BRITISH STANDARD

BS 5117-1.2: 1985

Testing corrosion inhibiting, engine coolant concentrate ("antifreeze") —

Part 1: Methods of test for determination of physical and chemical properties —

Section 1.2 Determination of boiling point

NOTE It is recommended that this Section be read in conjunction with the information given in the "General introduction", published separately as BS 5117-0.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

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1 Scope

This Section of BS 5117 describes a method for determination of the boiling point of engine coolant concentrate.

NOTE 1 The engine coolant concentrate is referred to hereafter as "the product".

NOTE 2 The method as described is intended for the determination of the boiling point of the undiluted product but it may also be used for solutions of the product.

NOTE 3 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Principle

A test portion is boiled under reflux using specified conditions and the boiling point is recorded and corrected to a barometric pressure of 1 013 mbar[1)].

3 Apparatus

3.1 *General.* The apparatus described in **3.2** to **3.7** is required and is shown in Figure 1(a).

3.2 *Two-necked round bottom flask,* capacity 100 mL, the central and side necks of which are fitted respectively with a 19/26 and 14/23 ground glass socket complying with BS 572. The principal dimensions are shown in Figure 1(b).

3.3 *Glass condenser,* water cooled, fitted with a 19/26 ground glass cone complying with BS 572. When fitted to the flask (**3.2**), the tip of the condenser tube projects below the 19/26 ground glass socket. The principal dimensions are shown in Figure 1(a).

3.4 *Thermometer,* designated F300C/76, complying with BS 593, fitted through the side neck of the flask so that the tip of the bulb is 6 mm from the base of the flask.

3.5 *Thermometer adaptor,* comprising a glass extension piece, one end of which is fitted with a 14/23 ground glass cone complying with BS 572 and the other end of which is fitted with a screw fitting[2)] through which the thermometer can be secured by means of a plastics threaded cap and a rubber gasket. The principal dimensions are shown in Figure 1(a).

NOTE The threaded cap and gasket should be made of materials which are substantially unaffected by diols at temperatures of up to 200 °C.

3.6 *Electric heating mantle*

3.7 *Antibumping granules,* 1 mm to 2 mm.

4 Sampling of the product

Take a representative sample of not less than 500 mL, preferably from previously unopened containers in which the product is normally offered for sale[3)]. Place the sample in clean, dry, stoppered glass bottles of a dark colour. Agitate all containers before sampling to ensure homogeneity of the contents. Where a batch of containers is to be sampled, it is essential that the number of containers sampled is not less than the cube root of the number of containers in the batch. Prepare the final sample by taking equal portions from each container sampled and mix them together thoroughly. Take care to ensure that any method used for sealing the sample does not cause contamination.

NOTE A series of different tests may be carried out by using separate portions taken from one sample.

5 Procedure

Transfer 60 mL of the sample to the flask (**3.2**) in which have been placed three or four of the antibumping granules (**3.7**). Fit the thermometer (**3.4**) and the condenser (**3.3**), turn on the water supply and heat the flask by means of the electric heating mantle (**3.6**) until its contents boil gently. Adjust the heater until the reflux rate is about one drop per second and then after 2 min record the temperature registered on the thermometer (**3.4**), and also the atmospheric pressure at that time.

6 Expression of results

The boiling point, expressed in °C at a pressure of 1 013 mbar, is given by the formula:

$$T + 0.03\,(1\,013 - p)$$

where

T is the recorded boiling point (in °C);

p is the atmospheric pressure at which the boiling point was recorded (in mbar).

[1)] 1 mbar = 100 N/m^2 = 100 Pa.

[2)] A fitting STS 1/13 as supplied by Corning Ltd., has been found suitable.

[3)] See **A.2** of BS 5117-0:1985 and clauses **4** and **5** of BS 3195-1:1978 for further guidance on sampling procedures and equipment.

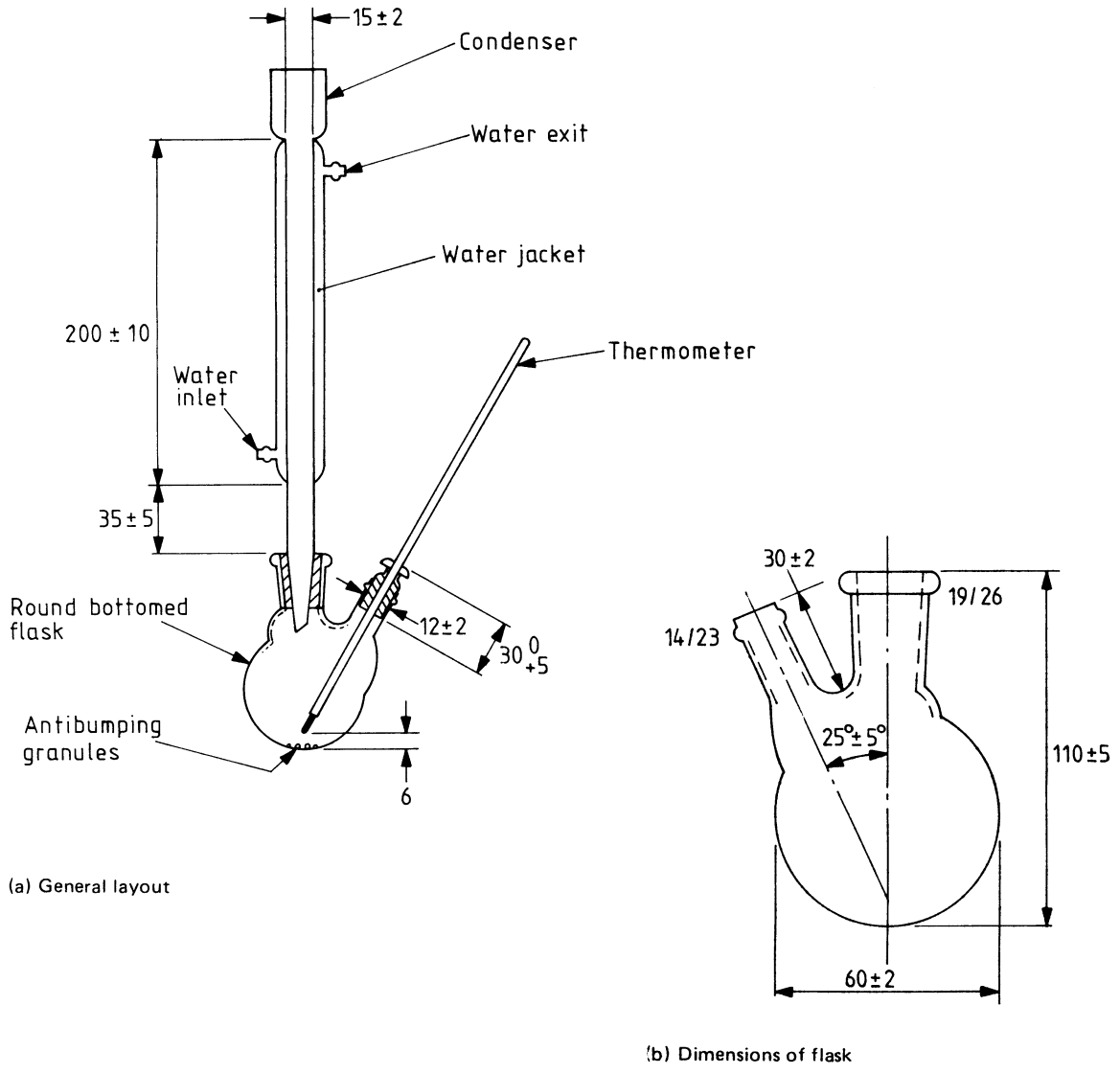

Figure 1 — Apparatus for determination of boiling point

Publications referred to

BS 572, *Specification for interchangeable conical ground glass joints.*
BS 593, *Laboratory thermometers.*
BS 3195, *Methods for sampling petroleum products.*
BS 3195-1, *Liquid hydrocarbons: manual sampling.*
BS 5117, *Testing corrosion inhibiting, engine coolant concentrate ("antifreeze").*
BS 5117-0, *General introduction.*

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