PTFE HOSES AND HOSE ASSEMBLIES

Original operating instructions

TECNO PLAST
INDUSTRIETECHNIK GMBH

Inhalt

PTFE OPERATING INSTRUCTIONS

It is extremely important and in the customer's best interest to observe the information contained in these operating instructions. TECNO PLAST shall not be liable for any defects that arise as a result of the customer's disregard for the information in these operating instructions.

1. Hose assembly pressure test

Before commissioning, it is extremely important to test the suitability of the products for the specified operating pressure. To this end, all products undergo a test at one and a half times the operating pressure depending on the pressure limiting component (fittings and hose version), generally using water. This can also be found in the respective TECNO PLAST catalogs and product brochures.

This test should be carried out with a fully assembled hose assembly as the hose liner and fittings are both tested for leaks at the same time.

TECNO PLAST does not test bulk hoses. Instead, following self-assembly, the customer must conduct a pressure test on the complete hose assembly.

Customers who order a hose assembly with fittings supplied by the customer themselves or fittings that are not included in the TECNO PLAST delivery program may have to accept a hose that has not been pressure tested because some fittings cannot be connected to the pressure testing system.

The hose connection is marked as "untested" and delivered with a note indicating that a pressure test should be carried out.

2. Installation of hose assemblies

The length of the hose assemblies and how they are installed must always be in keeping with the length calculations and installation methods outlined in the product brochures and catalogs (see also point 3.6.).

When connecting for use, the hose assembly fittings must always be connected to the appropriate counterparts using proper methods and proper tools, screwdrivers, clamps, nuts and bolts, etc. The connection must be tight enough to ensure that the joint does not leak, but not so tight that the sealing surface, in particular for PTFE-lined connection fittings, could be damaged.

3. Operating instructions for hose assemblies in accordance with Council Directive 2014/68/EU – Pressure Equipment Directive –

TECNO PLAST hose assemblies are robust, reliable and high-quality products that are also suitable for harsh operating conditions. However, it is necessary to select the correct hose and proper installation in advance.

TECNO PLAST can only offer recommendations regarding hose operation when all of the relevant information about the intended use is provided in writing.

3.1. Assembly

NB: DIN 20066, in particular section 13 as well as T002 (DGUV 213-053).

To guarantee hose assembly functionality and avoid shortening the period of time for which they may be used due to additional stresses, observe the following:

- Install hose assemblies in such a way as to not impede their natural position and movement.
- Do not subject hose assemblies to tensional or torsional loads or compression through external influences unless the assemblies are specifically designed for such loads.
- Do not use a bending radius any lower than the manufacturer's lowest specified bending radius.
- External influences and environmental conditions must correspond to the characteristics stated in the respective hose brochures.
- Prior to commissioning, check that the removable connections are properly fitted.
- Do not put the hose assemblies into operation if there is any visible external damage.
- Configure the hose assembly properly to avoid the risk of excessive strain due to improper movement, excessive forces or kinks directly at or behind the hose connection.
- If necessary, clean the hose prior to commissioning; remove all of the cleaning agent from the hose assembly, leaving no residue, before putting the hose assembly into operation in order to prevent, for example, chemical reactions (that may lead to explosions).
- Check for equipotential bonding as per TRGS 727 for those hose assemblies that require it and establish it afterwards if necessary.

For any other matters, refer to the TECNO PLAST installation instructions (see point 3.6.).

3.2. Commissioning, use

Prior to commissioning, perform the stipulated tests (e.g. acceptance test, pressure test etc.) in accordance with the applicable laws and regulations and carry out all technical, organizational and personal protective measures. Technical and organizational measures always take precedence. If it is still not possible to avoid all hazards, provide and use effective personal protective equipment.

The operating company must test the suitability of the hose assembly and components as regards operating temperature, vacuum, pressure and resistance.

In the event of possible abrasion, factor in and check for wear on the hose assembly.

Observe the operating parameters outlined in the declaration of conformity. If the buyer does not stipulate any specific operating parameters for the manufacturer to use when conducting its conformity assessment, the manufacturer's rating applies.

The hose assemblies are not designed to withstand external fire or flame treatment.

Accordingly, before any changes are made to the operating conditions, obtain any additional tests and information from the manufacturer to ensure that the hose assembly conforms to the new requirements.

3.3. Maintenance, servicing and inspection

Clean and flush out the hose assembly after each use and before each test.

When cleaning with steam or chemical additives, take into account the resistances of the hose assembly components (caution: the use of steam distributors is prohibited, and the same applies for cleaning using high pressure or high-pressure lances).

Before using again, remove all traces of cleaning agents to avoid unwanted chemical reactions.

3.3.1 Inspection intervals

As per section 2 paragraph 7 of the German Ordinance on Industrial Health and Safety, hose assemblies requiring testing must be tested by qualified personnel to ensure that they are in safe working condition:

- Prior to using for the first time, perform quality controls
- at regular intervals following the first use (on each individual hose assembly).
- Based on previous experience, one year inspection intervals can be recommended if the currently applicable hose specifications are adhered to. Higher loads require shorter inspection intervals, e.g. in the case of increased mechanical, dynamic, thermal or chemical loads.
- Test pressure (cold water as medium): max. permissible pressure (PS) x 1.5.

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3.3.2 Inspection scope

Regulate the type and scope of inspection (e.g. pressure test, visual inspection, etc.) or the "qualified person", for example, as per the German Ordinance on Industrial Health and Safety or T002 (DGUV 213-053). Record the result.

3.3.3 Repairs

The operating companies themselves may not perform repairs to the hose assemblies supplied by TECNO PLAST.

If the hose fails within 12 months (from the date of delivery), the operating company can, upon consultation with TECNO PLAST, decontaminate and return the hose along with a completed questionnaire and safety data sheet. A root cause analysis is performed and the result is recorded. Upon consultation with the operating company, a decision is made as to what measures are to be taken.

3.4. Safety information

TECNO PLAST products may not be used as implants in the human body, in the aviation and aerospace industry or in railway vehicles because the products were not designed for these purposes.

When in doubt, obtain approval from TECNO PLAST.

In addition, do not use PTFE hoses in radioactive surroundings as radiation severely compromises the mechanical and electrical properties.

The usage restrictions listed here and in the corresponding product brochures and catalogs are to be understood solely as general guidelines. It is impossible to provide an exhaustive catalog as the possibilities for using our products are extremely diverse.

It is the duty of the user of our products to always carefully check both the suitability of the hose assemblies for the respective application and any associated safety aspects. This applies in particular to the chemical and electrostatic compatibility of the liquids or gases passing through the hose assemblies as well as to the type and probability of occurrence of an excessive mechanical load (e.g. internal or external abrasion, crushing, abnormal bending, etc.). Careful consideration must also be given to the anticipated risk to employees, the general population and the surroundings in the case of such damage – including the associated financial burden.

TECNO PLAST will only respond in writing to inquiries regarding the products and their use. Without such written information, TECNO PLAST cannot assume any responsibility for problems when using the products that occur due to application conditions not expressly listed in the respective catalogs and product brochures.

The purchaser of our products remains responsible for ensuring that the end user is in possession of all of the necessary product-specific information, catalogs and product brochures as well as safety information, even if the purchaser sells the product or passes it on to a third party in some other way.

For proper use of the hose assemblies, observe the comprehensive information contained in the T002 (DGUV 213-053) leaflet as well as applicable accident prevention regulations.

Attention: In accordance with the German Ordinance on Industrial Health and Safety, the hose assembly can be both a tool as well as a component of a system requiring monitoring. The operating company must comply with the appropriate test requirements.

3.5. Hazard and risk analysis

Conduct an appropriate hazard and risk analysis prior to commissioning the hose assembly. The following parameters, among others, must be taken into account:

- Operating pressure
- Operating temperature
- Resistance to the media to be transported
- Installation conditions
- Discharge capacity/conductivity of hose components

As these parameters may vary from case to case, TECNO PLAST cannot conduct a blanket analysis.

It is the responsibility of the operator to provide the relevant parameters so that TECNO PLAST can carry out a customized hazard and risk analysis.

If this is not possible, the operating company bears all responsibility.

3.6. Installation instructions

The installation and application options for hose assemblies are so diverse that it is impossible to make recommendations about their use unless all of the relevant information regarding their actual use is available.

Hose assemblies are generally connected at both ends. Use is either static or dynamic. In neither case may the bending radius be any lower than the stated minimum bending radius (MBR) (see relevant hose tables). In most cases, this happens when the hose assembly is snapped off at one end. The reason for this is often that the hose length selected is too short or the dead weight of the hose assembly is too high. When configuring how the hose is going to be used or the place in which it will be used, remember to avoid movement directly at the connection.

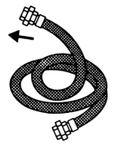
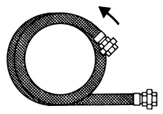
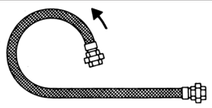
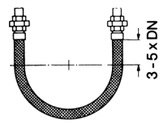
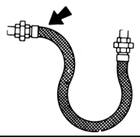
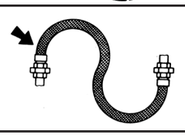
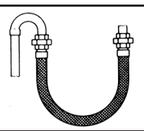
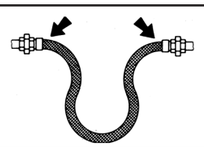
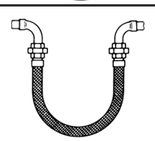
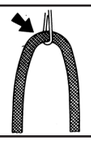
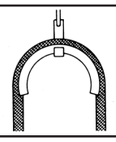
In addition, try to avoid exposing the hose assemblies to tension or abrasion. In many cases this can be achieved by varying the length, installation or using special fittings. Pulleys and hose hangers can also serve this purpose in some cases.

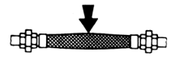
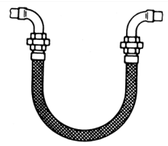
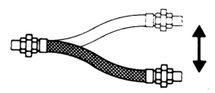
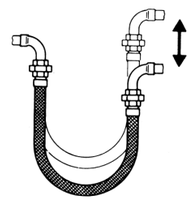
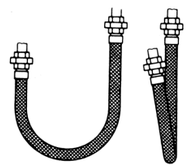
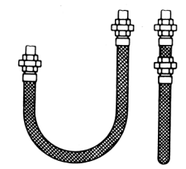
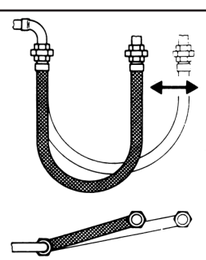
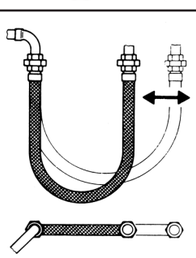
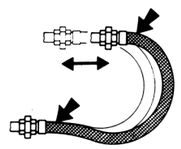
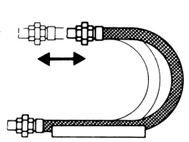
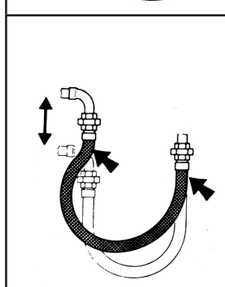
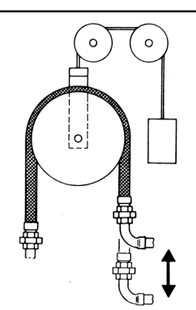
In general, avoid torsional stress. Install the hose without twists. Torsion occurs, for example, if the hose is twisted when installed. Ideally, both connections should be on the same level.

Torsion generally occurs (with bending stress), when there is movement in three dimensions (instead of two).

Below are a few typical installation errors and how to avoid them with the abovementioned hose types.

Avoid external loads on the hose caused by rubbing on edges, surfaces or on the bottom. Kinks and abrasion can significantly reduce the service life.

incorrect	correct	
		Pulling on the end of the hose when it is rolled up can create a harmful torsional load for PTFE and silicone hoses.
		
		If the hose is too short, it kinks at the ends. Service life is increased by selecting a larger bending radius than the minimum permitted bending radius. In addition, when calculating the length of each connection side, add a straight piece of approx. 3-5 times the DN.
		Using pipe elbows eliminates too much bending after the connections.
		
		
		Use a saddle-shaped hose hanger or a pulley to avoid too much of a bend due to hanging.

incorrect	correct	
		In the case of dynamic axial offset, either use a PTFE hose assembly that is long enough or use pipe elbows. (calculation table in the Corroflon brochure.)
		
		Torsional movements generally lead to hose failure, caused by incorrect installation. For this reason, the bending load should take place in two dimensions, avoiding torsional load on the hose.
		
		Unfavorable configuration.
		To avoid this, select a hose length that ensures there is no tension on the fitting or use a support or pulley.

4. TECNO PLAST Storage regulations / Guide values for storage and operating times

The following information is intended to provide our customers with guidelines to avoid damaging our products and achieve a long product life.

4.1. Storage regulations

When storing our products, observe the ISO 2230 and DIN EN ISO 8331 standards in their current version.

We refer in particular to the following:

1. Inventory change according to the “first in first out” principle
2. Storage temperature between -40 °C and +50 °C
3. Relative humidity not to exceed 70%
4. Protect from direct sunlight and UV exposure
5. Avoid ozone formation
6. Avoid the harmful effects of certain products and their vapors – e.g. disinfectants, solvents, etc.
7. Avoid the negative influences of electric and magnetic fields

4.2. Storage procedures

Storing the products outside is prohibited.

The PTFE hoses and hose assemblies should be stored away from other products in closed, adequately ventilated rooms on a dry surface on shelves or in storage boxes/drums. Observe the following points with this type of storage:

1. Ensure that bending radii are no lower than the minimum permitted bending radii
2. Products on the bottom should not be deformed by the weight of the products on top of them
3. Hose fittings should not depress or damage the hoses

Hanging hoses on hooks is not recommended. Hose assemblies may be stored hanging. If a hose assembly is hung by the fitting, ensure that the insertion is not damaged by the weight of the hose assembly.

Protect the hoses from rodents.

4.3. Guidelines for storage times

The following storage time guidelines apply to the different materials used in our products when adhering to the aforementioned storage instructions:

PTFE = unlimited

Stainless steels (fittings, ferrules, braid and wires) = unlimited

Polypropylene (fittings and braid) = 10 years (colors may fade under certain circumstances)

Kynar/Aramid braid)

Hastelloy (fittings and braid) = unlimited

Silicone - rubber for the cover = 10 years

EPDM - rubber for the cover = 10 years

For hoses consisting of a PTFE liner, stainless steel braid and silicone as the cover, the storage time is 10 years.
The material with the shortest storage time determines the guideline.

The aforementioned storage times are non-binding guidelines under optimal storage conditions. This is not associated with any acceptance of guarantee and/or extension of the warranty period.

It is the customer’s responsibility to check the products for damage incurred during storage prior to commissioning.

4.4. Life expectancy of hoses

It is not possible to give a general life expectancy guarantee that is valid for all TECNO PLAST products used in all applications.

It is only possible for TECNO PLAST to give reliable predictions regarding the likely life expectancy of products when they have precise knowledge of all relevant information about the application. TECNO PLAST will take a position on a written description of the situation prior to ordering.

If such written consent is not requested in this form and granted, TECNO PLAST cannot accept any liability whatsoever for what the customer would deem a premature failure of its products. The only exception to this rule is in the case of the use of faulty materials or demonstrable errors in production.

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4.5. Guidelines for operating times

Hose assemblies manufactured by TECNO PLAST undergo a leak test, an electrical resistance test and a visual inspection prior to delivery. Relevant certificates in accordance with DIN EN 10204 - 3.1 will be issued on request.

If the hose assembly has been stored for longer than 3 years, it should undergo an additional test according to T002 (DGUV 213-053) prior to commissioning.

The PTFE core hose has a high resistance to aging. There are hose assemblies that have been in use for more than 10 years. In the case of our CORROFLON-PTFE corrugated hose, we have even seen cases in which the product is still performing after 20 years.

Actual operating times may vary. It is only possible for TECNO PLAST to give reliable forecasts as to the likely life expectancy of the products in question when they have precise knowledge of all relevant information about the specific use.

An example of the limitations of the life expectancy of our products in pharmaceuticals is the cleaning methods commonly used in that industry.

In the pharmaceutical industry, the product BIOFLEX **ULTRA**/ PHARMALINE **N** is generally fitted with an RC = (EPDM) or SI = silicone rubber cover in order to avoid the problematic cleaning of the otherwise external pressure carrier (stainless steel braid).

Hose assemblies with EPDM or silicone covers withstand a minimum of 300 x 30 minute autoclave cycles at a temperature of up to +135 °C.

When repeatedly sterilized in autoclaves, covers may be damaged (brittleness), resulting in a shorter useful life of the products.

It is the customer’s responsibility to assess the risks associated with hose failure, including the anticipated consequences, and to take suitable measures to protect their employees and the public, if necessary.

Breakdowns can be avoided through proper handling and appropriate installation conditions. In this respect, we refer to the operating instructions and hose configurations with installation tips in our catalogs, which the customer must observe.

This information can also be found online at www.tecnoplast.de.

For safety reasons, we recommend carrying out an inspection in accordance with T002 (DGUV 213-053), including an additional endoscopic inspection of the core hose, by a qualified person or under the supervision of a qualified person at least once a year.

TECNO PLAST
INDUSTRIETECHNIK GMBH

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