

---

---

**Rubber hoses and hose assemblies  
for liquefied petroleum gas (LPG)  
in the liquid or gaseous phase and  
natural gas up to 2,5 MPa (25 bar) —  
Specification**

*Tuyaux et flexibles en caoutchouc pour gaz de pétrole liquéfié (GPL)  
en phase liquide ou gazeuse et le gaz naturel jusqu'à 2,5 MPa (25  
bar) — Spécifications*

(<https://standards.iteh.ai>)  
Document Preview

ISO 2928:2021

<https://standards.iteh.ai/catalog/standards/iso/c6ef4d16-8923-4b56-b73d-09af39c8f143/iso-2928-2021>



iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

ISO 2928:2021

<https://standards.iteh.ai/catalog/standards/iso/c6ef4d16-8923-4b56-b73d-09af39c8f143/iso-2928-2021>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

|                                                                                                     |           |
|-----------------------------------------------------------------------------------------------------|-----------|
| <b>Foreword</b> .....                                                                               | <b>iv</b> |
| <b>1 Scope</b> .....                                                                                | <b>1</b>  |
| <b>2 Normative references</b> .....                                                                 | <b>1</b>  |
| <b>3 Terms and definitions</b> .....                                                                | <b>2</b>  |
| <b>4 Classification</b> .....                                                                       | <b>2</b>  |
| <b>5 Materials and construction of hose and hose assembly</b> .....                                 | <b>2</b>  |
| <b>6 Dimensions</b> .....                                                                           | <b>3</b>  |
| 6.1 Nominal size, inside diameter, outside diameter, minimum bend radius.....                       | 3         |
| 6.2 Minimum thickness of lining and cover.....                                                      | 4         |
| 6.3 Concentricity.....                                                                              | 4         |
| 6.4 Tolerances in length.....                                                                       | 4         |
| <b>7 Physical properties</b> .....                                                                  | <b>4</b>  |
| 7.1 Compounds.....                                                                                  | 4         |
| 7.2 Finished hose and hose assemblies.....                                                          | 5         |
| <b>8 Electrical resistance</b> .....                                                                | <b>6</b>  |
| <b>9 Frequency of testing</b> .....                                                                 | <b>7</b>  |
| <b>10 Marking</b> .....                                                                             | <b>7</b>  |
| 10.1 Hoses.....                                                                                     | 7         |
| 10.2 Hose assemblies.....                                                                           | 8         |
| <b>Annex A (normative) Flammability test</b> .....                                                  | <b>9</b>  |
| <b>Annex B (normative) Frequency of testing for type tests and routine tests</b> .....              | <b>11</b> |
| <b>Annex C (informative) Recommended frequency of testing for production acceptance tests</b> ..... | <b>12</b> |

[ISO 2928:2021](https://standards.iteh.ai/iso/2928-2021)

<https://standards.iteh.ai/catalog/standards/iso/c6ef4d16-8923-4b56-b73d-09af39c8f143/iso-2928-2021>

## 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)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies*.

This fourth edition cancels and replaces the third edition (ISO 2928:2003), which has been technically revised.

The main changes compared to the previous edition are as follows:

- renaming of nominal size 9 into nominal size 10 and of nominal size 12 into nominal size 13 in [Tables 1](#) and [2](#);
- addition of hoses with a nominal size 10 in [Table 1](#);
- addition of non-pricked hoses in [Table 3](#);
- expansion of the hose/hose assembly classes in [Clause 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).

# Rubber hoses and hose assemblies for liquefied petroleum gas (LPG) in the liquid or gaseous phase and natural gas up to 2,5 MPa (25 bar) — Specification

**WARNING** — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to consider any national regulatory conditions.

## 1 Scope

This document specifies requirements for rubber hoses and rubber hose assemblies used for the transfer of liquefied petroleum gas (LPG) in the liquid or gaseous phase and natural gas and designed for use at working pressures ranging from vacuum to a maximum of 2,5 MPa (25 bar) within the temperature range  $-30\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$  or, for low-temperature hoses (designated -LT), within the temperature range  $-50\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$ .

## 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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1382, *Rubber — Vocabulary*

ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 4671, *Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies*

ISO 6179:2017, *Rubber, vulcanized or thermoplastic — Rubber sheets and rubber-coated fabrics — Determination of transmission rate of volatile liquids (gravimetric technique)*

ISO 7233, *Rubber and plastics hoses and hose assemblies — Determination of suction resistance*

ISO 7326, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance and conductivity*

ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components*

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*

ISO 10619-1, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*

ISO 10619-2:2017, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1382 and ISO 8330 apply.

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

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

### 4 Classification

Hoses and hose assemblies shall be one of the following types:

- type D: delivery hose;
- type D-LT: delivery hose, low-temperature;
- type SD: suction and delivery hose, helix-reinforced;
- type SD-LTR: suction and delivery hose, helix-reinforced, low-temperature (rough-bore).
- type SD-LTS: suction and delivery hose, helix-reinforced, low-temperature (smooth-bore);

All these types can be:

- electrically bonded, in which case the hose is additionally designated and marked with the symbol M;
- electrically conducting by virtue of a conducting rubber layer, in which case the hose is additionally designated and marked with the symbol  $\Omega$ ;
- electrically discontinuous.

### 5 Materials and construction of hose and hose assembly

The hose shall consist of the following:

- a lining of rubber resistant to *n*-pentane;
- a reinforcement of layers of woven, braided or spirally wound textile material or braided or spirally wound wire;
- a cover of black or coloured synthetic rubber, resistant to abrasion and outdoor exposure;
- for hoses designated M only, they shall additionally have two or more low-resistance electrical-bonding wires;
- for hoses designated  $\Omega$  only, cover and/or lining shall be conducting rubber;
- the cover shall be being pricked or unpricked to allow gas permeation; if the cover is unpricked a comparative measurement of permeation between the rubber materials of cover and lining shall be carried out, see [Table 3](#).
- for hoses types D and D-LT the materials and construction shall be as described above.