

Plastic tubing PUN-H★, PEN and PUN – a comparison

Tubing PUN-H and PEN are always a good choice for standard pneumatic applications. We also recommend them for use in all other applications. In plants where a temperature-dependent operating pressure of max. 1 MPa and an ambient temperature of max. 60 °C are required, all tubes meet the necessary requirements.

PUN-H★

Not only is the kink-resistant PUN-H easy to install, its resistance to hydrolysis and microbes makes it perfect for use in the food industry. In addition, the black version is UV-resistant and can thus be used outdoors.

PEN

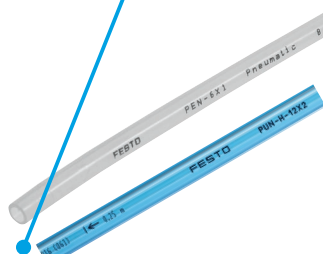
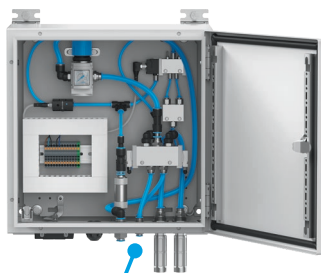
The cost-effective tubing PEN is ideal for standard pneumatic applications. Together with the fittings of the QS series, it creates a complete technical package that is economical too.

The manufacturing process for the tubing PEN is sustainable, as the production requires less energy compared to similar plastic tubing. This results in a small CO₂ footprint.

PUN¹⁾

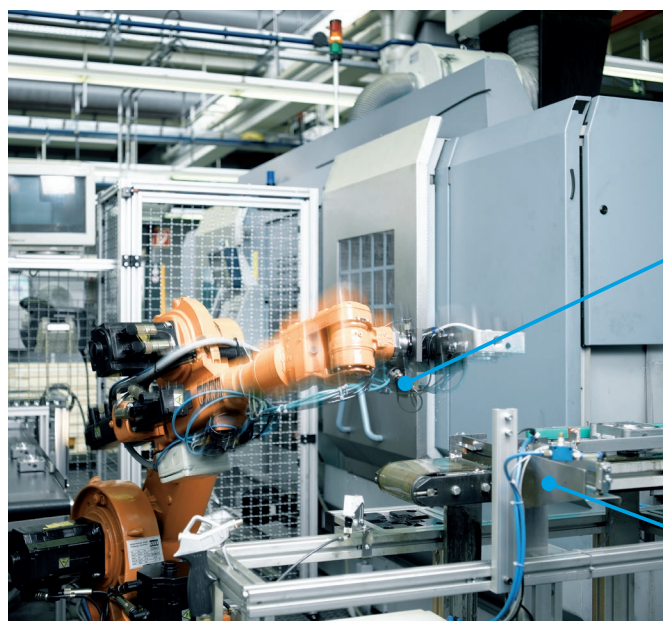
Highly flexible plastic tubing that is characterised by excellent resistance to abrasion and kinking. It also offers a large number of possible combinations. However, PUN should not be used anymore in new applications. It is recommended to switch to PUN-H or PEN.

Use cases based on the example of a robot cell



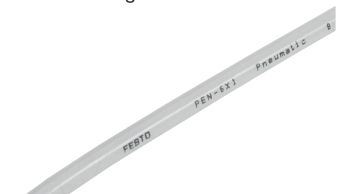
PEN / PUN-H¹⁾

Also suitable for dry and harsh environments (e.g. control cabinets)



PUN-H¹⁾

For tight industrial spaces with a high risk of kinking



PEN

For applications with low dynamic motion

1) PUN is comparable to PUN-H in terms of the variety of combinations with fittings and can also be used in similar areas of application. However, PUN should no longer be used in new applications. It is recommended to switch to PUN-H or PEN.

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Technical data			
Key features	PUN-H★	PEN	PUN ¹⁾
Material	Polyurethane	Polyethylene (cross-linked)	Polyurethane
Version			
Tubing O.D. [mm]	2, 3, 4, 6, 8, 10, 12, 14, 16	4, 6, 8, 10, 12, 14, 16	3, 4, 6, 8, 10, 12, 14, 16
Colour	Blue, black, silver, green, red, yellow, natural	Blue, black, silver, green, red, yellow, natural	Blue, black, silver, green, red, yellow
Colours, transparent version PUN-H-T (for Ø 4 ... 12 mm)	Blue, black, green, red, yellow	–	–
Area of application²⁾			
Temperature-dependent operating pressure [MPa]	–0.095 ... +1.0	–0.095 ... +1.0	–0.095 ... +1.0
Operating temperature [°C]	–35 ... +60	–30 ... +60	–35 ... +60
Resistance and suitability³⁾			
Chemical resistance	+	++	–
Hydrolysis resistance	++	+++	+
Suitability for use in the food industry	FDA-listed material	–	–
Operating media	Compressed air, vacuum, water ⁴⁾	Compressed air, vacuum, water ⁴⁾	Compressed air, vacuum

1) PUN should no longer be used in new applications. It is recommended to switch to PUN-H or PEN.

2) See the pressure and temperature curve graph

3) +++ Highly suitable ++ Suitable + Moderately suitable – Not suitable

4) As per the manufacturer's declaration

Finding and buying the right tube ¹⁾				
Key features	PUN-H★	PEN	PUN ²⁾	Description
Price attractive	++	+++	+	Out of the three tubes, PEN is the most attractively priced version.
Flexibility (alternating bending) ³⁾	+++	++	+++	Compared to PUN-H and PUN, PEN is slightly more resistant to bending. There is a risk of it breaking if the alternating bending cycles are too frequent.
Kink resistance ³⁾	+++	+	+++	PUN-H and PUN are very easy to fit in tight installation spaces thanks to their elastomer properties.
Abrasion behaviour (cable chain)	++	+++	++	PEN has very good fatigue strength when used in cable chains. However, unintentional rubbing (e.g. on edges) must be avoided.
Suitability for use in the food industry	+++	–	–	PUN-H consists of FDA-listed materials for use in the food industry.
Chemical resistance	+	++	+	PEN is a polyethylene tube that has a significantly better chemical resistance than TPU tubing such as PUN-H and PUN.
Hydrolysis and microbe resistance	++	+++	–	PEN is more resistant to the permeation of water than PUN-H.
Transparent colours	+++	–	–	The PUN-H portfolio also includes transparent tubes. This makes it easy to detect particles and moisture.
Fire test according to UL	+	–	+	PUN-H and PUN meet the requirements of the lowest flammability category according to UL 94 (HB).
Creep and creep rupture behaviour	+	+++	++	PEN has the lowest deformation under constant load compared to PUN-H and PUN. PEN and PUN can be connected with barbed fitting CN.
Tubing size range	+++	++	+	PEN and PUN-H are available in both inch and metric sizes. 2 mm versions are only offered with PUN-H.
DUO tubing	+++	–	+++	PUN-H and PUN are also available in DUO variants.
Spiral tubing	–	–	+++	PUN is available as single and also as DUO spiral tubing.

1) +++ Highly suitable ++ Suitable + Moderately suitable – Not suitable

2) PUN should no longer be used in new applications. It is recommended to switch to PUN-H or PEN.

3) The minimum possible bending radii for PEN, PUN-H and PUN are comparable. PEN is stiffer during installation because of its higher resistance to bending.