

Interesting Facts About Hoses

General Information

The suction and pressure hoses manufactured by Ocono APD Schlauchtechnik GmbH are designed for the conveyance of dry, gaseous and liquid media. The user is obliged to use our products solely in accordance with the technical data specified by us. All our technical data are the result of internal tests and trials conducted in accordance with international standards. They are provided for guidance only and refer to a medium and ambient temperature of +23°C, static pressure and vacuum loads, and straight hose lines of a length specified in the test standard. The specified values do not apply in the event of deviating temperatures, pulsating pressure and vacuum loads, vibrations of the hose assembly or the connection points, severely bent hoses or hoses that have been incorrectly secured. In such cases, the user must verify suitability for use. If there is no previous experience of using our products in such applications, we therefore strongly recommend carrying out preliminary tests or consulting our technical staff. This applies in particular to operating conditions involving alternating loads (movement), high temperatures, vibrations, abrasion, water vapour, chemical exposure or S-shaped hose routing. The application examples listed by us are therefore non-binding.

Storage of Plastic Hoses

The storage area must be cool, dry, and adequately ventilated. High ambient temperatures exceeding +45°C without air circulation can cause permanent deformation of plastic hoses. Please note that such temperatures can also occur inside packaged hose reels when exposed to direct sunlight. The maximum stacking height must be adjusted according to the specific product and the ambient temperature. Hose reels bearing a heavier load in summer temperatures may become deformed. Care must be taken to ensure that the hoses are stored tension-free—that is, without tension, pressure, or other stresses—since tension promotes both permanent deformation and cracking. When stored outdoors, plastic hoses must not be exposed to direct sunlight. The packaging must not seal the hose reel airtight. Depending on the product, plastic hoses must be protected from prolonged exposure to UV radiation and ozone.

Transport of Plastic Hoses

During transport, constant movement subjects plastic hoses to much greater stress than during storage. High outdoor temperatures in the summer, heat buildup on the truck, and constant vibrations while driving can quickly lead to permanent deformation of the hoses. For this reason, the stacking height during transport must be lower at high temperatures than during storage. Plastic hoses must not be thrown, dragged across the floor, run over, or stepped on during transport. This can damage the outer layer and deform the spiral, or even cause it to break completely. We assume no liability for such damage. Careful attention must therefore be paid to ensure that no damage occurs due to improper handling.

Temperature Behavior of Plastic Hoses

Unlike rubber hoses, the effects of cold and heat are very significant for plastic hoses. Plastic hoses change their flexibility at low or high temperatures of the medium or the environment. At lower temperatures, they can harden to the point of becoming brittle. At high temperatures near the material's melting point, they transition into a plastic—that is, deformable and flowable—state. Due to these properties, the pressure and vacuum specifications for plastic hoses are based exclusively on a medium and ambient temperature of +20°C. If the medium or ambient temperature deviates from this value, we cannot guarantee that the specified technical properties will be maintained.

The Effect of Sunlight on PVC Hoses

The sun's UV radiation can degrade PVC hoses and destroy them over time. This depends on the duration and intensity of sunlight exposure, which is generally lower in Northern Europe than in Southern Europe. Therefore, it is not possible to specify an exact timeframe. The embrittlement of plastic hoses caused by UV radiation can be slowed—but not completely stopped—by adding special UV stabilizers. However, these stabilizers also wear out over time due to ongoing UV exposure. Some of our hose types come standard with these UV stabilizers to ensure the longest possible service life when exposed to direct sunlight. Upon request, any hose type can be equipped with UV stabilizers under certain conditions.

Pressure and Vacuum Behavior of Hoses

True pressure hoses are all types that have a fabric reinforcement. All hose types with plastic or steel spirals are primarily vacuum hoses. It is important to note that all hoses can change in length and diameter and may twist, even within the specified pressure and vacuum ranges. For hoses with a fabric pressure-bearing layer, changes of up to 5% or more in length and circumference are normal, even under laboratory conditions. Any operating conditions that deviate from the standard further influence the behavior of these products. All hoses that have a spiral but no polyester fabric reinforcement are suitable as pressure hoses only to a very limited extent; they are primarily intended for vacuum applications. Due to their design, a change in length of up to 30% for these hose types is always possible during use, even within the specified pressure and vacuum ranges. The user must take into account all possible changes in length and circumference, as well as axial twisting of the hoses, during operation.

Unlike pipes, hoses must not be secured at short intervals under operating conditions; instead, they must be able to move freely at all times. When buried in the ground, hoses may only be installed in sufficiently sized conduit. In doing so, all possible changes in hose geometry that may occur during operation must always be taken into account. We strongly recommend determining the hose's behavior through preliminary field tests before proceeding with installation. In spiral hoses, length expansion and twisting under overpressure simultaneously lead to a reduction in the inner diameter. In hoses with a steel spiral, the spiral cannot fully accommodate this reduction in inner diameter. As a result, the spiral can push its way through the hose wall to the outside and destroy the hose. For continuous use in overpressure conditions, we generally recommend hoses with a fabric reinforcement as the actual pressure-bearing element. This prevents excessive length expansion. The specified values for working pressure in compressed air and pneumatic hoses were determined in accordance with DIN EN ISO 1402-7.3 at approximately 20 °C using water as the pressure medium.

Use of Hose Couplings

Plastic spiral hoses can be integrated with a wide variety of commercially available fittings in suction applications. During use, the hose adheres to the fitting and seals itself. In pressure applications, spiral hoses are significantly more difficult to seal permanently due to their elongation and changes in diameter. Our fittings from product group 989, which are individually tailored to the respective hose type, are ideally suited for this purpose. If using standard fittings, please consult our specific procedural recommendations. With PVC-reinforced hoses, it is important to note that the material has significantly lower notch toughness compared to rubber.

Therefore, fittings must not have any sharp edges that could tear the inner lining during installation. If the plastic-reinforced hoses are to be secured to a hose nipple using crimp sleeves or hose clamps, care must be taken to ensure that the crimping is performed with as little force as possible. Otherwise, the hose layers may be indented all the way down to the fabric by the fitting or the hose clamp, rendering the hose immediately unusable.

For safety reasons, we recommend hose fittings with a thread pitch smaller than the thickness of the hose's inner layer. As a general rule, ensure that no type of hose is sharply kinked directly behind a fitting when fittings are used.

Electrical Conductivity of Hoses

All plastic hoses with copper braiding or steel spirals can be used to dissipate electrostatic charges during the transport of powdered or granular materials. Because the braiding or spiral is grounded at both ends, these hoses are considered conductive.

When using the product in potentially explosive atmospheres, it is essential to comply with TRBS 2153. The user must verify and ensure, on a case-by-case basis, that the hoses are suitable for use and that all regulations specified in TRBS 2153 are met.

Food-Grade Hoses

By definition, plastic hoses are classified as food contact materials that may be intended for contact with food. European Regulation (EU) No. 10/2011 distinguishes, in Annex 3 starting on page 75, between six different categories—A, B, C, D1, D2, and E—according to which a food contact material (hose) can be tested. Testing for a specific category is conducted using a simulant and must be performed on the finished component (tubing).

The practice still common among many manufacturers of merely confirming the food contact suitability of the tubing's base material is not permitted. In the regulation, all foods are, in most cases, assigned to a single simulant (category). We specify the food categories for which our products are approved by printing them on the hose. We publish specific information on contact duration and possible exclusions in our declarations of conformity, which are available at any time. It is the responsibility of the user or customer to ensure, when selecting one of our products, that it is approved for the intended food and contact duration.

Regulation (EU) No. 10/2011 can be viewed online at any time at: <https://eur-lex.europa.eu/legal-content/DE/ALL/?uri=celex:32011R0010>. Of course, we are also happy to provide advice.

Dimensions

For hoses, the inner diameter is generally used, while pipes (e.g., sizes 910, 920, and 925) are classified by their outer diameter. For the sake of completeness, we also specify the wall thickness for almost all products.

Burst Pressure

The burst pressure is the pressure at which a hose fails due to the pressure. Testing is always conducted in accordance with the international standard DIN EN ISO 1402. The burst pressure is used to determine the operating pressure, taking general safety factors into account.

Operating Pressure

The operating pressure is always determined in accordance with the international standard DIN EN ISO 7751. Please note that suction hoses are not suitable for continuous operation under pressure. The values specified there apply only to short-term operation.

Test Print

Pressure applied during a non-destructive test and maintained for a specified duration to verify the integrity of the hose assembly. Depending on the hose design, the test pressure may be up to 50% higher than the operating pressure. At the test pressure, the hose must not exhibit any leaks or permanent deformation.

Negative Pressure (Vacuum)

This is the specified negative pressure that a hose can withstand without the lining becoming flattened or detached, or without delamination. This specification is always based on the international standard DIN EN ISO 7233.

Bending Radius

The bend radius of a hose refers to the radius of the smallest drum around which the hose can be wrapped without the cross-section changing significantly from its original shape. Testing is always conducted in accordance with the applicable standard for the product. To ensure a long service life, the following should be observed when using the hoses: Select the hose based on the maximum operating pressure specified in the catalog. The hose should never be forcibly deformed (e.g., kinked, crushed, run over by vehicles, twisted, etc.). Avoid dragging hose lines across rough surfaces and sharp edges.

The hose should not be constantly kinked at the couplings and should not be subjected to excessive tensile stress. Contact between unprotected hose ends and the fluid being transported must be avoided. Draining and careful cleaning significantly extend the service life of a hose line.

Special Types

Almost all types of hoses can be customized to suit the specific application at the customer's request. To this end, wall thicknesses, dimensions, pressure or vacuum ratings, colors, lengths, and shapes can be adjusted during the manufacturing process. We're always happy to answer your questions.

General Inspection and Maintenance

Even if the hoses were selected, stored, and installed correctly, they should be inspected regularly, depending on how often they are used. It is important to look for connections and irregularities that indicate deterioration of the hose, such as slits, cuts, delamination, tears in the outer cover (or interior) that expose the reinforcement, deformations, blisters, pressure bulges, sections that are too soft or too hard, or leaks. These irregularities should result in the hose being replaced. If an expiration date is indicated on the hose and has passed, the hose should not be used, even if it shows no obvious signs of wear or damage. Repairs should not be attempted unless the issue can be resolved by cutting off the affected section. Damage at the end of the hose can be removed.

For cleaning, we recommend soapy water; never use cleaning agents containing solvents. Never use abrasive, pointed, or sharp tools (metal brushes, sandpaper, etc.) for cleaning.

Attention: Length changes under pressure: Every hose expands or contracts by a certain amount when under pressure. This value can be on the order of a few percent of the effective length. This change depends on the hose type, its construction, and material (e.g., plastic spiral hoses), as well as the pressure.

True pressure hoses are all types that feature a fabric reinforcement. All hose types with plastic or steel spirals are primarily vacuum hoses and are suitable only for short-term pressure exposure.

Do you have any other questions about how to use it?

We're happy to assist you: Phone: +49 2162 36195-0 | Email: apd@ocono.com