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BSI Standards Publication

**Gas-fired overhead radiant tube heaters
and radiant tube heater systems for non-
domestic use – Safety and energy efficiency**

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National foreword

This British Standard is the UK implementation of EN 416:2019. It supersedes BS EN 777-1:2009, BS EN 777-2:2009 and BS EN 777-3:2009, which are withdrawn. Together with BS EN 17175:2019, it supersedes BS EN 416-1:2009 and BS EN 416-2:2006.

The UK participation in its preparation was entrusted to Technical Committee GSE/20, Non-domestic space heaters (gas).

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 580 99374 9

ICS 97.100.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2019.

Amendments/corrigenda issued since publication

Date	Text affected
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EUROPÄISCHE NORM

October 2019

ICS 97.100.20

Supersedes EN 416-1:2009, EN 416-2:2006, EN 777-1:2009, EN 777-2:2009, EN 777-3:2009

English Version

Gas-fired overhead radiant tube heaters and radiant tube heater systems for non-domestic use - Safety and energy efficiency

Systèmes à tubes radiants suspendus à usage non domestique utilisant les combustibles gazeux - Sécurité et efficacité énergétique

Gasbefeuerte Dunkelstrahler und Dunkelstrahlersysteme für gewerbliche und industrielle Anwendungen - Sicherheit und Energieeffizienz

This European Standard was approved by CEN on 26 August 2019.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 416:2019) has been prepared by Technical Committee CEN/TC 180 "Decentralized gas heating", 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 April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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

This document supersedes EN 416-1:2009, EN 416-2:2006, EN 777-1:2009, EN 777-2:2009 and EN 777-3:2009.

Aspects of safety and energy efficiency of appliances are brought together. Significant changes of the new document compared to the earlier standards are: incorporation recent state of the art radiant tube heaters, unique and more detailed description of method to determine radiant factor, incorporating terms and calculation scheme of Ecodesign Regulation (EU) No. 2015/1188, and minimum requirements of an optional flue gas heat exchanger.

The test gases, test pressures and appliance categories given in this European Standard are in accordance with those specified in EN 437:2003+A1:2009.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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

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1 Scope

This document specifies the requirements and test methods for the construction, safety, classification, marking and efficiency of non-domestic gas-fired overhead radiant tube heaters incorporating a single burner and multiple burner systems (referred to in the body of the text as the "system") with each burner unit under the control of an automatic burner control system.

For radiant tube heaters incorporating a single burner, this standard is applicable to Type A₂, A₃, B₁₂, B₁₃, B₂₂, B₂₃, B₄₂, B₄₃, B₅₂, B₅₃, C₁₂, C₁₃, C₃₂, C₃₃, C₅₂ and C₅₃ appliances 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 located upstream of the draught diverter, if provided.

For radiant tube heater systems incorporating multiple tube heater segments, this document is applicable to Type B₅₂, B_{52x}, B₅₃ and B_{53x} systems 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 document also includes appliances incorporating a secondary heat exchanger in the flue system.

This document is not applicable to:

- a) appliances designed for use in domestic dwelling;
- b) outdoor appliances;
- c) appliances where the heat input of any individual burner unit is in excess of 120 kW (based on the net calorific value of the appropriate reference test gas);
- d) appliances having combustion products evacuation ducts that are non-metallic in the flue system – except ducts downstream of a possible additional condensing exhaust gas heat exchanger.

In addition, for heater systems incorporating multiple tube heaters this standard is not applicable to:

- e) appliances and systems that are designed for continuous condensation within the flue system under normal operating conditions – except downstream a possible additional exhaust gas heat exchanger.

This standard is applicable to systems which are intended to be type tested.