



Floor heating – Systems and components – Part 3: Dimensioning

The European Standard EN 1264-3:1997 has the status of a Swedish Standard. This document contains the official English version of EN 1264-3:1997.

Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Golvvärme – System och komponenter – Del 3: Dimensionering

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English version

**Floor heating – Systems and components –
Part 3: Dimensioning**

Chauffage par le sol – Systèmes et
composants – Partie 3: Dimensionnement

Fußboden-Heizung – Systeme und
Komponenten – Teil 3: Auslegung

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CEN

European Committee for Standardization
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Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 130 "Space heating appliances without integral heat sources", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

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.

Introduction

This European Standard for floor heating systems consists of the following parts :

- Part 1 : Definitions and Symbols
- Part 2 : Determination of the thermal output
- Part 3 : Dimensioning
- Part 4 : Installation

1 Scope

This standard is applicable to hot water floor heating systems as defined in EN 1264-1.

Physiological limitations are taken into account when specifying the floor surface temperature. The design is based on performance characteristic curves and limit curves calculated in accordance with EN 1264-2.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate place in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies :

EN 1264 - 1:1997	Floor heating - Systems and components - Part 1 : Definitions and Symbols
EN 1264 - 2:1997	Floor heating - Systems and components - Part 2 : Determination of the thermal output
pr EN 1264 - 4:1993	Floor heating - Systems and components - Part 4 : Installation

3 Definitions and symbols

For the purposes of this standard, the definitions and symbols given in EN 1264-1 apply.

4 Basic principles

4.1 Heating medium differential temperature

The heating medium differential temperature $\Delta\theta_H$ is calculated using equation (1) (see EN 1264-2). In doing so, the effect of the temperature drop is taken into account.

$$\Delta\theta_H = \frac{\theta_V - \theta_R}{\ln \frac{\theta_V - \theta_i}{\theta_R - \theta_i}} \quad (1)$$

4.2 Performance characteristic curve

The performance characteristic curve describes the relationship between the heat flow density q of a system and the required heating medium differential temperature.

As a simplification, the heat flow density is taken to be directly proportional to the differential temperature of the heating medium:

$$q = K_H \cdot \Delta\theta_H \quad (2)$$

where $K_H = B \cdot \prod_i (a_i^m)$ in accordance with Part 2 of this European Standard.

4.3 Field of system characteristic curves

The field of characteristic curves of a floor heating system with a specific pipe spacing T shall at least contain performance characteristic curves for $R_{\lambda,B} = 0$ and three different values of floor covering thermal resistances in accordance with clause 9 of EN 1264-2:1997 including the limit curves (see Figure 1).

4.4 Limit curves

The limit curves in the field of system characteristic curves describe the relationship between the heating medium differential temperature and the heat flow density for the limit case temperature drop, where $\sigma = 0$ and at which the maximum floor surface temperature reaches the physiologically agreed limit value $\theta_{F,max}$ (29 °C for residence areas, 35 °C for peripheral areas)¹⁾. During design they apply for the determination of heat flow densities and associated differential temperatures where

$$0 \text{ K} < \sigma \leq 5 \text{ K}$$

(see also to 6.2).

The limit curves are used to specify the maximum permissible supply temperature (refer also to Figure 1).

The limit curve for $(\theta_{F,max} - \theta_i) = 9 \text{ K}$ is also applicable to bathrooms ($\theta_i = 24 \text{ °C}$)¹⁾.

¹⁾ National regulations can limit the temperature to a lower value

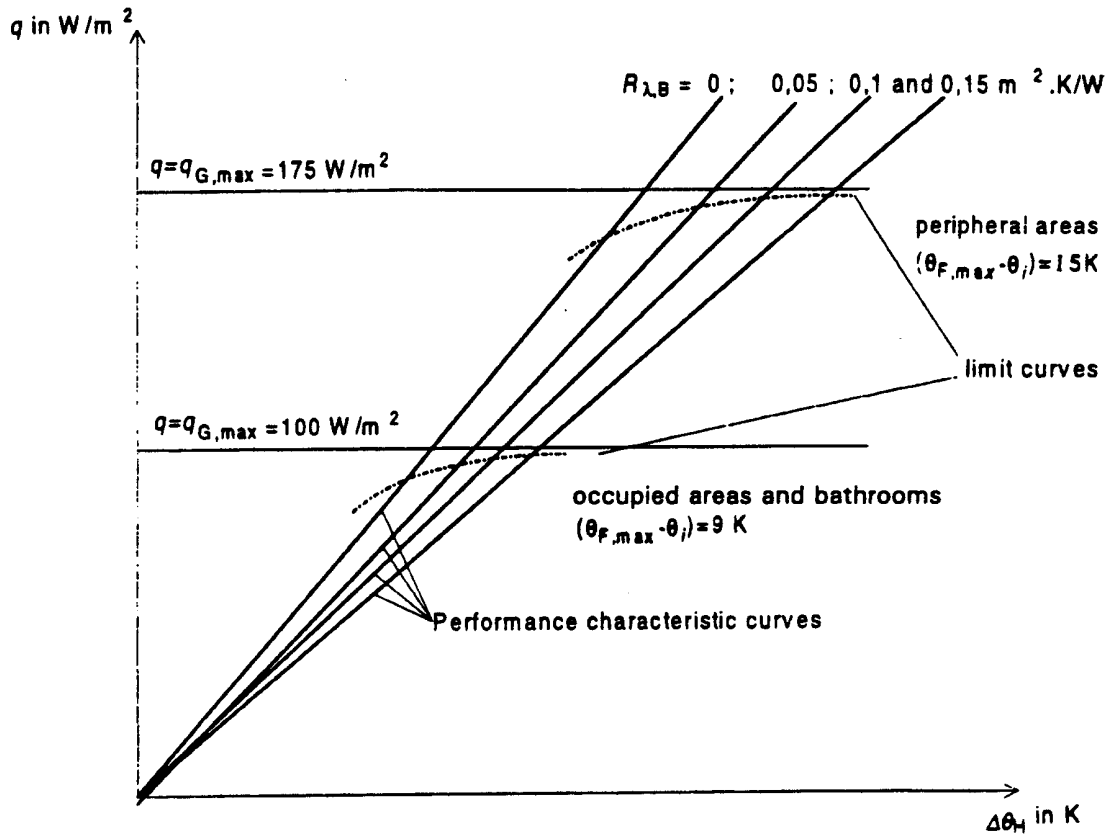


Figure 1: Field of system characteristic curves for $T = \text{const.}$ showing limit curves

4.5 Thermal inertia

The difference between the minimum and the maximum surface temperature of a floor heating system is so low that no consideration of thermal inertia is required.

5 Boundary conditions and limits

5.1 Supply pipes to adjacent rooms

Pipes passing through to adjacent rooms (supply pipes) are taken into account in the heating if the same type of usage can be assumed. The heat output of the supply pipes may also be taken into account for adjacent rooms.

5.2 Downward thermal insulation

To limit the heat flow through the floor to rooms below, the required thermal resistance of the insulating layer $R_{\lambda,ins}^{2)}$ shall be at minimum in accordance with Table 1 of prEN 1264-4:1993
It is calculated according to equation (3).

$$R_{\lambda,ins} = \frac{S_{ins}}{\lambda_{ins}} \tag{3}$$

²⁾ A higher heat conduction resistance between the heating plane and the underside of the floor (surface of the ceiling) also improves the chances of achieving the required temperature reduction in the room below (e.g. bedroom). It is recommended, particularly in multi-family houses, that a higher thermal resistance be selected than given here.