



**SLOVENSKI STANDARD**  
**SIST EN 13530-1:2002**

**01-november-2002**

---

?

Cryogenic vessels - Large transportable vacuum insulated vessels - Part 1: Fundamental requirements

Kryo-Behälter - Große ortsbewegliche, vakuum-isolierte Behälter - Teil 1:  
Grundanforderungen

**ITeH STANDARD PREVIEW**  
**(standards.iteh.ai)**

Réipients cryogéniques - Grands réipients transportables isolés sous vide - Partie 1:  
Exigences fondamentales

[SIST EN 13530-1:2002](https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002)

[https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-](https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002)

[11d3fc93a8a0/sist-en-13530-1-2002](https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002)

**Ta slovenski standard je istoveten z: EN 13530-1:2002**

---

**ICS:**

23.020.40      Proti mrazu odporne posode      Cryogenic vessels  
(kriogenske posode)

**SIST EN 13530-1:2002**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 13530-1:2002

<https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13530-1**

May 2002

ICS 23.020.40

English version

## Cryogenic vessels - Large transportable vacuum insulated vessels - Part 1: Fundamental requirements

Réceptifs cryogéniques - Grands réceptifs transportables isolés sous vide - Partie 1: Exigences fondamentales

Kryo-Behälter - Große ortsbewegliche, vakuum-isolierte Behälter - Teil 1: Grundanforderungen

This European Standard was approved by CEN on 3 January 2002.

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 Management Centre 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 13530-1:2002

<https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

## Contents

	page
Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms and definitions.....	4
4 General requirements.....	7
5 Mechanical loads .....	7
6 Chemical effects.....	8
7 Thermal loads.....	9
8 Materials.....	9
9 Design, fabrication, inspection and testing .....	9
10 Marking and labelling .....	10
11 Final acceptance test.....	10
12 Periodic inspection.....	10
Annex A (informative) Tank plates.....	11

SIST EN 13530-1:2002

<https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002>

## Foreword

This document EN 13530-1:2002 has been prepared by Technical Committee CEN/TC 268, "Cryogenic vessels", the secretariat of which is held by AFNOR.

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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

This European Standard 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).

In this standard the annex A is informative.

EN 13530 consists of the following parts under the general title, *Cryogenic vessels – Large transportable vacuum insulated vessels*:

– Part 1: *Fundamental requirements.*

– Part 2: *Design, fabrication, inspection and testing.*

– Part 3: *Operational requirements.*

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**EN 13530-1:2002 (E)****1 Scope**

This European Standard specifies the fundamental requirements for large transportable vacuum insulated cryogenic vessels designed to operate above atmospheric pressure. Appropriate parts can be used as a guidance for vessels designed to operate to the atmosphere.

This European Standard applies to fixed tanks (of tank-vehicles and tank-wagons), demountable tanks, tanks of battery-vehicles and tank-containers (TC) for refrigerated liquefied gases in the sense of the regulations of the transport of dangerous goods. This standard applies to large transportable vacuum insulated cryogenic vessels for fluids as specified in 3.1 and is not applicable to such vessels designed for toxic fluids.

**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 (including amendments).

EN 1252-1, *Cryogenic vessels - Materials - Part 1: Toughness requirements for temperatures below – 80 °C.*

EN 1252-2, *Cryogenic vessels - Materials - Part 2: Toughness requirements for temperatures between – 80 °C and – 20 °C.*

EN 1626, *Cryogenic vessels - Valves for cryogenic service.*

EN 1797, *Cryogenic vessels - Gas/material compatibility.*

EN 10204, *Metallic products; Types of inspection documents.*

EN 12300, *Cryogenic vessels - Cleanliness for cryogenic service.*

prEN 13648-1, *Cryogenic vessels - Safety devices for protection against excessive pressure - Part 1: Safety valves for cryogenic service.*

prEN 13530-2, *Cryogenic vessels - Large transportable vacuum insulated vessels - Part 2: Design, fabrication, inspection and testing.*

EN 13530-3, *Cryogenic vessels - Large transportable vacuum insulated vessels - Part 3: Operational requirements.*

**3 Terms and definitions**

For the purposes of this European Standard, the following terms and definitions apply.

**3.1****cryogenic fluid (refrigerated liquefied gas)**

gas which is partially liquid because of its low temperature<sup>1)</sup>. In the context of all parts of this standard the (refrigerated but) non-toxic gases and mixtures of them given in Table 1 are referred to as cryogenic fluids

---

1) This includes totally evaporated liquids and supercritical fluids.

Table 1 — Refrigerated but non toxic gases

classification code	Identification number, name and description <sup>a</sup>
3 °A	Asphyxiant gases 1913 Neon, refrigerated liquid 1951 Argon, refrigerated liquid 1963 Helium, refrigerated liquid 1970 Krypton, refrigerated liquid 1977 Nitrogen, refrigerated liquid 2187 Carbon dioxide, refrigerated liquid 2591 Xenon, refrigerated liquid 3136 Trifluoromethane refrigerated liquid 3158 Gas, refrigerated liquid, N.O.S. <sup>b</sup>
3 °O	Oxidizing gases 1003 Air, refrigerated liquid 1073 Oxygen, refrigerated liquid 2201 Nitrous oxide, refrigerated liquid, oxidizing 3311 Gas, refrigerated liquid, oxidizing, N.O.S. <sup>b</sup>
3 °F	Flammable gases 1038 Ethylene, refrigerated liquid 1961 Ethane, refrigerated liquid 1966 Hydrogen, refrigerated liquid 1972 Methane, refrigerated liquid or Natural gas, refrigerated liquid, with high methane content 3138 Ethylene, acetylene and propylene mixture, refrigerated liquid, containing at least 71,5 % ethylene with not more than 22,5 % acetylene and not more than 6 % propylene 3312 Gas, refrigerated liquid, flammable, N.O.S. <sup>b</sup>
<sup>a</sup> Classification codes, identification number, name and description according to ADR. <sup>b</sup> N.O.S. = not otherwise specified.	

### 3.2

#### large transportable cryogenic vessels (tank)

thermally insulated vessel of more than 1 000 l intended for the transport of one or more cryogenic fluids, consisting of an inner vessel, an outer jacket, all of the valves and service equipment together with the structural equipment. This large transportable cryogenic vessel representing a complete assembly ready for putting into service

### 3.3

#### thermal insulation

vacuum interspace between the inner vessel and the outer jacket. The space can or can not be filled with material to reduce the heat transfer between the inner vessel and the outer jacket

### 3.4

#### inner vessel

vessel intended to contain the cryogenic fluid

**EN 13530-1:2002 (E)****3.5****outer jacket**

gas-tight enclosure which contains the inner vessel and enables the vacuum to be established

**3.6****normal operation**

intended operation of the vessel at a pressure not greater than the maximum allowable working pressure including the handling loads defined in 3.7

**3.7****handling loads**

loads exerted on the transportable cryogenic vessel in all expected situations of transport including loading, unloading, moving lifting equipment

**3.8****documentation**

technical documents delivered by the manufacturer to the owner consisting of:

- all certificates establishing the conformity with this standard (e.g. material, pressure test, cleanliness, safety devices);
- a short description of the vessel (including characteristic data etc.);
- a list of fluids and their net mass for which the cryogenic vessel is designed;
- an operating manual (for the user) which consists of:
  - a short description of the vessel (including characteristic data etc.);
  - a statement that the vessel is in conformity with this standard;
  - the instructions for normal operation

**3.9****pipng system**

all pipes which can come in contact with cryogenic fluids including their valves, fittings, pressure relief devices as well as their supports

**3.10****equipment**

devices which have a safety related function with respect to pressure containment and/or control (e. g. protective or limiting devices, regulating and monitoring devices, valves, indicators)

**3.11****manufacturer of the large transportable cryogenic vessel**

company who carries out the final assembly, including the final acceptance test, of the large transportable cryogenic vessel

**3.12****volume of the inner vessel**

volume of the shell, excluding nozzles, pipes etc. determined at minimum design temperature and atmospheric pressure

**3.13****tare mass**

mass of the empty large transportable cryogenic vessel



**3.14****net mass**

maximum allowable mass of the cryogenic fluid which may be filled. The maximum allowable mass is equal or less of the mass of the cryogenic fluid at filling temperature and pressure when filled to 98 % of the volume of the inner vessel in the case of gases of 3 °A or 3 °O or when filled to 95 % in the case of gases of 3 °F

**3.15****gross mass**

sum of tare mass plus net mass

**3.16****pressure**

pressure relative to atmospheric pressure, i.e. gauge pressure. As a consequence, vacuum is designated by a negative value

**3.17****maximum allowable pressure ( $p_s$ )**

maximum operating pressure at normal operating conditions normally measured at the top of inner vessel, specified for safety reasons

**4 General requirements**

The large transportable cryogenic vessel shall safely withstand the mechanical and thermal loads and the chemical effects encountered during pressure test and normal operation. These requirements are deemed to be satisfied if clause 5 to 9 are fulfilled. The vessel shall be marked in accordance with clause 10, tested in accordance with clause 11 and clause 12 and operated in accordance with EN 13530-3.

**5 Mechanical loads**

SIST EN 13530-1:2002

<https://standards.iteh.ai/catalog/standards/sist/2085a1f5-bd39-46c8-ba3f-11d3fc93a8a0/sist-en-13530-1-2002>

**5.1 General**

The large transportable cryogenic vessel shall resist the mechanical loads mentioned in clause 4 without such deformation which could affect safety and which could lead to leakage. This requirement can be validated by:

- the calculation;
- the calculation and pressure strengthening method (see prEN 13530-2);
- the calculation and experimental method.

The mechanical loads to be considered are given in 5.2 and 5.3.

**5.2 Load during the pressure test**

The load exerted during the pressure test shall be:

$$p_T \geq 1,3 (p_s + 1)$$

where

$p_T$  is the test pressure (in bar);

$p_s$  is the maximum allowable pressure (in bar);

+ 1 is the allowance for external vacuum (in bar).