
**Road vehicles — Coiled tube assemblies
for air brake connection between towing
and towed vehicles —**

Part 2:
Performance requirements

*Véhicules routiers — Tuyaux flexibles spiralés munis de leurs raccords pour
liaison de freinage pneumatique entre le véhicule tracteur et un véhicule
tracté —*

Partie 2: Exigences de performances



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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7375-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 2, *Brake systems and equipment*.

ISO 7375 consists of the following parts, under the general title *Road vehicles — Coiled tube assemblies for air brake connection between towing and towed vehicles*:

- *Part 1: Dimensions*
- *Part 2: Performance requirements*

Annex A forms an integral part of this part of ISO 7375.

Road vehicles — Coiled tube assemblies for air brake connection between towing and towed vehicles —

Part 2: Performance requirements

1 Scope

This part of ISO 7375 specifies the minimum requirements for coiled tube assemblies manufactured from thermoplastic tubing and with suitable end fittings. It applies to coiled tube assemblies for vehicle combinations equipped with air brake systems.

This part of ISO 7375 does not apply to other thermoplastic tubing used in brake systems.

The coiled tube assemblies covered by this part of ISO 7375 belongs to two possible categories:

- tube assemblies for use up to a maximum working pressure of 1 000 kPa ¹⁾;
- tube assemblies for use up to a maximum working pressure of 1 250 kPa ¹⁾;

and within a temperature range between – 40 °C ²⁾ and + 100 °C.

2 Normative reference

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7375. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7375 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid international Standards.

ISO 1043-1:1997, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*.

ISO 1043-2:1988, *Plastics — Symbols — Part 2: Fillers and reinforcing materials*.

ISO 1043-3:1996, *Plastics — Symbols and abbreviated terms — Part 3: Plasticizers*.

ISO 1728:1980, *Road vehicles — Pneumatic braking connections between motor vehicles and towed vehicles — Interchangeability*.

ISO 7375-1:1996, *Road vehicles — Coiled pipe assemblies for pneumatic braking connection between motor vehicles and towed vehicles — Part 1: Dimensions*.

ISO 7628-1:— ³⁾, *Road vehicles — Thermoplastic tubing for air braking systems — Part 1: Dimensions and marking*.

1) 1 kPa = 10⁻² bar.

2) Consideration of a reduction of the lower temperature limit will be subject of future revision of this part of ISO 7375.

3) To be published. (Revision of ISO 7628-1:1985)

ISO 7628-2:—⁴⁾, *Road vehicles — Thermoplastics tubing for air braking systems — Part 2: Mounting on vehicle and test methods.*

3 General

The design of the suitable end fittings shall be approved by the vehicle manufacturer.

Tubing selected for the manufacture of coiled tube assemblies shall meet the requirements specified in ISO 7628-2.

Each combination of tubing and end fittings shall be subjected to the tests specified in clause 6.

4 Materials

Thermoplastic tubing shall be extruded from 100 % virgin material (not regrind). If reinforcement is used, then the users must make certain that the reinforced tubing is suitable for the application.

5 Installation on the vehicle

The installation shall be performed in accordance with ISO 1728.

Precautions shall be taken to protect the tubing against damage during installation, coupling and repair.

6 Tests

Unless otherwise stated, for the purposes of these tests, the samples with fittings shall be at least three days old and the tests performed at an ambient temperature of $(23 \pm 2)^\circ\text{C}$, at a relative humidity between 45 % and 75 %, and unpressurized.

Each test shall be conducted on a different sample, unless otherwise stated.

6.1 Extension test

A coiled tube assembly shall be drawn to its working length within (10 ± 1) s in accordance with ISO 7375-1.

The force required shall not be greater than 50 N.

6.2 Low temperature extension test

A sample of the coil assembly shall be maintained at a temperature of $(-40 \pm 2)^\circ\text{C}$ for 24 h. The sample shall be removed from the cold room within 5 s and then drawn to its working length within (10 ± 1) s.

The force required shall not be greater than 250 N.

6.3 Coil recovery test

The test shall be conducted on two coiled tube samples without fittings. The lengths l_0 , a and b (see figure 1) shall be measured with the coiled tube on a smooth and even surface with the closed coils together.

The test shall guarantee that any friction on the closed coils does not affect the results.

4) To be published. (Revision of ISO/TR 7628-2:1986)

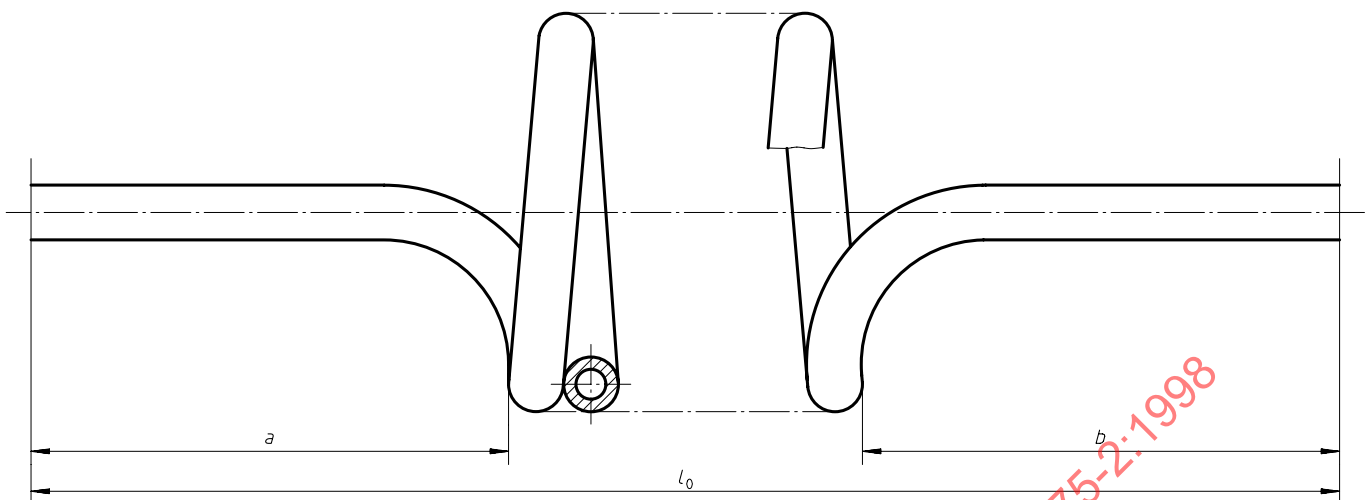


Figure 1 — Coiled tube

The samples shall be maintained for 12 h to 24 h at a temperature of:

(23 ± 2) °C for the first sample;

(70 ± 2) °C for the second sample.

The samples shall be removed from the oven within 5 s and then shall be drawn to their working length within (10 ± 1) s according to 6.1, held in this position for 60 s and then released.

The length l_5 shall be measured 5 min after releasing the coiled tubes.

The recovery (R) of the coiled tube shall be as specified in table 1.

Table 1 — Maximum value of recovery

Temperature °C	Recovery R
23 ± 2	≤ 2,3
70 ± 2	≤ 4,0

The following equation should be used to calculate the recovery R :

$$R = \frac{l_5 - a - b}{l_0 - a - b}$$

where

a is the tail length, in millimetres;

b is the tail length in millimetres;

l_0 is the overall length when the closed coils are together, in millimetres;

l_5 is the overall length, in millimetres, 5 min after releasing the coiled tube.

6.4 Leak test

The test shall be carried out on a piece of the coiled tube complete with end fittings, in accordance with annex D of ISO 7628-2:—.

6.5 Fitting pull off test

The tube assembly complete with end fittings shall be subjected to preconditioning which consists of a temperature cycle from + 100 °C to – 40 °C.

The temperature cycle consists of the following steps:

- a) conditioning the sample at (100 ± 2) °C for 1 h;
- b) allowing the sample to cool to ambient temperature;
- c) reduction of the temperature to (-40 ± 2) °C and maintenance for 4 h;
- d) increase of the temperature to (23 ± 5) °C and maintenance for 1 h.

A piece of the preconditioned tube assembly including an end fitting is cut off and subjected to a tensile test at a rate of 25 mm/min. The force required to remove the fitting shall be greater than or equal to 500 N.

6.6 Articulation test

The test shall be carried out on a coiled tube assembly with end fittings and kink protection. The coiled tube assembly shall be subjected to the preconditioning described in 6.5.

The coiled tube assembly shall be firmly attached by one of the end fittings and then drawn to its working length in accordance with ISO 7375-1.

The end fitting shall be articulated 90° each way to the longitudinal axis of the coiled tube assembly for 10 000 cycles.

The articulation cycle comprises of the following steps (see annex A):

- a) position 1 = reference;
- b) 90° rotation around a fixed point A to position 2;
- c) rotation back to position 1 to complete the first part of the cycle;
- d) 90° rotation around point A to position 3;
- e) rotation back to position 1 to complete the second part of the cycle;
- f) third part of the cycle identical to b) and c).

One cycle is equal to $(3 \pm 0,05)$ s.

There shall be no signs of kinking of the tube nor displacement of the anti-kink device.

6.7 Kink test

This test shall be carried out on three straight samples of tubing complete with one end fitting and, if any, its kink protection, in accordance to annex D of ISO 7628-2:—.

The assembly sample shall be firmly attached by the end fitting (see also annex A). A force of 150 N shall be applied to the tube perpendicularly to the longitudinal axis of the fitting thread at a distance of 200 mm measured from the end of the fitting shoulder. No kinking of the tube is permitted.

7 Marking

In addition to the marking in accordance with ISO 7628-1 on the tube, the coiled tube assembly shall be clearly and permanently identified as follows, avoiding repetition of the same information:

- ISO 7375;
- coiled tube assembly manufacturer designation;
- date code of manufacture of the coiled tube assembly;
- material type (ISO 1043-1, ISO 1043-2 and ISO 1043-3).

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Annex A (normative)

Apparatus used for the articulation test

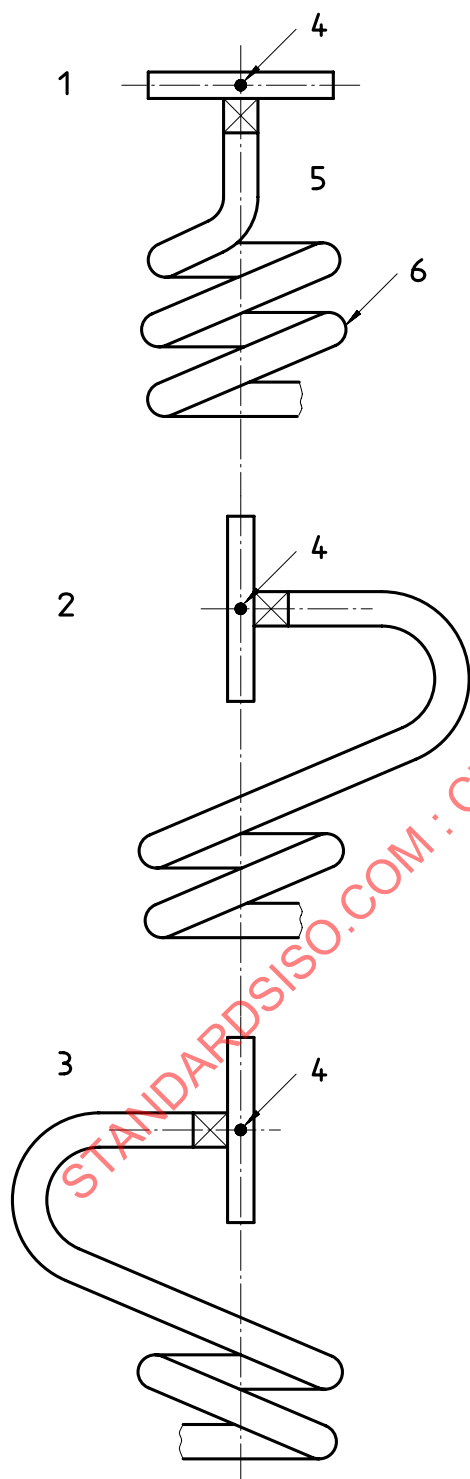


Figure A.1 — Position diagram