SLOVENSKI STANDARD
SIST EN 299:2000

01-junij-2000

Tlaļ ne ġobe za razprġevanje olja pri gorilnikih - Ugotavljanje kota in razprġevalnih znaļ ilnosti

Oil pressure-atomizing nozzles - Determination of the angle and spray characteristics

Öldruckzerstäuberdüsen - Prüfung der Sprühcharakteristik und des Winkels

Gicleurs sans retour pour brûleurs à fioul domestique à pulvérisation - Détermination de l'angle et des caractéristiques de pulvérisation

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ICS:

27.060.10	Gorilniki na tekoļ e in trdo gorivo	Liquid and solid fuel burners

SIST EN 299:2000 **en**

EUROPEAN STANDARD
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ICS 27.060.10

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English version

Oil pressure atomizing nozzles - Determination of the angle and spray characteristics

Gicleurs sans retour pour brûleurs à fioul domestique à pulvérisation - Détermination de l'angle et des caractéristiques de pulvérisation

Öldruckzerstäuberdüsen - Prüfung der Sprühcharakteristik und des Winkels

This European Standard was approved by CEN on 4 September 1998.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 299:1998 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 47 "Atomizing oil burners and their components - Function - Safety - Testing", the secretariat of which is held by DIN.

This European Standard supersedes ENV 299:1992.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 1999, and conflicting national standards shall be withdrawn at the latest by March 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1. Definitions

For the purposes of this standard, the following definitions apply:

1.1 Radial Spray Distribution - Spray angle

The variation in liquid flux when proceeding from the nozzle axis to the edge of the conical spray pattern at a specified distance from the atomizer.

1.2 Index Angle Y

The plane angle formed by a conical spray, wherein the magnitude of the angle shall be determined by a specified percentage, e.g. 80 %, of the total volume of liquid collected in a radial patternator.

1.3 Cumulative volume

The aggregate volume of liquid, expressed as a percentage of the total volume collected in a radial patternator, when proceeding from the spray axis (center of the patternator) to the edge of the spray pattern.

1.4 Radial Patternator

A device comprising a serie of concentric annular compartments with a row of collection cylinders that is capable of measuring the radial spray distribution, as defined in 1.1.

1.5 Index

An arbitrary number assigned to a group of oil burner nozzles having similar spray patterns; e. g. "I" indicating "solid".

2 Normative References

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 293
Oil pressure atomizing nozzles - Minimum requirements - Testing

3. Testing

3.1 Testing of the Radial Distribution/Spray pattern

3.1.1 Test equipment

The radial patternator, as shown in Figures 1 and 2, is a cylindrical vessel having a bottom plate comprising 14 concentric dividers that provide annular compartments from which liquid may be drained into graduated collection cylinders.

During testing, the top of the vessel is covered with a lid at whose center a nozzle holder is mounted, which is vertically adjustable, so that the specified distance can be maintained between the nozzle orifice and the upper beveled edges of the dividers.

Means shall be taken to ensure that the annular compartments and collection cylinders are not exposed to the spray prior or subsequent to the period designated for the collection of liquid.

3.1.2 Test procedure

The nozzle to be tested is mounted in the nozzle holder. The latter is adjusted so that the axial distance between the nozzle orifice and the upper edges of the dividers is 50 mm.

Testing shall be conducted with a reference oil as specified by EN 293. The total volume atomized during each test shall be at least 80 ml and shall in any case be sufficient to provide representative quantities of liquid in the collection cylinders.

At the conclusion of each test, the liquid volumes in each cylinder shall be recorded.

3.1.3 Processing of Test Data

The recorded liquid volumes shall be tabulated along with the corresponding cumulative percentage volumes (see table 3). Using the listed plane angles for each annular compartment, the cumulative volume (starting at the center of the patternator) may be correlated with the plane angle subtended by that volume. Using this procedure, the continuous radial distribution may be represented in tabular or graphical form.

3.1.4 Spray Uniformity and Angle Ratio

The radial mass-distribution is a measure of spatial uniformity at a specified distance from the atomizer. For example, a nozzle with "solid" spray pattern is relatively uniform, whereas a nozzle with "hollow" spray pattern is characterized by a high concentration of liquid at the outside of the spray cane.

An indication of uniformity or pattern type can be given by calculating the 50 % / 80 % angle ratio. The two angles are those which correspond to the 50 % and 80 % cumulative volumes, respectively may be determined by linear interpolation between the values (see table 3) that bracket the 50 % and 80 % points in table 3 (see 3.2.4).

3.1.5 Classification of Pattern Types

The defined angle ratio is the basis for classifying spray pattern to the arbitrary indices in Table 1.

Table 1

Index	50 % / 80 % Angle ratio	Qualtitative description of spray pattern
I	> 0,700	Solid
II	0,700 to 0,749	Semi-Solid
III	0,750 to 0,799	Semi-Hollow
IV	≥ 0,800	Hollow

3.2 Testing of the Index Angle

3.2.1 Test Equipment

See 3.1.1

3.2.2 Test Procedure

See 3.1.2

3.2.3 Processing of Test Data

See 3.1.3

3.2.4 Computation of Index Angle

The index angle for this standard is quantitatively defined as the 80 % angle. This is the angle corresponding to the inner angle where 80 % of the liquid volume is collected.

$$\gamma = \alpha + \left[\frac{(\beta - \alpha) \times (V - V_1)}{(V_2 - V_1)} \right]$$

γ = Index angle

V = 50 %, if the 50 % Index angle is to be computed, 80 %, if the 80 % Index angle is to be computed.

V_1 = Cumulative volume in percent collected in all patternator compartments up to and including the compartment such that V_1 is as large as possible without exceeding the value of 80 %, if the 80 % angle is computed, or without exceeding 50 %, if the 50 % angle is computed.

V_2 = Cumulative volume in percent collected in all patternator compartments up to and including the compartment such that V_2 is as small as possible but still exceeds the value of 80 %, if the 80 % angle is computed, or still exceeds the value of 50 %, if the 50 % angle is computed.

α = Plane angle subtended by outer edge of compartment corresponding to V_1

β = Plane angle subtended by outer edge of compartment corresponding to V_2.

Tabelle 2: Tolerances for the 80 % volume index angle marking are

Angle marking degrees	Tested angle degrees
50	45 to 55
60	56 to 65
70	66 to 75
80	76 to 85
90	86 to 95
100	96 to 105

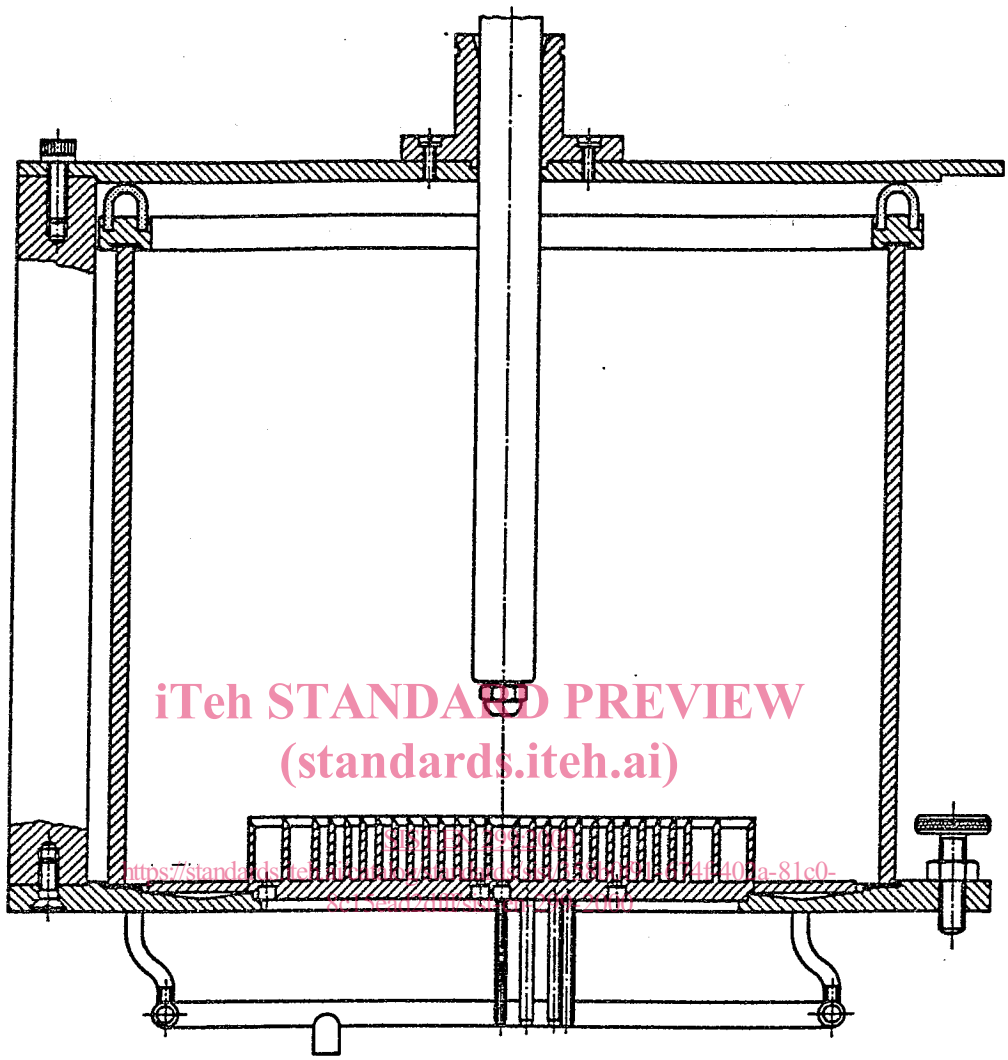

Figure 1

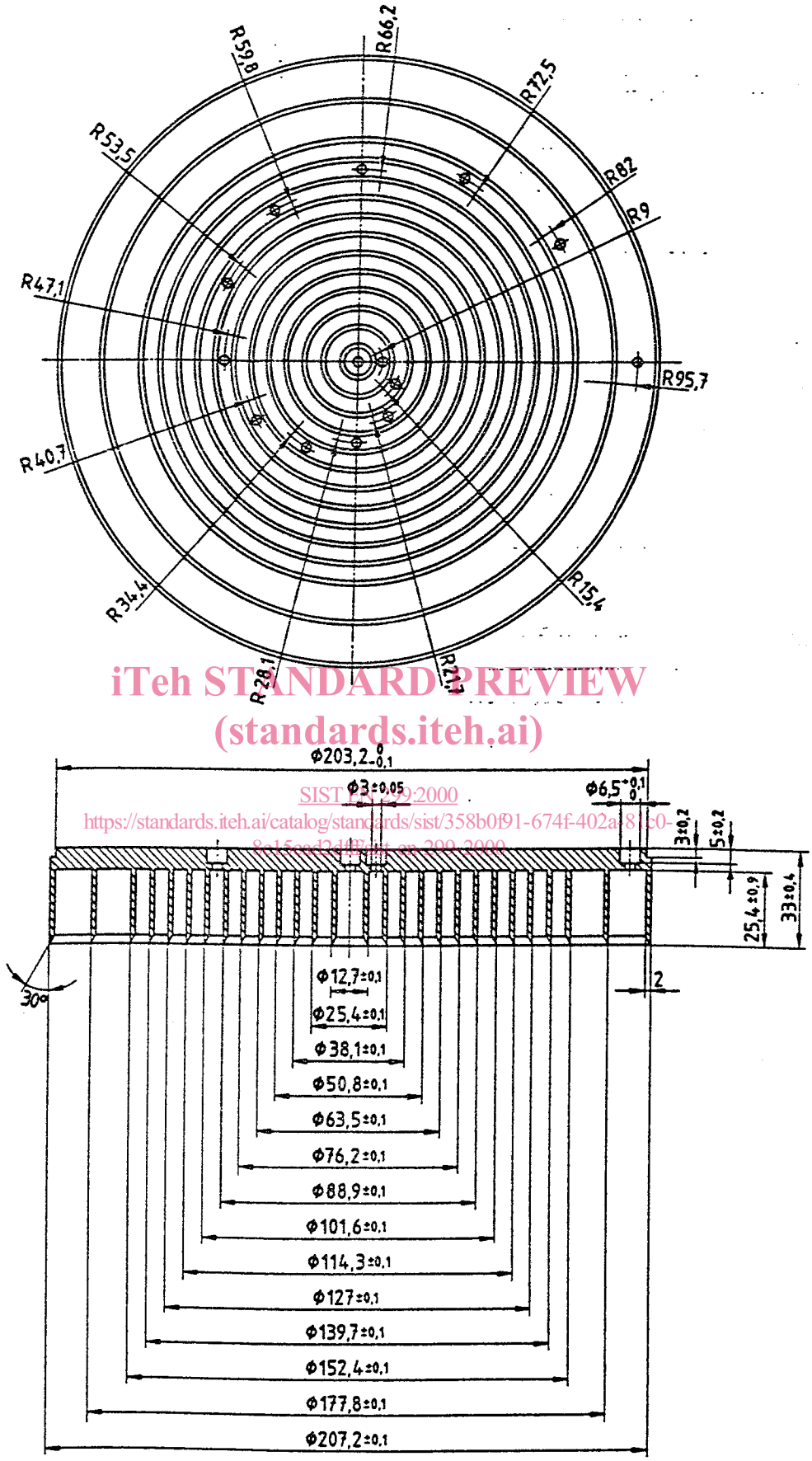

Figure 2