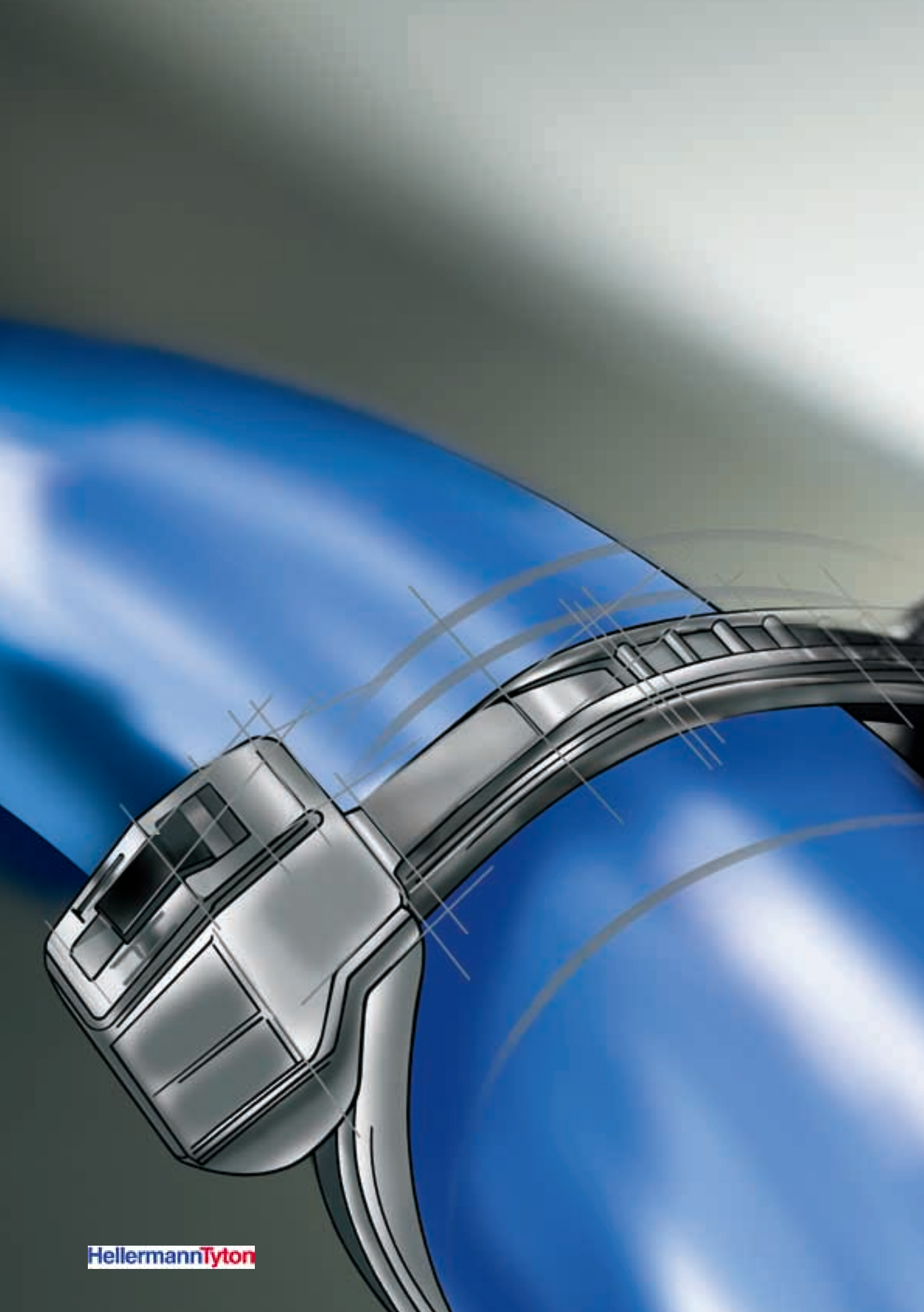
HellermannTyton

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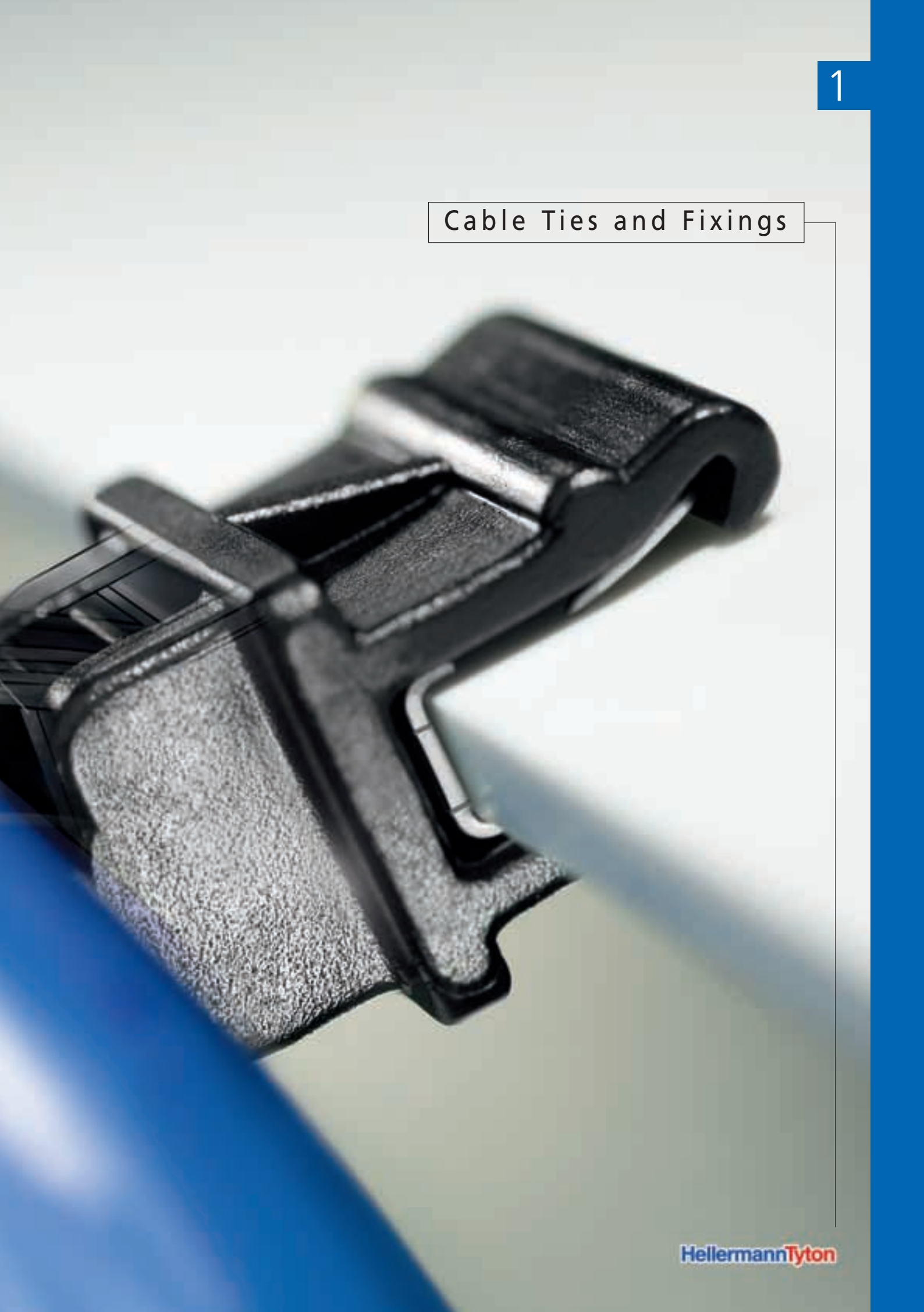
Cable Ties and Fixings



HellermannTyton

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Cable Ties and Fixings

Properties of polyamide PA66

Properties of polyamide PA66

Polyamides are among the most important thermoplastic synthetic materials. Thermoplastics can be reshaped by heating as often as required without undergoing chemical decomposition or other negative changes. This makes polyamide ideal for processing via injection moulding into high quality products. About 90% of cable ties and fixings from HellermannTyton are made from this material. Polyamide is also known under the brand name of Nylon®, which was introduced by the Dupont company.

The inner structure of polyamide displays a partial order of polymer chains, i.e. polyamides are partially crystalline. Due to the tighter packing of the individual molecular chains polyamide only has limited transparency to light. The plastic is therefore described as translucent.

The molecular chains of PA66 are made from two base units:

$$[\text{-NH}(\text{CH}_2)_6\text{NH-CO}(\text{CH}_2)_4\text{CO}]$$

1st base unit with 6 C atoms	2nd base unit with 6 C atoms

Each base unit contains 6 carbon atoms (C). Hence the name PA66.

The polyamide PA66 has many properties which are highly advantageous for HellermannTyton cable ties and fixings, such as:

- High strength, rigidity and hardness
- High dimensional stability, even under the effect of heat
- High abrasion resistance

Having a wide range of polyamides and additives allows for an optimum adaptation of the properties of the finished product to suit the respective requirements.

The following PA66 variants are used for HellermannTyton products:

- Polyamide 6.6 standard (PA66) for temperature conditions of up to +85°C
- Polyamide 6.6 Heat Stabilised (PA66HS) for temperature conditions of up to +105°C
- Polyamide 6.6 UV Stabilised (PA66W) for exterior use
- Polyamide 6.6 Heat Stabilised and UV Stabilised (PA66HSW) for exterior use up to +105°C
- Polyamide 6.6 Impact Resistant (PA66HIR) for high elasticity requirements
- Polyamide 6.6 impact Resistant and Heat Stabilised (PA66HIRHS) for high elasticity requirements and temperatures up to +105°C
- Polyamide 6.6 V0 for high standards of fire protection.

Water content in polyamide

Polyamide is a hygroscopic material – this means that it absorbs and releases water. The mechanical properties are significantly affected by the water content – especially flexibility and minimum tensile strength.

In a standard atmosphere of 23°C and 50% relative humidity, the degree of water saturation of polyamide is around 2.5%. For optimal processing of cable ties it is therefore important that the polyamide has a water content of approximately 2.5% in a state of equilibrium.

The quality and functionality of the products are thus affected by the water content, therefore the correct storage of our products is crucial. Please read our separate instructions on storage.

Since humidity is so critical to the quality of the tie, the question arises: What happens if the tie is installed and the water content in the tie alters?

The water content determines the flexibility and strength of a tie. At a water content of approximately 2.5% the tie has the ideal flexibility for installation. When the strap is being threaded through the head of the tie, the pawl must be flexible enough to "see-saw" over the serration of the strap without breaking. On the other hand, there must also be adequate material rigidity for the serrations of the pawl to engage with the serrations of the strap during the tying process so that a 'positive locking' action is achieved.

After achieving the positive locking action the tie is in a static condition. Changes in the mechanical properties of the tie as a function of water content are insignificant during this status.

For more details on the materials, see page 40.

Properties of UV-stabilised polyamide (PA66W)

The question constantly arises as to whether a black cable tie is suitable for use outside. This is dependant on the application of the tie, but in general the following statements can be made:

A black cable tie made of polyamide 6.6 standard (PA66) is only coloured black with a low proportion of carbon black. This is not sufficient to protect the material from damage caused by UV-radiation in the long term.

Products made from UV-stabilised polyamide PA66W are produced in accordance with ASTM standard D6779 with a higher carbon black percentage of at least 2%. So they resist UV-radiation in the European area for a considerably longer period than standard PA66.

This is clearly illustrated by the comparison of the two images on the right:

After 500 hours of UV- radiation exposure
Polyamide 6.6 standard (PA66) dyed black

The joint has been damaged throughout by UV-radiation.

Polyamide 6.6 UV-stabilised (PA66W) with at least 2% carbon black

The joint has only been altered at isolated points by the UV-radiation.

For outdoor use, therefore, we recommend our range of products made from UV-stabilised polyamide (PA66W).

A simple practical test:
"the hammer test"

You can quickly determine whether or not a cable tie is UV stabilised. Strike with a hammer the tail of the strap on the tie. Hold up this flattened end to the light. Cable ties with a carbon black content of at least 2% allow no light through and look black throughout. Standard black ties, however, are transparent on the flattened end.

Properties of polyamide PA12

Apart from PA66, there are polyamides which are less hygroscopic. These include PA12, which has a molecular chain made of a base unit with 12 carbon atoms:

[-NH$(CH_2)_{11}$CO-]

PA12 has the following advantages over PA66:

- Less hygroscopic - saturation at 23°C and 50% relative humidity is approximately 1%.
- Better impact performance.
- Good weather resistance, even without a special additive.

These three properties make PA12 ideal for use outdoors, in particularly when requirements may include impact resistance.

The water absorption of PA12 is not only less than that of PA66 but also slower. This is the requirement where the mechanical properties need to remain relatively unaffected by changing environmental conditions.

Properties of polyamide PA46

Polyamide PA66, despite the use of additives, is not suitable for long-term use in temperatures of +105°C. Due to considerably better heat resistance, polyamide PA46 is more suitable for temperatures of up to and exceeding 150°C (depending on the length of time of operation).

The molecular chain of PA46 is composed of two base units:

[-NH-$(CH_2)_4$NH-CO-$(CH_2)_4$-CO-]

1st base unit with 4 C atoms
2nd base unit with 6 C atoms

Advantages of PA46 over PA66:

- Greater rigidity, even at higher temperatures.
- Higher operating temperature ranges of up to +150°C (5,000 hours).
- Greater form stability at higher temperatures.
- Excellent chemical resistance.

Properties of Polyetheretherketone PEEK and Tefzel® (E/FTE)

Properties of Polyetheretherketone PEEK

PEEK, a linear aromatic polymer is semi-crystalline and is widely regarded as the highest performance thermoplastic material currently available. A summary of key physical properties is as follows:

High temperature performance

- Melting temperature of 343 °C (649 °F).
- Continuous Use Temperature of 260 °C (500 °F) (UL 746B).

Wear resistance

- Outstanding wear resistance over wide ranges of pressure, velocity, temperature and counter facial roughness.

Chemical resistance

- Excellent resistance to a wide range of chemical environments, even at elevated temperatures.
- The only common environment that dissolves it is concentrated sulfuric acid.

Fire, smoke and toxicity

- Highly stable and requires no flame-retardant additives to achieve a V-0 rating at 1.45 mm thickness.
- The composition and inherent purity of the material results in extremely low smoke and toxic gas emission in fire situations.

Hydrolysis resistance

- PEEK is not attacked by water or pressurized steam.
- Components that are constructed from these materials retain a high level of mechanical properties when continuously conditioned in water at elevated temperatures and pressures.

Purity

- PEEK materials are inherently pure with exceptionally low levels of ionic extractables.
- Excellent out gassing characteristics.

Radiation Resistance

- Excellent Radiation Resistance due to the energetically stable chemical structure of PEEK.

This makes PEEK the right choice for any high performance application in any industry with a clearly outstanding continuous use temperature of 260 °C.

Properties of Tefzel® (E/FTE)

E/TFE can be best described as a rugged thermoplastic with an outstanding balance of properties.

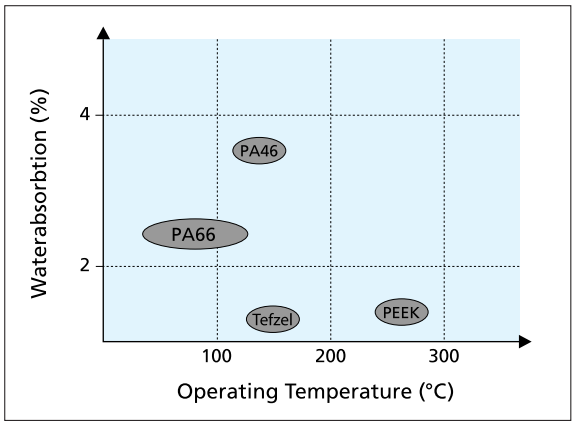
Mechanically, it is tough, has medium stiffness, impact and abrasion resistance.

Summary of key properties:

- No load continuous use temperature of 150 °C.
- Weather resistant
- Inert to most solvents and chemicals
- Hydrolytically stable
- Substantially better resistance to radiation than other plastic materials.

E/TFE can perform successfully in applications where other materials are lacking in mechanical toughness, broad thermal capa bility, ability to meet severe environmental conditions.

Tefzel® is a registered trademark of DuPont.



Chemical resistances of various plastics

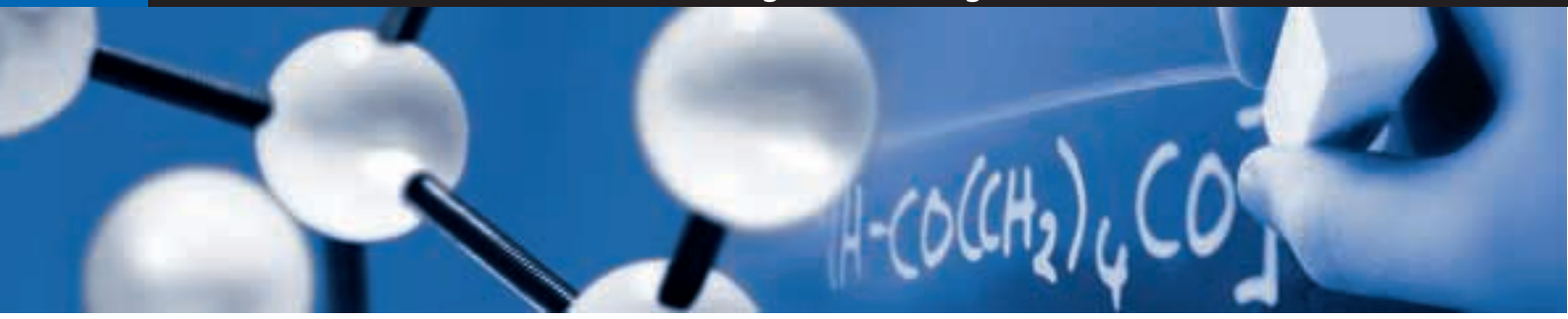
+ = resistant
o = partly resistant
- = not resistant

These values are only rough guides. They should be regarded as a material specification and are no substitute for a suitability test. Please see our technical datasheets for further details.

Medium	Conc. [%]	Temp. [°C]	PA66	PA46	PA12	POM	PP	TPU	Tefzel®	PEEK
Acetaldehyde, liquid	100	23	+	-		+	o	-	+	+
Acetone	100	23	+	+	+	+	+	-	+	+
Allyl chloride	100	23					+	-		
Formic acid	98	23	-		-	-	+	-	+	o
Aniline	100	23	+	o	o	o	+	-	+	+
Aromatic compounds						+	-		+	+
Benzaldehyde	any	23	+	o		+	+	-	+	+
Benzine/Benzol mix		23	+	+	+	+	o	o	+	+
Benzol	100	23	+		+	o	o	-	+	+
Bromine		23		-	-		-	-		
Chlorine, gaesous	100	23					-	o	+	
Chlorine, liquefied	100	23		-			-			
Chlorobenzene	100	23			-	o	+			
Chloroform	100	23		-	-	-	o			
Chromic acid	10	20	o	-		o	+		+	+
Chromic acid	20	23	-	-		-	+		+	+
Chromic acid	50	20	-	-		-	+		+	
CFC							o			
Cyclohexane	100	23	+			+	+	+	+	+
Cyclohexanone	100	23	+			+	+		+	+
Decahydronaphthlene	100	23	+			+	o		+	+
Diethyl ether	100	23	+			+	o		+	+
Di-isopropyl ether	100	23					o			
Dimethyl formamide	100	23	+	+		+	+		+	+
Dioctyl phthalate		23	+	+		+	+	-	+	+
Ethanonic acid	10	20	-	o	o	+	+		+	
Ethanonic acid	25	20	-			o	+		+	
Ethanonic acid	50	20	-			o	+		+	
Ethanonic acid	100	23	-	-		o	+		+	
Ethyl acetate	tech.pure	23		+	+	o	o			+
Freon		23					+			+
Heptane	100	23	+	+	+	+	+		+	+
Potass. Permanganate	<= 6	23	-	-	-	+	+		+	+
Ketone			+	+		+	+		+	+
Methylethylketone	100	23	+	+		o	+	-	+	+
Methyisobutylketone	100	23	+			+	+		+	+
Engine oil	100	23			+	+	+			+
Nitrobenzene	100	23	+	o		+	+	-	+	+
Ordinary petrol		23		+		+	+			+
Paraffin oil		23	+	+	+	+	+		+	+
Perchloroethylene		23	+		+	+	o	-	+	+
Petroleum		23	+	+	+	+	+		+	+
Phenol	approx. 70	23	-	-	-	-	+	-	+	
Nitric acid	10	20	-		-	-	+	-	+	+
Nitric acid	50	23	-		-	-	-	-	+	-
Carbon bisulphide	100	23	+	-	+	+	-	-	+	+
Sulphuric acid	10	20	-		o	-	+	+	+	o
Sulphuric acid	50	20	-			-	+	+	+	-
Sulphuric acid	96	23	-	-		-	-	+	+	-
Silicon oil		23	+	+	+	+	+	+	+	+
Salad oil		23		o			+			+
Carbon tetrachloride	100	23	+	+	o	+	o	-	+	+
Toluol	100	23	+		+	+	o	-	+	+
Trichlorethylene	100	23	+	o	o	o	o	-	+	+
Water, cold			+		+	+				+
Water, hot							+			+
Hydrogen peroxide	10	20	o			+	+		+	
Hydrogen peroxide	30	23	-	-		+	+	+	+	
Xylene	100	23	+	+	+	+	o	-	+	+

Tefzel® is a registered trademark of DuPont.

Introduction to the main locking technologies used for cable ties



Introduction to the main locking technologies used for cable ties

HellermannTyton offers a wide range of cable ties for use in different applications. By constantly refining our products and satisfying the ever-changing demands of the market, various locking technologies have been developed. Below you will find a brief overview of three most common locking technologies and their characteristics.

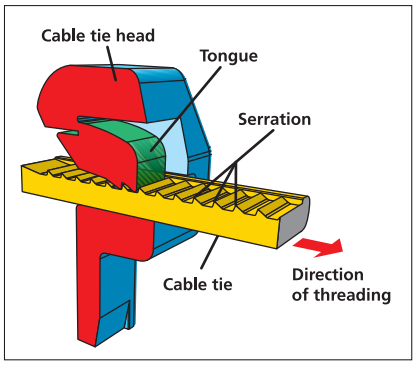
Cable ties with plastic pawls

This technology is used in 90% of all poly-amide (PA) cable ties applied by HellermannTyton. In order to cover a variety of applications, there are different variants of this system, for example: releasable versions, in-line versions, open head versions.

These are one-piece cable ties, that is the pawl is moulded as an integral part of the cable tie, thereby building in inherent strengths.

Locking technology

Positive locking is achieved by engaging the pawl with the strap serrations. This allows the cable tie to perform to the published minimum tensile strength, that is the loading that the cable tie can hold under application (see page 29).

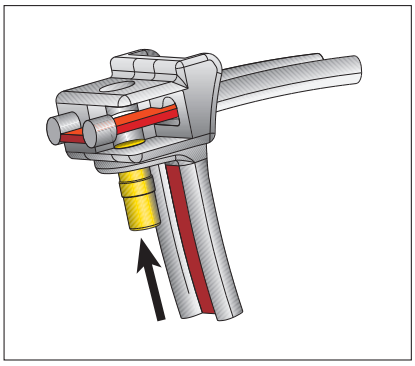


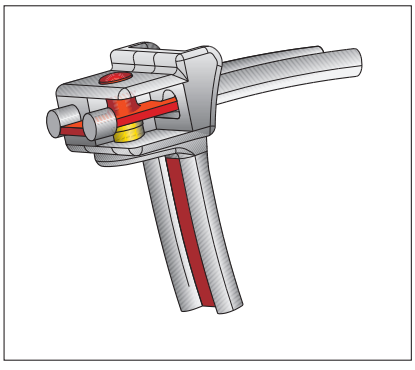
KR series cable ties

This cable tie is distinguished by its smooth strap and unique locking mechanism. With the KR series the chamfered head achieves an especially firm fit around the bundled material.

Locking technology

This patented lock technology takes advantage of the excellent deformation properties of polyamide (PA). Here, the glass fibre-reinforced (GRP) locking pin (yellow) is forced into the strap by the use of an application tool - either the KR6/8 or KR8PNSE (see page 416). The strap is deformed into the head of the tie by the application of the pin, thereby locking the cable tie in position and allowing for the bundling of heavy loads.





MBT series of cable ties

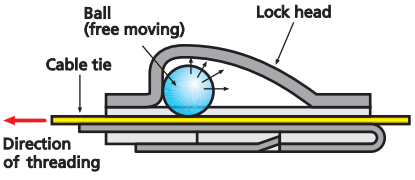
Made of stainless steel grades 304 or 316, the MBT range of cable ties have no serrations on the strap and are threaded parallel through the head, gliding under a metal ball-bearing locking mechanism. By using the MK9SST (see page 417) application tool the cable tie is tensioned and the strap cut to a flush finish.

Locking technology

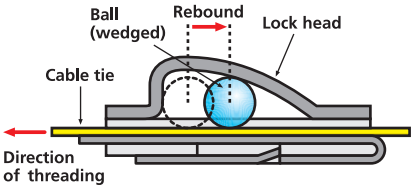
The strap is locked into the head by means of the small ball-bearing. The ball locks into the small end of the wedged shaped housing, forming a positive locking with the strap.

This cable tie is not suitable for rigid objects. Retraction of the ball-bearing (see drawing) is required into the small end of the wedged shaped housing to allow for a positive locking of the strap and also to make a flush cut of the end of the strap. Retraction, therefore, cannot take place with the bundling of inflexible materials. To bundle rigid objects LFPC channel (see page 90) should be laid as buffer between strap and bundled material to compensate for this retraction. This locking technology allows for minimum tensile strengths of up to 2225 Newton (500 LBS).

1. Initial position



2. Ball locks cable tie by wedging.

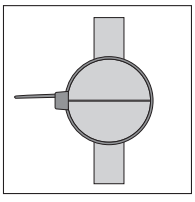


Determination of minimum tensile strength

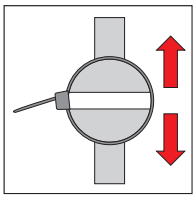
The minimum tensile strength is a critical selection criteria for cable ties. It expresses how much loading a cable tie can bear. This minimum tensile strength is determined in accordance with the Military Specification and Standards of the USA. Test conditions being laid down precisely in MIL-S-23190E:

- Conditioning of the test pieces
- Construction of the test apparatus
- Application of the tie on a split test probe
- Test speed

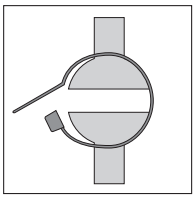
The test procedure to determine minimum tensile strength



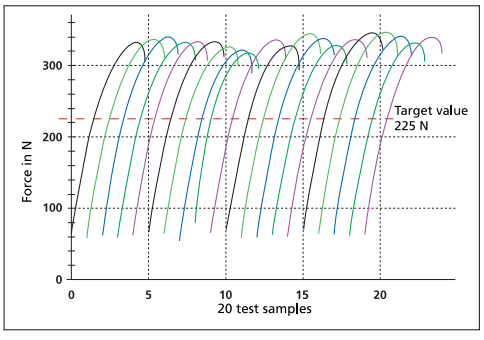
The cable tie is fixed onto a split mandrel test probe with the suitable cable tie application tool.



The mandrel is opened at a defined speed.



The loading at which the cable tie fails is determined. This value is stated in Newtons (N) and is recorded through a computer programme reading the tests. This programme produces graphs as outlined below.



Typical measurement protocol of a T50R made of PA66 with a minimum tensile strength of 225 N.

Explanation of minimum tensile strengths

What does a minimum tensile strength of 225 N (50LBS) mean?

To explain what this value means, the mass with which the tie can be loaded is calculated. The unit of measurement of the mass is stated in kg. To do so, the unit Newton (N) is shown in the following way:

[N] = [kg * m/s²]

The formula for calculating the mass is:

Mass = minimum tensile strength/ acceleration due to gravity

The acceleration due to gravity is 9.81 m/s²:

Mass = minimum tensile strength/ [kg * m/s²] /9.81 [m/s²]

At a minimum tensile strength of 225 N 50LBS) the mass is:

Mass = 225 [kg * m/s²] /9.81 [m/s²]

The units m/s² cancel each other out, leaving the unit [kg] for the mass. Thus:

Mass = 225/9.81 kg = 22.9 kg

Therefore, a T50R cable tie with a minimum tensile strength of 225 N (50LBS) can be loaded with 22.9 kg.

Conversely, with the required loading capacity the minimum tensile strength can be calculated by a mass:

Min. tensile strength = mass * 9.81[m/s²]

If the tie is to be loaded with, for example, 53 kg this produces:

Minimum tensile strength = [53 kg] * 9.81 [m/s²] = 520 N

In order to withstand a load of 53 kg, the tie must therefore have a minimum tensile strength of 520 N. In this case, select our T120R with a minimum tensile strength of 535 N (120LBS).

225 N/9,81 = 22,9 kg

53 kg * 9.81 = 520 N

Optimum storage conditions for cable ties made of polyamide (PA)

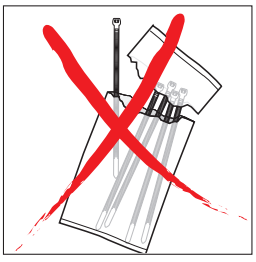
Optimum storage conditions for cable ties made of polyamide (PA)

HellermannTyton cable ties, fastenings and fixings are manufactured from high-quality polyamide (PA). This industrial synthetic material is mainly processed using injection moulding, but can also be extruded.

Polyamide is a hygroscopic material. This means that the material absorbs and loses moisture. For optimum handling of cable ties it is important that the material is in a condition of equilibrium with a water content of approximately 2.5%.

The packaging used by HellermannTyton ensures that the water content in the material remains constant. Therefore, it is important to store the products in their original packaging to preserve the quality of the ties.

Always store ties in the sealed plastic bag made of polyethylene!

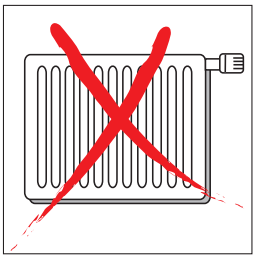


Once opened you should use the ties as quickly as possible!

Do not expose the product to direct sunlight!

Do not store the product in sunlight; for example, on the windowsill!

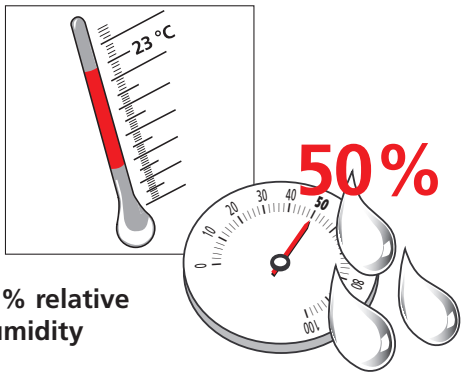
Store the product away from direct sources of heat!



Avoid contact with heat: for example, do not place on the radiators!

The ideal storage conditions are those of the central European standard climate:

23 °C



50% relative humidity

HellermannTyton cable ties conform to DIN EN 50146 standard

HellermannTyton are a supplier of high-quality solutions for the routing, oganising and securing of cables, hoses and pipes. The level of quality has been inspected by the VDE (Verband der Elektrotechnik, Elektronik, Informationstechnik e.V) [German Association for Electrical, Electronic and Information Technologies].

Cable ties from the inside-serrated T-Series and the outside-serrated OS-Series have been tested in accordance to the cable tie standard DIN EN 50146 (VDE 0604 PART 201):2000-12; EN 50146:1999-08. The result of this independent testing is complete compliance:

These cable ties therefore qualify to bear the VDE symbol.

In addition to cable ties made of the standard material polyamide 6.6 (PA66), ties made from heat-stabilised (PA66H) and UV-stabilised polyamide 6.6 (PA66W) have been successfully tested and approved.

HellermannTyton is the only manufacturer to offer cable ties with inside and outside serration with DIN approval. So all current applications in the field of electrical installation are covered.

The standard includes the following tests:

- Test of minimum installation temperature
- Test of minimum application temperature
- Minimum tensile strength (in the standard this is described as the looping test)
- Load test and heat ageing test
- Temperature cycle test
- Contribution to the spread of fire
- Corrosion resistance

The following HellermannTyton cable ties have been tested and certified:

T-Series inside-serrated cable ties
(see page 43-54) in the qualities:

Polyamide 6.6 (all colours)	38 types x 11 colours	=	418 cable ties
Polyamide 6.6 heat-stabilised (all colours)	38 types x 11 colours	=	418 cable ties
Polyamide 6.6 UV-stabilised (black)	38 types in black	=	38 cable ties
Total number of cable ties in T-Series to DIN standard			**874 cable ties**

OS-series outside-serrated cable ties
(see page 60)

Polyamide 6.6 heat-stabilised (all colours)	7 types x 11 colours	=	77 cable ties
Total number of cable ties in OS series to DIN standard			77 cable ties
Total number of HellermannTyton cable ties to DIN standard			**951 cable ties**

For further information on materials, see page 40.

■ suitable
□ of limited suitability
◩ partly suitable
++ very good
+ good
o limited
These details are only rough guide values. They should be regarded as a material specification and are no substitute for a suitablity test. Please see our datasheets for further details.

Typ	Page	Material	Operating Temperature [°C]
Inside Serrated Cable Ties			
T Series	43	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
T Series	47	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
T Series	49	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
T Series	51	PA66V0	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
T Series	51	PA66HIR	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
T Series	51	PA66HSW	-40 °C to +105 °C continuous
T Series	52	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
T Series	52	E / TFE	-80 °C to +150 °C continuous
T Series	53	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
T Series	53	PP	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LK Series	55	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LK Series	55	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LK Series	55	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
LK Series	55	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
WS Series	56	PA66HIRHS	-40 °C to +110 °C continuous
CTT Series, HRT, HT	57	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
CTT Series, HRT, HT	57	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
CTT Series, HRT, HT	57	PA66HSW	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
DH Series	58	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
DH Series	58	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
DH Series	58	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
DH Series	58	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
Outside Serrated Cable Ties			
RPE, PE Series	62	PA66HSW	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
RPE, PE Series	62	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LPH Series	63	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LPH Series	63	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
OS Series	60	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
OS Series	60	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
OS Series	60	PA66V0	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
OS Series	60	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
Releasable Cable Ties			
RT 100, 140, 250 Series	64	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
RT, RELK, RLT Series	65	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
RT, RELK, RLT Series	65	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
RT, RELK, RLT Series	65	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LRT, RT250 Series	66	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LRT, RT250 Series	66	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
REL Series	67	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
REL Series	67	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LR55 Series	68	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LR55 Series	68	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
SOFTFIX®/SRT Series	69	TPU	-40 °C to +85 °C
REZ Series	70	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
RS1 Series	70	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)

Resistant properties					Possible applications											Sample applications																	
UV light/ozone*	Oils and greases	Solvents	Petrol	Flammability	Switch cabinets	Electronics	Railway vehicles	Aerospace industries	Turbines and engines	Telecommunications	Ship-building/Marine	Military industry	Harnessmakers	Public buildings	Automotive industries	Bundling of cables and wires	Bundling of hoses	Welded or threaded studs	Drilled holes in sheet metal	Edge Fastening on steel plate	Blind hole with thread	Fixing with self adhesive base	Bundling of optical cables	Fastening optical cables	For restricted space	Fastening bellows	Parallel Wires	Post-installation fastening	Temporary fastening	For thin, sensitive insulation	Underwater use	Identification of packaging	Securing packaging
o	++	+	++	+	■	■	■	■		■	■	■	■	■	■	■	■																■
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□ of limited suitability
◩ partly suitable
++ very good
+ good
o limited
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Typ	Page	Material	Operating Temperature [°C]
Fixing Ties			
With Arrowhead (with Wings)	94	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead (with Wings)	94	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead (with Wings)	94	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
With Arrowhead (with Wings)	94	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Arrowhead and Disc	98	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead and Disc	98	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Arrowhead and Disc	98	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
With Arrowhead in the Strap	97	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Arrowhead in the Strap	97	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
With Arrowhead and Disc in the Strap	98	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead and Disc in the Strap	98	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
Arrowhead Mount Assemblies	99	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
with turnaround clip	113	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Arrowhead	93	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead	93	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Fir Tree Mount	101	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Fir Tree Mount Assemblies	102	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Fir Tree Mount Assemblies	102	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
Fir Tree Mount Assemblies	102	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Rivet	100	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Rivet	100	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Stud Fixing	107	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Stud Fixing	107	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
With Stud Fixing	107	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
With Stud Fixing in the Strap	110	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Weld Stud Fixing Assemblies	111	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Double Mounting Base for Weld Studs	112	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
MR range of Mounting Head Ties	118	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
MR range of Mounting Head Ties	118	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
WPT	119	PA66HIR	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
Self Adhesive Fixing Tie T18RSA	119	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Edge Clip Family	114	PA66HS, PA66HIRHS	-40 °C to +105 °C
TAS Aerial Support Tie	80	PA66HIR	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
CT and BHT Series of Chassis Ties	82	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Fixing Ties for Cable Tray CTF	81	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)

Resistant properties					Possible applications											Sample applications																	
UV light/ozone*	Oils and greases	Solvents	Petrol	Flammability	Switch cabinets	Electronics	Railway vehicles	Aerospace industries	Turbines and engines	Telecommunications	Ship-building/Marine	Military industry	Harnessmakers	Public buildings	Automotive industries	Bundling of cables and wires	Bundling of hoses	Welded or threaded studs	Drilled holes in sheet metal	Edge Fastening on steel plate	Blind hole with thread	Fixing with self adhesive base	Bundling of optical cables	Fastening optical cables	For restricted space	Fastening bellows	Parallel Wires	Post-installation fastening	Temporary fastening	For thin, sensitive insulation	Underwater use	Identification of packaging	Securing packaging
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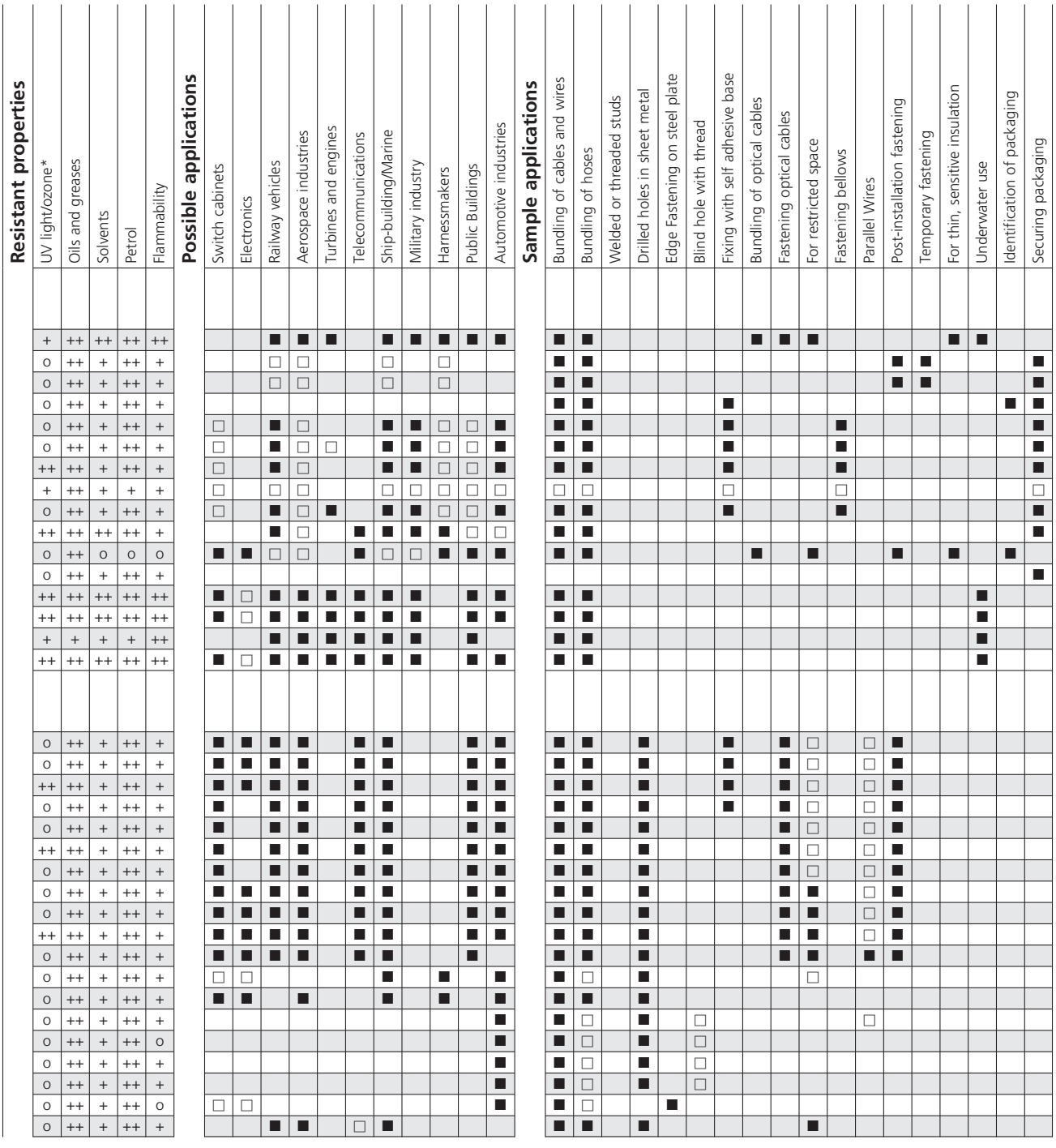
Type	Page	Material	Operating Temperature [°C]
Special Cable Ties			
PEEK	71	PEEK	-55 °C to +260 °C
SpeedyTie®	72	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
SpeedyTie®	72	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
MCT-Series	73	PA66MP	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	74	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	74	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
KR Series	74	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	75	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	75	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
EL,TY Series	77	POM	-40 °C to +85 °C
TEXTIES ®	78	PA, PE	-20 °C to +75 °C
TPT300	79	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
M Series	86	SS304	-80 °C to +538 °C
M Series	86	SS316	-80 °C to +538 °C
Protection Profile LFPC Series	90	PO	-40 °C to +90 °C Continuous, (+160 °C for 200 h)
AMTS System	84	SS316	-80 °C to +538 °C
Mounts for Cable Ties			
Self Adhesive / Screw Fixing MB	122	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive / Screw Fixing TY	123	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive / Screw Fixing TY	123	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR, LKC, NY	124	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR	125	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Screw Fixing KR	125	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR	125	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CTAM, MB, TY, CTAP	126	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CL8, FH, LKM, LKM	128	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CL8	128	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing MP, MSMP	129	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead TM1SF	129	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
SFC Arrowhead Cradle	130	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
TapeClip TC and CH Series	131	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
TapeClip TC and CH Series	131	PA66HIRHS	-40 °C to +105 °C
StandOff Clip with fir tree	132	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
StandOff Clip with fir tree	132	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
EdgeClip EC	133	PA66HIRHS	-40 °C to +105 °C
TY Plastic Rivets	155	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)



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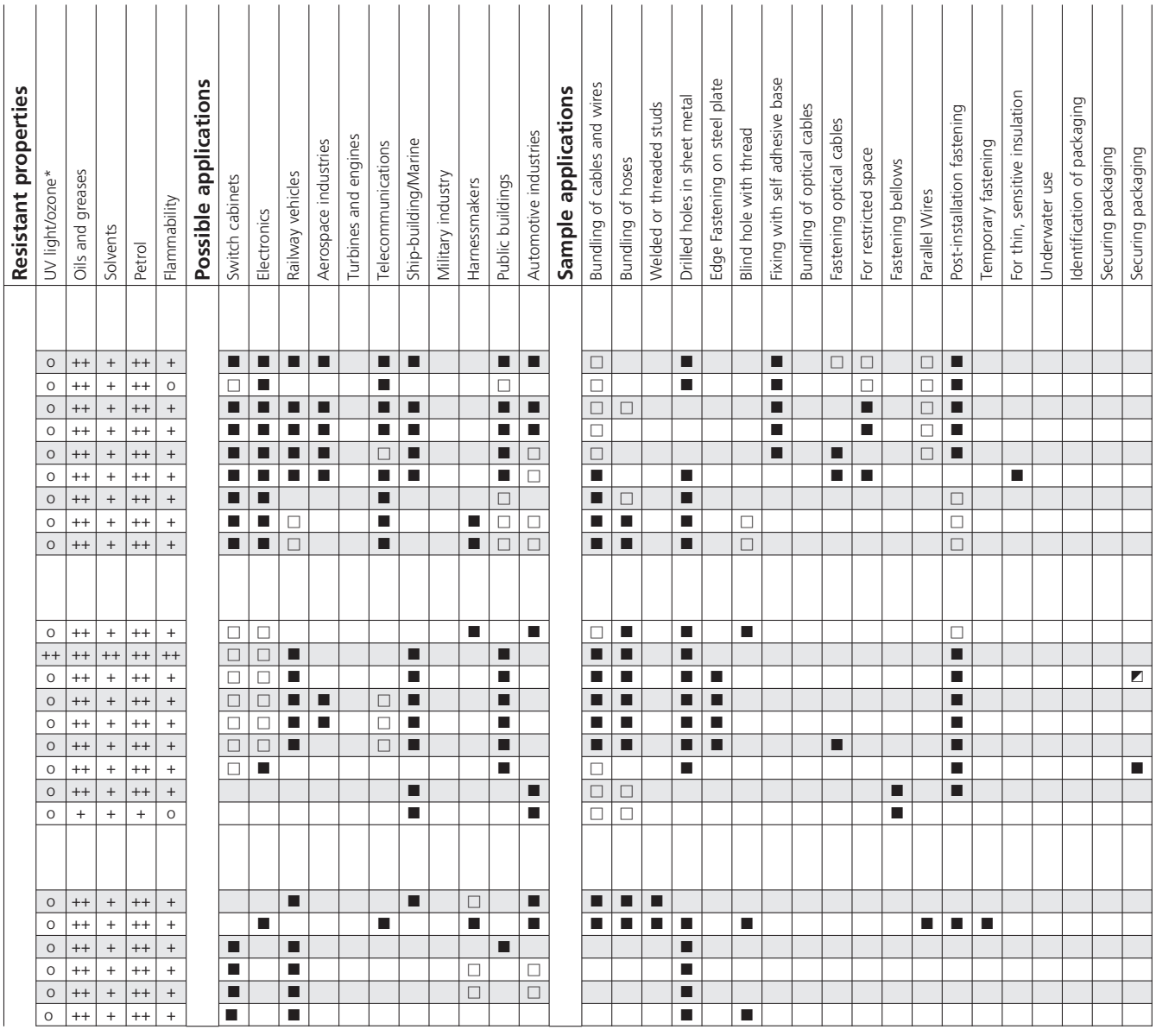
Typ	Page	Shortcut	Operating Temperature [°C]
Mounts for Cables and Wires			
Self Adhesive / Screw Fixing TY8H1S, RA, RB	143	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive 130100	144	PVC	-25 °C to +65 °C
Self Adhesive SAC	144	ST	-40 °C to +70 °C
Self Adhesive RA, RB	143	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
FKH Series	145	PA66HIR	-40 °C to +80 °C
With Arrowhead WPC	146	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Mount D-Clip	147	POM	-40 °C to +90 °C Continuous, (+110 °C for 500 h)
PC Series	149	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
PC Series	149	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
Clips and Snappers			
CTC Series	148	PA66HIRHS	-40 °C to +105 °C
Metal P-Clips	156	ALU	-40 °C to +180 °C
Metal P-Clips ALU with a Chloroprene Insert	156	ALU, CR	-20 °C to +80 °C
Plastic P-Clips HP	158	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Plastic P-Clips HP	158	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Cradle Clips	162	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KlamKlips	163	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Snapper SNP	160	POM	-40 °C to +85 °C
Snapper SNP (E)	160	PA66GF13	-40 °C to +105 °C
Mounts for Special Requirements			
Mounts with Stud Fixings SBH, SBF, CTMS	154	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Automatic Harness Clips	151	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LOK01 Fixing Base	153	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KM Series	164	PA66HIRHS	-40 °C to +105 °C
KM Series	164	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Plastic Rivets TY, R4, R6	155	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)



*Only valid for Central European climate.

Material specifications

Material specifications

Material	Operating Temperature	Colour	Flammability	Chem. Material Properties*
Ethylenterafluorine-ethylene – Tefzel (E/TFE)	-80 °C to +150 °C continuous	Blue (BU)	UL94 V0	• Resistance to radioactivity • UV- resistant, not moisture sentitive • Good chemical resistance to: acids, bases, oxidizing agents
Polyamide 6.6 High Impact Modified (PA66HIR)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 HB	• Limited brittlenes sensitivity • Good at low temperature
Polyamide 6.6 High Impact Modified, Heat Stabilised (PA66HIRHS)	-40 °C to +105 °C	Black (BK)	UL94 HB	• Limited brittlenes sensitivity • Good at low temperature • Modified elevated max. temperature
Polyacetal (POM)	-40 °C to +90 °C Continuous, (+110 °C for 500 h)	Natural (NA)	UL94 HB	• Limited brittlenes sensitivity • Flexible at low temperature • Not moisture sensitive • Robust on impacts
Stainless Steel Type SS304, Type SS316	-80 °C to +538 °C	Metal (ML)	–	• A distinctive feature of this material is its corrosion resistance, it is non rusting and antimagnetic.

Material specifications, Halogen Free

Material	Operating Temperature	Colour	Flammability	Chem. Material Properties*
Polyamide 12 (PA12)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 HB	• Good chemical resistance to: acids, bases, oxidizing agents • UV- resistant
Polyamide 6.6 (PA66)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	• High yield strength
Polyamide 6.6 Heat Stabilised (PA66HS)	-40 °C to +105 °C Continuous, (+145 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	• High yield strength • Modified elevated max. temperature
Polyamide 6.6 UV Resistant (PA66W)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 V2	• This material has been rendered weather resistant by the use of additives. It is particularly suitable for outdoor use, i.e. in direct sunlight.
Polypropylene (PP)	-20 °C to +85 °C	Natural (NA), Black (BK)**	UL94 HB	• Good chemical resistance to: organic acids • Floats in water, moderate yield strength
Thermoplastic Polyurethane (TPU)	-40 °C to +85 °C	Black (BK)	UL94 HB	• Thermoplastic polypropylene is highly elastic and resistant to UV light. It has good chemical resistance to acids, bases and oxidizing agents.
Polyamide 6.6 with metal particles	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Blue (BU)	UL94 HB	• High yield strength

Material specifications, Limited Fire Hazard

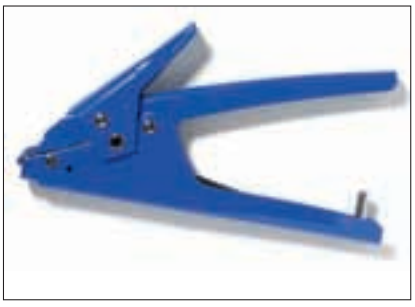
Material	Operating Temperature	Colour	Flammability	Chem. Material Properties*
Polyamide 4.6 (PA46)	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)	Natural (NA), Grey (GY)**	UL94 V2	• Polyamide 4.6 withstands high temperatures. The combustion performance of this plastic meets UL94 V2. It is also halogen free and, in the event of a fire, is characterised by its minimal generation of smoke, toxic fumes and corrosive acids.
Polyamide 6.6 V0 (PA66V0)	-40 °C to +85 °C continuous	White (WH)	UL94 V0	• High yield strength, low smoke emissions
Polyolefin	-40 °C to +90 °C	Black (BK)	UL94 V0	• Polyolefins also have flame propagation characteristics in compliance with UL94 V0. They are halogen free, self extinguishing and, in the event of a fire, are characterised by their minimal generation of smoke, toxic fumes and corrosive acids. They are stable in water, salt solutions, acids and oxidizing agents.

Material specifications, Halogen Free and Limited Fire Hazard

Material	Operating Temperature	Colour	Flammability	Chem. Material Properties*
Polyetheretherketone (PEEK)	-55 °C to +260 °C	Grey (GY)	UL94 V0	• Resistance to radioactivity • UV- resistant • Good chemical resistance to: acids, bases, oxidizing agents • Not moisture sentitive

* These details are only rough guide values. They should be regarded as a material specification and are no substitute for a suitability test. Please see our datasheets for further details.

** Other colours on request. Tefzel® is a registered trademark of DuPont.



MK10-SB
see page 410.

MK20, MK21
see page 410.

MK3SP
see page 411.

MK7
see page 411.

MK7HT
see page 411.

MK6
see page 412.

MK9
see page 412.

MK9HT
see page 412.

MK9SST
see page 417.

MK3PNSP2
see page 413.

MK7P
see page 414.

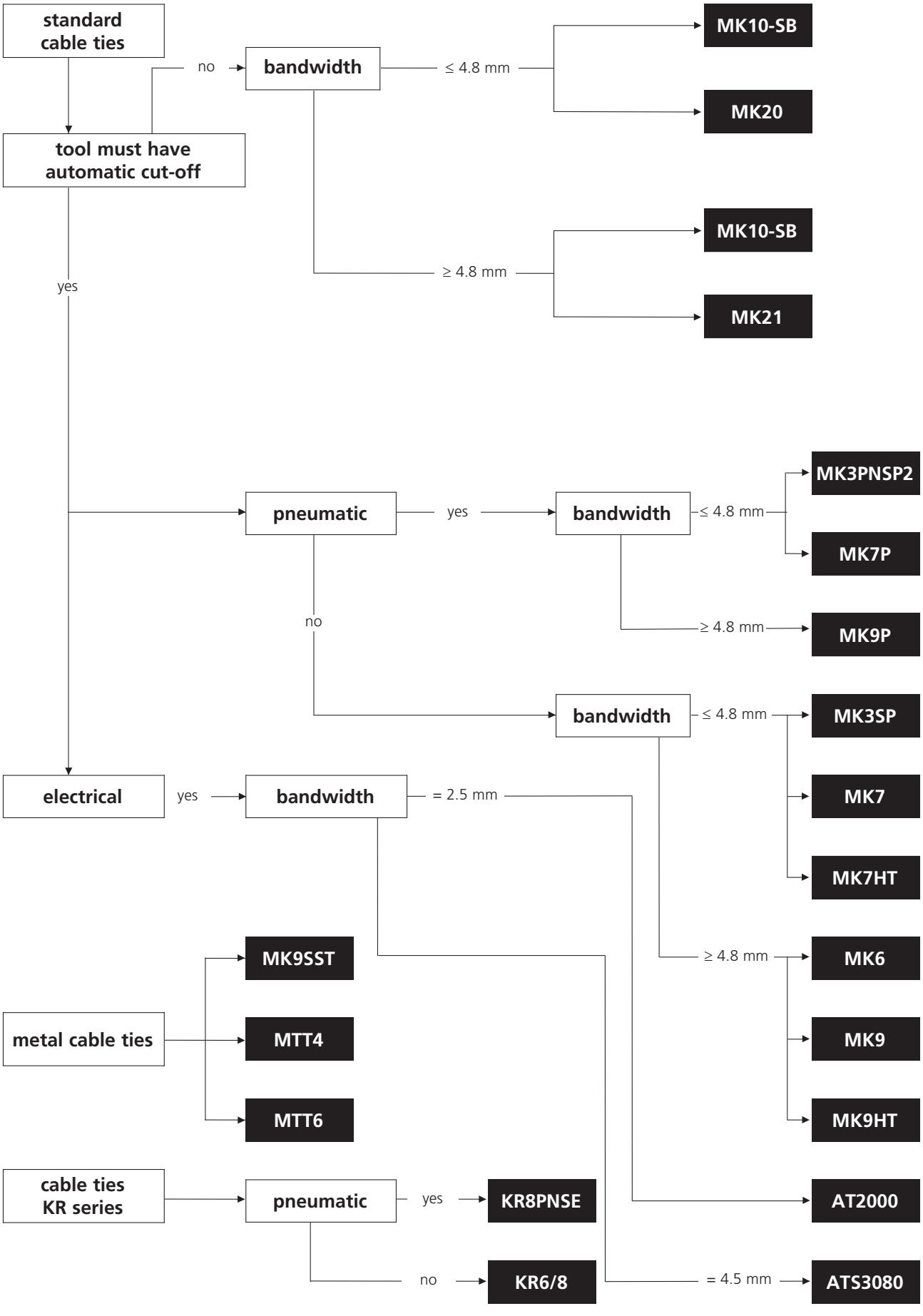
MK9P
see page 415.

KR6/8
see page 416.

KR8PNSE
see page 416.

For detailed information on application tooling please refer to chapter 6.2.

Flowchart for Optimum Tool Selection



T Series

Features and Benefits

Available in a wide range of materials, these cable ties all feature internal serrations allowing for a positive hold onto cable, hose and pipe bundles. The design of the head guarantees a high tensile strength whilst allowing a very low insertion force, this, combined with the bent tail design of many of the ties, ensures a simple and quick installation. Whilst easily installed by hand, manual and pneumatic (for high volume applications) tensioning tools are available to ensure a consistent and safe installation.

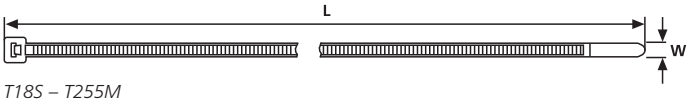
Application

For the routing, bundling and securing of cables, pipes and hoses.

T Series for bundling and securing of cables for a wide range of applications, available in various colours and materials.

Application Tool	Registration Numbers
MK3SP	1
MK3PNSP2, MK7P	2
MK7	3
MK7HT	4
MK20	5
MK6	6
MK9P, MK6PN	7
MK9	8
MK9HT	9
MK21	10
Autotool 2000	11

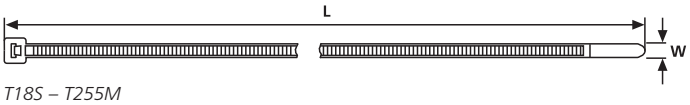
For more information please turn to page 404.



T18S – T255M

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 (PA66) – Standard



T18S – T255M

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

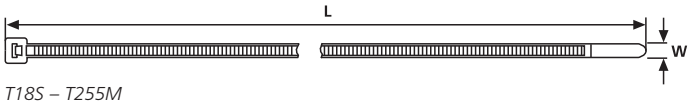
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 (PA66)								
111-02809	**T18S**	83	2.3	16.0	80	PA66	Natural (NA)	1–3, 5
111-02811	**T18S**	83	2.3	16.0	80	PA66	Black (BK)	1–3, 5
111-01910	**T18R**	100	2.5	22.0	80	PA66	Black (BK)	1–3, 5
111-01919	**T18R**	100	2.5	22.0	80	PA66	Natural (NA)	1–3, 5
111-02319	**T18I**	140	2.5	35.0	80	PA66	Natural (NA)	1–3, 5
111-02370	**T18I**	140	2.5	35.0	80	PA66	Black (BK)	1–3, 5
111-02010	**T18L**	205	2.5	55.0	80	PA66	Black (BK)	1–3, 5
111-02019	**T18L**	205	2.5	55.0	80	PA66	Natural (NA)	1–3, 5
111-02519	**T25L**	240	2.8	65.0	110	PA66	Natural (NA)	1–3, 5
111-02500	**T25L**	240	2.8	65.0	110	PA66	Black (BK)	1–3, 5
111-02619	**T25LL**	330	2.8	95.0	110	PA66	Natural (NA)	1–3, 5
111-02601	**T25LL**	330	2.8	95.0	110	PA66	Black (BK)	1–3, 5
111-03009	**T30R**	150	3.5	35.0	135	PA66	Natural (NA)	1–3, 5
111-03011	**T30R**	150	3.5	35.0	135	PA66	Black (BK)	1–3, 5
111-03410	**T30L**	190	3.5	50.0	135	PA66	Black (BK)	1–3, 5
111-03419	**T30L**	190	3.5	50.0	135	PA66	Natural (NA)	1–3, 5
111-04400	**T30LR**	260	3.3	65.0	180	PA66	Natural (NA)	1–5
111-03500	**T30LL**	290	3.5	80.0	135	PA66	Black (BK)	1–3, 5
111-03529	**T30LL**	290	3.5	80.0	135	PA66	Natural (NA)	1–3, 5
111-02900	**T30XL**	365	3.5	105	135	PA66	Natural (NA)	1–3, 5
111-02901	**T30XL**	365	3.5	105	135	PA66	Black (BK)	1–3, 5
111-03819	**T40R**	175	4.0	40.0	180	PA66	Natural (NA)	1–5
111-03801	**T40R**	175	4.0	40.0	180	PA66	Black (BK)	1–5
111-04600	**T40I**	290	4.0	80.0	180	PA66	Black (BK)	1–5
111-04609	**T40I**	290	4.0	80.0	180	PA66	Natural (NA)	1–5
111-04300	**T40L**	365	4.0	105	180	PA66	Natural (NA)	1–5
111-04301	**T40L**	365	4.0	105	180	PA66	Black (BK)	1–5

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 (PA66) – Standard



T18S – T255M

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

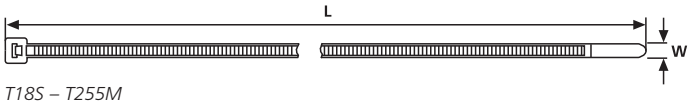
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 (PA66)								
111-05819	**T50S**	150	4.6	35.0	225	PA66	Natural (NA)	1–10
111-05810	**T50S**	150	4.6	35.0	225	PA66	Black (BK)	1–10
111-05000	**T50R**	200	4.6	50.0	225	PA66	Black (BK)	1–10
111-05013	**T50R**	200	4.6	50.0	225	PA66	Natural (NA)	1–10
111-06200	**T50M**	245	4.6	65.0	225	PA66	Black (BK)	1–10
111-06201	**T50M**	245	4.6	65.0	225	PA66	Natural (NA)	1–10
111-05210	**T50I**	300	4.6	85.0	225	PA66	Black (BK)	1–10
111-05219	**T50I**	300	4.6	85.0	225	PA66	Natural (NA)	1–10
111-05409	**T50L**	390	4.6	110	225	PA66	Natural (NA)	1–10
111-05400	**T50L**	390	4.6	110	225	PA66	Black (BK)	1–10
111-00268	**T50LL**	445	4.6	130	225	PA66	Black (BK)	1–10
111-06002	**T50LL**	445	4.6	130	225	PA66	Natural (NA)	1–10
111-05019	**T80R**	210	4.7	55.0	355	PA66	Natural (NA)	1–10
111-08010	**T80R**	210	4.7	55.0	355	PA66	Black (BK)	1–10
111-08210	**T80I**	300	4.7	85.0	355	PA66	Black (BK)	1–10
111-08229	**T80I**	300	4.7	85.0	355	PA66	Natural (NA)	1–10
111-05410	**T80L**	390	4.7	110	355	PA66	Black (BK)	1–10
111-05419	**T80L**	390	4.7	110	355	PA66	Natural (NA)	1–10
111-12829	**T120S**	225	7.6	55.0	535	PA66	Natural (NA)	6–10
111-00179	**T120S**	225	7.6	55.0	535	PA66	Black (BK)	6–10
111-12210	**T120I**	300	7.6	80.0	535	PA66	Black (BK)	6–10
111-12219	**T120I**	300	7.6	80.0	535	PA66	Natural (NA)	6–10
111-12010	**T120R(E)**	380	7.6	100	535	PA66	Black (BK)	6–10
111-12019	**T120R(E)**	380	7.6	100	535	PA66	Natural (NA)	6–10
111-12610	**T120M**	460	7.6	130	535	PA66	Black (BK)	6–10
111-12619	**T120M**	460	7.6	130	535	PA66	Natural (NA)	6–10
111-12701	**T120XM**	600	7.6	175	535	PA66	Black (BK)	6–10
111-12704	**T120XM**	600	7.6	175	535	PA66	Natural (NA)	6–10
111-12429	**T120L**	760	7.6	225	535	PA66	Natural (NA)	6–10
111-12403	**T120L**	760	7.6	225	535	PA66	Black (BK)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 (PA66) – Standard



T18S – T255M

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

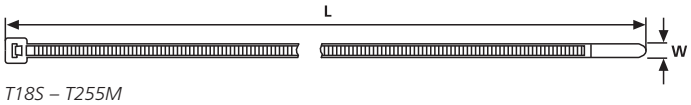
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 (PA66)								
111-15200	**T150R(U)**	390	8.8	105	780	PA66	Black (BK)	6–10
111-15203	**T150R(U)**	390	8.8	105	780	PA66	Natural (NA)	6–10
111-15619	**T150M**	530	8.9	150	780	PA66	Natural (NA)	6–9
111-00124	**T150M**	530	8.9	150	780	PA66	Black (BK)	6–9
111-15419	**T150L**	820	8.9	245	780	PA66	Natural (NA)	6–9
111-15405	**T150L**	820	8.9	245	780	PA66	Black (BK)	6–9
111-15719	**T150LL**	925	8.9	275	780	PA66	Natural (NA)	6–9
111-15700	**T150LL**	925	8.9	275	780	PA66	Black (BK)	6–9
111-15519	**T150XL**	1095	8.9	330	780	PA66	Natural (NA)	6–9
111-15500	**T150XL**	1095	8.9	330	780	PA66	Black (BK)	6–9
111-15300	**T150XLL**	1325	8.9	405	780	PA66	Black (BK)	6–9
111-15304	**T150XLL**	1325	8.9	405	780	PA66	Natural (NA)	6–9
111-24704	**T250S**	225	12.5	55.0	1115	PA66	Black (BK)	7-9
111-24705	**T250S**	225	12.5	55.0	1115	PA66	Natural (NA)	7-9
111-25102	**T250X**	370	12.5	100	1115	PA66	Black (BK)	7-9
111-25103	**T250X**	370	12.5	100	1115	PA66	Natural (NA)	7-9
111-24801	**T250R**	520	12.5	145	1115	PA66	Black (BK)	7-9
111-24803	**T250R**	520	12.5	145	1115	PA66	Natural (NA)	7-9
111-25001	**T250M**	565	12.5	150	1115	PA66	Black (BK)	7-9
111-25002	**T250M**	565	12.5	150	1115	PA66	Natural (NA)	7-9
111-25219	**T250I**	725	12.5	203	1115	PA66	Natural (NA)	7-9
111-24600	**T250L**	880	12.5	254	1115	PA66	Natural (NA)	7-9
111-24601	**T250L**	880	12.5	254	1115	PA66	Black (BK)	7-9
111-25200	**T250XL**	1030	12.5	305	1115	PA66	Black (BK)	7-9
111-00466	**T250XL**	1030	12.5	305	1115	PA66	Natural (NA)	7-9

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 – UV Stabilised



T18S – T255M

Application Tool	Registration Numbers
MK3SP	1
MK3PNSP2, MK7P	2
MK7	3
MK7HT	4
MK20	5
MK6	6
MK9P, MK6PN	7
MK9	8
MK9HT	9
MK21	10
Autotool 2000	11

For more information please turn to page 404.

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

HF halogenfree RoHS

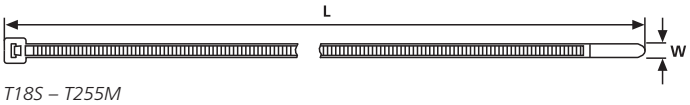
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 UV Stabilised								
111-02860	**T18S**	83	2.3	16.0	80	PA66W	Black (BK)	1–3, 5
111-01960	**T18R**	100	2.5	22.0	80	PA66W	Black (BK)	1–3, 5
111-02360	**T18I**	140	2.5	35.0	80	PA66W	Black (BK)	1–3, 5
111-02012	**T18L**	205	2.5	55.0	80	PA66W	Black (BK)	1–3, 5
111-02560	**T25L**	240	2.8	65.0	110	PA66W	Black (BK)	1–3, 5
111-02660	**T25LL**	330	2.8	95.0	110	PA66W	Black (BK)	1–3, 5
111-03030	**T30R**	150	3.5	35.0	135	PA66W	Black (BK)	1–3, 5
111-03460	**T30L**	190	3.5	50.0	135	PA66W	Black (BK)	1–3, 5
111-04402	**T30LR**	260	3.3	65.0	135	PA66W	Black (BK)	1–5
111-03570	**T30LL**	290	3.5	80.0	135	PA66W	Black (BK)	1–3, 5
111-03860	**T40R**	175	4.0	40.0	180	PA66W	Black (BK)	1–5
111-05860	**T50S**	150	4.6	35.0	225	PA66W	Black (BK)	1–10
111-04889	**T50R**	200	4.6	50.0	225	PA66W	Black (BK)	1–10
111-06206	**T50M**	245	4.6	65.0	225	PA66W	Black (BK)	1–10
111-05260	**T50I**	300	4.6	85.0	225	PA66W	Black (BK)	1–10
111-05440	**T50L**	390	4.6	110	225	PA66W	Black (BK)	1–10
111-06000	**T50LL**	445	4.6	130	225	PA66W	Black (BK)	1–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 – UV Stabilised



T18S – T255M

Application Tool	Registration Numbers
MK3SP	1
MK3PNSP2, MK7P	2
MK7	3
MK7HT	4
MK20	5
MK6	6
MK9P, MK6PN	7
MK9	8
MK9HT	9
MK21	10
Autotool 2000	11

For more information please turn to page 404.

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

HF halogenfree RoHS

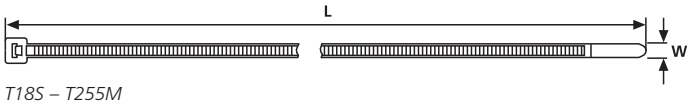
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 UV Stabilised								
111-05060	**T80R**	210	4.7	55.0	355	PA66W	Black (BK)	1–10
111-08290	**T80I**	300	4.7	85.0	355	PA66W	Black (BK)	1–10
111-05460	**T80L**	390	4.7	110	355	PA66W	Black (BK)	1–10
111-12830	**T120S**	225	7.6	55.0	535	PA66W	Black (BK)	6–10
111-12230	**T120I**	300	7.6	80.0	535	PA66W	Black (BK)	6–10
111-12060	**T120R(E)**	380	7.6	100	535	PA66W	Black (BK)	6–10
111-12660	**T120M**	460	7.6	130	535	PA66W	Black (BK)	6–10
111-00171	**T120XM**	600	7.6	175	535	PA66W	Black (BK)	6–10
111-12430	**T120L**	760	7.6	225	535	PA66W	Black (BK)	6–10
111-15206	**T150R(U)**	390	8.9	105	780	PA66W	Black (BK)	6–10
111-15660	**T150M**	530	8.9	150	780	PA66W	Black (BK)	6–9
111-15460	**T150L**	820	8.8	245	780	PA66W	Black (BK)	6–9
111-15704	**T150LL**	925	8.9	275	780	PA66W	Black (BK)	6–9
111-15502	**T150XL**	1095	8.9	330	780	PA66W	Black (BK)	6–9
111-15305	**T150XLL**	1325	8.9	405	780	PA66W	Black (BK)	6–9
111-25100	**T250X**	370	12.5	100	1115	PA66W	Black (BK)	7-9
111-24805	**T250R**	520	12.5	145	1115	PA66W	Black (BK)	7-9

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 – Heat Stabilised



T18S – T255M

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

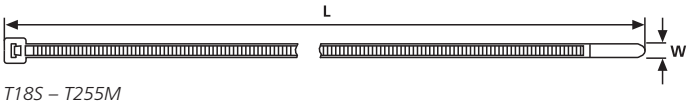
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 Heat Stabilised								
111-02815	**T18S**	83	2.3	16.0	80	PA66HS	Black (BK)	1–3, 5
111-01803	**T18R**	100	2.5	22.0	80	PA66HS	Black (BK)	1–3, 5
111-01959	**T18R**	100	2.5	22.0	80	PA66HS	Natural (NA)	1–3, 5
111-02306	**T18I**	140	2.5	35.0	80	PA66HS	Natural (NA)	1–3, 5
111-02358	**T18I**	140	2.5	35.0	80	PA66HS	Black (BK)	1–3, 5
111-02059	**T18L**	205	2.5	55.0	80	PA66HS	Natural (NA)	1–3, 5
111-02005	**T18L**	205	2.5	55.0	80	PA66HS	Black (BK)	1–3, 5
111-02501	**T25L**	240	2.8	65.0	110	PA66HS	Natural (NA)	1–3, 5
111-02602	**T25LL**	330	2.8	95.0	110	PA66HS	Natural (NA)	1–3, 5
111-03049	**T30R**	150	3.5	35.0	135	PA66HS	Natural (NA)	1–3, 5
111-03050	**T30R**	150	3.5	35.0	135	PA66HS	Black (BK)	1–3, 5
111-03459	**T30L**	190	3.5	50.0	135	PA66HS	Natural (NA)	1–3, 5
111-03450	**T30L**	190	3.5	50.0	135	PA66HS	Black (BK)	1–3, 5
111-04401	**T30LR**	260	3.3	65.0	135	PA66HS	Natural (NA)	1–5
111-04404	**T30LR**	260	3.3	65.0	135	PA66HS	Black (BK)	1–5
111-03569	**T30LL**	290	3.5	80.0	135	PA66HS	Natural (NA)	1–3, 5
111-00278	**T30LL**	290	3.5	80.0	135	PA66HS	Black (BK)	1–3, 5
111-03859	**T40R**	175	4.0	40.0	180	PA66HS	Natural (NA)	1–5
111-03970	**T40R**	175	4.0	40.0	180	PA66HS	Black (BK)	1–5
111-04614	**T40I**	290	4.0	80.0	180	PA66HS	Black (BK)	1–5
111-04314	**T40L**	365	4.0	105	180	PA66HS	Black (BK)	1–5
111-05850	**T50S**	150	4.6	35.0	225	PA66HS	Black (BK)	1–10
111-05859	**T50S**	150	4.6	35.0	225	PA66HS	Natural (NA)	1–10
111-04950	**T50R**	200	4.6	50.0	225	PA66HS	Black (BK)	1–10
111-04882	**T50R**	200	4.6	50.0	225	PA66HS	Natural (NA)	1–10
111-06205	**T50M**	245	4.6	65.0	225	PA66HS	Natural (NA)	1–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series, Polyamide 6.6 – Heat Stabilised



T18S – T255M

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

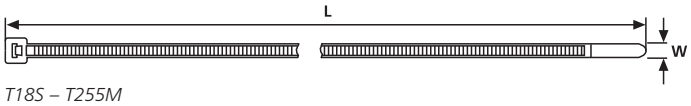
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 Heat Stabilised								
111-05259	**T50I**	300	4.6	85.0	225	PA66HS	Natural (NA)	1–10
117-05250	**T50I**	300	4.6	85.0	225	PA66HS	Black (BK)	1–10
111-05435	**T50L**	390	4.6	110	225	PA66HS	Black (BK)	1–10
111-05436	**T50L**	390	4.6	110	225	PA66HS	Natural (NA)	1–10
111-05059	**T80R**	210	4.7	55.0	355	PA66HS	Natural (NA)	1–10
117-08070	**T80R**	210	4.7	55.0	355	PA66HS	Black (BK)	1–10
111-08259	**T80I**	300	4.7	85.0	355	PA66HS	Natural (NA)	1–10
111-08250	**T80I**	300	4.7	85.0	355	PA66HS	Black (BK)	1–10
111-05459	**T80L**	390	4.7	110	355	PA66HS	Natural (NA)	1–10
111-00388	**T80L**	390	4.7	110	355	PA66HS	Black (BK)	1–10
111-12850	**T120S**	225	7.6	55.0	535	PA66HS	Black (BK)	6–10
111-12824	**T120S**	225	7.6	55.0	535	PA66HS	Natural (NA)	6–10
111-12240	**T120I**	300	7.6	80.0	535	PA66HS	Black (BK)	6–10
111-12249	**T120I**	300	7.6	80.0	535	PA66HS	Natural (NA)	6–10
111-12050	**T120R(E)**	380	7.6	100	535	PA66HS	Black (BK)	6–10
111-12059	**T120R(E)**	380	7.6	100	535	PA66HS	Natural (NA)	6–10
111-00153	**T120M**	460	7.6	130	535	PA66HS	Black (BK)	6–10
111-12719	**T120XM**	600	7.6	175	535	PA66HS	Natural (NA)	6–10
111-12700	**T120XM**	600	7.6	175	535	PA66HS	Black (BK)	6–10
111-12440	**T120L**	760	7.6	225	535	PA66HS	Black (BK)	6–10
111-12449	**T120L**	760	7.6	225	535	PA66HS	Natural (NA)	6–10
111-15050	**T150R(H)**	365	7.6	100	670	PA66HS	Black (BK)	6–10
111-15069	**T150R(H)**	365	7.6	100	670	PA66HS	Natural (NA)	6–10
111-15609	**T150M**	530	8.9	150	780	PA66HS	Black (BK)	6–9
111-15410	**T150L**	820	8.8	245	780	PA66HS	Black (BK)	6–9
111-15510	**T150XL**	1095	8.9	330	780	PA66HS	Black (BK)	6–9

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series



T18S – T255M

Material Data

Material	**Polyamide 6.6 Heat and UV Stabilised (PA66HSW)**
Operating Temperature	**-40 °C to +105 °C continuous**
Flammability	**UL94 V2**

RoHS

Material Data

Material	**Polyamide 6.6 High Impact Modified (PA66HIR)**
Operating Temperature	**-40 °C to +80 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**

RoHS

Material Data

Material	**Polyamide 6.6 High Impact Modified, Heat Stabilised (PA66HIRHS)**
Operating Temperature	**-40 °C to +110 °C continuous**
Flammability	**UL94 HB**

RoHS

Material Data

Material	**Polyamide 6.6 V0 (PA66V0)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V0**

LFH Limited Fire Hazard

RoHS

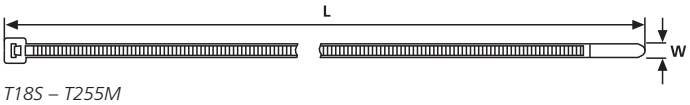
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6. Heat Stabilised, UV Stabilised								
111-01916	**T18R**	100	2.5	22.0	80	PA66HSW	Black (BK)	1–3, 5
111-03071	**T30R**	150	3.5	35.0	135	PA66HSW	Black (BK)	1–3, 5
111-04907	**T50R**	200	4.6	50.0	225	PA66HSW	Black (BK)	1–10
111-05253	**T50I**	300	4.6	85.0	225	PA66HSW	Black (BK)	1–10
111-05472	**T50L**	390	4.6	110	225	PA66HSW	Black (BK)	1–10
111-12822	**T120S**	225	7.6	55.0	535	PA66HSW	Black (BK)	6–10
Polyamide 6.6 High Impact Modified								
111-25500	**T255S**	225	12.5	55.0	1115	PA66HIRHS	Black (BK)	7-9
111-25400	**T255R**	515	12.5	145	1115	PA66HIR	Black (BK)	7-9
111-25300	**T255M**	560	12.5	160	1115	PA66HIR	Black (BK)	7-9
Polyamide 6.6 V0 rated								
111-91819	**T18R**	100	2.5	22.0	80	PA66V0	White (WH)	1–3, 5
111-02043	**T18L**	205	2.5	55.0	80	PA66V0	White (WH)	1–3, 5
111-93019	**T30R**	150	3.5	35.0	135	PA66V0	White (WH)	1–3, 5
111-95019	**T50R**	200	4.6	50.0	225	PA66V0	White (WH)	1–10
111-00317	**T50I**	300	4.6	85.0	225	PA66V0	White (WH)	1–10
111-91210	**T120R(E)**	380	7.6	100	535	PA66V0	White (WH)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series



T18S – T255M

Material Data

Material	**Ethylenterafluorineethylene - Tefzel (E/TFE)**
Operating Temperature	**-80 °C to +150 °C continuous**
Flammability	**UL94 V0**

Tefzel® is a registered trademark of DuPont.

Material Data

Material	**Polyamide 4.6 (PA46)**
Operating Temperature	**-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)**
Flammability	**UL94 V2**

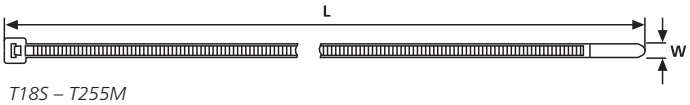
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
TEFZEL/ETFE								
111-01923	**T18R(U)**	100	2.5	22.0	40	E / TFE	Blue (BU)	1–3, 5
111-03343	**T30L**	198	3.6	50.0	66	E / TFE	Blue (BU)	1–3, 5
111-05026	**T50R(U)**	200	4.6	50.0	158	E / TFE	Blue (BU)	1–10
111-12826	**T120S**	225	7.6	55.0	311	E / TFE	Blue (BU)	6–10
111-12026	**T120R**	380	7.6	100	311	E / TFE	Blue (BU)	6–10
Polyamide 4.6 High Temp.								
111-01831	**T18R**	100	2.5	22.0	80	PA46	Natural (NA)	1–3, 5
114-03379	**T30R**	150	3.5	35.0	135	PA46	Natural (NA)	1–3, 5
111-00264	**T30R**	150	3.5	35.0	135	PA46	Grey (GY)	1–3, 5
114-04979	**T50R**	200	4.6	50.0	225	PA46	Natural (NA)	1–10
111-05220	**T50I**	300	4.6	85.0	225	PA46	Natural (NA)	1–10
114-05779	**T50L**	390	4.6	110	225	PA46	Natural (NA)	1–10
114-12179	**T120R(E)**	380	7.6	100	535	PA46	Natural (NA)	6–10
111-12401	**T120L**	760	7.6	225	535	PA46	Black (BK)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series



T18S – T255M

Material Data

Material	**Polyamide 6.6 High Impact Modified scan black (PA66HIR(S))**
Operating Temperature	**-40 °C to +80 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**

Material Data

Material	**Polypropylene (PP)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**

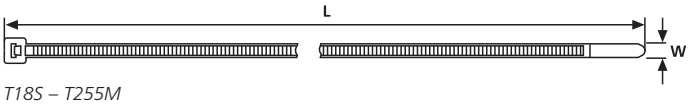
Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 High Impact Modified scan black (PA66HIR(S))								
111-04890	**T50R**	200	4.6	50.0	225	PA66HIR(S)	Black (BK)	1–10
111-00222	**T50I**	300	4.6	85.0	225	PA66HIR(S)	Black (BK)	1–10
111-05441	**T50L**	390	4.6	110	225	PA66HIR(S)	Black (BK)	1–10
111-12203	**T120I**	300	7.6	80.0	535	PA66HIR(S)	Black (BK)	6–10
111-12032	**T120R(E)**	380	7.6	100	535	PA66HIR(S)	Black (BK)	6–10
111-12402	**T120L**	760	7.6	225	535	PA66HIR(S)	Black (BK)	6–10
Polypropylene (PP)								
111-01918	**T18R**	100	2.5	19.0	49	PP	Black (BK)	1–3, 5
111-01922	**T18R**	100	2.5	19.0	49	PP	Natural (NA)	1–3, 5
111-00471	**T30R**	150	3.5	35.0	89	PP	Natural (NA)	1–3, 5
111-00472	**T30R**	150	3.5	35.0	89	PP	Black (BK)	1–3, 5
111-04928	**T50R**	200	4.6	50.0	133	PP	Black (BK)	1–10
111-04931	**T50R**	200	4.6	50.0	133	PP	Natural (NA)	1–10
111-12827	**T120S**	225	7.6	55.0	267	PP	Black (BK)	6–10
111-00475	**T120R**	380	7.6	100	267	PP	Natural (NA)	6–10
111-12066	**T120R**	380	7.6	100	267	PP	Black (BK)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

T Series



T18S – T255M

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 Colours								
116-01816	**T18R**	100	2.5	22.0	80	PA66	Blue (BU)	1–3, 5
111-01815	**T18R**	100	2.5	22.0	80	PA66	Green (GN)	1–3, 5
111-01812	**T18R**	100	2.5	22.0	80	PA66	Red (RD)	1–3, 5
111-01810	**T18R**	100	2.5	22.0	80	PA66	Yellow (YE)	1–3, 5
111-03008	**T30R**	150	3.5	35.0	135	PA66	Blue (BU)	1–3, 5
111-03014	**T30R**	150	3.5	35.0	135	PA66	Green (GN)	1–3, 5
111-03004	**T30R**	150	3.5	35.0	135	PA66	Red (RD)	1–3, 5
111-03006	**T30R**	150	3.5	35.0	135	PA66	Yellow (YE)	1–3, 5
111-03312	**T30L**	190	3.5	50.0	135	PA66	Blue (BU)	1–3, 5
111-00193	**T30L**	190	3.5	50.0	135	PA66	Green (GN)	1–3, 5
111-00196	**T30L**	190	3.5	50.0	135	PA66	Red (RD)	1–3, 5
111-03309	**T30L**	190	3.5	50.0	135	PA66	Yellow (YE)	1–3, 5
111-04800	**T50R**	200	4.6	50.0	225	PA66	Blue (BU)	1–10
111-04801	**T50R**	200	4.6	50.0	225	PA66	Green (GN)	1–10
111-04804	**T50R**	200	4.6	50.0	225	PA66	Red (RD)	1–10
111-04805	**T50R**	200	4.6	50.0	225	PA66	Yellow (YE)	1–10
111-05202	**T50I**	300	4.6	85.0	225	PA66	Blue (BU)	1–10
111-00284	**T50I**	300	4.6	85.0	225	PA66	Green (GN)	1–10
111-05203	**T50I**	300	4.6	85.0	225	PA66	Red (RD)	1–10
111-05208	**T50I**	300	4.6	85.0	225	PA66	Yellow (YE)	1–10
111-05404	**T50L**	390	4.6	110	225	PA66	Blue (BU)	1–10
111-05402	**T50L**	390	4.6	110	225	PA66	Green (GN)	1–10
111-05406	**T50L**	390	4.6	110	225	PA66	Red (RD)	1–10
111-05428	**T50L**	390	4.6	110	225	PA66	Yellow (YE)	1–10
116-08016	**T80R**	210	4.7	55.0	355	PA66	Blue (BU)	1–10
116-08015	**T80R**	210	4.7	55.0	355	PA66	Green (GN)	1–10
116-08012	**T80R**	210	4.7	55.0	355	PA66	Red (RD)	1–10
116-08014	**T80R**	210	4.7	55.0	355	PA66	Yellow (YE)	1–10
116-05416	**T80L**	390	4.7	110	355	PA66	Blue (BU)	1–10
116-05415	**T80L**	390	4.7	110	355	PA66	Green (GN)	1–10
116-05412	**T80L**	390	4.7	110	355	PA66	Red (RD)	1–10
116-05414	**T80L**	390	4.7	110	355	PA66	Yellow (YE)	1–10
111-12004	**T120R(E)**	380	7.6	100	535	PA66	Blue (BU)	6–10
111-12001	**T120R(E)**	380	7.6	100	535	PA66	Green (GN)	6–10
111-12002	**T120R(E)**	380	7.6	100	535	PA66	Red (RD)	6–10
111-12003	**T120R(E)**	380	7.6	100	535	PA66	Yellow (YE)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

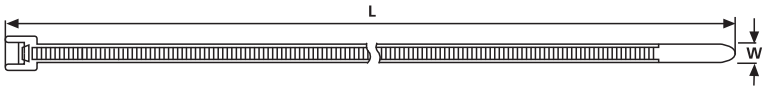
LK Series Industrial Ties

Features and Benefits

Available in a wide range of materials, these cable ties all feature internal serrations allowing for a positive hold onto cable, hose and pipe bundles. The design of the head guarantees a high tensile strength whilst allowing a very low insertion force, this, combined with the bent tail design of many of the ties ensures a simple and quick installation. Whilst easily installed by hand manual, and pneumatic (for high volume applications) tensioning tools are available to ensure a consistent and safe installation.

Application

For routing, bundling and securing of cables, pipes and hoses.



LK Series Industrial Ties

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 High Impact Modified scan black (PA66HIR(S))**
Operating Temperature	**-40 °C to +80 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**

Material specification please see page 40.

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
LK2								
111-60219	**LK2**	120	4.8	28.0	135	PA66	Natural (NA)	1–10
111-60210	**LK2**	120	4.8	28.0	135	PA66	Black (BK)	1–10
111-60205	**LK2**	120	4.8	28.0	135	PA66W	Black (BK)	1–10
LK2A								
111-60119	**LK2A**	270	4.6	73.0	225	PA66	Natural (NA)	1–10
111-60110	**LK2A**	270	4.6	73.0	225	PA66	Black (BK)	1–10
111-60160	**LK2A**	270	4.6	73.0	225	PA66W	Black (BK)	1–10
111-60159	**LK2A**	270	4.6	73.0	225	PA66HS	Natural (NA)	1–10
111-60150	**LK2A**	270	4.6	73.0	225	PA66HS	Black (BK)	1–10
111-00127	**LK2A**	270	4.6	73.0	225	PA66HIR(S)	Black (BK)	1–10
LK2L								
111-60001	**LK2L**	350	4.8	95.0	225	PA66	Natural (NA)	1–10
111-60000	**LK2L**	350	4.8	95.0	225	PA66	Black (BK)	1–10
LK5								
111-60519	**LK5**	535	13.2	150	1115	PA66	Natural (NA)	8, 9
111-60510	**LK5**	535	13.2	150	1115	PA66	Black (BK)	8, 9
111-60560	**LK5**	535	13.2	150	1115	PA66W	Black (BK)	8, 9
111-60559	**LK5**	535	13.2	150	1115	PA66HS	Natural (NA)	8, 9
111-60501	**LK5**	535	13.2	150	1115	PA66HIR(S)	Black (BK)	8, 9

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

Wide Strap Heavy Duty Cable Ties

Features and Benefits

The wide strap cable tie minimizes pinching on soft bundles and features a low profile head to provide compact bundling.
A thinner strap provides increased flexibility for improved ergonomics.

- Wide strap is designed to minimize pinching of soft hoses and convoluted tubing.
- Low profile head.
- Clamping rails on the bottom of head to increase grip on round bundles.
- Accommodates a large range of bundle diameters: 9.5 mm – 104 mm.
- Flexible strap.

Application

The very flexible wide strap is used in heavy-duty application where limited room is offered for the application. It is therefore a valued product in all areas of the mass transit and construction industry.

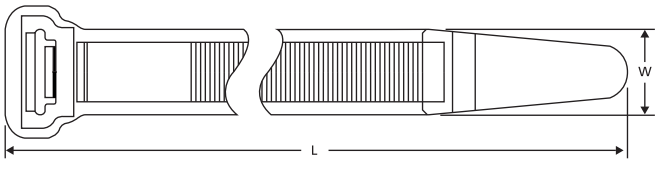
The wide strap cable tie accommodates a large range of bundle diameters: 9.5 mm - 104 mm.

These cable ties can also be used with the new heavy duty mounts (up from page 136).

Material Data

Material	**Polyamide 6.6 High Impact Modified, Heat Stabilised (PA66HIRHS)**
Operating Temperature	**-40 °C to +110 °C continuous**
Flammability	**UL94 HB**

RoHS



Wide Strap Heavy Duty Cable Ties

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
111-12300	**WSS**	230	12.7	55.0	534	PA66HIRHS	Black (BK)
111-12301	**WSI**	305	12.7	80.0	534	PA66HIRHS	Black (BK)
111-12302	**WSR**	380	12.7	100	534	PA66HIRHS	Black (BK)

All dimensions in mm. Subject to technical changes.

CTT, HT Hose Ties

Features and Benefits

The curved design of the head ensures a seal around the full circumference of the hose/ gaiter giving excellent protection against the ingress of water or dirt. For optimum sealing performance it is recommended that the correct HellermannTyton application tool is used. Both hand operated and pneumatic tools are available.

Application

Designed to secure pipes, hoses and gaiters, where low pressures are being secured. These ties can be used in many industries, including: automotive, white goods manufacturers and construction.

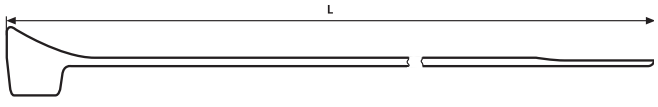
CTT ties installed on flexible gaiters.

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



CTT Hose Ties

Material Data

Material	**Polyamide 6.6 Heat and UV Stabilised (PA66HSW)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
CTT20R								
112-51919	**CTT20R**	100	2.5	13.0	90	PA66	Natural (NA)	1–3, 5
112-51900	**CTT20R**	100	2.0	13.0	90	PA66	Black (BK)	1–3, 5
112-51960	**CTT20R**	100	2.5	13.0	90	PA66HS	Black (BK)	1–3, 5
CTT60R								
112-52104	**CTT60R**	205	4.7	45.0	265	PA66	Natural (NA)	1–10
112-56019	**CTT60R**	205	4.7	45.0	265	PA66	Natural (NA)	1–10
112-52112	**CTT60R**	205	4.7	45.0	265	PA66HS	Black (BK)	1–10
112-56060	**CTT60R**	205	4.7	45.0	265	PA66HSW	Black (BK)	1–10
HRT50R								
112-00001	**HRT50R**	275	4.7	70.0	225	PA66	Natural (NA)	1–10
HT120R								
112-00100	**HT120R**	340	7.6	90.0	535	PA66HS	Black (BK)	6–10

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

DH Series Double Headed Ties

Features and Benefits

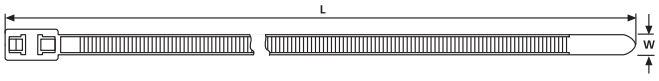
Designed with two heads, these ties can be assembled into a 'figure 8' for securing two cables. Its flexible adjustment means that the bundles can be of different sizes.

Application

Ideal for running two cables in parallel, that need to be separated. These ties allow for installation of a second cable run without the need for additional cable ties.

The DH ties are also widely used within the packaging industry – the first loop closes and secures the bag, whilst the second loop can be made into a carrying handle (subject to weight).

Bundling two cable runs using the DH ties.



DH Series

Material Data	
Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data	
Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

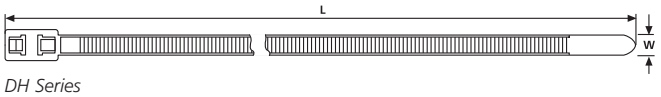
Material Data	
Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Material Data	
Material	**Polyamide 4.6 (PA46)**
Operating Temperature	**-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)**
Flammability	**UL94 V2**

DH Series Double Headed Ties

Application Tool	Registration Numbers
MK3SP	1
MK3PNSP2, MK7P	2
MK7	3
MK7HT	4
MK20	5
MK6	6
MK9P, MK6PN	7
MK9	8
MK9HT	9
MK21	10

For more information please turn to page 410.



DH Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Ø per loop max.	Min. Tensile Strength (N)	Min. Tensile Strength (N) 2nd loop	Material	Colour	Application Tool
117-05002	**T50RDH**	210	4.7	19.0	225	180	PA66	Natural (NA)	1–10
117-05000	**T50RDH**	210	4.7	19.0	225	180	PA66	Black (BK)	1–10
117-05060	**T50RDH**	210	4.7	19.0	225	180	PA66W	Black (BK)	1–10
117-05050	**T50RDH**	210	4.7	19.0	225	180	PA66HS	Black (BK)	1–10
117-00004	**T50RDH**	210	4.7	19.0	225	180	PA46	Grey (GY)	1–10
117-05302	**T50IDH**	305	4.7	38.0	225	180	PA66	Natural (NA)	1–10
117-05362	**T50IDH**	305	4.7	38.0	225	180	PA66	Black (BK)	1–10
117-05360	**T50IDH**	305	4.7	38.0	225	180	PA66W	Black (BK)	1–10
117-05402	**T50LDH**	395	4.7	50.0	225	180	PA66	Natural (NA)	1–10
117-05400	**T50LDH**	395	4.7	50.0	225	180	PA66	Black (BK)	1–10
117-05460	**T50LDH**	395	4.7	50.0	225	180	PA66W	Black (BK)	1–10
117-00008	**T50LDH**	395	4.7	50.0	225	180	PA66HS	Black (BK)	1–10

All dimensions in mm. Subject to technical changes.

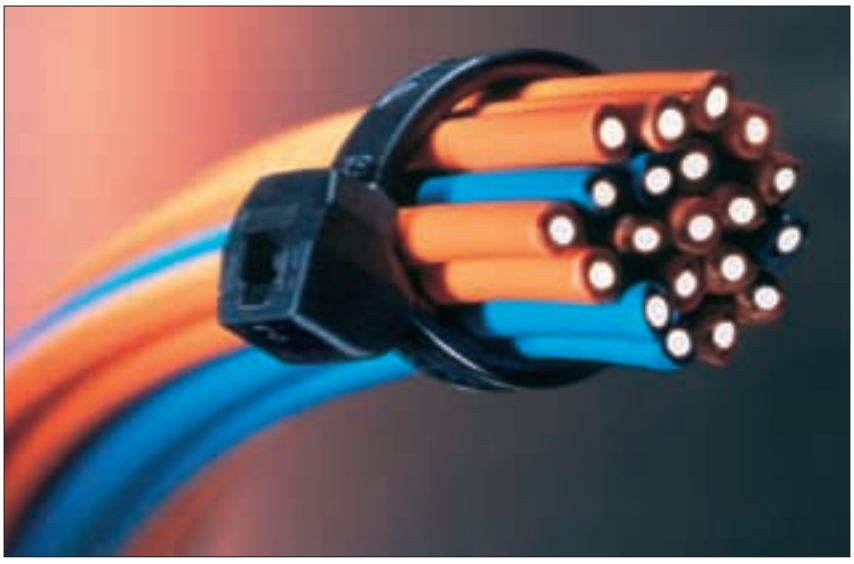
Please Note for Product Specific Approvals please refer to the Appendix

OS Series Outside Serrated Ties

Features and Benefits

The ever increasing demands within the mass transit, automotive and data cable installation industries for tighter bundles has led to problems with the conventional inside serrated cable tie design causing damage to cable insulations, especially in vibration environments.

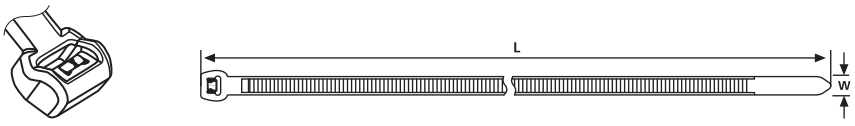
The OS range of outside serrated cable ties have overcome these problems. The design offers high tensile strengths, low insertion forces and a smooth surface to the cable insulation – minimising any indentation or damage. The curved shape of the head allows the tie to follow the contours of the cable and takes up less space than other designs of cable ties.



The contoured head needs less installation space, provides low insertion force and offers high strength.

Application

Designed originally for the automotive market these ties are now being used in many areas where thin-walled or soft insulation wires and cable are being installed, e.g. railways, aircraft, data cable installations, electronics.



The new head design of the OS Series

Material Data	
Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

HF halogenfree RoHS

Material Data	
Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

HF halogenfree RoHS

Material Data	
Material	**Polyamide 4.6 (PA46)**
Operating Temperature	**-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)**
Flammability	**UL94 V2, Limited Fire Hazard, Low generation of toxic gases and corrosive acid, Low smoke generation**

LFH Limited Fire Hazard RoHS

Material Data	
Material	**Polyamide 6.6 V0 (PA66V0)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V0, Low generation of toxic gases and corrosive acid, Low smoke generation**

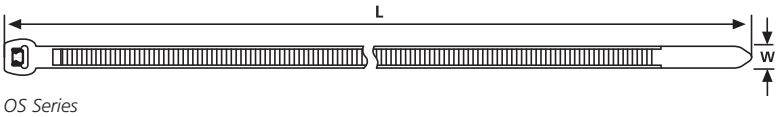
LFH Limited Fire Hazard RoHS

OS Series Outside Serrated Ties

Application Tool	Registration Numbers
MK3SP	1
MK3PNSP2, MK7P	2
MK7	3
MK7HT	4
MK20	5
MK6	6
MK9P, MK6PN	7
MK9	8
MK9HT	9
MK21	10

For more information please turn to page 410.

Smooth surface prevents insulation damage by chafe and indentation.



OS Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø min.	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 UV Stabilised									
118-00039	**T18ROS**	100	2.5	1.6	20.0	80	PA66W	Black (BK)	1–3, 5
118-05860	**T50SOS**	150	4.6	1.6	35.0	225	PA66W	Black (BK)	1–5
118-05060	**T50ROS**	200	4.6	1.6	50.0	225	PA66W	Black (BK)	1–5
Polyamide 6.6 Heat Stabilised									
118-00035	**T18ROS**	100	2.5	1.6	20.0	80	PA66HS	Natural (NA)	1–3, 5
118-04702	**T18ROS**	100	2.5	1.6	20.0	80	PA66HS	Black (BK)	1–3, 5
118-00064	**T30ROS**	148	3.4	1.6	35.0	135	PA66HS	Natural (NA)	1–3, 5
118-04800	**T30ROS**	145	3.4	1.6	35.0	135	PA66HS	Black (BK)	1–3, 5
118-00044	**T30LOS**	200	3.4	1.6	50.0	135	PA66HS	Natural (NA)	1–3, 5
118-04900	**T30LOS**	200	3.4	1.6	50.0	135	PA66HS	Black (BK)	1–3, 5
118-05859	**T50SOS**	150	4.6	1.6	35.0	225	PA66HS	Natural (NA)	1–5
118-05850	**T50SOS**	150	4.6	1.6	35.0	225	PA66HS	Black (BK)	1–5
118-05059	**T50ROS**	200	4.6	1.6	50.0	225	PA66HS	Natural (NA)	1–5
118-05050	**T50ROS**	200	4.6	1.6	50.0	225	PA66HS	Black (BK)	1–5
118-00055	**T50MOS**	245	4.6	1.6	66.0	225	PA66HS	Natural (NA)	1–5
118-00018	**T50MOS**	245	4.6	1.6	66.0	225	PA66HS	Black (BK)	1–5
118-05900	**T50LOS**	384	4.6	1.6	110	225	PA66HS	Black (BK)	1–5
118-00067	**T120ROS**	385	7.6	5.0	105	535	PA66HS	Natural (NA)	6–10
118-00066	**T120ROS**	385	7.6	5.0	105	535	PA66HS	Black (BK)	6–10
Polyamide 6.6 V0 rated									
118-00014	**T30ROS**	148	3.4	1.6	35.0	135	PA66V0	White (WH)	1–3, 5
118-00021	**T50MOS**	245	4.6	1.6	66.0	225	PA66V0	White (WH)	1–5
Polyamide 4.6 High Temp.									
118-05878	**T50SOS**	150	4.6	1.6	35.0	225	PA46	Grey (GY)	1–5
118-00040	**T50ROS**	200	4.6	1.6	50.0	225	PA46	Natural (NA)	1–5
118-05078	**T50ROS**	200	4.6	1.6	50.0	225	PA46	Grey (GY)	1–5
118-00022	**T50MOS**	245	4.6	1.6	66.0	225	PA46	Natural (NA)	1–5

All dimensions in mm. Subject to technical changes.

Other materials available on request.

Please Note for Product Specific Approvals please refer to the Appendix

RPE Series and PE Series Low Profile Ties

Features and Benefits

These cable ties are "outside serrated", presenting a smooth surface to the cable bundle. This, combined with the width of the ties, gives a broad contact area with the cable, avoiding any problems with damage to the insulation. The PE/RPE ranges have the benefit of EDF (French Electricity Board) approval. The "Low Profile" design of the head allows for use in applications with restricted space.

The RPE ties are releasable, reusable allowing for the addition or removal of cables after installation.

Application

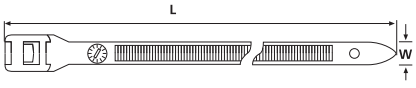
Designed primarily for use within the electrical supply industry these ties are particularly useful in areas with limited space, due to their low profile "parallel entry" closure. Particularly suitable for outdoor use as they are manufactured from "UV" resistant polyamides.

Coloured versions of PE400 are ideal for securing foam padding to playground equipment, by effectively applying the tie 'inside out'. This ensures there are no sharp edges and ultimate safety. PE400 can also be colour matched for any application.

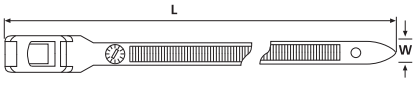
RPE, PE Series.

Material Data

Material	**Polyamide 6.6 Heat and UV Stabilised (PA66HSW)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



PE Series



RPE Series

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
112-18060	**PE180**	180	9.0	42.0	330	PA66HSW	Black (BK)	6–10, MK10-SB
112-53060	**PE530**	535	9.0	146	445	PA66HSW	Black (BK)	6–10, MK10-SB
112-18100	**PE400**	400	9.0	116	445	PA66	Green (GN)	6–10, MK10-SB
112-18101	**PE400**	400	9.0	116	445	PA66	Blue (BU)	6–10, MK10-SB
112-18102	**PE400**	400	9.0	116	445	PA66	Red (RD)	6–10, MK10-SB
112-18103	**PE400**	400	9.0	116	445	PA66	Yellow (YE)	6–10, MK10-SB
112-27560	**RPE275**	275	9.0	69.0	445	PA66HSW	Black (BK)	6–10, MK10-SB
112-35060	**RPE350**	350	9.0	92.0	445	PA66HSW	Black (BK)	6–10, MK10-SB

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

LPH Series Low Profile Ties

Features and Benefits

These cable ties are "outside serrated", presenting a smooth surface to the cable bundle and avoiding any problems with damage to the insulation, the width of the ties gives a broad contact area with the cable, again minimising the risk of damage. The PE/RPE ranges have the benefit of EDF (French Electrivcity Board) approval. The "Low Profile" design of the head allows for use in applications with restricted space. The RP ties are releasable and reusable allowing for the addition or removal of cables after installation.

Application

Designed primarily for use within the electrical supply industry these ties are particularly useful in areas with limited space, e.g. cable bundling in shafts and are particularly suitable for outdoor use.

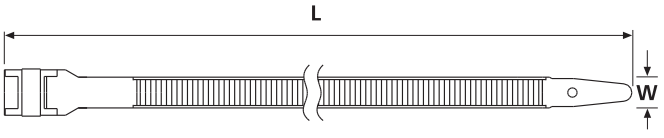
LPH Series.

Material Data

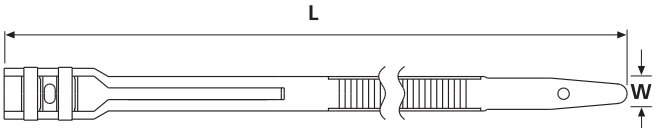
Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



LPH175 Series



LPH275 Series, LPH350 Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
112-00201	**LPH175**	175	9	40.0	310	PA66	Black (BK)	6–10, MK10-SB
112-00204	**LPH175**	175	9	40.0	310	PA66W	Black (BK)	6–10, MK10-SB
112-00301	**LPH275**	265	9	62.0	480	PA66	Black (BK)	6–10, MK10-SB
112-00306	**LPH275**	265	9	62.0	480	PA66W	Black (BK)	6–10, MK10-SB
112-00401	**LPH350**	355	9	92.0	480	PA66	Black (BK)	6–10, MK10-SB
112-00404	**LPH350**	355	9	92.0	480	PA66W	Black (BK)	6–10, MK10-SB

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

RT 100, 140, 250 Series Releasable Ties

Features and Benefits

These easily released cable ties are manufactured in PA12 giving them excellent weather resistance, making them ideal for outdoor applications. The outside serrated design ensures that whilst gripping the bundle surface tightly they do not cause indentation or damage to the insulation or hose, especially in vibration environments.

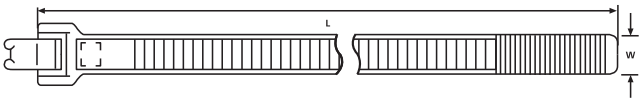
Application

These releasable and reusable cable ties are ideal for temporary or permanent installation in a wide variety of applications in industries as diverse as: automotive, construction and panel building.

RT250 tie used as a hose fixing in a car engine compartment.

Material Data

Material	**Polyamide 12 (PA12)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**



RT Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
131-11120	**RT100**	100	7.0	23.0	170	PA12	Black (BK)
131-11420	**RT140**	140	9.0	36.0	190	PA12	Black (BK)
131-12520	**RT250**	250	9.0	71.0	190	PA12	Black (BK)

All dimensions in mm. Subject to technical changes.

RT, RELK, RLT Series Releasable Cable Ties

Features and Benefits

The extended pawl allows for the quick and simple release of the ties. Manufactured in various grades of PA66 these products are suitable for indoor, outdoor and high temperature applications.

Application

Used in a wide range of industries these releasable and reusable ties are ideal where temporary installation or the addition or removal of cables is required, for example: theatres, outdoor events and harness work.

The RT, RELK and RLT cable ties can be re-opened and re-used.

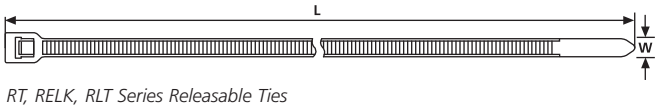
Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Material specification please see page 40.



RT, RELK, RLT Series Releasable Ties

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
115-06219	**RT40R**	215	4.0	51.0	180	PA66	Natural (NA)
115-06200	**RT40R**	215	4.0	51.0	180	PA66	Black (BK)
115-06319	**RT50S**	165	4.6	35.0	225	PA66	Natural (NA)
115-06300	**RT50S**	165	4.6	35.0	225	PA66	Black (BK)
115-02202	**RELK2R**	200	4.6	50.0	200	PA66	Natural (NA)
115-02200	**RELK2R**	200	4.6	50.0	200	PA66	Black (BK)
115-06729	**RELK2M**	250	4.6	65.0	200	PA66	Natural (NA)
115-02000	**RELK2M**	250	4.6	65.0	200	PA66	Black (BK)
115-02101	**RELK2I**	300	4.6	81.0	200	PA66	Natural (NA)
115-06760	**RELK2I**	300	4.6	81.0	200	PA66	Black (BK)
115-06919	**RELK2L**	350	4.6	95.0	200	PA66	Natural (NA)
115-02300	**RELK2L**	350	4.6	95.0	200	PA66	Black (BK)
111-70319	**RLT120**	340	7.6	90.0	535	PA66	Natural (NA)
111-70361	**RLT120**	340	7.6	90.0	535	PA66	Black (BK)
111-70119	**RLT150**	770	8.9	225	670	PA66	Natural (NA)
111-70110	**RLT150**	770	8.9	225	670	PA66	Black (BK)
111-70160	**RLT150**	770	8.9	225	670	PA66W	Black (BK)
111-70159	**RLT150**	770	8.9	225	670	PA66HS	Natural (NA)

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

LRT, RT250 Series Releasable Ties

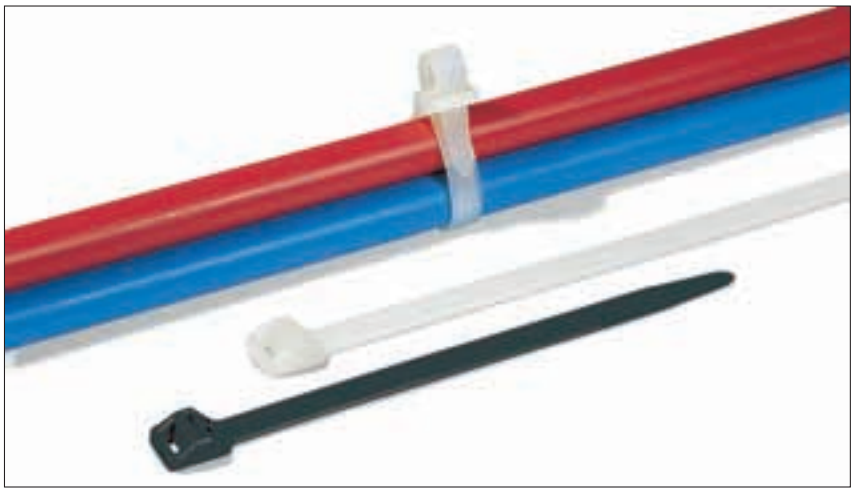
Features and Benefits

The extended pawl allows for quick and simple release of the ties. An eyelet on the head of the ties allows any excess tail to be tucked neatly away - this also helps to prevent the trigger from accidental release

Application

Used in a wide range of industries these releasable and reusable ties are ideal where temporary installation or the addition or removal of cables is required, for example: theatres, outdoor events or harness work.

These ties are ideal for larger or heavier applications.

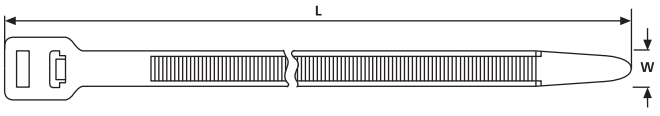


Ideal for larger or heavier bundles these ties can be opened and reused.

Material specification please see page 40.

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



LRT, RT250 Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
111-70400	**LRT230**	230	7.6	52.0	535	PA66	Black (BK)	6–9
131-75819	**RT250S**	230	12.5	50.0	1115	PA66	Natural (NA)	9
115-41800	**RT250S**	230	12.5	50.0	1115	PA66	Black (BK)	9
115-41803	**RT250S**	230	12.5	50.0	1115	PA66W	Black (BK)	9
131-75019	**RT250R**	515	12.5	127	1115	PA66	Natural (NA)	9
115-41300	**RT250R**	515	12.5	127	1115	PA66	Black (BK)	9
115-41303	**RT250R**	515	12.5	127	1115	PA66W	Black (BK)	9
131-75619	**RT250M**	565	12.5	150	1115	PA66	Natural (NA)	9
131-75610	**RT250M**	565	12.5	150	1115	PA66	Black (BK)	9
131-75620	**RT250M**	565	12.5	150	1115	PA66W	Black (BK)	9
131-75219	**RT250I**	735	12.5	203	1115	PA66	Natural (NA)	9
115-41401	**RT250I**	735	12.5	203	1115	PA66	Black (BK)	9
115-41403	**RT250I**	735	12.5	203	1115	PA66W	Black (BK)	9
131-75419	**RT250L**	889	12.5	254	1115	PA66	Natural (NA)	9
131-75519	**RT250XL**	1030	12.5	305	1115	PA66	Natural (NA)	9
131-75510	**RT250XL**	1030	12.5	305	1115	PA66	Black (BK)	9
131-75560	**RT250XL**	1030	12.5	305	1115	PA66W	Black (BK)	9

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

REL Series Releasable Ties

Features and Benefits

The specially designed unique release mechanism makes this releasable and reusable tie one of the easiest to operate, it can be quickly and simply opened with one hand.

Application

Ideal for use where there is the need to repeatedly open and close the tie – both industrial and commercial applications, for example: bundling garden hoses, extension cables, harness manufacture.

The REL series have a simple opening mechanism.

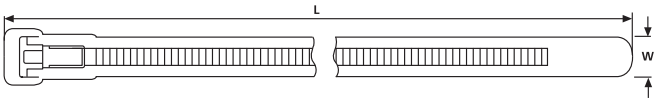
Material specification please see page 40.

Material Data

Material	**Polyamide 6.6 UV Resistant (PA66W)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 High Impact Modified scan black (PA66HIR(S))**
Operating Temperature	**-40 °C to +80 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 HB**



REL Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
131-21019	**REL100**	100	6.5	21.0	180	PA66	Natural (NA)
131-21010	**REL100**	100	6.7	21.0	180	PA66	Black (BK)
131-21419	**REL140**	150	7.6	35.0	200	PA66	Natural (NA)
131-21410	**REL140**	150	7.6	35.0	200	PA66	Black (BK)
131-21460	**REL140**	150	7.6	35.0	200	PA66W	Black (BK)
115-00027	**REL180**	180	6.5	46.0	150	PA66	Black (BK)
131-22519	**REL250**	250	7.6	68.0	200	PA66	Natural (NA)
131-22510	**REL250**	250	7.6	68.0	200	PA66	Black (BK)
131-22560	**REL250**	250	7.5	68.0	200	PA66W	Black (BK)
111-00074	**REL250S**	230	12.2	50.0	1115	PA66HIR(S)	Black (BK)
111-00075	**REL250X**	385	12.2	100	1115	PA66HIR(S)	Black (BK)

All dimensions in mm. Subject to technical changes.

Please Note for Product Specific Approvals please refer to the Appendix

LR55 Series Releasable Ties

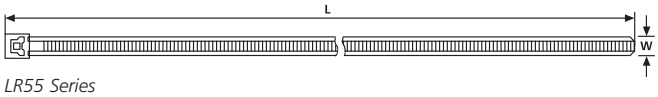
Features and Benefits

The extended pawl allows for quick and simple release of the ties. Manufactured in various colours these cable ties are ideal for applications where colour coding is required. Additionally, the LR55 Series are outside serrated, minimising the risk of damage to cable insulation.

Application

These releasable and reusable ties are ideal where temporary installation or the addition or removal of cables is required, for example: logistic identification (colour coding), packaging industries, cable harness manufacturing.

The LR55 cable ties are reuseable and ideal for colour coding.



LR55 Series

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**

Material Data

Material	**Polyamide 6.6 Heat Stabilised (PA66HS)**
Operating Temperature	**-40 °C to +105 °C Continuous, (+145 °C for 500 h)**
Flammability	**UL94 V2**

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
LR55S							
115-00010	**LR55S**	145	4.7	35.0	245	PA66	Red (RD)
115-00011	**LR55S**	145	4.7	35.0	245	PA66	Yellow (YE)
115-00012	**LR55S**	145	4.7	35.0	245	PA66	Green (GN)
115-00013	**LR55S**	145	4.7	35.0	245	PA66	Blue (BU)
115-00014	**LR55S**	145	4.7	35.0	245	PA66	Grey (GY)
115-00015	**LR55S**	145	4.7	35.0	245	PA66	Natural (NA)
115-00009	**LR55S**	145	4.7	35.0	245	PA66HS	Black (BK)
LR55R							
115-00003	**LR55R**	195	4.7	50.0	245	PA66	Red (RD)
115-00004	**LR55R**	195	4.7	50.0	245	PA66	Yellow (YE)
115-00005	**LR55R**	195	4.7	50.0	245	PA66	Green (GN)
115-00006	**LR55R**	195	4.7	50.0	245	PA66	Blue (BU)
115-00007	**LR55R**	195	4.7	50.0	245	PA66	Grey (GY)
115-00008	**LR55R**	195	4.7	50.0	245	PA66	Natural (NA)
115-00002	**LR55R**	195	4.7	50.0	245	PA66HS	Black (BK)

All dimensions in mm. Subject to technical changes.

SRT Series Releasable Ties

Features and Benefits

Manufactured from a soft, tear-resistant thermoplastic polyurethane these ties have several unique features: UV and weather resistant, strong yet elastic, and suitable for temperatures as low as -40 degrees C.

The SRT ties are releasable and reusable which is ideal for bundling cables in temporary applications such as musical events, theatres, cable harnesses.

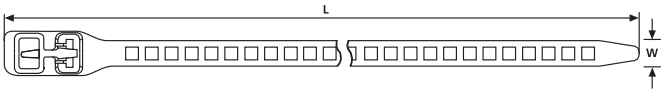
Application

The SRT range offers solutions to numerous bundling applications. The soft, flexible material makes these ties particularly suitable for use on data and fibre-optic cables. The elasticity of the material makes them ideal for securing young trees to support poles, and other applications within the gardening and landscaping industry.

The Elasticity of the SOFTIX ties makes them suitable for use in many applications.

SOFTFIX ties available in small quantities.

with 2nd loop to run bundles in parallel!



SRT Series

Material Data

Material	**Thermoplastic Polyurethane (TPU)**
Colour	**Black (BK)**
Operating Temperature	**-40 °C to +85 °C**
Flammability	**UL94 HB**

HF halogenfree RoHS

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Pack Cont.
115-07190	**SOFTFIX® XS**	180	7.0	45.0	57	16
115-07270	**SOFTFIX® S**	260	7.0	79.0	57	12
115-11270	**SOFTFIX® M**	260	11.0	55.0	123	8
115-11350	**SOFTFIX® L**	340	11.0	90.0	123	6
115-28590	**SOFTFIX® XL**	580	28.0	150	360	3

All dimensions in mm. Subject to technical changes.

REZ Series Releasable Ties

Features and Benefits

The unique, patented head design enables quick and simple use. The tie can be inserted in the normal way and pulled tight or the tail can be twisted into the open part of the head and locked into place. The quick-release mechanism can be released by one hand – even when the tie is under tension – by simply pinching the ears.

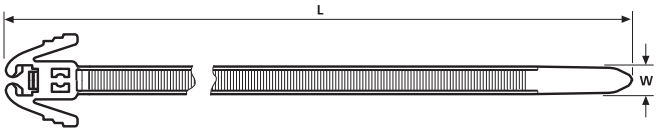
Application

These releasable and reusable ties are ideal for temporary installations or the addition and/or removal of cables. Suitable for a multitude of uses, such as the packaging industry as a bag closure where access to part of the bag contents may be needed but the bag needs to be re-sealed (example - milk powder in the catering industry).

The REZ ties have a one-hand, simple, release mechanism.

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



REZ-Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Colour
115-40200	**REZ200**	200	4.7	50.0	135	Black (BK)
115-00032	**REZ300**	305	4.7	80.0	135	Natural (NA)
115-40300	**REZ300**	305	4.7	80.0	135	Black (BK)
115-00043	**REZ300**	305	4.7	80.0	135	Red (RD)

All dimensions in mm. Subject to technical changes.

RS1 Series

Features and Benefits

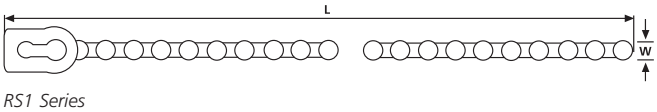
This bobble tie allows a simple and quick fixing.

Application

Ideal for temporary bundling or as a bag closure.

Material Data

Material	**Polyamide 6.6 (PA66)**
Operating Temperature	**-40 °C to +85 °C Continuous, (+105 °C for 500 h)**
Flammability	**UL94 V2**



RS1 Series

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Colour
111-81100	**RS1**	110	2.0	31.0	Black (BK)
111-81103	**RS1**	110	2.0	31.0	Natural (NA)

All dimensions in mm. Subject to technical changes.