Coated and Cold-Rolled Steel Sheet," *Automotive Corrosion and Prevention Conference Proceedings, P-268*, Society of Automotive Engineers, Warrendale, PA, 1993, pp. 65-83.
11. Granata, R.D. and Moussavi-Madani, M., "Characterization of Corrosion Products and Corrosion Mechanisms on Automotive Coated Steels Subjected to Field and Laboratory Exposure Tests," Leigh University Report to the ASP Corrosion Task Force, January 10, 1996.
12. ASTM E 691-92, "Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method."
13. ASTM E 177-90a, "Standard Practice for Use of the Terms Precision and Bias in ASTM Test Methods."
14. Townsend, H.E. and McCune D.C., "Round-Robin Evaluation of a New Standard Laboratory Test for Cosmetic Corrosion," *Automotive Corrosion and Prevention Conference Proceedings, SP-1265*, Society of Automotive Engineers, Warrendale, PA, 1997, pp. 53-68.
15. H. E. Townsend, D. D. Davidson, and M. R. Ostermiller, "Development of Laboratory Corrosion Tests by the Automotive and Steel Industries of North America," *Proceedings of the Fourth International Conference on Zinc and Zinc-Alloy Coated Steel Sheet*, Iron and Steel Institute of Japan, Tokyo, pp. 659-666 (1998).