SLOVENSKI STANDARD

SIST EN 1020:1999/A1:2002

01-april-2002

Plinski grelniki zraka s prisilno konvekcijo za ogrevanje nestanovanjskih prostorov, z imensko moļ jo do vkljuļ no 300 kW, z ventilatorjem za zgorevalni zrak in/ali produkte zgorevanja - Dopolnilo A1

Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, incorporating a fan to assist transportation of combustion air and/or combustion products

Gasbefeuerte Warmlufterzeuger mit erzwungener Konvektion zum Beheizen von Räumen für den nicht-häuslichen Gebrauch mit einer Nennwärmebelastung nicht über 300 kW, mit Gebläse zur Beförderung der Verbrennungsluft und/oder der Abgase

Générateurs d'air chaud a convection forcée utilisant les combustibles gazeux pour le chauffage de locaux autres que l'habitat individuel de débit calorifique sur PCI inférieur ou égal a 300 kW, comportant un ventilateur pour aider l'alimentation en air comburant et/ou l'évacuation des produits de combustion

Ta slovenski standard je istoveten z: **EN 1020:1997/A1:2001**

ICS:

97.100.20

SIST EN 1020:1999/A1:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1020:1997/A1

September 2001

ICS 97.100.20

English version

Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, incorporating a fan to assist transportation of combustion air and/or combustion products

Générateurs d'air chaud à convection forcée utilisant les combustibles gazeux pour le chauffage de locaux autres que l'habitat individuel de débit calorifique sur PCI inférieur ou égal à 300 kW, comportant un ventilateur pour aider l'alimentation en air comburant et/ou l'évacuation des produits de combustion

Gasbefeuerte Warmlufterzeuger mit verstärkter Konvektion zum Beheizen von Räumen für den nicht-häuslichen Gebrauch mit einer Nennwärmebelastung nicht über 300 kW, mit Gebläse zur Beförderung der Verbrennungsluft und/oder der Abgase

This amendment A1 modifies the European Standard EN 1020:1997; it was approved by CEN on 18 August 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This amendment 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 1020:1997/A1:2001 E

Foreword

This Amendment EN 1020:1997/A1:2001 to the EN 1020:1997 has been prepared by Technical Committee CEN/TC 179 "Gas-fired air heaters", the secretariat of which is held by NEN.

This Amendment to the European Standard EN 1020:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2002, and conflicting national standards shall be withdrawn at the latest by March 2002.

This Amendment to the European Standard EN 1020:1997 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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.

2 Normative references

Add:

"CR 1404 Determination of emissions from appliances burning gaseous fuels during type testing"

5.1.5.3 Other pollutants

Add subclause 5.1.5.3 with following text:

Under the test and calculation conditions of 6.3.5.5, the NO_x concentration in the dry air-free products of combustion shall not exceed 260 mg/kWh or the manufacturer's declared maximum concentration, whichever is the lower. However, for appliances intended to use only third family gases, the limit NO_x value is multiplied by a factor of 1,60. For appliances intended to use propane only, the limit NO_x value is multiplied by a factor of 1,50.

6.3.5.5 Other pollutants

Add subclause 6.3.5.5 with following text:

6.3.5.5.1 General

The appliance is installed as specified in 6.3.5.1.

For appliances intended to use second and third family gases, the tests are carried out with reference gas G 20. For appliances intended to use only G 25, the tests are carried out with reference gas G 25. For appliances intended to use only third family gases, the tests are carried out with reference gas G 30. For appliances intended to use propane only, the tests are carried out with reference gas G 31.

The appliance is adjusted to its nominal heat input and, where appropriate, to other heat inputs provided by the controls.

The NO_x measurements are carried out when the appliance is at thermal equilibrium, conforming with details given in CR 1404.

The reference conditions for the combustion air are:

— temperature : 20 °C;

— humidity : 10 g H_2O /kg air.

If the test conditions are different from these reference conditions, it will be necessary to correct the NOx values as specified below.

$$NO_{x,0} = NO_{x,m} + \frac{0{,}02\ NO_{x,m} - 0{,}34}{1 - 0{,}02\,(h_m - 10)}(h_m - 10) + 0{,}85\,(20 - T_m)$$

Where

$NO_{x,0}$ is the value of NO_x corrected to the reference conditions expressed in milligram per kilowatt hour (mg/kWh);

$NO_{x,m}$ is the NO_x measured at h_m and T_m in milligram per kilowatt hour (mg/kWh) in the range 50 mg/kWh to 300 mg/kWh;

h_m is humidity during the measurement of $NO_{x,m}$ in g/kg in the range 5 g/kg to 15 g/kg;

T_m is the ambient temperature during the measurement of $NO_{x,m}$ in °C in the range 15 °C to 25 °C.

The measured NO_x values are weighted in accordance with 6.3.5.5.2. It is checked that the weighted NO_x value does not exceed the limit value stated in 5.1.5.3.

For the calculation of conversions of NO_x, see Annex K.

6.3.5.5.2 Weighting

The measured NO_x values are weighted using the formulae below, which take into account the efficiency of the appliance, its heat capacity and its usage characteristics.

On/off appliances: $E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}}$

High/low appliances:

with $Q_{min} \geq 60$ %: $0{,}2\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}8\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

with 60 % > $Q_{min} \geq 50$ %: $0{,}25\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}75\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

with 50 % > $Q_{min} \geq 40$ %: $0{,}33\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}67\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

with 40 % > $Q_{min} \geq 30$ %: $0{,}5\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}5\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

with $Q_{min} < 30$ %: $E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}}$

Modulating appliances:

with $Q_{min} \geq 60$ %: $0{,}2\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}8\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

with $Q_{min} < 60$ %: $0{,}2\,E_{Q_n} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_n}} + 0{,}4\,E_{Q_{60}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{60}}} + 0{,}4\,E_{Q_{min}} \cdot \frac{9\,\eta_{ref}}{10\,\eta_{Q_{min}}}$

Where

E_{Qn} is the emission figure at nominal heat input;

E_{Qmin} is the emission figure at minimum heat input;

E_{Q60} is the emission figure at 60 % of the nominal heat input;

η_{ref} is the reference efficiency, i.e. the applicable efficiency requirement stated in 5.2;

η_{Qn} is the efficiency at nominal heat input;

η_{Qmin} is the efficiency at minimum heat input;

η_{Q60} is the efficiency at 60 % of the nominal heat input.

NOTE: See also 5.2, where Q_{min} is understood to be any heat input lower than the nominal heat input, and for which both the efficiency and the NO_x emission figure are measured.

7.3.7 Emissions

Add subclause 7.3.7 with following text:

The manufacturer may choose to declare the weighted NO_x emission value or to express it by a class according to the following list:

— Class 1, for values not exceeding 250 mg/kWh;

— Class 2, for values not exceeding 200 mg/kWh;

— Class 3, for values not exceeding 150 mg/kWh;

— Class 4, for values not exceeding 100 mg/kWh;

— Class 5, for values not exceeding 50 mg/kWh.

The value or class may be marked on the appliance or contained in the technical data.

Annex K

(informative)

Calculation of conversions of NO_x

Table K.1 - Conversion of the emission value of NO_x for first family gases

1×10^{-6} = 2,054 mg/m³ (1×10^{-6} = 1 cm³/m³)		G 110	
		mg/kWh	mg/MJ
O_2 = 0 %	1×10^{-6} =	1,714	0,476
	1 mg/m³ =	0,834	0,232
O_2 = 3 %	1×10^{-6} =	2,000	0,556
	1 mg/m³ =	0,974	0,270

Table K.2 - Conversion of the emission value of NO_x for second family gases

1×10^{-6} = 2,054 mg/m³ (1×10^{-6} = 1 cm³/m³)		G 20		G 25	
		mg/kWh	mg/MJ	mg/kWh	mg/MJ
O_2 = 0 %	1×10^{-6} =	1,764	0,490	1,797	0,499
	1 mg/m³ =	0,859	0,239	0,875	0,243
O_2 = 3 %	1×10^{-6} =	2,059	0,572	2,098	0,583
	1 mg/m³ =	1,002	0,278	1,021	0,284

Table K.3 - Conversion of the emission value of NO_x for third family gases

1×10^{-6} = 2,054 mg/m³ (1×10^{-6} = 1 cm³/m³)		G 30		G 31	
		mg/kWh	mg/MJ	mg/kWh	mg/MJ
O_2 = 0 %	1×10^{-6} =	1,792	0,498	1,778	0,494
	1 mg/m³ =	0,872	0,242	0,866	0,240
O_2 = 3 %	1×10^{-6} =	2,091	0,581	2,075	0,576
	1 mg/m³ =	1,018	0,283	1,010	0,281