Angst+Pfister
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ASSIWELL® Metal hoses
Operating manual for metal hose assemblies

GENERAL

The hose assemblies are designed and produced for a defined maximum operating pressure, temperature, and fluid. It is the responsibility of the end user to identify and analyse the relevant hazards and to define and implement the necessary measures. All necessary technical, organizational, and personal protective measures must be taken to ensure that the hose assembly is operated safely.

The hose assemblies must be handled, installed and operated in accordance with this manual and the laws, regulations, directives, and standards applicable in the country in which the hose assembly is used.

PROPERTIES

The properties of the metal hoses, such as those noted in the datasheets, are determined for specifically defined operating conditions. Any deviations from these conditions have an impact on the performance of the metal hose assembly. Examples of this are: variations in temperature, pressure, flow rate, type of motion, vibration, and cleanliness.
Metal hose assemblies that are not fitted with an external thermal insulation have risk of scorching due to their high thermal conductivity.

Metal hoses are designed only for bending motions up to the minimum bending radius. Metal hose assemblies must not be subjected to axial or torsional loads. The layout, handling and installation instructions in this manual are essential to avoid damaging metal hoses.

TRANSPORT & STORAGE

- Hoses, hose assemblies and accessories must be packed and fixed in such a way that they can not be damaged. Special precautions must be taken against shocks and vibrations during transport.
- Transport and store in a clean and dry environment; avoid direct exposure to UV-light; protect from heat sources; hoses and hose assemblies must not get in contact with substances and surfaces which can cause damages.
- Stainless steel hose assemblies must not be exposed to chlorides, bromides, iodides, extraneous rust, or rust film.
- Close all ends and openings with protection caps to protect against pollution, ozone influence, and corrosion.
- Hoses, hose assemblies and accessories must be transported and stored in a strain free position. If transported or stored coiled, the minimum bending radius must not fall below the manufacturer's specified value.
- Protect hose assemblies from kinks, abrasion, and impacts.

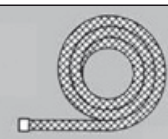
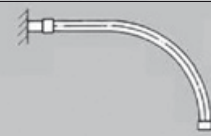
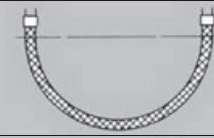
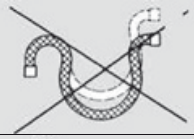
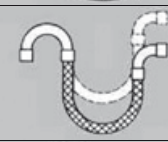
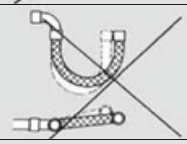
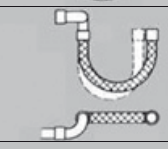
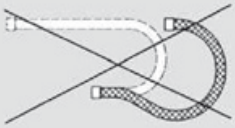
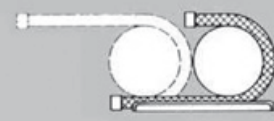
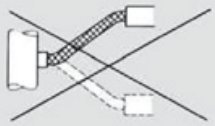
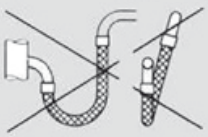
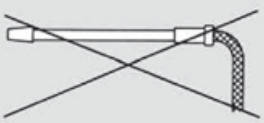
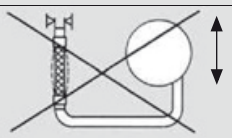
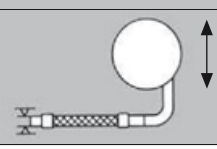
INSTALLATION

- The hose assemblies must be installed in a way that their natural position and movement are not impeded.
- The hose must not be bent more than its minimum allowed bending radius in any point.
- Hose assemblies must not be subjected to strain, torsion, and impacts.
- Hose assemblies must be protected from outside mechanical, thermal, and chemical influences.

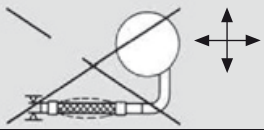
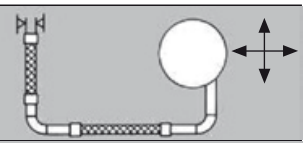
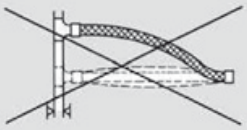
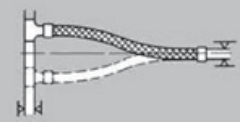
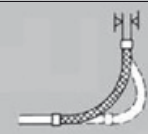
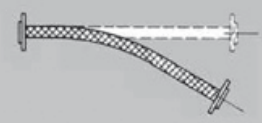
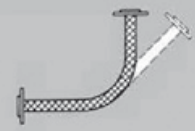
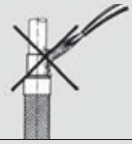
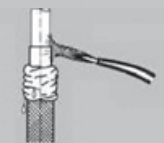
- Removable joints must be checked to fit tightly before putting in operation.
- Do not put a visibly of suspectedly damaged hose assembly in operation.
- If necessary, the hose assemblies must be cleaned appropriately before initial operation.
- If grounding (equipotential bonding) is required, this must be connected and checked after installation.
- Install according to existing local and national regulations, as well as best custom and practice.
- Follow both the installation instructions for the corrugated metal hose and the metal hose assembly.

See DIN 20066, DGUV Rule 113-015, TÜV leaflet 002 and the following table for more installation requirements:

INSTALLATION INSTRUCTIONS METAL HOSES

Wrong installation		Correct installation
	Do not pull on a hose that is coiled. Unroll the coil.	
	Do not put under torsion. Ensure a twist-free installation.	
	Do not use hose assemblies with unsuitable length. Ensure that the flexible (active) hose length is suited for the application.	
	Do not create unnecessary bends in the hose. Use pipe bends.	
	Do not move the hose obliquely to the installation plane. Only allow movements in the installation plane.	
	Do not allow the hose to sag. Consider the use of a support.	
	Do not use a straight hose configuration for large lateral displacements. Use a U-shaped configuration.	
	Do not bend the hose in more than one plane. Install in one plane to avoid torsion.	
	Do not suspend the hose by a single point. Use a support roll to avoid exceeding the bending limit.	
	Do not create a pulling load on a bend. Use an elbow instead.	
	Do not allow axial vibrations on the hose. Install the hose perpendicular to the swinging motion.	

INSTALLATION INSTRUCTIONS METAL HOSES

Wrong installation		Correct installation
	Do not allow vibrations in multiple directions on a single straight hose. Consider a design with two perpendicular hose portions instead.	
	Minimize the movement of the hose by centering its nominal position.	
	Do not induce axial displacements. Consider installing the hose perpendicular to the displacements.	
	Do not use a straight hose for large lateral movements. Consider installing the hose in a 90° bend.	
	The hose bend and movements must be in the same plane to avoid torsion.	
	Consider the total displacements for defining the correct length of the hose and use elbows to avoid excessive bending of the hose.	
	Use the correct length for the hose assembly.	
	Use the correct length for the hose assembly.	
	Do not allow angular movements that create torsion on the hose. Only bend the hose in the installation plane.	
	Do not overheat the hose and hose welding seam. Cool it while welding the fitting if necessary.	
	Do not damage the hose or braid. Use an outer protection if necessary.	

APPLICATION

Hose assemblies must only be used in applications for which they have been designed. The operating conditions on the marking and in the manufacturer's documentation of the hose assemblies must be respected.

The most relevant parameters are:

- Pressure: the maximum operating pressure must not be exceeded.
- Temperature: the maximum operating temperature must not be exceeded.
- Bending radius: minimum allowed bending radius must be respected in each point.
- Cyclic loads and their effects on the service life have to be considered.
- The chemical and thermal resistance of the materials.

If the hose assemblies are labelled according to one of the following standards, the corresponding requirements apply:

- **EN ISO 10380:** Corrugated metal hoses and metal hose assemblies; Any deterioration or destruction of any part of the corrugated metal hose shall result in the need to replace the complete installed length; alterations to any part of the corrugated metal hose shall mean that it is no longer in conformity with this International Standard.
- **DIN 3384:** Hose assemblies of stainless steel for gas applications When using gas hose assemblies in Switzerland the following guidelines must be observed:
    - **SVGW guideline G1:** Guideline for natural gas installation in buildings
    - **EKAS Directive No. 6517:** Directive on liquefied gas
- **DIN EN 14585-1:** Corrugated metal hose assemblies for pressure applications according to PED 2014/68/EU
- **EC 1935/2004:** Materials and articles intended to come into contact with food.

- **DIN EN ISO 21012:** Cryogenic vessels - Hose assemblies
- **DIN 2827:** Hose assemblies of stainless steels for chemical applications. For hose assemblies according to DIN 2827 the material 1.4571 is prescribed. These hose assemblies are marked with the material number. As these hoses are ordered standardized according to this standard, the manufacturer cannot carry out a hazard analysis on chemical resistance. Within the framework of the hazard, the operator has to verify whether resistance of the material for the relevant medium is provided. Depending on the hazard level of the substance, repeated tests must be carried out at adequate intervals.
- **DIN 1988:** The installation of drinking water hose assemblies in buildings must be carried out in accordance with DVGW-TRGI or TRF or DVGW-TRWI.

MAINTENANCE & INSPECTION

Cleaning

The hose assembly must be cleaned and rinsed after each operation, and prior to each inspection. If cleaned with steam or with chemical additives, the chemical resistance of the hose assembly components must be considered. Special cleaning procedures are required for food applications.

Inspections

The condition of hose assemblies subject to compulsory inspection must be verified and documented by a qualified person:

- Prior to initial use
- In regular intervals after initial use
- After a repair or replacement

The inspection intervals must be adapted the installation situation and actual operating conditions. Inspections must for example be performed at shorter intervals for applications with high pressure, dynamic elements and aggressive, poisonous, or highly inflammable media.

The type and scope of an inspection (e.g. pressure test, visual examination, examination of the electrical conductivity test) are regulated in Industrial Safety Regulations such as TRBS 1203 or TÜV leaflet 002. Inspections must be carried out by qualified persons. The result must be documented.

Repairs
Repairs of hose assemblies must be carried out by a qualified person only, according to the valid operating safety regulation with subsequent inspection, marking, and documentation.

REMARK

For the appropriate application of hose assemblies, the comprehensive notices of leaflet TÜV 002 and the relevant rules for accident prevention must be observed.

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