SVENSK STANDARD
SS-EN 378-1:2016+A1:2020

Kyl- och värmeutrustning – Kylteknik och värmepumpsteknik – Säkerhetskrav och miljökrav –
Del 1: Grundläggande krav, definitioner, klassificering och urvalskriterier

Refrigerating systems and heat pumps – Safety and environmental requirements –
Part 1: Basic requirements, definitions, classification and selection criteria

Svenska Institutet för Standarder

Språk: engelska/English
Utgåva: 1

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Standarden är framtagen av kommittén för Kyl- och värmepumpsanläggningar - Säkerhet, SIS/TK 243.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

Fastställd: 2020-11-02
ICS: 01.040.27;27.080;27.200

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Europastandarden EN 378-1:2016+A1:2020 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 378-1:2016+A1:2020.

Denna standard ersätter SS-EN 378-1:2016, utgåva 4 och SS-EN 378-1:2016, utgåva 4.

The European Standard EN 378-1:2016+A1:2020 has the status of a Swedish Standard. This document contains the official version of EN 378-1:2016+A1:2020.

This standard supersedes the SS-EN 378-1:2016, edition 4 and SS-EN 378-1:2016, edition 4.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 378-1:2016+A1

October 2020

ICS 01.040.27; 27.080; 27.200

Supersedes EN 378-1:2016

English Version

Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and selection criteria

Systèmes frigorifiques et pompes à chaleur - Exigences de sécurité et d'environnement - Partie 1 : Exigences de base, définitions, classification et critères de choix

Kälteanlagen und Wärmepumpen - Sicherheitstechnische und umweltrelevante Anforderungen - Teil 1: Grundlegende Anforderungen, Begriffe, Klassifikationen und Auswahlkriterien

This European Standard was approved by CEN on 3 September 2016 and includes Amendment 1 approved by CEN on 17 August 2020.

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 378-1:2016+A1:2020) 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 April 2021, and conflicting national standards shall be withdrawn at the latest by April 2021.

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

This document includes Amendment 1 approved by CEN on 17 August 2020.

This document supersedes ▌A1⟩ EN 378-1:2016 ⟨A1▌.

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

EN 378 consists of the following parts under the general title “Refrigerating systems and heat pumps — Safety and environmental requirements”:

— *Part 1: Basic requirements, definitions, classification and selection criteria;*

— *Part 2: Design, construction, testing, marking and documentation;*

— *Part 3: Installation site and personal protection;*

— *Part 4: Operation, maintenance, repair and recovery.*

The main changes in part 1 with respect to the previous edition are listed below:

— harmonization as far as possible with ISO 5149:2014 and ISO 817:2014;

— adapt definitions for the purpose of harmonizing EN 378-2:2016 with PED.

Following detailed changes are worth noting:

— modification of the term “special machinery room” to “separate refrigeration machinery room” and adapt the definition in view of combustion equipment;

— modifications/inclusion of definitions for “part of the refrigerating system” (3.1.8), “pressure equipment” (3.1.20) and “pressure vessels” (3.4.8) in view of PED;

— movement of the location classification from Annex C to 5.3;

— rewording of the system examples in 5.3 to make the relation clear with location classification;

— replacement of Annex F (safety group) classifications by 5.2;

— modification of the approach to determine the refrigerant charge of a refrigeration system. The charge limit requirement is decided based on the most stringent refrigerant charge that results from the calculation based on toxicity and the calculation based on flammability. To this purpose,

the tables in Annex C are modified. Table C.1 contains requirements based on toxicity classes, Table C.2 contains requirements based on flammability classes;

— addition of the refrigerant classes as determined in ISO 817 to toxicity classes A, B and flammability classes 1, 2L, 2, 3;

— modification of the charge limits for refrigerants of flammability class 3, for location classification III;

— addition of C.3, alternative risk management;

— addition of refrigerants in Annex E that have been approved for publication in ASHRAE 34 in January 2015 (not those approved for public review in January 2015);

— inclusion in Annex E of GWP values for refrigerants in view of REGULATION (EU) No 517/2014 (F-gas).

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

Introduction

This European Standard relates to safety and environmental requirements in the design, manufacture, construction, installation, operation, maintenance, repair and disposal of refrigerating systems and appliances regarding local and global environments. It does not related to the final destruction of the refrigerants.

It is intended to minimize possible hazards to persons, property and the environment from refrigerating systems and refrigerants. These hazards are associated with the physical and chemical characteristics of refrigerants and the pressures and temperatures occurring in refrigeration cycles.

Attention is drawn to hazards such as excessive temperature at compressor discharge, liquid slugging, erroneous operation and reduction in mechanical strength caused by corrosion, erosion, thermal stress, liquid hammer or vibration. Corrosion deserves special consideration as conditions peculiar to refrigerating systems arise due to alternate frosting and defrosting or the covering of equipment by insulation.

The extent to which hazards are covered is indicated in Annex G. In addition, machinery should comply as appropriate with EN ISO 12100 for hazards which are not covered by this European Standard.

Commonly used refrigerants except R-717 are heavier than air. Care should be taken to avoid stagnant pockets of heavy refrigerant vapours by proper location of ventilation inlet and exhaust openings. Refrigerants and their combinations with oils, water or other substances, can affect the system chemically and physically. They can, if they have detrimental properties, endanger persons, property and the environment when escaping from the refrigerating system. Refrigerants shall be selected with due regard to their potential influence on the global environment (ODP, GWP) as well as their possible effects on the local environment. Evaluation of the environmental performance requires a life cycle approach. With regard to global climate change the **T**otal **E**quivalent **W**arming **I**mpact approach is generally used as the basis (see Annex B). Reference should be made to the EN ISO 14040- series to address other environmental aspects. Many factors influence environmental impacts such as:

— location of the system;

— energy efficiency of the system;

— type of refrigerant;

— service frequency;

— refrigerant leaks;

— sensitivity of charge on efficiency;

— minimization of heat load;

— control methods.

Additional investments may be directed towards reducing leaks, increasing energy efficiency or modifying the design in order to use a different refrigerant. A life cycle approach is necessary to identify where additional investments will have the most beneficial effects.

1 Scope

This European Standard specifies the requirements for the safety of persons and property, provides guidance for the protection of the environment and establishes procedures for the operation, maintenance and repair of refrigerating systems and the recovery of refrigerants.

The term “refrigerating system” used in this European Standard includes heat pumps.

This part of EN 378 specifies the classification and selection criteria applicable to refrigerating systems. These classification and selection criteria are used in parts 2, 3 and 4.

This standard applies:

a) to refrigerating systems, stationary or mobile, of all sizes except to vehicle air conditioning systems covered by a specific product standard e.g. ISO 13043;

b) to secondary cooling or heating systems;

c) to the location of the refrigerating systems;

d) to replaced parts and added components after adoption of this standard if they are not identical in function and in the capacity;

Systems using refrigerants other than those listed in Annex E of this European Standard are not covered by this standard.

Annex C specifies how to determine the amount of refrigerant permitted in a given space, which when exceeded, requires additional protective measures to reduce the risk.

Annex E specifies criteria for safety and environmental considerations of different refrigerants used in refrigeration and air conditioning.

This standard is not applicable to refrigerating systems and heat pumps which were manufactured before the date of its publication as a European Standard except for extensions and modifications to the system which were implemented after publication.

This standard is applicable to new refrigerating systems, extensions or modifications of already existing systems, and for existing stationary systems, being transferred to and operated on another site.

This standard also applies in the case of the conversion of a system to another refrigerant type, in which case conformity to the relevant clauses of parts 1 to 4 of the standard shall be assessed.

Product family standards dealing with the safety of refrigerating systems takes precedence over horizontal and generic standards covering the same subject.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 378-2:2016, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

A1 EN 378-3:2016+A1:2020, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site and personal protection* A1

EN 12263, *Refrigerating systems and heat pumps — Safety switching devices for limiting the pressure — Requirements and tests*

EN 14276-2, *Pressure equipment for refrigerating systems and heat pumps — Part 2: Piping — General requirements*

ISO 817:2014, *Refrigerants — Designation and safety classification*