TOTAKU Hose Handling Precautions

Hoses are flexible and convenient piping materials, but unexpected accidents may occur depending on the conditions of use. Be sure to carefully read and adhere to the handling precautions beforehand. Please understand that our company cannot be held responsible for any damages resulting from failure to follow these precautions.

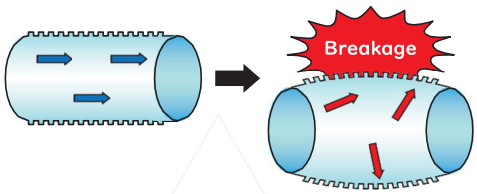
1. Usage Precautions (Fluid: Water, Liquids)

1. The allowable pressure of the hose indicates the maximum pressure it can handle when it is either straight or bent with a radius larger than the minimum allowable bend radius. Therefore, it must not be used at pressures exceeding this limit. Note that this does not represent the maximum continuous operating pressure (working pressure).
2. ***Allowable pressure is not the same as the maximum operating pressure. Please refer to the following table to determine the operating pressure (working pressure) accordingly.***

How to Calculate Operating Pressure	Hose Type	Safety Factor
Operating Pressure × Safety Factor ≤ Allowable Pressure	TOTAKU ECO Series, TOTAKU Fluoro Series, SD Hose Series (General Use, Food-Grade, Oil- Resistant, AS, Grounded), TOTAKU HERAN Series	2.0
	Line Power Series	1.5

Note: For information on the safety factors and allowable pressure of each hose, please refer to the respective product pages for each hose.

3. The performance of the hose (allowable pressure, operating pressure, bending, etc.) is significantly affected by the fluid and surrounding temperatures. Please note that for some hoses, at a fluid temperature of 50°C (122°F), the allowable and operating pressures may decrease to less than half of the values at 25°C (77°F) when the ambient temperature is 30°C (86°F).
4. Certain fluids—such as drugs, solvents, acids, and alkalis—may cause changes to the hose material, including hardening or swelling. In these cases, ensure the safety factor is calculated as: operating pressure × 3.0 ≤ allowable pressure. ***Hoses must never be used for highly toxic chemicals, highly concentrated acids or alkalis, explosive or flammable gases, or other hazardous substances.*** Using hoses in such conditions poses a significant risk of hose failure, which could lead to severe injury or health risks.
5. Do not bury hoses underground. External pressure and internal pressure creep may cause the reinforcement layer to crack, leading to potential leaks.
6. Avoid using hoses inside sleeve pipes. Expansion during pressurization may cause the hose to bend or meander, potentially leading to cracks in the reinforcement layer or leaks.
7. When used in the riser section of a submersible pump, a water hammer may occur when the pump stops. In such cases, set the pump pressure with a higher safety factor as described in 4. A water hammer may cause the hose to fail, leading to potential accidents.



8. When operating a valve, open or close it slowly over at least three seconds to avoid creating shock pressure. Closing a valve too quickly, especially at the end of the hose, can generate shock pressure and may result in hose failure. As a rule of thumb, shock pressure can be estimated by converting the flow velocity (ft/sec [m/sec]) into pressure (psi [MPa]) and adding it to the operating pressure. This occurs when the valve is closed abruptly. ***Note: Use a flow velocity of 6.6 ft/sec (2 m/sec) or less as a guideline.***
9. When hoses are used outdoors for extended periods, they may experience UV degradation, leading to discoloration (darkening), hardening, or ozone-induced cracking. If you notice signs of discoloration or cracking, replace the hose with a new one as soon as possible.
10. Hoses should be regarded as consumable items.
11. ***Do not use hoses for compressed air piping.*** Under certain conditions, they may burst, posing a risk of accidents.
12. Never use general-purpose hoses for pharmaceutical applications. Doing so may result in legal penalties under applicable laws.
13. If the hose will be used for transporting highpurity chemicals, please consult us. For example, when used for transporting pure water, the hose itself will not be affected; however, components of the hose may leach into the water, potentially contaminating its purity.
14. For food-related applications, please use hoses classified as food-grade. Using any other type of hose may result in legal penalties under applicable laws.
15. ***When using food-grade hoses for transporting drinking water or food products, ensure that the interior of the hose is thoroughly cleaned before use.***

2. Precautions for Hose Installation

1. Hoses are consumable items. Hoses gradually deteriorate over time with extended use. Perform regular inspections (see 5. Inspection) and discontinue use immediately if any abnormalities are detected. Replace with a new hose as needed.
2. When installing hoses, take precautions to ensure that, in the event of failure, the damage does not pose a risk to people or surrounding equipment (such as electrical systems).
3. Hoses expand and contract due to internal pressure, so ensure adequate slack when installing them.
4. When using hoses in fixed piping, operate them at no more than half of their allowable pressure. Operating near the allowable pressure may cause significant hose expansion, resulting in reduced bend radius in certain areas, which could lead to damage. For fixed piping applications, consider using the LINE POWER series, which minimizes expansion under pressure.
5. Hose twisting can lead to performance degradation. If twisting occurs due to equipment oscillation or rotation, use swivel joints, loose flanges, or cap nut-type joints.
6. Using a hose with a small bend radius reduces its allowable pressure. If (operating pressure)×(safety factor) approaches the hose's allowable pressure, ensure the bend radius is greater than the minimum allowable bend radius.
7. Connecting a hose horizontally to equipment at a high position can cause its weight to concentrate bending stress near the connection point, leading to early failure. To prevent this, support the area near the fittings, use an elbow joint, or route the hose vertically.
8. If the hose is connected horizontally to equipment positioned high up, its own weight can place stress near the connection point, potentially causing it to break prematurely. To prevent this, support the hose near the fittings, use an elbow joint, or install the hose vertically.
9. Ensure that 1–2 meters of hose remain in a straight position on both the inlet and outlet sides of the pump (piping). Additionally, secure the hose to prevent tension caused by pump movement or vibrations.
10. If the hose is subject to stretching, contraction, vibration, or repetitive motion that causes it to rub against other objects, protect the hose by using supports, protective wires, or guard springs.
11. Avoid using hoses in a horizontally suspended position (e.g., ceiling-mounted horizontal piping). The hose's own weight, fluid weight, and pressure-induced elongation can cause sagging or bending, which may lead to damage.
12. Avoid applying external shocks to the hose.
13. Do not step on the hose or run over it with a vehicle.
14. Do not pull the hose to move machinery, nor move machinery or vehicles while the hose is still attached.
15. ***When installing long hoses (165 feet [50 meters] or more), be aware that differences in elevation and pressure loss may prevent the required flow rate from being achieved. Please exercise caution in such cases***

3. Precautions for Hose Storage

3-1. Storing Hoses After Use

1. After using the hose, remove any residue inside by rinsing it with water or other appropriate methods.
2. Rinse the hose with water to remove any deposits from the inner surface, and cap both ends of the hose.
3. Store the hose in a location away from direct sunlight.

3-2. Storage as Stock

1. Store in a cool, dark place with low humidity, away from direct sunlight.
2. Cap both ends of the hose to prevent dust and debris from entering.
3. Do not stack hoses in large quantities or place heavy objects on top of them.
4. Do not store hoses in an excessively bent state. Whenever possible, store them indoors in a straight position on a flat floor.
5. When PVC hoses come into contact with rubber products, the PVC hoses may discolor. To prevent this, avoid storing them in contact with rubber products. ***Note: Some products may discolor. For details, please refer to the "Caution" section for each product.***

4. Precautions for Hose Transportation

1. Do not drag hoses on the ground or over concrete during transportation.
2. Do not throw or subject hoses to impacts during loading and unloading.
3. When lifting hoses with a crane or similar equipment, avoid single-point lifting. Use a lifting beam and nylon slings for multi-point lifting.

5. Inspection (To Prevent Accidents and Ensure Safe Hose Usage)

5-1. Daily Inspections

Perform a visual inspection of the hose before use. If any abnormalities are detected, replace the hose or take appropriate measures, such as removing the affected section.

5-2. Periodic Inspections

Conduct a thorough visual inspection and a hydrostatic pressure test at or below the allowable pressure every three months, following the steps outlined below.

(a) Visual Inspection

If any of the following abnormalities are found, the hose is unsuitable for use and should be replaced with a new one:

- Abnormalities near fittings: Localized stretching, swelling, bending, or leakage.
- External damage: Significant surface damage, reinforcement layer cracks, or cracks in the grooves.
- Hose abnormalities: Flattening, deformation, kinking, internal swelling, or delamination.
- Other severe deterioration: Hardening, swelling, cracking, etc.

(b) Hydrostatic Pressure Test

Use the hose's initial expansion during pressurization (based on our inspection report data or your own initial pressure test data and product condition) as a reference. If the values from periodic inspections exceed 1.5 times the initial value, stop using the hose immediately and replace it with a new one. ***Additionally, always perform the test at or below the allowable pressure.*** Testing at excessively high pressures may shorten the hose's lifespan.

6. Precautions for Fittings and Bands

1. i. When using hoses other than ducting hoses, use a nipple with an outer diameter that is approximately the same as or slightly larger than the hose's inner diameter. If the nipple's outer diameter is smaller than the hose's inner diameter, it may result in water leakage or fitting detachment, potentially causing accidents.

   ii. For ducting hoses, the nipple's outer diameter must be smaller than the hose's inner diameter, so be sure to select the correct size.

2. Some commercially available fittings may not be compatible for installation. Please consult us in advance.

3. ***The hose's pressure resistance varies depending on the type, number, and tightening force of the bands.*** Choose the appropriate bands based on the hose's operating conditions.

7. Others

1. Discard used hoses as industrial waste.
2. Our products are solid materials with a fixed shape and are therefore not subject to SDS requirements. (However, reference data is available upon request.)

8. Hose Selection Guidelines - *Please review the below items thoroughly when contacting us.*

Usage	Purpose		
	Device Name		
Specifications	Dimensions	Inner Diameter	Actual size (in [mm])
		Outer Diameter	Actual size (in [mm])
		Length	Total length including fittings
	Fittings	Flange/Nipple	ANSI/ASME (JIS), K Flange, SCollar with Thread, etc. For other special types, please contact us.
		Clamping Method	SY band, Reber clamp, TOTAKU power band, outer tube crimping, etc. For other special tightening methods, please consult us.
Fluid	State	Gas, liquid, solid, slurry, etc.	
	Composition & Concentration	Composition and Concentration	
	Temperature	Fluid temperature (°F [°C])	
	Flow Rate & Flow Velocity	Flow Rate: GPM / SCFM (m^3/h) | Flow Velocity: ft/sec (m/s)	
Operating Conditions	Pressure	Maximum Operating Pressure	Discharge pressure: psi (MPa) Suction (vacuum) pressure: inHg (kPa)
		Peak Pressure	Pump pressure, surge pressure, etc.
	Environmental Conditions	Outside Air Temperature	°F (°C)
		Atmosphere	Outdoor, indoor, offshore, underwater, etc.
		External Pressure	psi (MPa)
	Bending Conditions	Installation Dimensions	Installation type and motion diagram, etc.
		Minimum Bending Radius	Must meet or exceed the allowable bending radius, etc.
		Operating Cycle	Repetitive bending cycle, etc.
	Usage Time	Continuous use time and intermittent cycle, etc.	
Performance	Past Usage Record	Manufacturer, product name, time in use (operating time), etc.	
Regulations	Applicable Laws & Standards	Food sanitation regulations, etc.	

Explanation of Hose Physical Property Terms

Allowable Pressure (at Room Temperature)

Allowable pressure represents the maximum pressure a hose can withstand when in a straight position or bent with a radius larger than the minimum allowable bend radius. It must not be used at pressures exceeding this limit. This is not the maximum continuous operating pressure (working pressure). The allowable pressure decreases at higher operating temperatures and also varies depending on the hose size, fitting and band combination, and operating environment.

The allowable pressure is not the maximum operating pressure. Therefore, use the following formula as a reference when determining the operating pressure (working pressure):

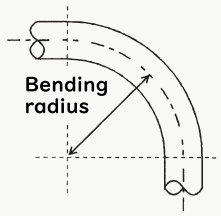
(Operating Pressure) × (Safety Factor) ≤ (Allowable Pressure)

Allowable Vacuum Pressure (Room Temperature)

This is the maximum vacuum pressure that can be applied to the hose at room temperature. The hose cannot be used at vacuum pressures exceeding this limit. Additionally, the allowable vacuum pressure decreases at higher operating temperatures. According to the Japanese Industrial Standard (JIS Z 8703), room temperature is defined as 68°F ± 27°F (20°C ± 15°C).

Allowable Bending Radius

This is the minimum bending radius the hose can safely accommodate.
Using the hose at a smaller bending radius is not permitted.



How the Radius is Measured

The bending radius is measured from the center of the bend to the centerline of the hose.