INTERNATIONAL STANDARD

**ISO 7657**

Second edition
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# Pipework — General requirements for stripwound flexible metal hoses

*Tuyauteries — Exigences générales pour tuyaux métalliques flexibles agrafés*

Reference number
ISO 7657:1995(E)

# 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 7657 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, Subcommittee SC 11, *Flexible interlocked and convoluted metallic hoses*.

This second edition cancels and replaces the first edition (ISO 7657:1985), of which it constitutes a technical revision.



International Organization for Standardization
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# Pipework — General requirements for stripwound flexible metal hoses

## 1 Scope

This International standard defines the conditions to be met for stripwound flexible metal hoses, without coating as defined in ISO 7369:1983, 4.1.10.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 683-13:1986, *Heat-treatable steels, alloy steels and free-cutting steels — Part 13: Wrought stainless steels.*

ISO 1634-1:1987, *Wrought copper and copper alloy plate, sheet and strip — Part 1: Technical conditions of delivery for plate, sheet and strip for general purposes.*

ISO 2081:1986, *Metallic coatings — Electroplated coatings of zinc on iron or steel.*

ISO 6317:1982, *Hot-rolled carbon steel strip of commercial and drawing qualities.*

ISO 7369:1983, *Pipework — Flexible metallic hoses — Vocabulary of general terms.*

ISO 7658:1984, *Pipework — Stripwound flexible metal hoses — Testing and verification of characteristics.*

## 3 Manufacture

All stripwound flexible metal hoses defined in this International Standard are manufactured from helically wound preformed strip, generally with a right-hand lead where the turns, with or without packing, are connected together by single or double overlapping. Flexibility is achieved by adjacent turns sliding on each other.

## 4 Materials — Strip quality

### 4.1 Stripwound flexible metal hoses made of protected unalloyed steel (carbon steel)

Rolled strip in accordance with ISO 6317, and protected.

The following types are distinguished:

— type A, hot-dipped galvanized steel;

— type B, electrogalvanized steel;

— type C, see ISO 6317.

Any other protection shall have, at least, the characteristics of protection Fe/Zn 5C, defined and verified in accordance with ISO 2081.

### 4.2 Stripwound flexible metal hoses made of stainless steel

Rolled strip in accordance with ISO 683-13.

The following types are distinguished:

— type A, austenitic stainless steel;

— type B, ferritic stainless steel.

### 4.3 Stripwound flexible metal hoses made of copper alloys

Rolled strip in accordance with ISO 1634-1.

The following types are distinguished:

— type A, bronze;

— type B, brass.

## 5 Performance characteristics

General conditions of test and verification are given in ISO 7658.

### 5.1 Common characteristics of all stripwound flexible metal hoses

#### 5.1.1 Coiling diameter

Diameter of cylinder on which a hose can be wound until coils touch. This diameter gives an idea of flexibility: pliancy is indicated by the ease of coiling.

#### 5.1.2 Tensile strength

The heaviest tensile load a stripwound flexible metal hose can withstand longitudinally before rupture.

#### 5.1.3 Crush strength

The heaviest load a stripwound flexible metal hose can withstand perpendicular to its longitudinal axis, with permanent deformation of the inside diameter of 5 %.

### 5.2 Particular characteristics of leak-proof stripwound flexible metal hose assemblies

#### 5.2.1 Burst pressure

Burst pressure is reached when a continuous flow of water drops appears on the test-piece, just before bursting at standard test temperature in accordance witn ISO 554.

#### 5.2.2 Maximum permissible working pressure

The maximum permissible working pressure of a piping component is the effective maximum pressure that this component can withstand at a given temperature, on a permanent basis, resulting from the characteristics of the materials used, its fabrication, or its dimensions.

In particular, the maximum permissible pressure of a leak-proof stripwound flexible metal hose assembly shall not be more than one third of the burst pressure as defined in 5.2.1, under the same conditions of temperature.

#### 5.2.3 Hydraulic test pressure

This is one and a half times the maximum permissible working pressure.

## 6 Temperature-related requirements for use

### 6.1 Maximum permissible working temperature

The maximum permissible working temperature of a stripwound flexible metal hose assembly is the lowest maximum permissible working temperature of any constituent component:

a) material;

b) protection;

c) packing;

d) attachment method;

e) connection method.

EXAMPLE

The maximum permissible temperature depends on the basic packing material (see figure 1):

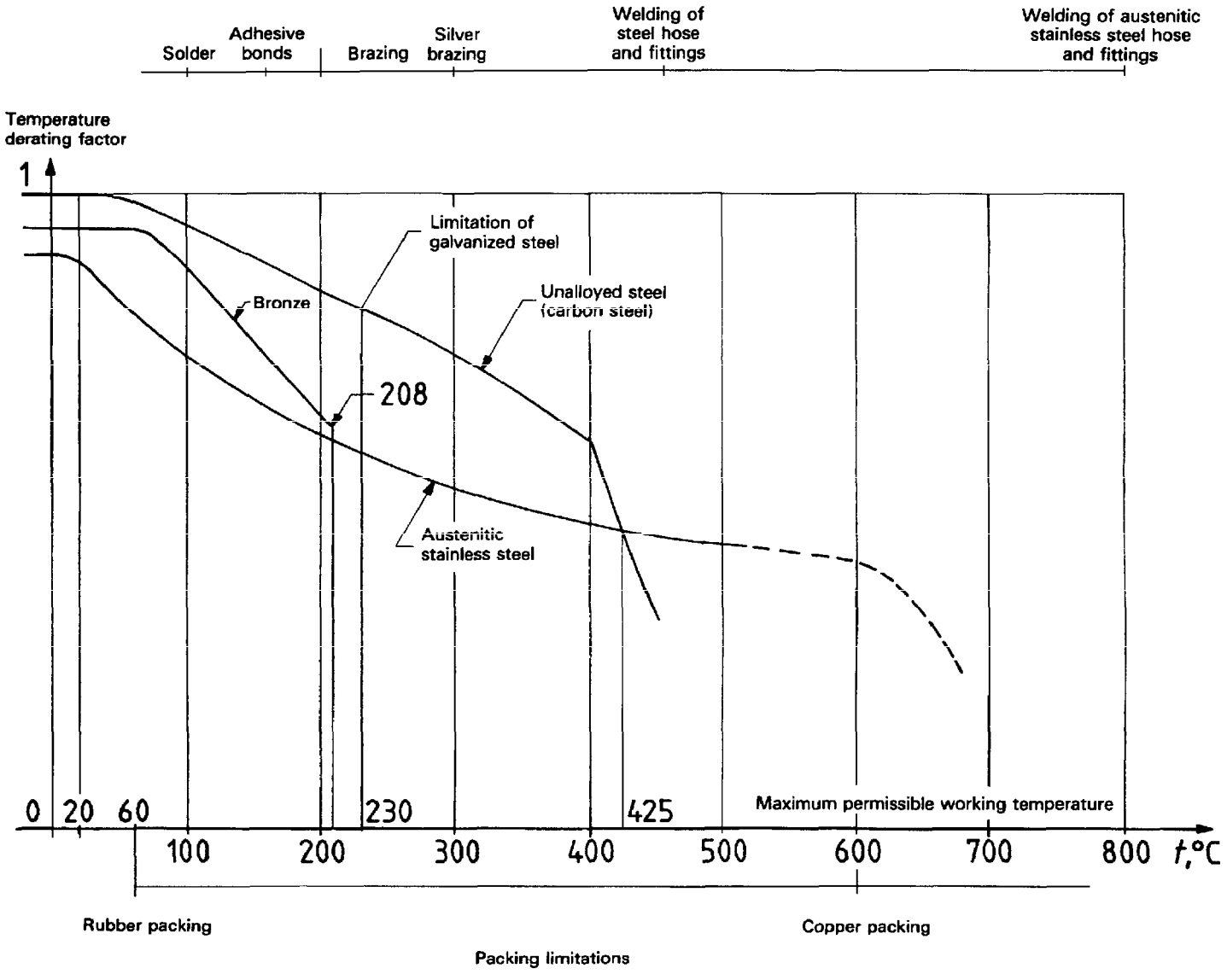
a) rubber packing: up to ≈ 60 °C;

b) copper packing: up to ≈ 600 °C.

### 6.2 Variation of characteristics with temperature

An increase in temperature causes a decrease in the mechanical strength of components, and therefore in the strength of stripwound flexible metal hoses.

The lowered strength of the whole assembly shall be equal to that of the element least able to withstand temperature variation.




The temperature derating factor is the ratio of burst pressure at temperature $t$ to burst pressure at room temperature. It is therefore equal to the ratio of maximum permissible working pressure at temperature $t$ to the maximum permissible working pressure at room temperature.

The curves are shown as an example.

NOTE — The curve for galvanized steel is the same as one for unalloyed steel (carbon steel). The temperature limit of use (230 °C) corresponds to that of the oxidation of the protection.

The limitations of packing and fitting attachment methods are shown as an example.

**Figure 1 — Temperature derating factor and maximum permissible working pressure for fitting attachment methods**

**ICS 23.040.70**

**Descriptors:** piping, metal tubes, hoses, lock-seamed metal hoses, specifications, operating requirements, temperature.

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