Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 4-8: Space heating generation systems, air heating and overhead radiant heating systems

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Foreword

This document (EN 15316-4-8:2011) has been prepared by Technical Committee CEN/TC 228 “Heating systems in buildings”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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Introduction

This European Standard presents methods for calculation of the additional energy requirements of a heat generation system in order to meet the building demand. The calculation is based on the performance characteristics of the products given in product standards and on other characteristics required to evaluate the performance of the products as included in the system.

This method can be used for the following applications:

— judging compliance with regulations expressed in terms of energy targets;

— optimisation of the energy performance of a planned heat generation system, by applying the method to several possible options;

— assessing the effect of possible energy conservation measures on an existing heat generation system, by calculating the energy use with and without the energy conservation measure.

The user should refer to other European Standards or to national documents for input data and detailed calculation procedures not provided by this standard.

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1 Scope

This European Standard is part of a series of standards on the method for calculation of system energy requirements and system efficiencies.

The scope of this specific part is to standardise the:

— required inputs;

— calculation method;

— resulting outputs

for space heating generation by:

a) air heating systems, including control, and

b) overhead radiant heating systems for non-domestic use , including control.

This European Standard does not apply to air heating systems that utilise water as a heat transfer medium.

2 Normative references

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

EN 416-1, *Single burner gas-fired overhead radiant tube heaters for non-domestic use — Part 1: Safety*

EN 419-1, *Non-domestic gas-fired overhead luminous radiant heaters — Part 1:Safety*

EN 621, *Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, without a fan to assist transportation of combustion air and/or combustion products*

EN 777-1, *Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use — Part 1: System D - Safety*

EN 777-2, *Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use — Part 2: System E - Safety*

EN 777-3, *Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use — Part 3: System F - Safety*

EN 777-4, *Multi-burner gas-fired overhead radiant tube heater systems for non-domestic use — Part 4: System H - Safety*

EN 778, *Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products*

EN 1020, *Non-domestic forced convection gas-fired air heaters for space heating not exceeding a net heat input of 300 kW, incorporating a fan to assist transportation of combustion air or combustion products*

EN 1196, *Domestic and non-domestic gas-fired air heaters — Supplementary requirements for condensing air heaters*

EN 1319, *Domestic gas-fired forced convection air heaters for space heating, with fan-assisted burners not exceeding a net heat input of 70 kW*

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EN 13410, *Gas-fired overhead radiant heaters — Ventilation requirements for non-domestic premises*

EN 15316-2-1, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 2-1: Space heating emission systems*

EN 15316-2-3, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 2-3: Space heating distribution systems*

EN 15316-4-1:2008, *Heating systems in buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-1: Space heating generation systems, combustion systems (boilers)*

EN ISO 7345:1995, *Thermal insulation — Physical quantities and definitions (ISO 7345:1987)*

EN ISO 13790, *Energy performance of buildings — Calculation of energy use for space heating and cooling (ISO 13790:2008)*

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3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995 and the following apply.

3.1.1
air heating system
heating system composed of one or more individual forced convection air heating appliances

3.1.2
auxiliary energy
electrical energy used by technical building systems for heating, cooling, ventilation and /or domestic water to support energy transformation to satisfy energy needs

NOTE 1 This includes energy for fans, pumps, electronics, etc.

NOTE 2 Adapted from EN 15316-1:2007.

3.1.3
calculation period
time period over which the calculation is performed

NOTE The calculation period can be divided into a number of calculation steps.

[EN 15316-1:2007]

3.1.4
combustion power
product of the fuel flow rate and the net caloric value of the fuel

3.1.5
condensing air heater
air heater designed to make use of the latent heat released by condensation of water vapour in the combustion flue products

NOTE The heater will allow the condensate to leave the heat exchanger in liquid form by way of a condensate drain.

3.1.6
energy need for heating or cooling
energy to be delivered to or extracted from a conditioned space to maintain the intended temperature conditions during a given period of time