



NSAI
Standards

Irish Standard
I.S. EN 777-3:2009

Multi-burner gas-fired overhead radiant tube heater systems for non domestic use - Part 3: System F - Safety

I.S. EN 777-3:2009

Incorporating amendments/corrigenda issued since publication:

<i>This document replaces:</i> I.S. EN 777-3:2000	<i>This document is based on:</i> EN 777-3:2009 EN 777-3:1999	<i>Published:</i> 11 March, 2009 10 March, 2000	
This document was published under the authority of the NSAI and comes into effect on: 11 May, 2009		ICS number: 91.140.40	
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie	Price Code: AB
Údarás um Chaighdeáin Náisiúnta na hÉireann			

English Version

Multi-burner gas-fired overhead radiant tube heater systems for non domestic use - Part 3: System F - Safety

Tubes radiants suspendus à multi-brûleurs utilisant les
combustibles gazeux à usage non-domestique - Partie 3 :
Système F - Sécurité

Dunkelstrahlersysteme mit mehreren Brennern mit Gebläse
für gewerbliche und industrielle Anwendung - Teil 3:
System F - 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.....	14
4 System classification.....	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	27
5.4 Main burners.....	28
5.5 Pressure test points.....	28
5.6 Injectors	28
6 Operational requirements	29
6.1 Soundness	29
6.2 Heat inputs.....	29
6.3 Limiting temperatures	29
6.4 Ignition, cross-lighting and flame stability.....	30
6.5 Pressure regulator	30
6.6 Combustion	30
6.7 Air-proving device in the common duct	31
6.8 Prolonged performance.....	31
6.9 Measurements of oxides of Nitrogen, NO_x	32
7 Test methods	32
7.1 General.....	32
7.2 Construction and design.....	39
7.3 Safety of operation.....	39
7.4 Other pollutants	52
8 Marking and instructions	55
8.1 Marking of the system and the packaging	55
8.2 Instructions.....	59
8.3 Presentation	63
9 Evaluation of conformity of POCEs and their associated terminals	63
9.1 General.....	63
9.2 Type testing	63
9.3 Factory production control (FPC)	64
Annex A (informative) National situations	66
A.1 General.....	66
A.2 Categories listed in the body of the standard and marketed in different countries	66

A.3	Appliance supply pressures corresponding to the categories given in A.2	68
A.4	Special categories marketed nationally or locally	70
A.5	Test gases corresponding to the special categories given in A.4	74
A.6	Gas connections in the various countries	75
A.7	Flue connections in the various countries	77
Annex B	(informative) System F	78
Annex C	(informative) Equivalence rules	79
C.1	Conversion to categories within a restricted Wobbe Index range	79
C.2	Conversion to categories within an identical Wobbe Index range	79
C.3	Conversion to categories within a wider Wobbe Index range	80
Annex D	(informative) Calculation of the mass flow rate of flue gases	81
D.1	Flue gas mass flow rate	81
D.2	Quantity of air in the flue gas	81
D.3	Flue gas excess air ratio (λ)	82
D.4	Quantity of water vapour in the flue gas	82
D.5	Quantity of Nitrogen in the flue gas	82
D.6	Quantity of Oxygen in the flue gas	82
D.7	Dry quantity of flue gas	83
D.8	Quantity of carbon dioxide in the flue gas	83
Annex E	(informative) Identification of gas types in use in various countries	85
Annex F	(normative) Special national conditions	86
F.1	General	86
Annex G	(informative) Calculation example of the weighting factors for a system with several rates	87
G.1	Appliance rates	87
G.2	Weighting of $Q_{pi,\%} = 20$	87
G.3	Weighting of $Q_{pi,\%} = 40$	87
G.4	Weighting of $Q_{pi,\%} = 60$	87
G.5	Weighting of $Q_{pi,\%} = 70$	88
G.6	Total weighting	88
Annex H	(informative) NO_x conversion calculation	89
H.1	NO_x emission conversion factors	89
H.2	NO_x Conversion — Calculation	90
Annex I	(informative) National situations of countries whose national bodies are CEN associate members	92
Annex J	(informative) An example of sampling plans	93
J.1	Sampling plans	93
J.2	Inspection levels and procedures	94
Annex K	95
K.1	General conditions of test	95
K.2	Test conditions	95
K.3	Test procedure	95
K.4	Accuracy of measurement	97
K.5	Calculation of Flue Loss	97
Annex ZA	(informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	100
Annex ZB	(informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive	103
ZB.1	Scope and relevant characteristics	103
ZB.2	Procedure(s) for attestation of conformity of [construction products]	105
ZB.3	CE marking and labelling	108
Bibliography	110

Foreword

This document (EN 777-3:2009) 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 777-3:1999.

This revision modifies EN 777-3:1999. It has been prepared to incorporate requirements for combustion products evacuation ducts, POCEs, 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 B_{52x} and Type B_{53x} rather than Type B_{22x} and Type B_{23x}.

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 F 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 B_{52x} and Type B_{53x} 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 dwellings;
- 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 incorporated between the exhaust fan and the flue duct;
- 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 POCEs and their associated terminals.

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

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*

I.S. EN 777-3:2009

EN 777-3:2009 (E)

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 calorific values, 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 alloy 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

3.1.2

multi-burner systems

those radiant tube heater systems which employ two or more burner units with each unit incorporating independent flame monitoring.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-