BS 6580:2010

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Specification for corrosion inhibiting, engine coolant concentrate ("antifreeze")

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Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 6, an inside back cover and a back cover.

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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 March 2010. It was prepared by Technical Committee I/–, *Miscellaneous standards materials and chemicals*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 6580:1992+A1:1993, which is withdrawn.

Information about this document

This is a full revision of the standard, which removes references to British Standards methods that are unsupported by a Technical Committee at this time, and replace them with references to American Society for Testing and Materials (ASTM) standards.

This British Standard comprises a performance specification for corrosion inhibiting, coolant concentrates based on diols for use in the cooling systems of all types of liquid-cooled internal combustion engine. It is intended to apply to products based on ethanediol (ethylene glycol) and propane-1,2-diol (propylene glycol) but products containing other diols or polyols such as digol (2,2'-oxydiethanol) or glycerol (1, 2, 3-propane triol) are not excluded.

Traditionally the term "antifreeze" has been used to describe the concentrate which is added to the water in the cooling system of an internal combustion engine. However, this term takes into account only the frost-protective role of the product, so implying that its use is a seasonal requirement, and ignores its function as a heat exchange medium which is designed to protect the cooling system of the engine from corrosion and damage under all operating conditions. The term "engine coolant concentrate" embraces all these requirements and is preferred. For the purposes of this standard, the engine coolant concentrate is generally referred to as "the product".

Although not comprehensive, this specification ought to help to prevent the marketing of those products which are likely to cause significant damage to the cooling system, either from lack of frost protection or by corrosion. However, although a product might conform with the requirements of this specification, it is also most important, for a particular engine, that careful note be taken of any special requirements indicated by the engine manufacturer.

Note further that product formulations conforming with this specification are not necessarily compatible with each other.

Product certification

Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing product surveillance, which may be coupled with assessment of a supplier's quality systems against BS EN ISO 9001.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies minimum performance requirements and certain marking requirements for coolant concentrates intended for use at appropriate dilutions in the cooling systems of all types of liquid-cooled internal combustion engine.

NOTE 1 Recommendations for informative labelling are given in Annex A.

NOTE 2 The engine coolant concentrate is generally referred to hereafter as "the product".

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D 1120, *Standard Test Method for Boiling Point of Engine Coolants*

ASTM D 1177, *Standard Test Method for Freezing Point of Aqueous Engine Coolants*

ASTM D 1384, *Standard Test Method for Corrosion Test for Engine Coolants in Glassware*

ASTM D 1881, *Standard Test Method for Foaming Tendencies of Engine Coolants in Glassware*

ASTM D 3306, *Standard Specification for Glycol Engine Coolant for Automobile and Light-Duty Service*

ASTM D 4340, *Standard Test Method for Corrosion of Cast Aluminum Alloys in Engine Coolants Under Heat-Rejecting Conditions*

ASTM D 7304, *Standard Test Method for Determination of Denatonium Ionin Engine Coolant by HPLC*

ASTM D 7437, *Standard Test Method for Hard Water Stability of Engine Coolants*

BS EN ISO 2592/BS 2000-36, *Methods of test for petroleum and its products – BS 2000-36: Determination of flash and fire points – Cleveland open cup method – (Identical with IP 36-2002).*

BS EN ISO 3696:1995, *Water for analytical laboratory use – Specification and test methods*

3 Term and definition

For the purposes of this British Standard, the following definition applies.

3.1 coolant
liquid which is caused to circulate through the cooling system of an internal combustion engine and which consists of an aqueous solution of an engine coolant concentrate

4 Sampling

The product shall be sampled in accordance with the requirements of the particular test method.

5 Flash point

The product shall have a minimum flash point of 100 °C when determined by the method described in BS EN ISO 2592.

6 Boiling point

The boiling point of the undiluted product shall be not lower than 150 °C when determined by the method described in ASTM D 1120.

7 Freezing point

The freezing point of a 50% (V/V) solution of the product in water conforming to grade 3 of BS EN ISO 3696:1995 shall be not higher than –33 °C when determined by the method described in ASTM D 1177.

8 Foaming characteristics

The foaming characteristics of a 33⅓ % (V/V) solution of the product in water conforming to grade 3 of BS EN ISO 3696:1995 shall be such that the volume of foam produced shall be not greater than 50 mL, and the break time shall be not greater than 5 s, when determined by the method described in ASTM D 1881.

9 Hard water stability

The hard water stability of the product, expressed as the volume of precipitate obtained, shall not exceed 0.5 cm^3 when determined by the method described in ASTM D 7437.

10 Mass loss in hot immersion glassware tests

The corrosion inhibiting properties of the product shall be determined by hot immersion tests as described in ASTM D 1384. The average corrected metal mass loss for triplicate tests shall not exceed the values specified in Table 1. There shall be no pitting of the exposed surfaces of the test specimens, but crevice attack in the area covered by the spacers shall be permitted.

Table 1 **Maximum mass loss**

Metal	Hot immersion mass loss
	mg
Copper	10
Solder	30
Brass	10
Steel	10
Cast iron	10
Aluminium alloy	30

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11 Corrosion rate of cast aluminium alloy under heat-transfer conditions

The rate of corrosion of cast aluminium alloy under heat-transfer conditions shall not exceed 1.0 mg/cm^2·week when the product is tested by the method described in ASTM D 4340.

12 Public health

NOTE Product containing 25% or more 1,2 ethane diol which is supplied as packaged goods intended for retail to the general public is required to contain 25 ppm or more of denatonium benzoate, or the package has to be fitted with a childproof closure.

The amount of denatonium benzoate in a coolant shall be determined by the quantitative method described in ASTM D 7304.

13 Marking

The container in which the product is supplied shall be prominently marked with the following information: [1)]

a) the name and address and registered trade mark of the manufacturer or supplier;

b) the caption:

"ENGINE COOLANT CONCENTRATE ("ANTIFREEZE") CONFORMS TO THE REQUIREMENTS OF BS 6580:2010" [2)]

Predilutes comprising only concentrate conforming to BS 6580:2010 and water meeting ASTM D 3306 quality and having a freezing point of not more than –15 °C shall be prominently marked "based on coolant concentrate conforming to BS 6580:2010."

NOTE 1 Reference to any British Standard other than this specification is unnecessary and should not be made.

NOTE 2 It is emphasized that compliance with the marking requirements given above will not be sufficient to meet the requirements of current legislation.

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1) It is recommended that the minimum height of each character in the lettering be 3 mm.

2) Marking BS 6580:2010 on or in relation to a product represents the manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

NOTE 3 Requirements for precautionary marking and labelling have been omitted from this edition of the standard, because they are governed by legislation. Attention is drawn to The Classification, Packaging and Labelling of Dangerous Substances Regulations 1984*, SI 1984/1244 [1], and amendments thereof [2], which are currently in force. Under these Regulations certain constituents of engine coolant concentrate are classified as (for example) "harmful" and the Regulations require the labelling of the product to include the names of such constituents and the appropriate symbol.*

Attention is also drawn to the Precautionary labelling of petroleum products in packages — a labelling system *[3] published by CONCAWE.* [3)]

NOTE 4 Recommendations for informative labelling are given in Annex A.

[3)] Conservation of Clean Air and Water Western Europe.

Annex A Informative labelling

In addition to the marking requirements given in Clause **13**, it is recommended that the container carry the following information and advice:

a) simple instructions for preparing the coolant, adding it to the engine cooling system, "topping up" (to prevent undesirable variation in the coolant composition) and the recommended life in use;

b) the need to consult the vehicle manufacturer or handbook if there is any doubt about the suitability of the product for a particular engine;

c) the dual role of the product to protect against frost and to inhibit corrosion;

d) the level of frost protection afforded at the concentration recommended by the manufacturer;

e) the undesirability of mixing different brands of engine coolant concentrate, as they may be incompatible;

f) the need to wash immediately car paintwork on which the engine coolant concentrate or the coolant has been spilled.

Bibliography

[1] GREAT BRITAIN. The Classification, Packaging and Labelling of Dangerous Substances Regulations, SI 1984/1244. London: HMSO.

[2] GREAT BRITAIN. Amendments of the Classification, Packaging and Labelling of Dangerous Substances Regulations, SI 1986/1922, SI 1988/766, SI 1989/2208 and SI 1990/1255. London: HMSO.

[3] *Precautionary labelling of petroleum products in packages — a labelling system.* CONCAWE publication no. 1/85, 1985 [4)]

[4)] Available from CONCAWE, Madouplein 1, B-1030 Brussels, Belgium.

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