

Kõrgele paigaldatavad mitme põletiga, soojust kiirgava toruga gaasküttega soojussüsteemid mittekoduseks kasutamiseks. Osa 1: Süsteem D. Ohutus

Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use - Part 1: System D - Safety

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 777-1:2009 sisaldab Euroopa standardi EN 777-1:2009 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 30.09.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 11.03.2009.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 777-1:2009 consists of the English text of the European standard EN 777-1:2009.

This standard is ratified with the order of Estonian Centre for Standardisation dated 30.09.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 11.03.2009.

The standard is available from Estonian standardisation organisation.

ICS 97.100.20

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

English Version

Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use - Part 1: System D - Safety

Tubes radiants suspendus à multi-brûleurs utilisant les
combustibles gazeux à usage non-domestique - Partie 1 :
Système D - Sécurité

Dunkelstrahlersysteme mit mehreren Brennern mit Gebläse
für gewerbliche und industrielle Anwendung - Teil 1:
System D - Sicherheit

This European Standard was approved by CEN on 24 January 2009.

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

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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
3.1 System and its constituent parts	6
3.2 Adjusting, control and safety devices	9
3.3 System operation	10
3.4 Gases	13
3.5 Conditions of operation and measurement	14
3.6 Country of destination	15
4 Classification of systems	15
4.1 Classification according to the nature of the gases used (categories)	15
4.2 Classification according to the gases capable of being used	15
4.3 Classification according to the mode of evacuation of the combustion products	17
5 Constructional requirements	17
5.1 General	17
5.2 Requirements for adjusting, control and safety devices	22
5.3 Ignition devices	26
5.4 Main burners	27
5.5 Pressure test points	27
5.6 Injectors	27
6 Operational requirements	28
6.1 Soundness	28
6.2 Heat inputs	28
6.3 Limiting temperatures	28
6.4 Ignition, cross-lighting and flame stability	29
6.5 Pressure regulator	29
6.6 Combustion	29
6.7 Prolonged performance	30
6.8 Measurement of oxides of Nitrogen, NO _x	31
7 Test methods	31
7.1 General	31
7.2 Construction and design	38
7.3 Safety of operation	38
7.4 Other pollutants	50
8 Marking and instructions	53
8.1 Marking of the system and the packaging	53
8.2 Instructions	57
8.3 Presentation	61
9 Evaluation of conformity of POCEDs and their associated terminals	61
9.1 General	61
9.2 Type testing	61
9.3 Factory production control (FPC)	62
Annex A (informative) National situations	64
A.1 General	64
A.2 Categories listed in the body of the standard and marketed in different countries	64
A.3 Appliance supply pressures corresponding to the categories given in A.2	66

A.4	Special categories marketed nationally or locally.....	68
A.5	Test gases corresponding to the special categories given in A.4.....	72
A.6	Gas connections in the various countries	73
A.7	Flue connections in the various countries.....	75
Annex B	(informative) System D	76
B.1	Type D systems.....	76
Annex C	(informative) Equivalence rules	78
C.1	Conversion to categories within a restricted Wobbe Index range	78
C.2	Conversion to categories within an identical Wobbe Index range	78
C.3	Conversion to categories within a wider Wobbe Index range.....	79
Annex D	(informative) Calculation of the mass flow rate of flue gases	80
D.1	Flue gas mass flow rate.....	80
D.2	Quantity of air in the flue gas	80
D.3	Flue gas excess air ratio (λ).....	81
D.4	Quantity of water vapour in the flue gas	81
D.5	Quantity of Nitrogen in the flue gas	81
D.6	Quantity of Oxygen in the flue gas.....	81
D.7	Dry quantity of flue gas	82
D.8	Quantity of carbon dioxide in the flue gas	82
Annex E	(informative) Identification of gas types in use in various countries	84
Annex F	(normative) Special national conditions	85
F.1	General.....	85
Annex G	(informative) Calculation example of the weighting factors for a system with several rates	86
G.1	Appliance rates	86
G.2	Weighting of $Q_{pi,\%} = 20$	86
G.3	Weighting of $Q_{pi,\%} = 40$	86
G.4	Weighting of $Q_{pi,\%} = 60$	86
G.5	Weighting of $Q_{pi,\%} = 70$	87
G.6	Total weighting.....	87
Annex H	(informative) Calculation of conversions of NO_x	88
H.1	NO_x emission conversion factors.....	88
H.2	NO_x Conversion — Calculation.....	89
Annex I	(informative) National situations of countries whose national bodies are CEN associate members.....	91
Annex J	(informative) An example of sampling plans	92
J.1	Sampling plans.....	92
J.2	Inspection levels and procedures	93
Annex K	(informative) Flue determination	94
K.1	General conditions of test.....	94
K.2	Test conditions.....	94
K.3	Test procedure	94
K.4	Accuracy of measurement	96
K.5	Calculation of Flue Loss.....	96
Annex ZA	(informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.....	99
Annex ZB	(informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive	102
ZB.1	Scope and relevant characteristics.....	102
ZB.2	Procedure(s) for attestation of conformity of [construction products]	104
ZB.3	CE marking and labelling	107
Bibliography		109

Foreword

This document (EN 777-1:2009) has been prepared by Technical Committee CEN/TC 180 "Domestic and non-domestic gas fired air heaters and non-domestic gas fired overhead radiant heaters", the secretariat of which is held by AFNOR.

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 September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 777-1:1999.

This revision modifies EN 777-1:1999. It has been prepared to incorporate requirements for combustion products evacuation ducts, POCEDs, supplied as an integral part of the system to support the EU Directive 89/106/EEC on construction products under mandate M/105. To this end the systems within the scope of this standard are now defined as Type B₅₂ rather than Type B₂₂.

Furthermore, the opportunity presented by this revision has been taken to update the standard in respect to EN 437:2003.

This document 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).

For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.

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

1 Scope

This European Standard specifies the requirements and test methods for the construction, safety, classification and marking of non-domestic gas-fired overhead radiant tube heaters incorporated into a multi-burner system (called system D and referred to in the body of the text as the “system”) with each burner unit under the control of an automatic burner control system.

This standard is applicable to Type B₅₂ systems (see 4.3) intended for use in other than domestic dwellings, in which the supply of combustion air and/or the evacuation of the products of combustion is achieved by mechanical means.

This standard is not applicable to:

- a) systems designed for use in domestic dwelling;
- b) outdoor systems;
- c) systems of heat input in excess of 120 kW (based on the net calorific value of the appropriate reference test gas);
- d) systems having a draught diverter;
- e) systems having fully pre-mixed gas and air burners in which:
 - 1) either the gas and all the combustion air are brought together just before the level of the combustion zone; or
 - 2) the pre-mixing of the gas and all combustion air is carried out in a part of the burner upstream of the combustion zone;
- f) systems that are designed for continuous condensation within the flue system under normal operating conditions;
- g) systems having combustion products evacuation ducts that are non-metallic.

This standard is applicable to systems which are intended to be type tested. It also includes requirements concerning the evaluation of conformity, including factory production control, but these requirements only apply to POCEDs and their associated terminals.

NOTE Requirements for systems which are not intended to be type tested would need to be subject to further consideration.

Requirements concerning the rational use of energy have not been included in this European Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the editions cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 88-1:2007, *Pressure regulators and associated safety devices for gas appliances - Part 1: Pressure regulators for inlet pressures up to and including 500 mbar*

EN 126:2004, *Multifunctional controls for gas burning appliances*

EN 161:2007, *Automatic shut-off valves for gas burners and gas appliances*

EN 257, *Mechanical thermostats for gas-burning appliances*

EN 298:2003, *Automatic gas burner control systems gas burners and gas burning appliances with or without fans*

EN 437:2003, *Test gases - Test pressures - Appliance categories*

EN 10226-1:2004, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Taper external threads and parallel internal threads - Dimensions, tolerances and designation*

EN 10226-2:2005, *Pipe threads where pressure tight joints are made on the threads – Part 2: Taper external threads and taper internal threads - Dimensions, tolerances and designation*

EN 60335-1:2002, *Household and similar electrical appliances – Safety - Part 1: General requirements*

EN 60335-2-102:2006, *Household and similar electrical appliances – Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning having electrical connections*

EN 60529:1992, *Degrees of protection provided by enclosures (IP code)*

EN 60584-1:1995, *Thermocouples — Part 1: Reference tables*

EN 60584-2:1993, *Thermocouples — Part 2: Tolerances*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes (ISO 3166-1:2006)*

EN ISO 6976:2005, *Natural gas - Calculation of the calorific value, density, relative density and Wobbe index from composition (ISO 6976:1995 including Corrigendum 1:1997, Corrigendum 2:1997 and Corrigendum 3:1999)*

ISO 7005-1:1992, *Metallic flanges - Part 1: Steel flanges*

ISO 7005-2:1988, *Metallic flanges - Part 2: Cast iron flanges*

ISO 7005-3:1988, *Metallic flanges - Part 3: Copper flanges and composite flanges*

CR 1404:1994, *Determination of emissions from appliances burning gaseous fuels during type testing.*

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply:

3.1 System and its constituent parts

3.1.1

overhead radiant tube heater

gas-fired appliance intended for installation above head level which is designed to heat the space beneath by radiation by means of a tube or tubes, heated by the internal passage of combustion products