

SVENSK STANDARD

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Refrigerating systems and heat pumps – Pressure relief devices and their associated piping – Methods for calculation

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Denna standard ersätter SS-EN 13136:2013, utgåva 2.

The European Standard EN 13136:2013+A1:2018 has the status of a Swedish Standard. This document contains the official version of EN 13136:2013+A1:2018.

This standard supersedes the SS-EN 13136:2013, edition 2.

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EUROPEAN STANDARD

EN 13136:2013+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2018

ICS 27.080; 27.200

Supersedes EN 13136:2013

English Version

Refrigerating systems and heat pumps - Pressure relief devices and their associated piping - Methods for calculation

Systèmes frigorifiques et pompes à chaleur - Dispositifs de limitation de pression et tuyauteries associées - Méthodes de calcul

Kälteanlagen und Wärmepumpen - Druckentlastungseinrichtungen und zugehörige Leitungen - Berechnungsverfahren

This European Standard was approved by CEN on 24 August 2013 and includes Amendment 1 approved by CEN on 5 November 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 13136:2013+A1:2018) has been prepared by Technical Committee CEN/TC 182 “Refrigerating systems, safety and environmental requirements”, 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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2018-11-05.

This document supersedes A1 EN 13136:2013 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

A1 Compared to EN 13136:2013, EN 13136:2013+A1:2018 takes into account changes in Annex A and Annex C. A1

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Introduction

This European Standard is based on applicable parts of EN ISO 4126-1:2013, EN ISO 4126-2:2003 and EN 12284.

It is suited to the specific requirements, and includes the data, of refrigerating systems. It provides means of satisfying the pressure relief devices requirements of EN 378-2:2008+A2:2012.

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1 Scope

1.1 This European Standard describes the calculation of mass flow for sizing pressure relief devices for components of refrigerating systems.

NOTE The term "refrigerating system" used in this European Standard includes heat pumps.

1.2 This European Standard describes the calculation of discharge capacities for pressure relief valves and other pressure relief devices in refrigerating systems including the necessary data for sizing these when relieving to atmosphere or to components within the system at lower pressure.

1.3 This European Standard specifies the requirements for selection of pressure relief devices to prevent excessive pressure due to internal and external heat sources, the sources of increasing pressure (e.g. compressor, heaters, etc.) and thermal expansion of trapped liquid.

1.4 This European Standard describes the calculation of the pressure loss in the upstream and downstream line of pressure relief valves and other pressure relief devices and includes the necessary data.

1.5 This European Standard refers to other relevant standards in Clause 5.

2 Normative references

[A1] The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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. **[A1]**

EN 378-1:2008+A2:2012, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

EN 378-2:2008+A2:2012, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

EN 764-1:2004, *Pressure equipment — Part 1: Terminology — Pressure, temperature, volume, nominal size*

EN 764-2:2012, *Pressure equipment — Part 2: Quantities, symbols and units*

EN 12284:2003, *Refrigerating systems and heat pumps — Valves — Requirements, testing and marking*

EN ISO 4126-1:2013, *Safety devices for protection against excessive pressure — Part 1: Safety valves (ISO 4126-1:2013)*

EN ISO 4126-2:2003, *Safety devices for protection against excessive pressure — Part 2: Bursting disc safety devices (ISO 4126-2:2003)*

ISO 817, *Refrigerants — Designation system*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 378-1:2008+A2:2012, EN 12284:2003, EN ISO 4126-1:2013, EN ISO 4126-2:2003 and EN 764-1:2004 apply.

A1 ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp> **A1**

4 Symbols

For the purposes of this document, the symbols given in EN 764-2:2012 and the following apply:

Symbol	Designation	Unit
A	Flow area of the pressure relief valve $A = \left[\frac{\pi \times d^2}{4} \right]$	mm ²
A_c	Calculated flow area	mm ²
A_{DN}	Valve cross section related to DN	mm ²
A_{in}	Inside area of inlet tube	mm ²
A_{liq}	Calculated flow area of liquid after expansion	mm ²
A_{out}	Inside area of outlet tube	mm ²
A_R	Inside area of tube	mm ²
A_{surf}	External surface area of the vessel	m ²
A_{vap}	Calculated flow area of vapour after expansion	mm ²
C	Function of the isentropic exponents (Table A.2)	–
DN	Nominal size (see EN ISO 6708:1995)	–
d	Actual most narrow flow diameter of the pressure relief valve	mm
d_c	Calculated flow diameter of the pressure relief valve	mm
d_{in}	Inside diameter of inlet tube	mm
d_{out}	Inside diameter of outlet tube	mm
D_R	Outside diameter of tube (Table A.4)	mm
d_R	Inside diameter of tube	mm
h_{vap}	Heat of vaporisation calculated at 1,1 times the set pressure of the pressure relief device (for super critical or superheated conditions, see 6.1)	kJ/kg
K_b	Theoretical capacity correction factor for sub-critical flow (Table A.3)	–
K_d	Certified coefficient of discharge taking into account the backpressure ratio p_b/p_o and the possible reduced stroke of the pressure relief valve	–