

**Heat exchangers - Test procedures for
establishing the performance of forced
convection unit air coolers for refrigeration**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 328:2001 sisaldab Euroopa standardi EN 328:1999 ingliskeelset teksti.

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English version

Heat exchangers - Test procedures for establishing the
performance of forced convection unit air coolers for
refrigeration

Echangeurs thermiques - Procédures d'essai pour la
détermination de la performance des aérofrigorifères à
convection forcée

Wärmeaustauscher - Prüfverfahren zur Bestimmung der
Leistungskriterien von Ventilatorluftkühlern

This European Standard was approved by CEN on 10 March 1999.

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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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 110 "Heat exchangers", the secretariat of which is held by BSI.

This European Standard replaces ENV 328:1992.

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of an identical text or by endorsement, at the latest by October 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

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 is one of a series of European Standards dedicated to heat exchangers.

1 Scope

This European Standard is applicable to non-ducted unit air coolers for refrigeration operating:

- a) with direct dry expansion of a refrigerant
- b) with liquid overfeed by pump circulation of a refrigerant
- c) with a liquid.

This standard specifies uniform methods of performance assessment to test and ascertain the following:

- product identification
- standard capacity
- standard liquid pressure drop
- standard refrigerant pressure drop (for operation with liquid overfeed by pump circulation only)
- nominal air flow rate
- nominal fan power

It does not cover evaluation of conformity.

It is not applicable to air coolers for duct mounting or with natural air convection.

This standard does not cover technical safety aspects.

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 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.

ISO 5801	Industrial fans - Performance testing using standardized airways
EN 45001	General criteria for the operation of testing laboratories
IEC 60034-1	Rotating Electrical Machines - Part 1 Rating and Performance

3 Definitions

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

3.1 physical definitions

3.1.1 forced convection unit air cooler: Refrigeration system component transferring heat from air to a refrigerant or liquid. The air is mechanically circulated over the heat transfer surface by integral fan(s) and fan drive(s). The heat transfer coil includes refrigerant distributing and collecting headers.

In the following "forced convection unit air cooler" is referred to as "unit cooler".

3.1.2 heat transfer surface (air side): Total external surface of the cooling coil which is in contact with the air flow passing the cooling coil.

3.1.3 internal volume: Volume of the refrigerant containing parts of the unit cooler between its two connections.

3.1.4 fouling resistance: Thermal resistance of a layer of unwanted deposit on the heat exchanger surface reducing its heat transfer performance.

NOTE: The fouling resistance for a clean surface is zero. Clean, in this context, means that all production residues have been removed from the heat transfer surface and the fan(s) by the factory's cleaning process.