

TC 5

International Standard



7657

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**Pipework — Stripwound flexible metal hoses —
Specifications and temperature-related requirements for
use**

Tuyauterie — Tuyaux métalliques flexibles agrafés — Spécifications et conditions d'emploi en température

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7657 was developed by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, and was circulated to the member bodies in March 1983.

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It has been approved by the member bodies of the following countries:

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Brazil	Korea, Rep. of	Sweden
China	Mexico	Switzerland
Czechoslovakia	Netherlands	United Kingdom
France	Norway	USA

No member body expressed disapproval of the document.

Pipework — Stripwound flexible metal hoses — Specifications and temperature-related requirements for use

1 Scope and field of application

This International Standard defines the conditions to be met for stripwound flexible metal hoses, without coating as defined in clause 4.1.10 of ISO 7369.

2 References

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

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

ISO 1634, *Wrought copper and copper alloys — Rolled flat products (plate, sheet, strip) — Mechanical properties.*

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

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

ISO 7369, *Pipework — Flexible metal hose — Vocabulary of general terms.*

ISO 7658, *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 according to ISO 6317, and protected.

The following types are distinguished :

- type A, hot-dipped galvanized steel;
- type B, electrogalvanized steel.

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

4.2 Stripwound flexible metal hoses made of stainless steel

Rolled strip according to 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 according to ISO 1634.

The following types are distinguished :

- type A, bronze;
- type B, brass.

5 Required 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 Hydraulic pressure strength (Hydraulic bursting pressure)

Bursting pressure is reached when a continuous flow of water drops appears on the test-piece, just before bursting at standard test temperature according to 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 hydraulic bursting 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 material of packing (see the figure) :

- a) rubber packing : up to ≈ 60 °C;
- b) asbestos packing : up to ≈ 230 °C;
- c) 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.

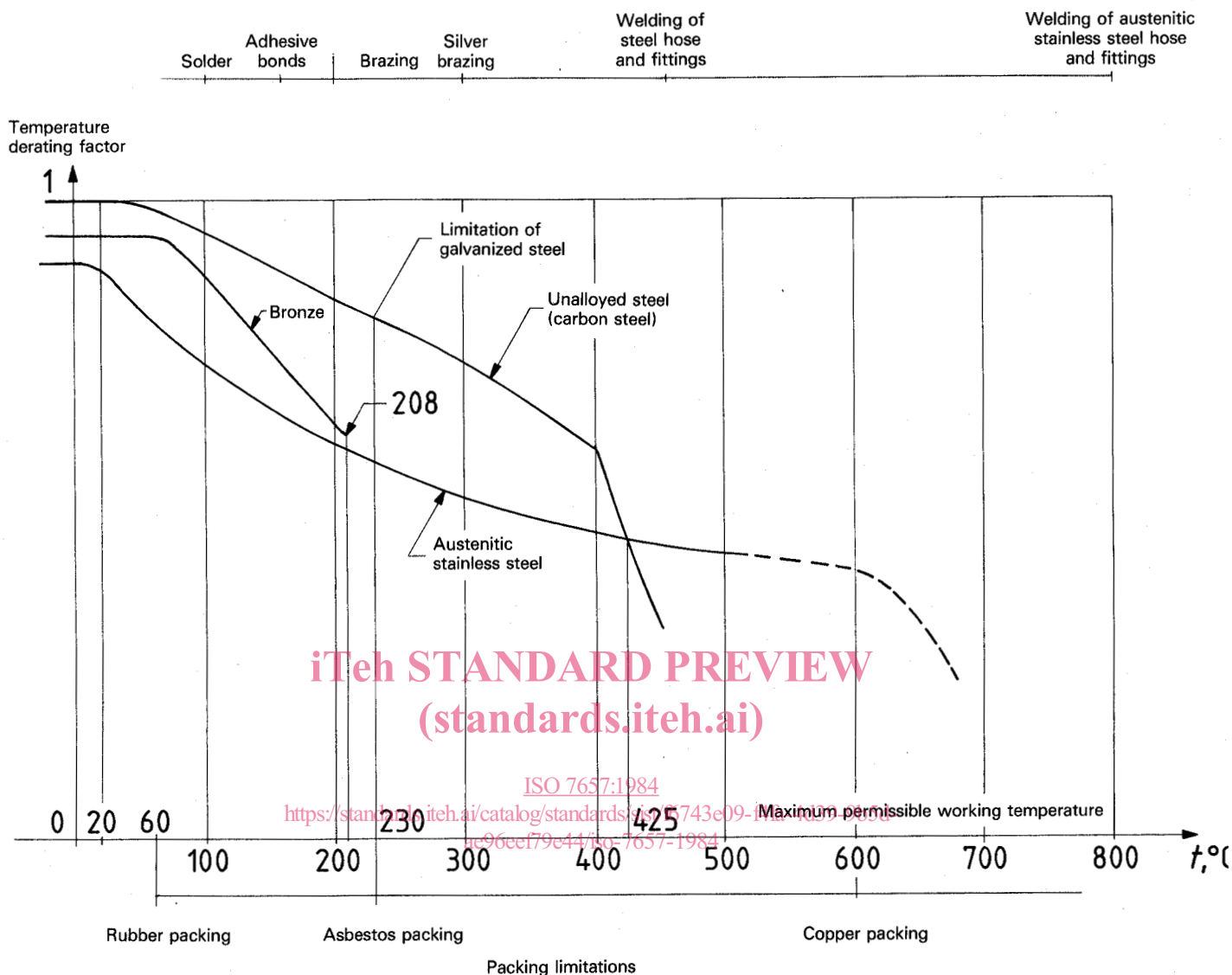


Figure — Temperature derating factor and maximum permissible working pressure for fitting attachment methods

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

The curves are shown as an example in the figure.

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

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

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