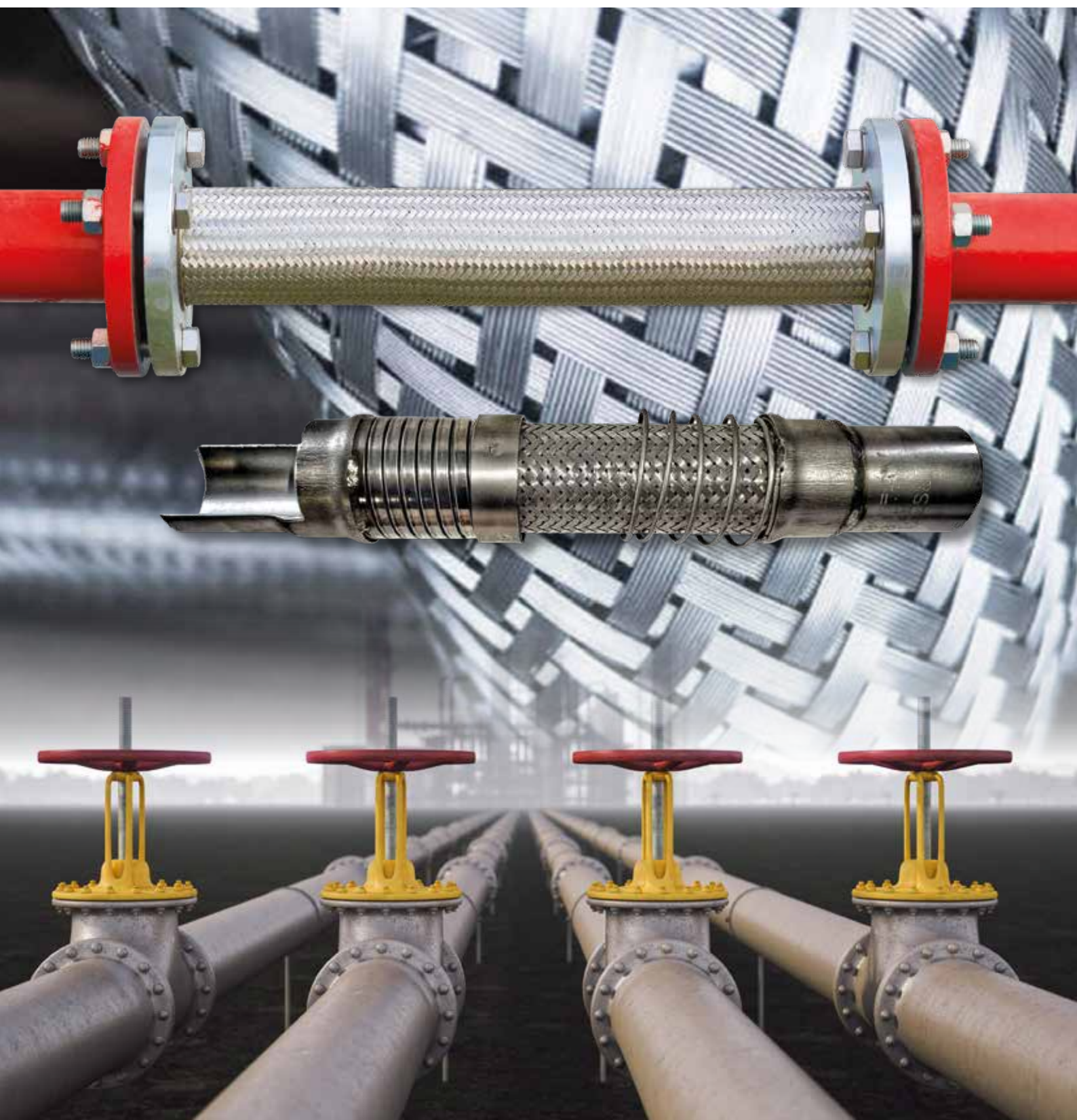


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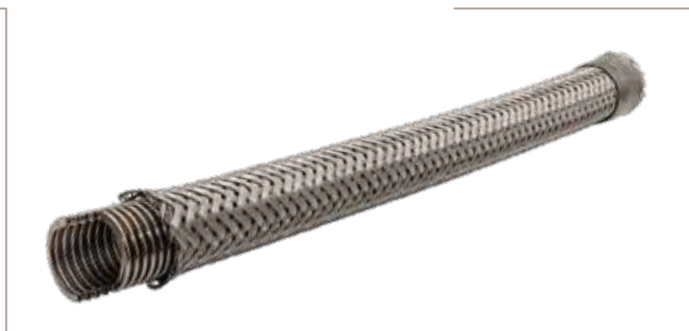
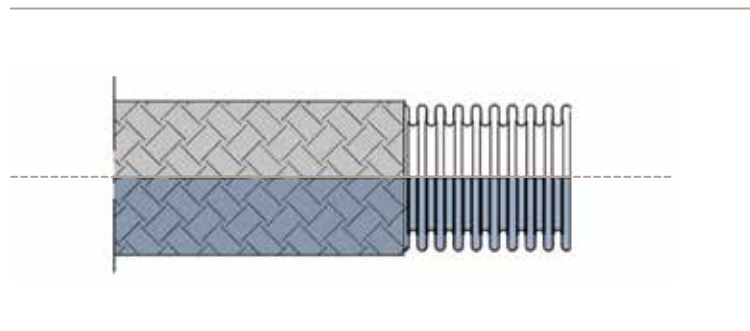


METAL FLEXIBLE HOSES



ATAG METAL FLEXIBLE HOSES

ATAG metal flexible hoses offer the highest level of reliability and durability.



They are manufactured from drawn hoses (with or without longitudinal welding). Through a mechanical or hydraulic forming process, corrugations (parallel or helical) are created. In order to withstand high operating pressures, the corrugated hose is covered with one or more metallic braids.

These products are used in a wide range of applications depending on customer requirements. Generally employed in industrial sectors, they are mainly used for the conveyance (or handling) of:

- Steam and steam condensate

- Superheated water
- Gases / liquids
- Acid solvents
- Combustible gases
- Air
- Oxygen for chemical and hospital use
- Oil in liquid state

In all cases, the compatibility of the conveyed fluid with the hose material must be verified.

METAL FLEXIBLE HOSES

Below is a list of industrial applications:

Hydraulics

- Transport of high-pressure fluids in machinery such as presses, industrial, agricultural and military vehicles, etc.

Food industry

- Conveyance of food-grade fluids requiring flexible piping capable of withstanding sometimes acidic products and high pressures.

Chemical industry

- Transport of acidic fluids and chemical substances under high pressure.

Pharmaceutical industry

- Transport of sensitive fluids, sometimes sterile.

Refrigeration

- Conveyance of refrigerant fluids in the industrial sector.

Optoelectronics

- Ensures the transmission of information by protecting the light conductor from mechanical damage.

Petrochemical / Oil & Gas

- Transport of steam and condensate, acids, solvents, gases and chemical liquids.

It is therefore evident that ATAG metal flexible hoses are designed to meet specific requirements, such as:

- **Conveyance of fluids and gases.**
- **Compensation of misalignments.**
- **Absorption of vibrations.**
- **Resistance to severe or extreme operating conditions.**
- **Mechanical protection.**

ATAG metal flexible hoses comply with specific technical parameters:

- 1) **Nominal pressure:** pressure referred to ambient temperature.
- 2) **Test pressure:** pressure to which the product is subjected at ambient temperature prior to delivery.
- 3) **Dynamic bending radius:** in the absence of pressure, the radius at which the hose axis can be continuously and repeatedly bent.
- 4) **Static bending radius:** when only a very limited number of bends are required, or bending occurs only during installation, the bending radius values may be significantly reduced, at the cost of plastic deformation of the corrugation.



METAL FLEXIBLE HOSES



COMPONENTS OF THE METAL FLEXIBLE HOSE

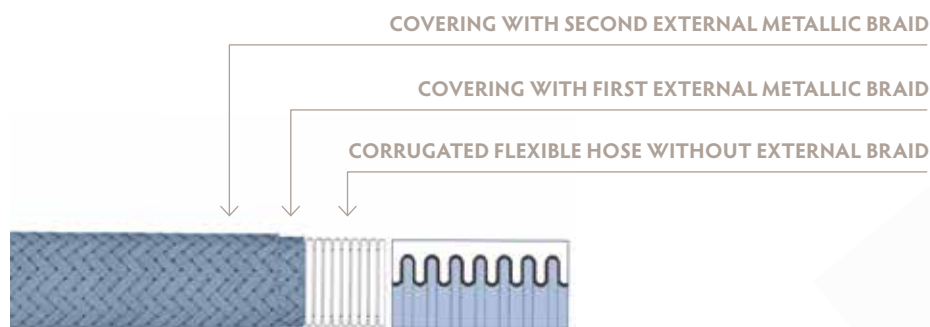
Let us consider a flexible hose assembled according to the customer's specifications. It is mainly composed of three parts:

- 1) Flexible hose (without external braid, with one braid, or with two external braids)
- 2) End fittings
- 3) Accessories



METAL FLEXIBLE HOSE

The hose consists of an internal corrugated tube and, if required, one or more external metallic braids (usually up to two braids).



The materials most commonly used are:

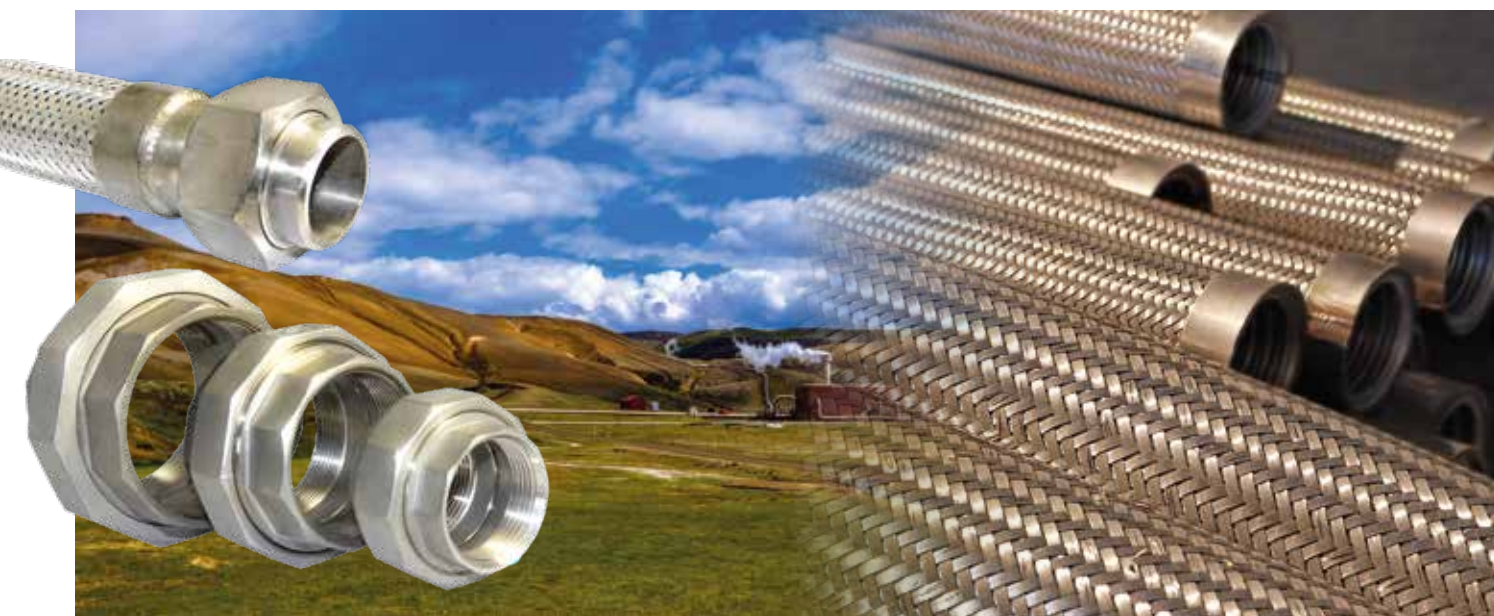
- Corrugated hose: AISI 321 or AISI 316
- External braid: AISI 304 or AISI 316

Naturally, hoses can also be manufactured using different and higher-performance materials (for example Inconel 625, Monel, Copper, etc.).

These solutions are intended for specific applications and must be evaluated on a case-by-case basis.



METAL FLEXIBLE HOSES



END FITTINGS

End fittings are the components that allow the metal flexible hose to be connected to the relevant system or line. Each type of fitting requires proper joining to the flexible hose by welding, which must take into account the operating conditions. End fittings may be made of carbon steel, stainless steel, or other materials, depending on customer requirements and service conditions.

The choice of the end fitting must meet the customer's needs. End fittings are available in various types; below is a summary of the most commonly used ones:



- Plain weld-end fitting: available in different thicknesses and lengths. This category also includes weld ends manufactured from pipes in accordance with specific standards.
- Three-piece union: available with male connection, female connection, or weld-end connection, each with different thread types.
- Fixed male fitting: available with different thread types (for example GAS parallel, GAS taper, NPT, etc.) and sealing faces (such as flat face or conical seat).
- Fixed flange: available according to different standards (for example ASME, EN, API, etc.), including custom-designed flanges.
- Swivel flange on bracket: the same characteristics of the fixed

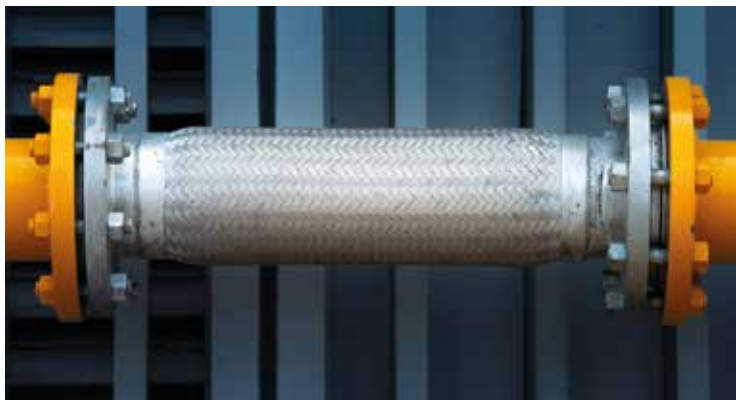
flanges also apply to swivel flanges.

The bracket may have different thicknesses and be manufactured according to specific standards (for example ANSI B16.9).

- Swivel nut with conical seat: also available with flat face or other sealing types. Various thread standards can be supplied.
- Quick-connect fittings: available in several types and for different applications; all allow rapid and safe flow interruption.
- TRI-CLAMP fittings
- SMS fittings
- Custom-designed fittings: fittings manufactured according to specific customer requirements.

METAL FLEXIBLE HOSES

If the end fitting you require is not listed above, **do not worry!**
Contact **ATAG** or get in touch with your local sales representative.
We will certainly be able to **find the ideal solution** for your application.



ACCESSORIES

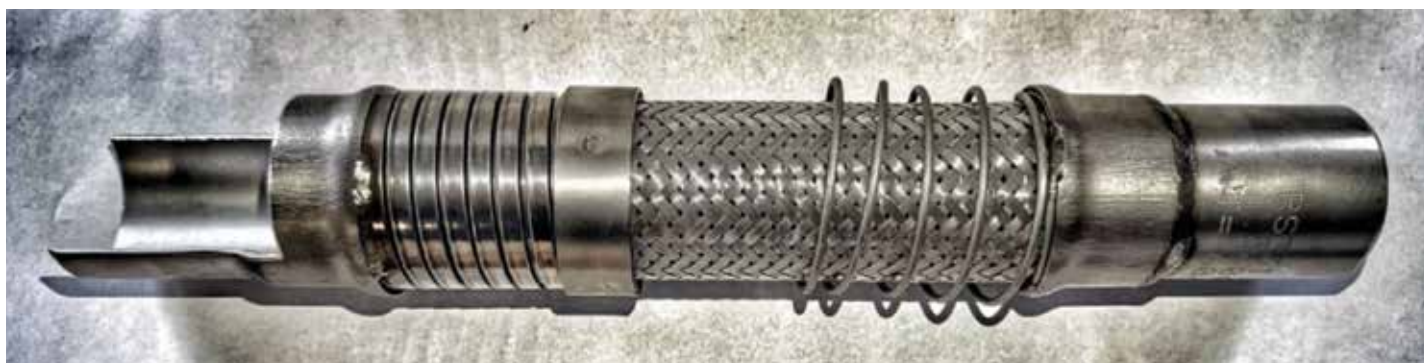
Metal flexible hoses can be completed with various accessories designed to meet specific user requirements.

These may include:

- Pyrotex protective sleeve: particularly used to prevent operators from coming into direct contact with a flexible hose conveying high-temperature fluids or gases.
- Silicone sleeves or sleeves made of other materials: depending on the selected material, these sleeves offer high resistance to chemical attack and environmental exposure, containment in the event of hose failure, and easy hose identification even from a distance (colors may indicate specific uses).
- Metal helical spiral: applied at the ends or along the entire hose length. During bending, this solution shifts stresses away from the welded joints at the fittings, preventing cracking and subsequent leakage.
- PVC or similar material helical spiral: applied along the entire length of the hose, this solution provides additional protection to the hose itself. For example, if a hose laid on the ground is dragged, the external braided layer is protected.
- Safety cable: in the event of accidental detachment of the metal flexible hose from the line, this solution keeps the hose in position, preventing damage to people and/or property.



METAL FLEXIBLE HOSES



Attention to detail has always been a hallmark of ATAG.

When customers require documentation certifying the quality of the manufactured product and/or the parameters used for its design and construction, and when a simple declaration is not sufficient, it becomes necessary to rely on certifications that validate the work carried out.

Below is a summary of some of the certifications most frequently requested by our customers:



- **PED** (Pressure Equipment Directive)
- **ASME** (American Society of Mechanical Engineers)
- **ATEX** (Atmospheres Explosive)
- **MOCA** (Materials and Articles in Contact with Food)
- Third-party certification bodies (**Bureau Veritas**, **Lloyd's Register**, **RINA**, **ABS**, **DNV**, **TÜV**, etc.)

At **ATAG**, we pay close attention to the needs of customers who are constantly seeking the best solutions to the challenges of modern industry.



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