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Vitreous and porcelain enamels — Apparatus for testing with acid and neutral liquids and their vapours

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FOREWORD

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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 2733 was drawn up by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*, and circulated to the Member Bodies in June 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Italy	Sweden
Egypt, Arab Rep. of	Japan	Switzerland
France	Netherlands	Thailand
Germany	New Zealand	Turkey
Hungary	Poland	United Kingdom
India	Portugal	U.S.S.R.
Ireland	Romania	
Israel	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

Vitreous and porcelain enamels – Apparatus for testing with acid and neutral liquids and their vapours

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the apparatus to be used for testing the resistance of flat surfaces of vitreous and porcelain enamels to attack by solutions such as acid and neutral liquids and their vapours.

This apparatus permits the determination of the resistance of vitreous and porcelain enamels to the liquid and vapour phases of the corrosive medium within one testing period.

2 REFERENCES

ISO/R 695, *Determination of the resistance of glass to attack by a boiling aqueous solution of mixed alkali.*

ISO/R 718, *Methods for thermal shock tests on laboratory glassware.*

ISO/R 719, *Determination of the hydrolytic resistance of glass grains at 98 °C.*

ISO/R 868, *Plastics – Determination of indentation hardness of plastics by means of a durometer (Shore hardness).*

3 APPARATUS

The testing apparatus (see figure 1) consists of a cylinder (see figure 2) with two adjacent supports with standard sockets for holding a return flow cooler on one side and a thermometer on the other. The thermometer is for measuring the temperature of the vapour chamber.

Two test specimens form the top and bottom of the cylinder. The cylinder with the specimens is supported between two triangular plates (see figure 3), locked at the corners by three screw bolts, three wing nuts and three hexagonal nuts. Between the triangular plates and specimen an asbestos washer is fixed. The specimens are sealed against the ground edges of the cylinder with packing rings, the material of which is dependent on the type of test solution.

When testing specimens cut from an enamelled article, the packing rings are to be replaced by protective envelopes (see figure 4) in which the specimens are placed.

The apparatus is heated externally by a heater placed upon the lower half of the cylinder.

The testing apparatus is composed of the following parts :

3.1 Cylinder (see figure 2) of water-, acid-, alkali- and heat-resistant glass, for example borosilicate glass. When the glass is tested according to ISO/R 719, the consumption of 0,01 N hydrochloric acid shall not exceed 0,10 g per gram of glass grains. According to ISO/R 695, the loss in mass per unit area of the glass shall not exceed 3,0 mg/dm². When the cylinder is tested according to ISO/R 718, it shall pass the test without breaking at a difference in temperature of at least 120 °C.

3.2 Return flow cooler, for example a Liebig condenser, with a jacket length of 400 mm and standard ground joint.

3.3 Thermometer with standard ground joint, a range of 0 to 250 °C and a graduation interval of 1 °C.

3.4 Two triangular plates of surface-protected steel, shown in figure 3.

3.5 Three hexagonal nuts with a thread fitting the screw bolt.

3.6 Three wing nuts with a thread fitting the screw bolt.

3.7 Three screw bolts of corrosion-resistant steel.

3.8 Two asbestos washers.

3.9 Two packings specified in clause 4.

3.10 Heater, 500 W, of heat-conducting alloy covered with asbestos.

3.11 Heat-control device, for example rheostat, variable transformer, electronic control equipment.

4 PACKINGS

The method of packing the specimens towards the ground edges of the cylinder depends on the type of specimen and the type of test solution. The International Standard for the test method in question specifies which of the three following packings should be used during testing.

a) Packing A

Compressed asbestos-fibre washers : 100 mm external diameter, 79 ± 1 mm internal diameter, 2 mm thick, covered with a plastics material resistant to acid at 140°C (for example polytetrafluorethylene).

b) Packing B

Packing ring : 100 mm external diameter, $80 - 0,3^0$ mm internal diameter, 2 to 3 mm thick, consisting of rubber with Shore hardness A/70/1 according to ISO/R 868, resistant to acid and water at 140°C (for example neoprene).

c) Packing C

Protective envelope shown in figure 4, consisting of rubber with Shore hardness A/70/1 according to ISO/R 868, resistant to acid and water at 140°C (for example neoprene).

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Dimensions in millimetres

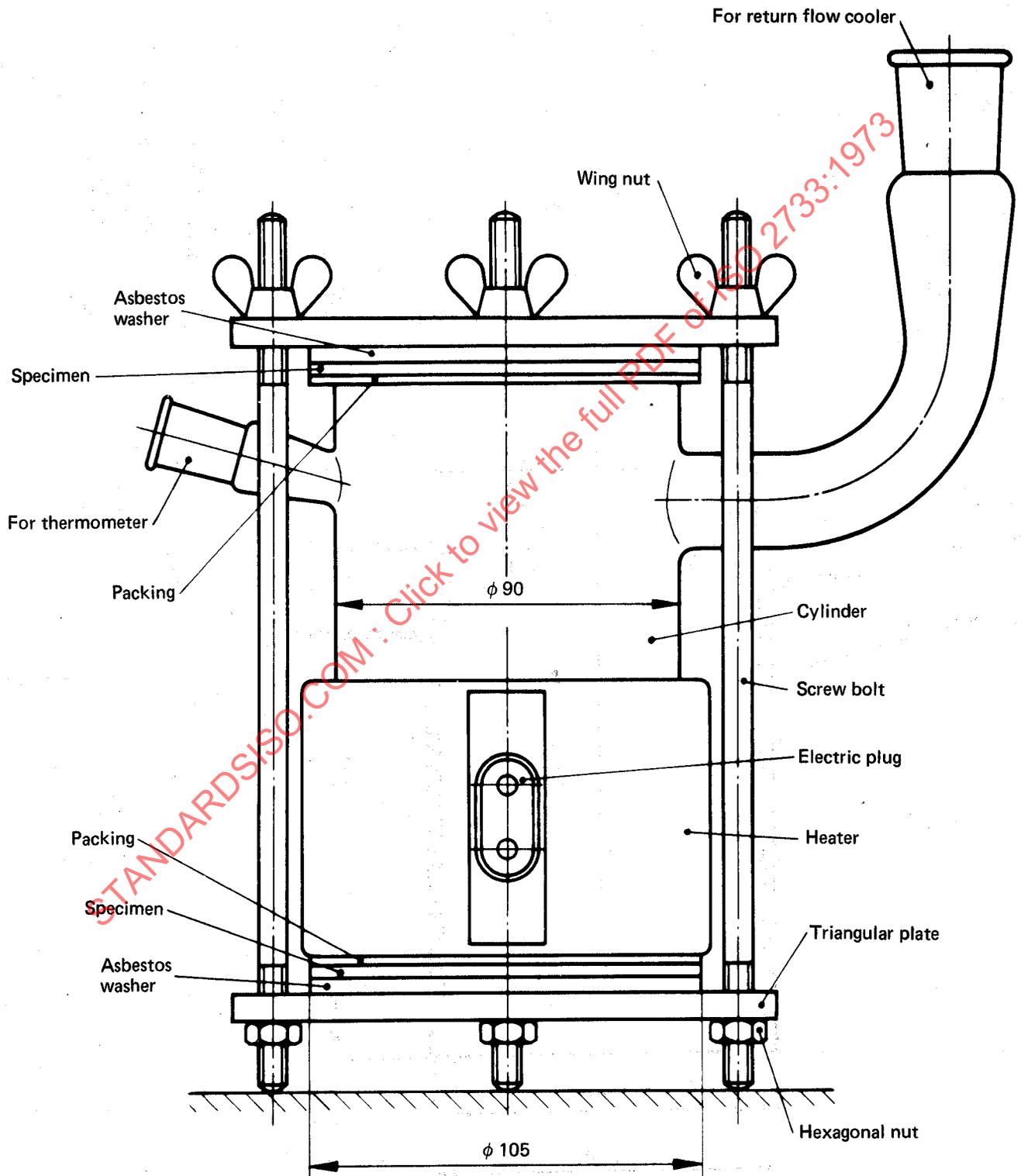


FIGURE 1 - Testing apparatus

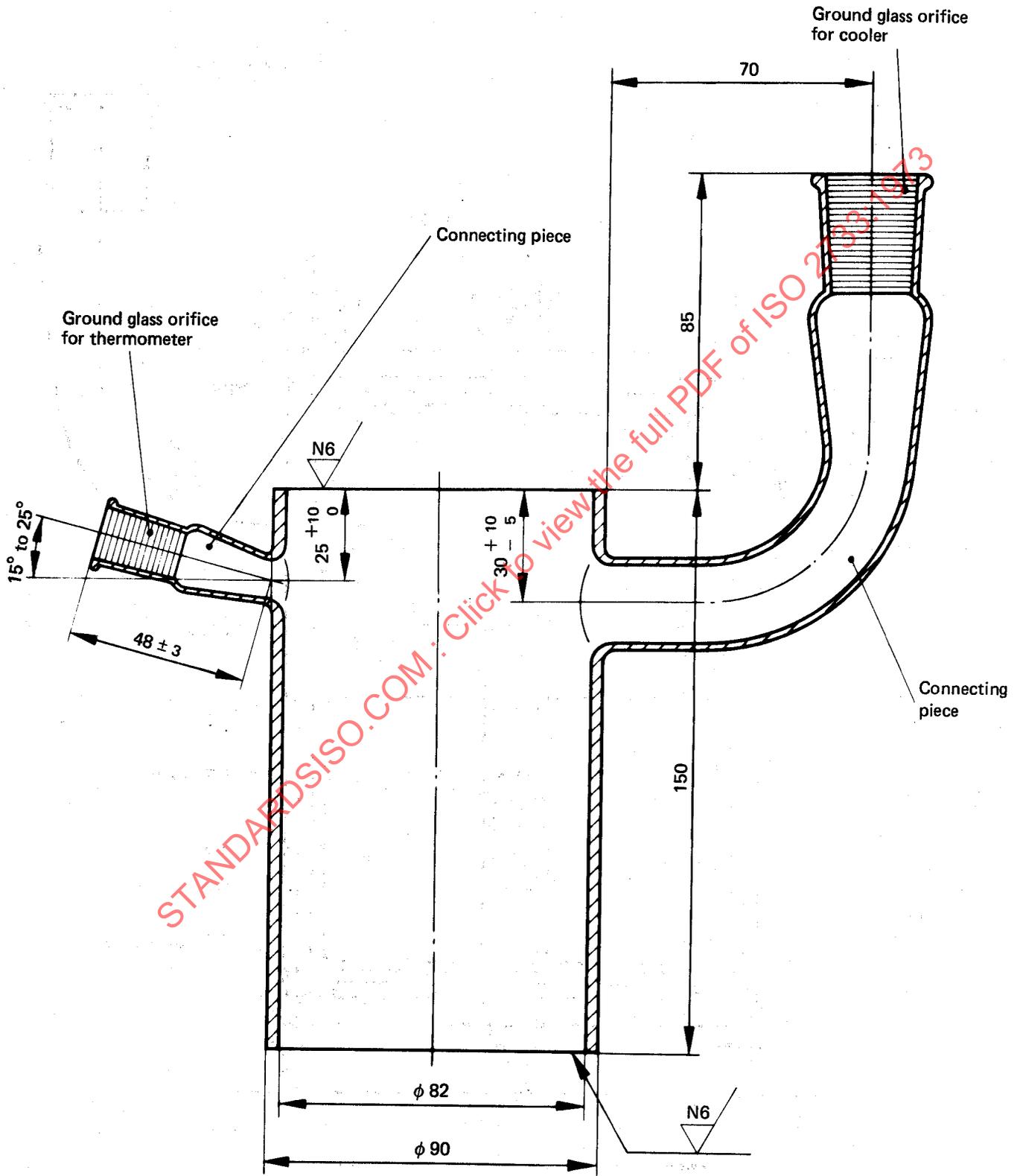


FIGURE 2 - Cylinder