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Plinske naprave za gostinstvo - 2. del: Smotrna raba energije

Gas heated catering equipment - Part 2: Rational use of energy

Großküchengeräte für gasförmige Brennstoffe - Teil 2: Rationelle Energienutzung

Appareils de cuisine professionnelle utilisant les combustibles gazeux - Partie 2: Utilisation rationnelle de l'énergie

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CEN

European Committee for Standardization
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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 106 "Large kitchen appliances using gaseous fuels", the secretariat of which is held by AFNOR.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

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of an identical text or by endorsement, at the latest by July 1995, and conflicting national standards shall be withdrawn at the latest by December 1995.

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

1 Scope

This European Standard sets out the requirements and test methods for the rational use of energy of gas heated catering equipment, described in 1.1 of EN 203-1: 1992.

2 Normative references

This present standard incorporates by means of dated or undated references, 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 those publications apply to this standard only if incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 203-1: 1992 *Gas heated catering equipment - Part 1: Safety requirements*

3 Performance characteristics

3.1 General performance

For each of the following appliances, tests are carried out under general conditions of test 4.1.

3.2 Open flame burners

When tested in accordance with 4.2, the thermal efficiency shall be not less than 50 %.

Burners for specific cooking applications (paella, wok, galettoire etc.) are not subject to the efficiency test.

3.3 Ovens (traditional, convection and combined convection/steaming)

When tested in accordance with 4.3, the gas rate in kilowatts (kW) required to maintain the stated temperature shall not exceed:

$$0{,}22\ \sqrt[3]{V^2}$$

where

V is the volume of the cooking space in cubic decimeters (dm^3).

Volume is defined as the usable shelf area multiplied by the height of the door opening.

3.4 Boiling pans

When tested in accordance with 4,4, the thermal efficiency shall be not less than:

- for direct fired pans, 50 %
- for jacketed pans, 45 %

3.5 Fryers

When tested in accordance with 4.5 the thermal efficiency shall be not less than 50 %.

3.6 Hot cupboards

When tested in accordance with 4.6, the gas rate in kilowatts (kW) required to maintain the stated temperature shall not exceed:

$$0{,}05\ \sqrt[3]{V^2}$$

where

V is the volume of usable cupboard space in cubic decimeters.

Volume is defined as the usable shelf area multiplied by the height of the door opening.

3.7 Water boilers - continuous flow

When tested in accordance with 4.7, the thermal efficiency shall be not less than 60 %.

3.8 Water boilers - bulk

When tested in accordance with 4.8, the thermal efficiency shall be not less than 50 %.

4 Test conditions

4.1 General conditions of test

4.1.1 *Test room*

The test room shall be maintained at an ambient temperature of (20 + 5) °C unless otherwise specified.

The room shall be adequately ventilated, but free from draughts likely to affect the performance of the appliance.

4.1.2 *Preparation of appliance*

The appliance shall be installed and adjusted according to the manufacturer's instructions, using one of the reference test gases of the appropriate family and group at the normal appliance inlet pressure.

Before any tests are made, the appliance shall be operated at its full working temperature and at its nominal rate for a period sufficient to dry the insulation and to remove any products from temporary finish which might affect the testing.

The appliance shall be at room temperature at the start of each test unless otherwise stated.

During testing, the initial adjustment of the appliance shall not be altered unless specifically required by the test method.

Test pressure shall be measured correct to within ±2 % and controlled so that the variation does not exceed ±2 %.

Unless otherwise specified, appliances with regulating or limiting devices shall be tested with those devices at their maximum setting if the setting is intended to be altered by the user.

Appliances requiring a water supply shall be connected to a supply of appropriate pressure and the water level adjusted in accordance with the manufacturer's instructions. If not designed to be connected to a water supply, the water container shall be filled to the indicated level for each test and, when necessary, be maintained at this level during the test.

4.2 Open flame burners

4.2.1 *General*

The burner is adjusted to its nominal rate.

The test in 4.2.2 is carried out with the pan support in place.

Aluminium pans are used which have a matt base, polished sides and the characteristics described in table 9 of EN 203-1: 1992.

The test is carried out with the pan lid in place.

The required area of the base of the pan is given by the following formula:

$$S = 212\ Q_n$$

where

Q_n is the nominal heat input based on net calorific value, in kilowatts;

S is the area of the base in square centimetres.

If there is no pan corresponding to the heat input of the burner, two tests are carried out, one with a pan having the immediately greater diameter and one with a pan having the immediately smaller diameter.

The results are plotted on a graph, and a result corresponding to the calculated area is obtained by interpolation.

4.2.2 *Efficiency*

The pan is filled with the quantity of water corresponding to the heat input stated in table 9 of EN 203-1.

The initial temperature of the water shall be (20 ± 1) °C when measured at the centre of the water, using a mercury thermometer or equivalent, fixed by a correctly adjusted stopper through the lid.

The burner is extinguished as soon as the rise in temperature of the water reaches 70 K.

It is then considered that the hot condition has been reached.

The pan previously used is replaced with the standard pan (see table 9) containing the corresponding mass of water at (20 ± 1) °C.

As soon as the water temperature reaches 70 K above its initial value, the burner is extinguished and the gas consumption and maximum water temperature attained are measured.

The efficiency is given by:

$$\eta = m \times C_p \times \frac{(t_2 - t_1)}{V_c \times H_i} \times 100$$

where

η is the efficiency, in per cent;

m is the mass of water, in kilograms;

C_p is the specific heat of water [4, 186 x 10^{-3} MJ/ (kg °C)];

t_1 is the initial water temperature, in degrees Celsius;

t_2 is the final water temperature, in degrees Celsius;

V_c is the volume or mass of gas burned, in cubic metres or kilograms.

The volume of gas consumed determined from the volume measured is given by:

$$V_c = V_{mes} \times \frac{p_a + p - p_w}{1\ 013{,}25} \times \frac{288{,}15}{273{,}15 + t_g}$$

where:

V_{mes} is the volume of gas measured in cubic metres;

p_a is the atmospheric pressure in millibars;

p is the supply pressure of the gas at the point of measurement of the heat input in millibars;

p_w is the partial pressure of water vapour in millibars;