

Precautions to ensure safe usage

The precautions given below are intended to ensure safe and correct use of the products.
Note that certain restrictions apply to use of these products. Failure to observe these could result in injury or property damage.

 Warning	A potentially hazardous situation which could result in death or serious injury.
 Caution	A dangerous situation which could result in minor or medium injury and/or in which only property damage is foreseen.

 **Warning** TOYOX products have been developed and manufactured for general industrial applications.

For applications that require safety, confirm in advance.

Never use for implant or injection application or other applications where there is a possibility of the product partially remaining in the body.

ToyoX makes no guarantee of the adaptability or safeness related to such applications.

Please read the Handling Precautions carefully before use.

Note: See the terminology glosses on our website for words marked with a ※.

TOYOFUSSO / TOYOFUSSO-E / TOYOFUSSO-S / TOYOFUSSO SOFT Hose

① Notes for using the hoses

-  **Warning** Always use a hose within its recommended temperature and pressure range. ※ Do not use TOYOFUSSO Hose, TOYOFUSSO-E Hose or TOYOFUSSO SOFT Hose for negative pressure applications. They may deform and become unusable.
- Hoses expand and contract according to internal pressure, so adequate space should be provided when setting up.
- When pressurizing, slowly open / close any valves to avoid ※¹ impact pressure.
- The innermost layer is composed of a fluorine resin resistant to most chemicals and solvents. However, be aware that some substances cannot be used with this product. For this reason, the hose product should be tested under the normal operation conditions. (For more information on the chemical resistances of this product, visit our website or contact a customer service representative.)
- Use a hose that is compatible with the fluid used. Avoid using any other.
- TOYOFUSSO Hose, TOYOFUSSO-E Hose, TOYOFUSSO-S Hose and TOYOFUSSO SOFT Hose contain fluorine resin in their innermost layer and have resistance to fuel oil such as gasoline and solvents such as toluene. However, do not use them for fuel tubing.
-  **Warning** It is recommended to wrap metallic wire around the hose for grounding to reduce static electricity when using flammable fluid. TOYOFUSSO-E Hose has an antistatic band inside the hose. Be sure to ground or bond the couplings.
-  **Warning** The TOYOFUSSO-E Hose antistatic line is intended to prevent static, and cannot be used as a grounding or bonding line for connecting devices, or for other electrical connection applications. As well, it has no electrical neutralization function for fluids. Prepare other countermeasures for fluid neutralization. ToyoX assumes no responsibility for injury or property damage taking place in the vicinity of the hose terminal ends.
-  **Warning** The TOYOFUSSO-E Hose does not guarantee disaster prevention. Carry out safety management such as flow rate limitation of low-conductivity liquids and combustible liquids as well as reduced spray density.
- Depending on the usage, the Fire Service Act may apply. Ask your local fire station for details.
- TOYOFUSSO, TOYOFUSSO-E, TOYOFUSSO-S and TOYOFUSSO SOFT Hoses have a layered structure, and even though the inner layer is resistant to fluids, such factors as high temperature and high pressure may result in the fluid penetrating the inner layer, causing degradation of the other layers, including ※⁶ swelling. Additionally, fluid characteristics and use conditions may cause wear, ※⁵ separation, or melting of the inner layer. Adequate precautions should be taken before use to ensure safety.
- Clean the inside of the hose before using it to transport drinking water or food. (Clean the hose with hot water (80°C or below) for 30 minutes or less at 0.1 MPa pressure or less.)
- Use hoses at bend angles larger than their ※³ minimum bending radius. Angles smaller than the minimum bending radius may result in hose overbending or lower pressure resistance.
- Powders and granular materials may cause wear. Use a hose with as large a bending radius as possible. As well, please note that in the case of the TOYOFUSSO-E Hose, there is a risk that the carbon strip in the antistatic electricity layer may wear away and be introduced into the fluid.
- Do not use a hose that is extremely bent near a coupling.
- Keep the hose away from open flame.
- Do not run over hoses with a vehicle or other heavy objects.
- Do not use collapsed hoses.
- Do not let hard angled objects, such as pieces of iron, press hard or rub strongly against a hose.
-  **Warning** Do not pass an electric current through the hose. This is dangerous because it may rupture the hose or cause electric shock.
-  **Warning** Do not allow anything other than the inner surface of the couplings or hose to come in contact with fluids (food, etc.), because the fluids may permeate the hose reinforcement layer or remain inside the couplings, and bacteria may propagate (attach to the parts) or the hose may deteriorate. Also, dust, hose fragments (reinforcement material) and ink adhering to the outer surface may be mixed in.

② Notes for cutting the hoses

- To cut the hoses, use cutters with new blades as much as possible. (The reinforcement threads may protrude from the end of the hose.)
- When cutting a hose, make sure that the edge face of the hose is cut perpendicularly. If it is not perpendicular, the hose may leak or become disconnected.
- In the case of cutting TOYOFUSSO-S Hose, the reinforcement coil may cause injury or may damage or make a hole in the hose. Please take sufficient care.

③ Notes for assembly

- We recommend using our dedicated coupling TOYOCONNECTOR or our DEDICATED FITTING FOR TOYOFUSSO for TOYOFUSSO Hose, TOYOFUSSO-E Hose, TOYOFUSSO-S Hose and TOYOFUSSO SOFT Hose. If you use a coupling other than our dedicated couplings or attach the coupling not according to our manual, the performance of your hose may decrease.

2. After mounting of couplings, ※4 permanent deformation of plastic may cause fluid leakage, hose disconnection, or hose rupture. Consult Toyox about coupling types and characteristics of hose material.
3. The compression strength indicated in this brochure is based on data which was obtained from pressure tests conducted by Toyox using the hoses alone by its own testing method. Therefore, the hose may be dislocated before the hose ruptures, or another problem may occur depending on the conditions of the couplings being mounted (the shapes of hose nipples, types of hose clamps, number of hose clamps, fastening torque and how they are crimped). Select a safe, effective method for mounting couplings to the hoses based on the following data on withstanding pressure. For technological information on mounting couplings, please make inquiries through our Customer Advice Center.
4. When mounting the Toyox dedicated coupling TOYOCONNECTOR on a hose, tighten until there is no gap between the fitting and the cap nut. A gap between the fitting and cap nut may cause the nut to become an isolated conductor, accumulating static electricity and leading to electrical discharge or ignition.
5. When fastening the TOYOFUSSO-E Hose with a hose clamp, be sure to ground or bond the clamp. Failure to ground may cause the hose clamp to become an isolated conductor, accumulating static electricity and leading to electrical discharge or ignition.

④ Notes for inspections

1. Pre-work inspection: Before starting operation, check the hose for abnormalities, such as external damage, stiffening, softening and discoloration.
2. Regular inspection: During periods when the hose is in use, be sure to perform regular monthly inspections.

What to do if an abnormality is found

The life of hoses will be greatly affected by the physical properties, temperature, and flow rates of the fluid as well as by the frequency of pressurization and depressurization. If any of the following problems or similar signs are found in the pre-work or regular inspections, immediately cease use and replace the hose.

1. Abnormality near the coupling: localized stretching, bending, leakage or swelling
2. External damage: large scratches in the outer surface, cracking, or water infiltrating the reinforcement layer
3. Internal abnormalities: Bulging or ※5 separation of the inner surface, or wear that leads to exposure of the hose reinforcement material.
Note: In the case of abnormalities on the interior or exterior surface, hose scrapings and fragments of hose reinforcing materials may mix into the fluid inside the hose.
4. Other abnormal changes (stiffening, ※6 swelling, cracking, bulging, discoloration of the reinforcement layer, etc.)

⑤ Notes for storage

1. Do not store outdoors or in a place subject to direct sunlight. This may cause the quality of the hose surface to deteriorate, becoming sticky and/or susceptible to cracking. Store in a low-humidity, well-ventilated place. Store keeping the inside of the hose free from foreign matter and dust.
2. Do not store where the hose will make contact with other PVC products or near rubber products.

⑥ Notes for disposal

1. The hose should be disposed of in accordance with the requirements of the local region.
2. **⚠ Warning** Under no circumstances should the TOYOFUSSO Hose, TOYOFUSSO-E Hose, TOYOFUSSO-S Hose or TOYOFUSSO SOFT Hose be incinerated. Incineration can generate toxic gases. Treat as industrial waste for disposal purposes.