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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 220, *Cryogenic vessels*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 268, *Cryogenic vessels*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 21012:2018), which has been technically revised.

The main changes are as follows:

- Modification of the Scope;
- Modification of the normative references;
- Improvement of the link between requirements of materials (4.2) and addition of a new [Annex E](#) for materials;
- Explanations provided for austenitic stainless steel in pressure test ([subclause 5.2.4](#)).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Cryogenic vessels — Hoses

## 1 Scope

This document specifies design, construction, type and production testing, and marking requirements for both non-insulated cryogenic flexible hoses and insulated vacuum jacketed hoses used for the transfer of cryogenic fluids within the following range of operating conditions:

- working temperature range: from  $-270\text{ }^{\circ}\text{C}$  to  $+65\text{ }^{\circ}\text{C}$ ;
- nominal size (DN): from 10 to 100.

End fittings for mounting of any couplings are within the scope of this document, but the couplings are subject to other standards.

## 2 Normative references

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.

ISO 7369, *Pipework — Metal hoses and hose assemblies — Vocabulary*

ISO 10806, *Pipework — Fittings for corrugated metal hoses*

ISO 21010, *Cryogenic vessels — Gas/material compatibility*

ISO 21028-1, *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature — Part 1: Temperatures below  $-80\text{ }^{\circ}\text{C}$*

ISO 23208, *Cryogenic vessels — Cleanliness for cryogenic service*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7369 and the following apply.

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

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

### 3.1

#### **hose**

flexible leak-tight inner tube of either corrugated metal, elastomer or plastic

### 3.2

#### **braid**

layer, or layers, of cylindrically woven wires covering the *hose* (3.1) and permanently attached to the flexible *hose assembly* (3.5) *end fitting* (3.4) with a ferrule, serving the function of restraining the flexible hose against elongation