ILNAS

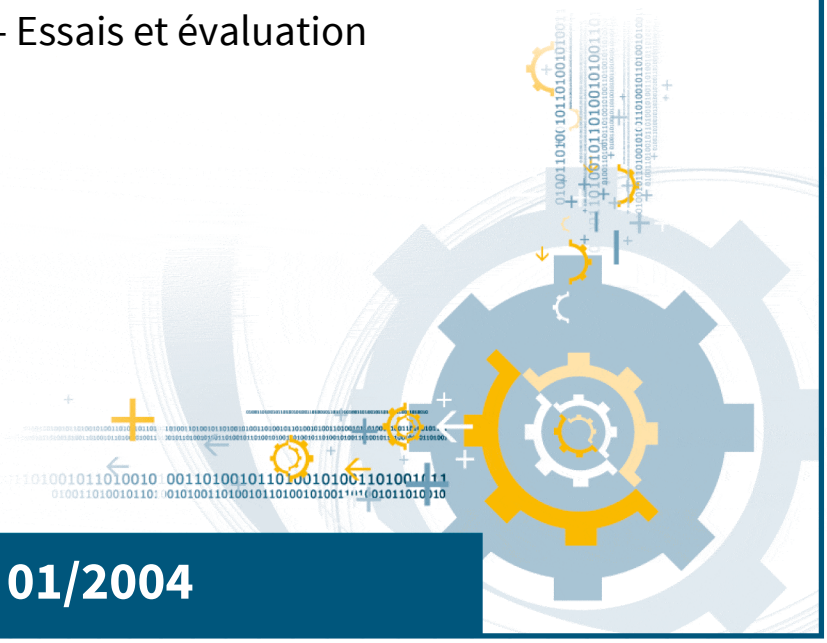
Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 14240:2004

Ventilation for buildings - Chilled ceilings - Testing and rating

Lüftung von Gebäuden - Kühldecken - Prüfung und Bewertung

Ventilation de bâtiments - Plafonds refroidis - Essais et évaluation



01/2004

National Foreword

This European Standard EN 14240:2004 was adopted as Luxembourgish Standard ILNAS-EN 14240:2004.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14240

January 2004

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English version

Ventilation for buildings - Chilled ceilings - Testing and rating

Ventilation de bâtiments - Plafonds refroidis - Essais et évaluation

Lüftung von Gebäuden - Kühldecken - Prüfung und Bewertung

This European Standard was approved by CEN on 3 November 2003.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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Contents

Foreword

This document (EN 14240:2004) has been prepared by Technical Committee CEN/TC 156 "Ventilation for buildings", the secretariat of which is held by BSI.

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 July 2004, and conflicting national standards shall be withdrawn at the latest by July 2004.

Annex A is informative.

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

1 Scope

This European Standard specifies test conditions and methods for the determination of the cooling capacity of chilled ceilings and other extended chilled surfaces.

The purpose of the standard is to give comparable and repeatable product data.

The test method applies to all types of surface cooling systems using any medium as energy transport medium.

NOTE The result is valid only for the specified test set up. For other conditions (i.e. different positions of heat loads, forced flow around the test object, variations in surface area) the producer should give guidance based on full-scale tests.

This standard refers to water as the cooling medium throughout, however wherever water is specified any other cooling medium can also be used in the test. Where air is the transport medium this air may not be discharged into the test room. In addition, this standard refers to chilled surfaces and where “surfaces” are specified this should be taken to include ceiling, wall or floor as appropriate.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendment 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 (including amendments).

EN 12792, *Ventilation for buildings – Symbols, terminology and graphical symbols.*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions in EN 12792 together with the following apply.

3.1.1
chilled surfaces
surfaces that are part of the room periphery (such as ceiling, walls and floor) and cooled with water

3.1.2
test room
room in which the test object is mounted

3.1.3
room air temperature (θ_a)
air temperature measured with radiation shielded sensor

3.1.4
globe temperature (θ_g)
dry resultant temperature of the room, measured with a temperature sensor placed in the centre of the globe as in 4.3

3.1.5
reference room temperature (θ_r)
average of the measured globe temperature, measured in the middle of the room at a height of 1,1 m above the floor, during the test period

3.1.6
cooling water flow rate (q_w)
average of the measured water flow rate during the test period

3.1.7
cooling water inlet temperature (θ_{w1})
average of the measured water temperature into the test object during the test period

3.1.8
cooling water outlet temperature (θ_{w2})
average of the measured water temperature out of the test object during the test period

3.1.9
mean cooling water temperature (θ_w)
the mean value of the sum of the cooling water inlet and outlet temperatures

3.1.10
temperature difference ($\Delta\theta$)
difference between reference room temperature and mean cooling water temperature [$\Delta\theta=\theta_r-\theta_w$]

3.1.11
specific heat capacity (c_p)
heat required to raise the temperature of a unit mass of the cooling medium by 1 K

NOTE c_p for water = 4,187 $kJkg^{-1}K^{-1}$ at 15°C.

3.1.12
test room area (A_t)
area of the test room surface (ceiling, wall or floor) on which the test object is located (see Figure 1).

3.1.13
installation area (A_i)
projection of the total test object onto the room surface, including all intermediate surface channel supports and air gaps, associated with normal panel installation (see Figure 1)

3.1.14
panel area (A_p)
projection of the panels onto the room surface, excluding intermediate surface channel supports and air gaps associated with normal panel installation (see Figure 1)

3.1.15
active area (A_a)
reference area to calculate the specific cooling capacity of the test object (see Figure 2)

3.1.16
cooling capacity (P)
total cooling capacity of the test object calculated from the measured cooling water flow rate and the cooling water temperature rise

3.1.17
specific cooling capacity of a chilled surface (P_a)
cooling capacity divided by the active area of the chilled surface

3.1.18
nominal temperature difference ($\Delta\theta_N$)
temperature difference between the reference room temperature and the mean cooling water temperature