
INTERNATIONAL STANDARD



2176

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Petroleum products — Lubricating grease — Determination of dropping point

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2176 was drawn up by Technical Committee ISO/TC 28, *Petroleum products*.

It was approved in July 1971 by the Member Bodies of the following countries:

Australia	India	Spain
Austria	Ireland	Sweden
Belgium	Italy	Switzerland
Bulgaria	Netherlands	Turkey
Chile	New Zealand	United Kingdom
Czechoslovakia	Poland	U.S.A.
Egypt, Arab Rep. of	Portugal	U.S.S.R.
France	Romania	
Germany	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

Petroleum products — Lubricating grease — Determination of dropping point

1 SCOPE AND FIELD OF APPLICATION

This International Standard describes a method for the determination of the dropping point of lubricating grease.

2 DEFINITION

dropping point : The temperature at which a grease acquires a certain fluidity in the course of a test conducted under standardized conditions.

The dropping point should be considered to have only limited bearing upon service performance.

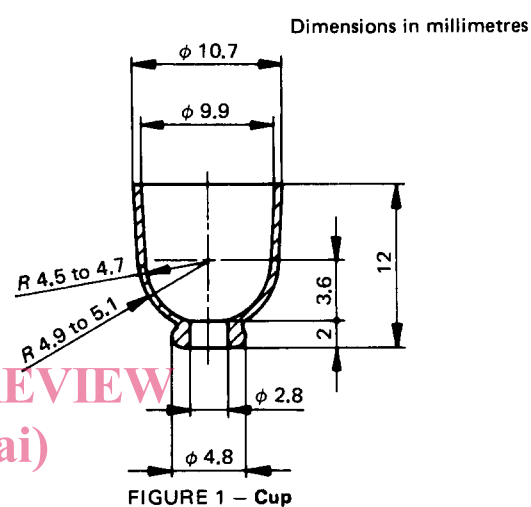
3 APPARATUS

3.1 Grease cup in chromium-plated brass, conforming to the dimensions shown in Figure 1.

3.2 Test tube, of heat-resistant borosilicate glass, with rim, conforming to the dimensions shown in Figure 2. The tube is provided with three indentations on the circumference to support the grease cup at about the point shown in Figure 2.

3.3 Thermometers, partial immersion type, conforming to the following specification:

Range	- 5 to + 300 °C
Immersion	76 mm
Graduation	1 °C
Longer lines at each	5 °C
Figured at each	10 °C
Scale error not to exceed	1 °C
Overall length	390 ± 5 mm
Stem diameter	6.5 ± 0.5 mm
Bulb length	10 to 15 mm
Bulb diameter	5.5 ± 0.5 mm
Distance from bottom of bulb to 0 °C line	100 to 110 mm
Distance from bottom of bulb to 300 °C line	329 to 358 mm

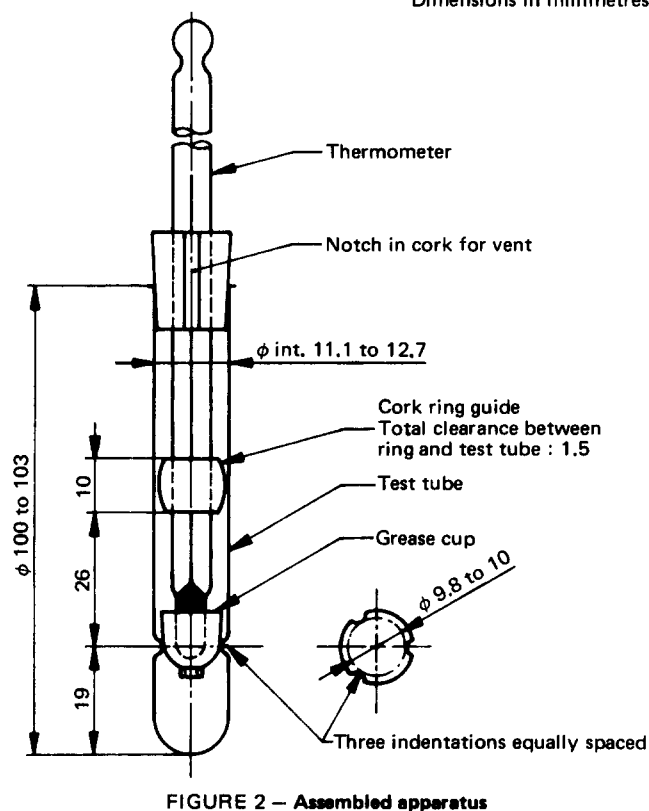


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Dimensions in millimetres



3.4 Accessories: An oil bath consisting of a 400 ml beaker and suitable oil, a ring stand and ring for support of the oil bath, clamps for thermometers, two corks as illustrated in Figure 2, a polished metal rod 1.2 to 1.6 mm in diameter and 150 mm in length and suitable means for heating and stirring the oil bath. Heating shall preferably be effected by an immersed electrical-resistance heater regulated by voltage control.

4 PROCEDURE

4.1 Place the corks on one of the thermometers (3.3) as shown in Figure 2, and adjust the position of the upper cork so that the tip of the thermometer bulb will be about 3 mm above the bottom of the grease cup (3.1) when the apparatus is assembled for the test. Suspend a second thermometer in the oil bath so that its bulb will be at approximately the same level as the bulb of the thermometer in the test tube.

NOTE — The position of the tip of the thermometer in the test tube is not critical so long as the orifice is not obstructed; with the film of grease applied to the inside of the cup, the thermometer bulb shall not be in contact with the grease.

4.2 Remove the grease cup and fill by pressing the larger opening into the grease to be tested until the cup is filled, taking care to avoid working of the grease as far as possible. Remove any excess grease with a spatula or knife. Gently press the cup, held in a vertical position with the smaller opening at the bottom, down over the metal rod (3.4) until the latter protrudes about 25 mm. Press the rod against the cup in such a manner that the rod makes contact at both the upper and lower peripheries of the cup. Maintain this contact, rotating the cup on the rod along the index finger so as to give it a helical motion down the rod to remove a conical section of the grease which adheres along the rod. When the cup has finally slipped over the end of the rod, a smooth film of reproducible thickness shall be left inside the cup.

4.3 Place the cup and the thermometer in the test tube and suspend the test tube in the oil bath with the oil level within 6 mm of the rim. If the cork holding the thermometer in the test tube has been properly chosen, the 76 mm immersion mark on the thermometer will coincide with the lower edge of the cork. Immerse the assembly to this point.

4.4 Stir the oil bath, and heat at a rate of 4 to 7 °C per minute until the bath reaches a temperature approximately 17 °C below the expected dropping point of the grease. At this point reduce the rate of heating so that the temperature in the test tube will be within 2 °C or less of the temperature in the oil bath before the oil bath temperature increases an additional 2.5 °C. Continue heating at a rate such that the difference between the temperatures in the test tube and in the oil bath is maintained between 1 and 2 °C. This condition is established when the oil bath is heated at a rate of about 1 to 1.5 °C per minute. As

the temperature increases, grease will gradually protrude through the orifice of the grease cup. When a drop of grease falls, note the temperatures on the two thermometers.

NOTES

1 Certain greases, for example, some aluminium-base greases, form a drop with a tailing thread upon melting, which may break off or which may hold until the drop reaches the bottom of the test tube; in the latter case, note the temperatures when the drop reaches the bottom of the test tube.

2 The dropping points of some greases, particularly those containing aluminium soaps, are known to decrease upon ageing, the change being much greater than the deviation permitted in results obtained by different laboratories. Therefore, comparative tests between laboratories must be made within a period of 6 days.

4.5 Two determinations may be made simultaneously in the same bath provided both samples have approximately the same dropping points.

5 EXPRESSION OF RESULTS

The dropping point is the average of the two readings taken, one on the thermometer in the oil bath and the other on the thermometer in the test tube.

6 PRECISION

The following criteria shall be used for judging the acceptability of results.

6.1 Repeatability

Duplicate results by the same operator using the same apparatus shall be considered suspect if they differ by more than 7 °C.

6.2 Reproducibility

The results submitted by each of two laboratories shall be considered suspect if they differ by more than 13 °C.

NOTE — The precision limits shown are based on a statistical analysis of composite dropping point data obtained by eight operators on nine greases. The average number of tests per laboratory on each sample was three plus. Dropping points of the nine samples ranged from 88 to 260 °C. Precision varied with dropping point range as follows:

Dropping point range (approximate) °C	Repeatability °C	Reproducibility °C
88 to 105	2	7
165 to 191	8	12
205 to 260	8	20

7 TEST REPORT

The test report shall give the result obtained and make reference to this International Standard.