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# Australian Standard 2108—1984

# CORROSION INHIBITORS AND COOLANT COMPOUNDS FOR ENGINE COOLING SYSTEMS—PRELIMINARY ASSESSMENT

STANDARDS ASSOCIATION OF AUSTRALIA
*Incorporated by Royal Charter*



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This Australian standard was prepared by Committee CH/29, Additives for Engine Cooling Systems. It was approved on behalf of the Council of the Standards Association of Australia on 8 November 1983 and published on 6 January 1984.

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The following interests are represented on Committee CH/29:

Aluminium Development Council

Australian Automobile Association

Australian Institute of Petroleum Ltd

Australian Mineral Development Laboratories

Department of Defence

Federal Chamber of Automotive Industries

Federation of Automotive Products Manufacturers

Railways of Australia Committee

Royal Australian Chemical Institute

Society of Automotive Engineers, Australasia

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AUSTRALIAN STANDARD

# CORROSION INHIBITORS AND COOLANT COMPOUNDS FOR ENGINE COOLING SYSTEMS—PRELIMINARY ASSESSMENT

AS 2108—1984

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# PREFACE

This new edition of AS 2108—1977 was prepared by the Association's Committee on Additives for Engine Cooling Systems, and is intended to provide a preliminary assessment of requirements of corrosion inhibitors and engine coolant compounds (antifreeze and antiboil) for use under Australian conditions. It applies to corrosion inhibitors and engine coolant compounds in the form of concentrates which require dilution before use, and to solutions which are formulated for direct use in engine cooling systems.

Because of the difficulty in obtaining correlation between laboratory and field tests, BS 5117, Methods of Test for Corrosion Inhibition Performance of Antifreeze Solutions, includes recirculating rig static engine and field tests in addition to glassware corrosion tests. The committee, however, was of the opinion that the limited Australian market for antifreeze did not warrant this extensive range of tests. It was considered that the only corrosion test which could be economically justified for Australian conditions was the glassware corrosion test. It was accordingly decided to limit the standard to this test, leaving individual vehicle or engine manufacturers with general test facilities to carry out additional tests should they consider this either necessary or desirable to qualify a product for their own vehicle or engines.

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STANDARDS ASSOCIATION OF AUSTRALIA

# Australian Standard
# for
# CORROSION INHIBITORS AND COOLANT COMPOUNDS FOR ENGINE COOLING SYSTEMS—PRELIMINARY ASSESSMENT

**1 SCOPE.** This standard specifies requirements for corrosion inhibitors and engine coolant compounds (antifreeze and antiboil).

The standard applies both to concentrates which require dilution before use, and to solutions which are formulated for direct use in the engine cooling system. Provision is also made for informative labelling of containers.

**2 APPLICATION.** This standard is intended only as a first stage in the assessment of a corrosion inhibitor and/or coolant compound, because certain factors could introduce the situation where compliance with a general performance standard may not mean satisfactory service performance; among these factors are the following:

(a) There currently exists no correlation between laboratory and field tests.

(b) Optimum requirements may vary between engine makes and types of cooling systems.

(c) Service conditions vary.

Consequently, the standard provides certain minimum performance requirements which should facilitate negotiations between an engine manufacturer and the formulator, but which preclude its adoption as a general performance standard for the products. If further tests are required to qualify the corrosion inhibitor and/or coolant compound to this standard for a particular engine, it is recommended that these tests be conducted in accordance with Appendix A.

NOTE: In some cases a formulation to a different standard may be recommended by the engine manufacturer, and in these cases the engine manufacturer's recommendation should be followed.

**3 REFERENCED DOCUMENTS.** The following documents are referred to in this standard:

| | |
|---|---|
| BS 5117 | Methods of Test for Corrosion Inhibition Performance of Antifreeze Solutions |
| ASTM D92 | Test Method for Flash and Fire Points by Cleveland Open Cup |
| ASTM D1120 | Test Method for Boiling Point of Engine Antifreezes |
| ASTM D1121 | Test Method for Reserve Alkalinity of Engine Antifreezes, Antirusts and Coolants |
| ASTM D1177 | Test Method for Freezing Point of Aqueous Engine Antifreeze Solutions |
| ASTM D1287 | Test Method for pH of Engine Antifreezes, Antirusts, and Coolants |
| ASTM D1384 | Method for Corrosion Test for Engine Coolants in Glassware |
| ASTM D1881 | Test Method for Foaming Tendencies of Engine Coolants in Glassware |
| ASTM D1882 | Test Method for Effect of Antifreeze and Cooling System Chemical Solutions on Organic Finishes for Automotive Vehicles |
| ASTM D3634 | Test for Trace Chloride Ion in Engine Antifreeze/Coolants in the Presence of Mercaptobenzothiazole |
| SAE J20e | Coolant System Hoses |

NOTE: Attention is also drawn to Appendix A, which includes a list of documents for optional tests.

**4 DEFINITIONS.** For the purpose of this standard, the following definitions apply:

**Corrosion inhibitor**—a formulation which when added to water inhibits corrosion of the metals normally found in an engine cooling system, or achieves the same effect without dilution.

**Coolant compound**—a formulation which when added to water depresses the freezing point, raises the boiling point, and inhibits corrosion of the metals normally found in an engine cooling system, or achieves the same effect without dilution.

**5 GENERAL REQUIREMENTS.**

**5.1 Miscibility with water.** The corrosion inhibitor or coolant compound shall be miscible with water in all recommended proportions.

NOTE: Antifoaming agents are immiscible, and if present, will be observed as either an oily film or as dispersed droplets.

**5.2 Colour.** The corrosion inhibitor or coolant compound shall be a distinctive colour which is readily visible in the 'test solution' and which does not affect the analytical procedures referred to herein.

**5.3 Shelf life.** The manufacturer shall establish that the shelf life of a corrosion inhibitor or coolant compound when stored in accordance with the manufacturer's recommendations shall be 2 years after which time it shall meet the requirements of Clauses 5 and 6.

**6 SPECIFIC REQUIREMENTS FOR CORROSION INHIBITORS.**

**6.1 General test condition.** The corrosion inhibitor shall be tested at the minimum concentration recommended by the manufacturer of the corrosion inhibitor for use in an engine cooling system, unless otherwise specified herein.

The test solution shall be made up with standard water complying with BS 5117, Appendix F.

**6.2 Flashpoint.** When determined in accordance with ASTM D92, the flashpoint of the concentrate shall be at least 100°C.

**6.3 Foaming.** When tested in accordance with ASTM D1881, both the unused 'test solution', and the 'test solution' after the glassware corrosion test (see Clause 6.7), shall not increase in volume by more than 150 mL, and the break time shall not exceed 5 s.