

INTERNATIONAL STANDARD

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6247**

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Petroleum products — Determination of foaming characteristics of lubricating oils

*Produits pétroliers — Détermination des caractéristiques de moussage
des huiles lubrifiantes*



Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6247 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

Annexes A and B form an integral part of this International Standard.

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Petroleum products — Determination of foaming characteristics of lubricating oils

WARNING – The use of this International Standard may involve hazardous materials, operations and equipment. This International Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a method for the determination of the foaming characteristics of lubricating oils at specified moderate temperatures. It is applicable to lubricants which may or may not contain additives to modify or suppress the tendency to form stable foams. The ratings used to describe the foaming tendency and/or stability are empirical.

NOTE 1 This method may be used to indicate potential problems in lubrication, cavitation and loss in systems where foam formation adversely affects equipment operation.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3696:1987, *Water for analytical laboratory use – Specification and test methods*.

ISO 6353-2:1983, *Reagents for chemical analysis – Part 2: Specifications – First series*.

ISO 6353-3:1987, *Reagents for chemical analysis – Part 3: Specifications – Second series*.

3 Terms and definitions

For the purposes of this International Standard, the following definitions apply.

3.1 diffuser

device for dispersing gas into liquid

3.2 foam

a collection of bubbles formed in, or on the surface of, a liquid in which the air (gas) is the major component on a volumetric basis

3.3 lubricant

any material interposed between two surfaces that reduces the friction or wear between them

3.4 maximum pore diameter

the diameter of a capillary of circular cross-section, expressed in micrometres, which is equivalent, with respect to surface tension effects, to the largest pore of the diffuser under consideration

3.5 permeability

the flow of gas through the gas diffuser, in millilitres per minute, under a gas pressure of 2,45 kPa

4 Principle

The test portion, maintained at 24 °C, is blown with air at a constant rate for 5 min, then allowed to settle for 10 min. The volume of foam is measured at the end of each period. The test is repeated on a second test portion at 93,5 °C, and then, after collapsing the foam, at 24 °C.

5 Reagents and materials

During the analysis, unless otherwise stated, use only reagents specified in ISO 6353-2 and ISO 6353-3, if listed there, or of analytical reagent grade, and water conforming to grade 3 of ISO 3696.

5.1 Heptane.

5.2 Methylbenzene (toluene).

5.3 Acetone.

5.4 Propan-2-ol.

5.5 Detergent, non-ionic, soluble in water.

5.6 Butylphthalate, for flowmeter (6.4) if required.

6 Apparatus

6.1 Foaming test apparatus, illustrated in figure 1, and consisting of the following:

6.1.1 Graduated cylinder, of 1 000 ml capacity, graduated in 10 ml increments. The distance from the inside bottom to the 1 000 ml graduation shall be 335 mm to 385 mm. The top shall be circular, and if cut, shall be smoothed by fine polishing or grinding.

NOTE 2 Cylinders with spouts can have the top portion cut off below the spout to produce the circular top.

6.1.2 Stopper, of rubber or other suitable material, to fit the circular top of the graduated cylinder. There shall be a central hole to accommodate the air-inlet tube, and a second off-centre hole to accommodate the air-outlet tube.

6.1.3 Diffuser, spherical, of fused crystalline alumina grain with a diameter of 25,4 mm, or cylindrical, of sintered 5 µm porous stainless steel, and conforming to the following specification as measured by the procedures specified in annex A.

Pore diameter: 80 µm maximum

Permeability: 3 000 ml/min to 6 000 ml/min

NOTE 3 Diffusers may be attached to the air-inlet tube by any convenient means. A suitable arrangement is shown in figure 2.

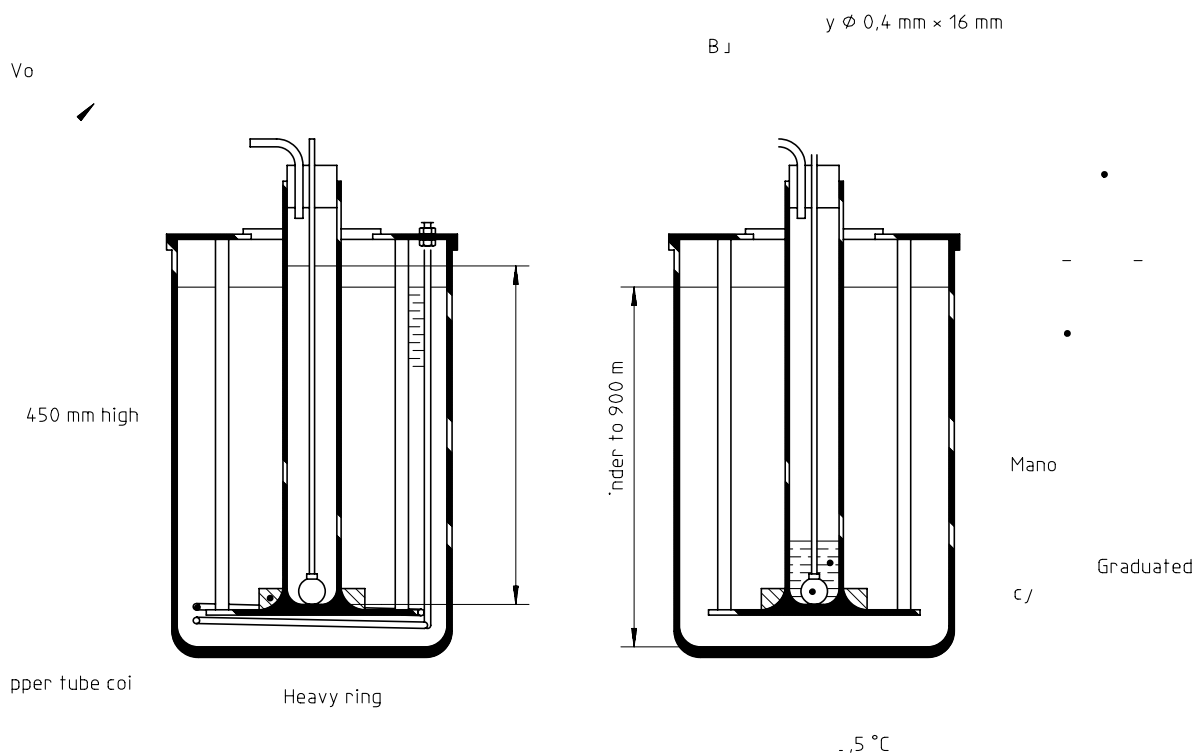


Figure 1 — Foaming test apparatus

Dimensions in millimetres

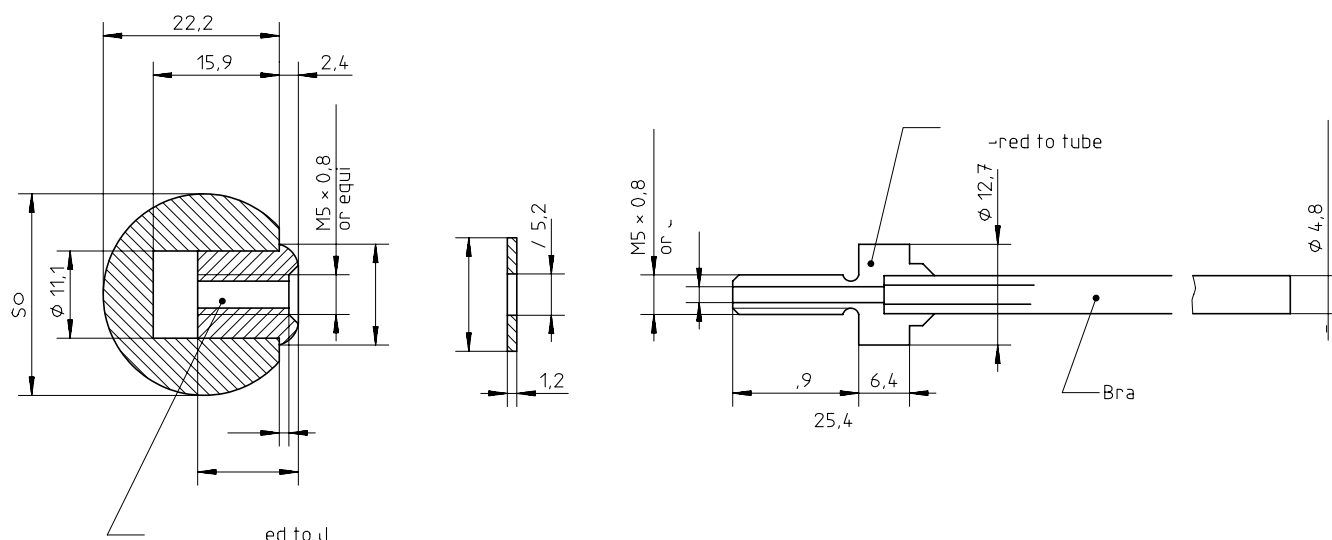


Figure 2 — Suitable attachment of diffuser to air inlet tube

6.2 Test baths, of a size sufficient to immerse the graduated cylinder (6.1.1) to at least the 900 ml mark and capable of being maintained at the specified test temperature $\pm 0,5$ °C. Both the bath and bath liquid shall be transparent enough to read graduations on the immersed cylinder.

NOTE 4 Cylindrical borosilicate glass jars approximately 300 mm in diameter and 450 mm in height make satisfactory baths.

NOTE 5 It is recommended that the 93,5 °C bath is placed inside a clear container of sufficient capacity to contain the liquid in the event of breakage.