

Heat exchangers — Forced circulation air-cooling and air-heating coils — Test procedures for establishing the performance

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This Draft for Development, having been prepared under the direction of the Refrigeration, Heating and Air Conditioning Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 March 1994

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Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
Foreword	2
Text of ENV 1216	3
National annex NA (informative) Committees responsible	Inside back cover

National foreword

This Draft for Development has been prepared under the direction of the Refrigeration, Heating and Air Conditioning Standards Policy Committee and is the English language version of European Prestandard ENV 1216:1993 *Heat exchangers — Forced circulation air-cooling and air-heating coils — Test procedures for establishing the performance* published by the European Committee for Standardization (CEN).

ENV 1216 was produced as a result of international discussion in which the UK took an active part.

NOTE 1 This work was originally undertaken under the auspices of E/-/16 which has now been reconstituted to form Technical Committee RHE/30.

This publication is not be regarded as a British Standard

It is being issued in the Draft for Development series of publications and is of a provisional nature because the subject matter is still under technical development requiring wider exposure. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European Standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its three-year life. The commencement of the review period will be notified by an announcement in *BSI News*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the prestandard or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee RHE/30 at the BSI London Office, 2 Park Street, London, W1A 2BS, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

NOTE 2 At places in the text the unit of pressure is expressed in hecto Pascals (hPa).
1 mbar = 100 N/m² = 1 hPa.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ENV title page, pages 2 to 20, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Heat exchangers, pipes, tubes, definitions, symbols, calorific power, measurements, installation, tests, computation

English version

Heat exchangers — Forced circulation air-cooling and air-heating coils — Test procedures for establishing the performance

Echangeurs thermiques — Batteries à ailettes à circulation forcée — Procédures d'essais pour la détermination de la performance

Wärmeaustauscher — Luftkühler und Lufterhitzer für erzwungene Konvektion — Prüfverfahren zur Leistungsfeststellung

This European Prestandard (ENV) was approved by CEN on 1993-03-10 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard (EN).

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Prestandard was prepared by CEN Technical Committee CEN/TC 110 Heat exchangers, the Secretariat of which is held by SIS. This European Prestandard has been adopted during the meeting of CEN/TC 110 as a European Prestandard on 1993-03-10 after consideration of comments received from a public enquiry and establishment of the final version of the European Prestandard.

According to the CEN/CENELEC Common Rules, the following countries are bound to announce the existence of this European Prestandard: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Contents

	Page
Foreword	2
0 Introduction	3
1 Scope and normative references	3
2 Definitions	3
3 Symbols	7
4 Standard capacity	9
5 Manufacturer's data	9
6 Measurements	10
7 Testing methods and equipment	12
8 Testing procedures	14
9 Capacity calculations	15
10 Conversion to standard conditions	16
11 Test report	17
Annex A (normative) Circuit diagrams	18
Figure A.1 — Heating/cooling with liquid	18
Figure A.2 — Heating with refrigerant	18
Figure A.3 — Cooling with refrigerant by direct expansion	19
Table 1 — Uncertainty of measurements	10

0 Introduction

This European Prestandard is part of a series of European Prestandards dedicated to heat exchangers.

1 Scope and normative references

1.1 Scope

This European Prestandard applies to forced circulation air-cooling or air-heating coils operating:

- a) with an evaporating or condensing refrigerant,
- b) with a cooling or heating fluid,
- c) without fans.

Operation with steam is not part of the standard.

Its purpose is to establish uniform methods of testing under non frosting conditions.

This Prestandard prescribes laboratory methods, conducted on test samples.

It is not the purpose of this Prestandard to specify the types of test used for production or field testing.

To test and ascertain:

- product identification,
- the capacity,
- air side pressure drop,
- fluid side pressure drop.

at standard conditions, unless otherwise stated by the user.

1.2 Normative references

1.2.1 This European Prestandard 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 amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of publication referred to applies:

ENV 247	Heat exchangers	Terminology
ENV 305	Heat exchangers	Definition of performance of heat exchangers and the general test procedure for establishing performance of all heat exchangers
ENV 306	Heat exchangers	Methods of measuring the parameters necessary for establishing the performance
ENV 307	Heat exchangers	Guidelines to prepare instructions required to maintain the performance of each type of heat exchanger
ISO 5221		Air distribution and air diffusion — Rules to methods of measuring air flow rate in an air handling duct
EN 45001		General criteria for the operation of testing laboratories.

1.2.2 As a general requirement, the European Prestandards ENV 247, ENV 305, ENV 306, and ENV 307, shall apply where appropriate and not otherwise stated in the following chapters.

2 Definitions

For the purposes of this prestandard, the following definitions apply:

2.1 Forced-circulation air-cooling or air-heating coil

A tubular heat exchanger, with or without extended surfaces, for use in an air flow, circulated by fans.

2.1.1

forced-circulation air-cooling coil

an air-cooling coil through which a cooling fluid is circulated for the purpose of the sensible cooling or sensible cooling and dehumidification of a forced-circulation air flow, including all components necessary for the distribution and collection of the cooling fluid

2.1.2**forced-circulation air-heating coil**

an air-heating coil through which a heating fluid is circulated for the purpose of the sensible heating of a forced-circulation air flow, including all components necessary for the distribution and collection of the heating fluid

2.1.3**cooling fluid**

either refrigerant or a liquid

2.1.4**heating fluid**

either refrigerant or a liquid

2.1.5**(Primary) refrigerant**

the working fluid, in a refrigeration system, that absorbs heat by evaporation at a low temperature and rejects it by condensation at a higher temperature. In the following, the term refrigerant is used

2.1.6**liquid**

a working fluid circulated through a heating or cooling system which remains liquid during the absorption or rejection of heat

2.2 Coil dimensions**2.2.1****row**

a bank of tubes that are located in a plane at right angle to the direction of the air flow

2.2.2**coil inlet area**

the internal cross sectional area of the duct containing the heat exchanger supplied by the manufacturer

2.2.3**total heat transfer surface (air side)**

the whole external surface of the coil which is exposed to the air flow passing through the coil

2.3 Capacity**2.3.1 Air-cooling capacity****2.3.1.1****sensible (dry) air-cooling capacity**

the heat flow which is rejected by the air by means of temperature drop

2.3.1.2**latent air-cooling capacity**

the latent heat flow which is rejected by the condensing water vapour of the air

2.3.1.3**total cooling capacity on air side**

the sum of the sensible and the latent capacities measured at the same time

it is equal to the enthalpy change of the air across the air cooling coil reduced by the enthalpy flow removed by the condensed water

2.3.1.4**total cooling capacity on fluid side**

the heat flow absorbed by the cooling fluid, expressed as the product of the mass flow of the cooling fluid and the difference between specific enthalpies at the outlet and inlet connections of the coil