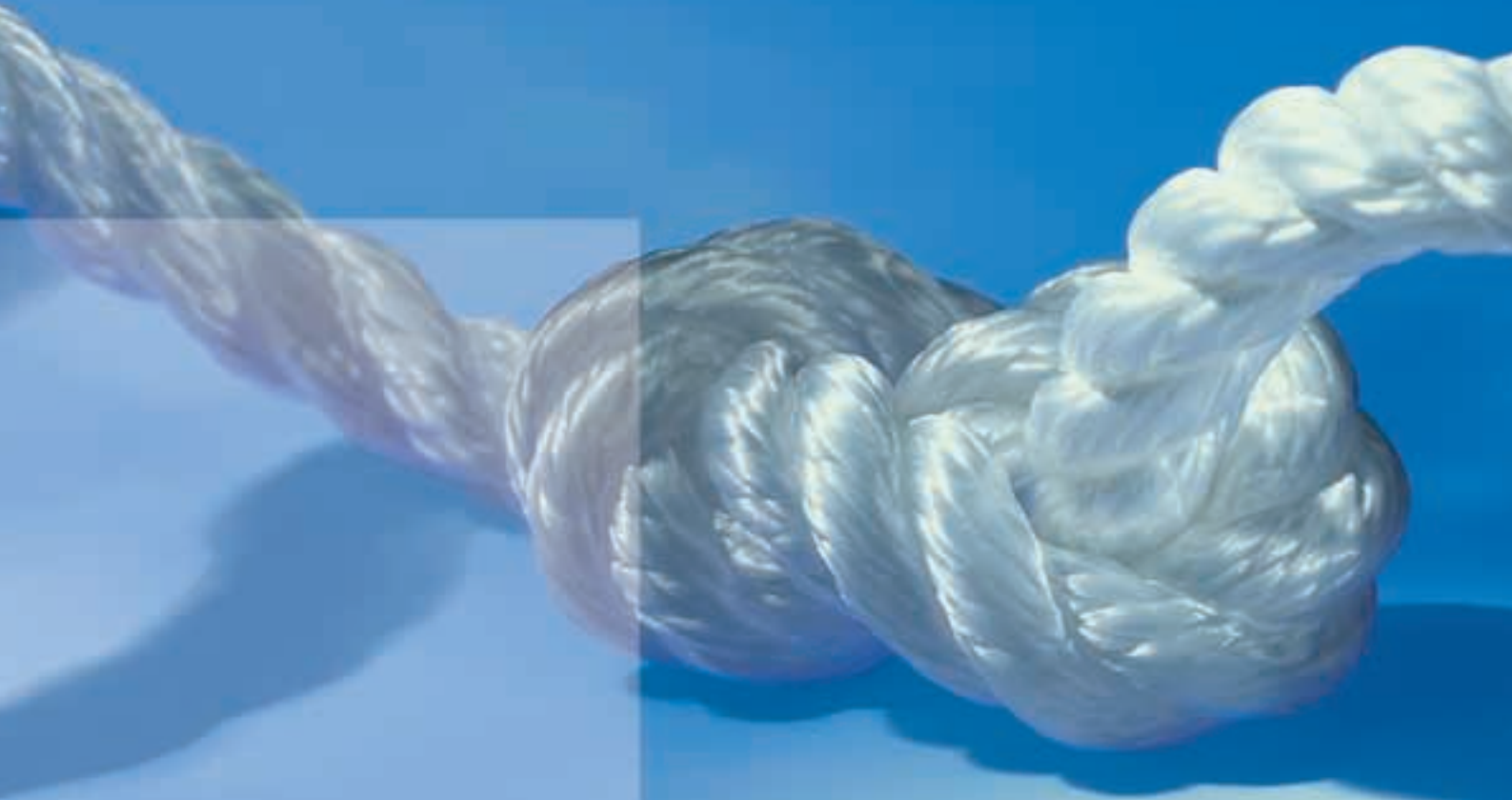




# Cable Ties and Fixings





## 1.1 Cable Ties

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# Cable Ties and Fixings

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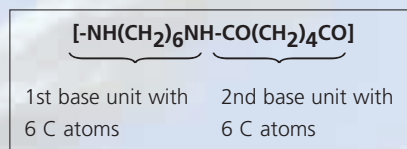
## Properties of polyamide PA66

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:



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 34.**

## 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.*

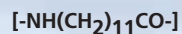
**For outdoor use, therefore, we recommend our range of products made from UV-stabilised polyamide (PA66W).**

### 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:



**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.

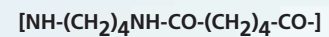
These three properties make PA12 ideal for use outdoors, in particularly when requirements may include impact resistance.

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:



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

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.

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®

ETFE can be best described as a rugged thermoplastic with an outstanding balance of properties.

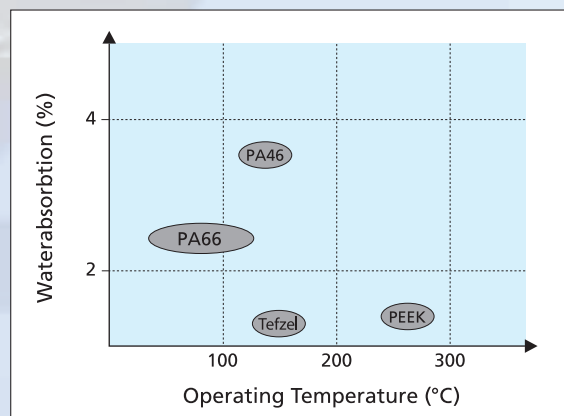
Mechanically, it is tough, has medium stiffness, impact and abrasion resistance.

Summary of key properties:

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

ETFE can perform successfully in applications where other materials are lacking in mechanical toughness, broad thermal capability, ability to meet severe environmental conditions.

Tefzel® is a registered trademark of Dupont.



## Chemical resistances of various plastics

## 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®
Acetaldehyde, liquid	100	23	+	-		+	o	-	+
Acetone	100	+	+	+	+	+	+	-	+
Allyl chloride	100	23					+	-	
Formic acid	98	23	-		-	-	+	-	+
Aniline	100	23	+	o	o	o	+	-	+
Aromatic compounds						+	-		+
Benzaldehyde	any	23	+	o		+	+	-	+
Benzene/benzol mix		23	+	+	+	+	o	o	+
Benzol	100	23	+		+	o	o	-	+
Bromine		23		-	-		-	-	
Chlorine, gaseous	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	+			+	+		+
Decahydronaphthalene	100	23	+			+	o		+
Diethyl ether	100	23	+			+	o		+
Di-isopropyl ether	100	23					o		
Dimethyl formamide	100	23	+	+		+	+		+
Diethyl phthalate		23	+	+		+	+	-	+
Ethanoic acid	10	20	-	o	o	+	+		+
Ethanoic acid	25	20	-			o	+		+
Ethanoic acid	50	20	-			o	+		+
Ethanoic acid	100	23	-	-		o	+		+
Ethyl acetate	tech. pure	23		+	+	o	o		
Freon		23					+		
Heptane	100	23	+	+	+	+	+		+
Potass. Permanganate	<= 6	23	-	-	-	+	+		+
Ketone			+	+		+	+		+
Methyl ethyl ketone	100	23	+	+		o	+	-	+
Methylisobutylcetone	100	23	+			+	+		+
Engine oil		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	-	+	+	+
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**

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.

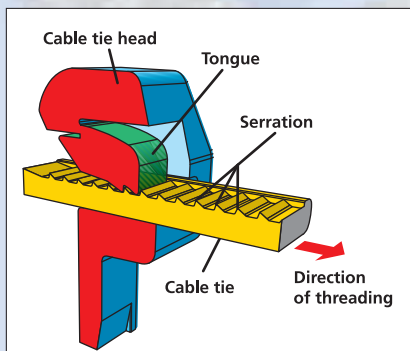
**Cable ties with plastic pawls**

This technology is used in 90% of all polyamide (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 23).

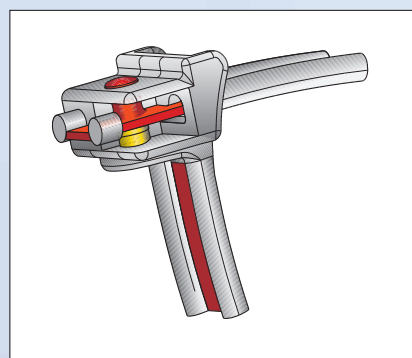
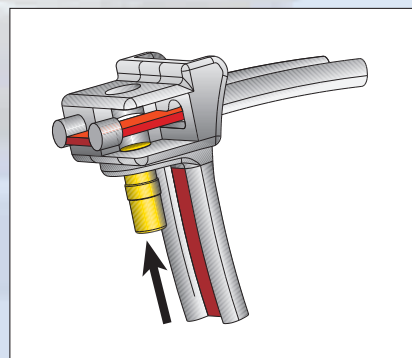


**KR series cable ties**

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 408). 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.



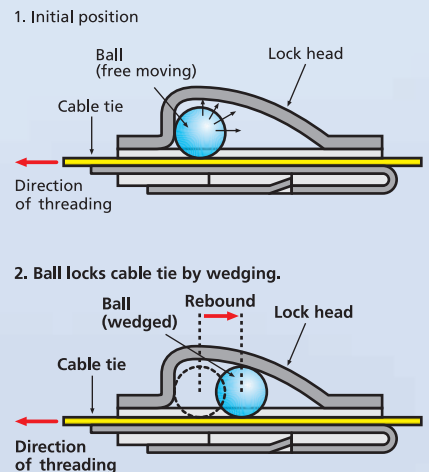
**MBT series of cable ties**

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 408) 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 84) 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).



# Determination of minimum tensile strength

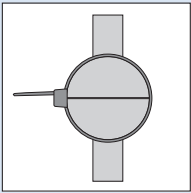
## Determination of minimum tensile strength

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

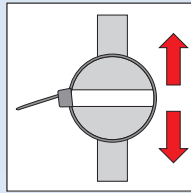
accordance with the Military Specification and Standards of the USA. Test conditions being laid down precisely in MIL-S-23190E:

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

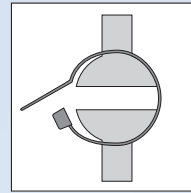
### The test procedure to determine minimum tensile strength



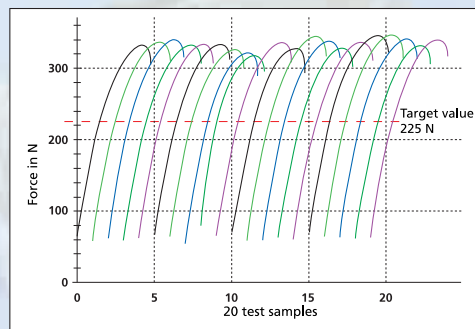
The cable tie is fixed onto a split mandrel test probe with the suitable cable tie application tool.



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:

$$[N] = [kg * m/s^2]$$

The formula for calculating the mass is:

$$\text{Mass} = \frac{\text{minimum tensile strength}}{\text{acceleration due to gravity}}$$

The acceleration due to gravity is 9.81 m/s<sup>2</sup>:

$$\text{Mass} = \frac{\text{minimum tensile strength}}{[kg * m/s^2] / 9.81 [m/s^2]}$$

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

$$\text{Mass} = 225 [kg * m/s^2] / 9.81 [m/s^2]$$

The units m/s<sup>2</sup> cancel each other out, leaving the unit [kg] for the mass. Thus:

$$\text{Mass} = 225 / 9.81 \text{ kg} = 22.9 \text{ kg}$$

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:

$$\text{Min. tensile strength} = \text{mass} * 9.81 [m/s^2]$$

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

$$\text{Minimum tensile strength} = [53 \text{ kg}] * 9.81 [m/s^2] = 520 \text{ N}$$

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).



$$225 \text{ N} / 9.81 = 22.9 \text{ kg}$$

$$53 \text{ kg} * 9.81 = 520 \text{ N}$$



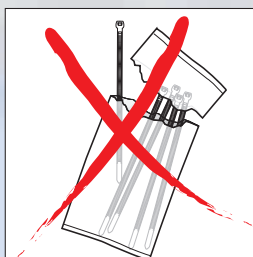
### Optimum storage conditions for cable ties made of polyamide (PA)

**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%.

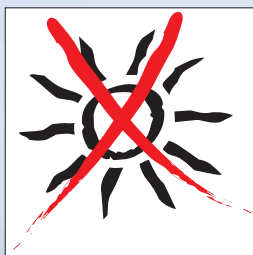
The packaging used by **HellermannTyton** ensures that the water content in the material remains constant. Therefore, it is important to store the products in their original packaging to preserve the quality of the ties.

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



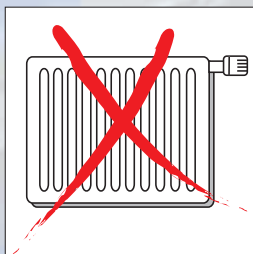
Once opened you should use the ties as quickly as possible!

Do not expose the product to direct sunlight!



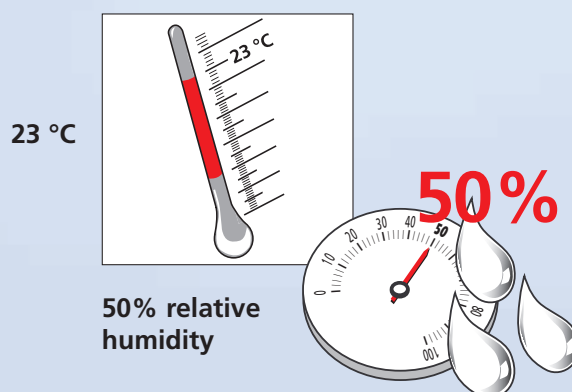
Do not store the product in sunlight; for example, on the windowsill!

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:



# HellermannTyton cable ties conform to DIN EN 50146 standard

## HellermannTyton cable ties conform to DIN EN 50146 standard

**HellermannTyton** are a supplier of high-quality solutions for the routing, organising 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 37-48) 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 54 )

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 34.**

- 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 suitability test. Please see our datasheets for further details.

Typ	Page	Material	Operating Temperature [°C]
<b>Inside Serrated Cable Ties</b>			
<b>T Series</b>	37	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	41	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	43	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>T Series</b>	45	PA66V0	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	45	PA66HIR	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	45	PA66HSW	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	46	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>T Series</b>	46	E / TFE	-80 °C to +150 °C
<b>T Series</b>	46	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
<b>T Series</b>	46	PP	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LK Series</b>	49	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LK Series</b>	49	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LK Series</b>	49	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>LK Series</b>	49	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
<b>WS Series</b>	50	PA66HIRHS	-40 °C to +110 °C continuous
<b>CTT Series, HRT, HT</b>	51	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>CTT Series, HRT, HT</b>	51	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>CTT Series, HRT, HT</b>	51	PA66HSW	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>DH Series</b>	52	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>DH Series</b>	52	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>DH Series</b>	52	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>DH Series</b>	52	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>Outside Serrated Cable Ties</b>			
<b>RPE, PE Series</b>	56	PA66HSW	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>RPE, PE Series</b>	56	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LPH Series</b>	57	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LPH Series</b>	57	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>OS Series</b>	54	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>OS Series</b>	54	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>OS Series</b>	54	PA66V0	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>OS Series</b>	54	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>Releasable Cable Ties</b>			
<b>RT 100, 140, 250 Series</b>	58	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>RT, RELK, RLT Series</b>	59	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>RT, RELK, RLT Series</b>	59	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>RT, RELK, RLT Series</b>	59	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LRT, RT250 Series</b>	60	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LRT, RT250 Series</b>	60	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>REL Series</b>	61	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>REL Series</b>	61	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LR55 Series</b>	62	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>LR55 Series</b>	62	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>SOFTFIX®/SRT Series</b>	63	TPU	-40 °C to +85 °C
<b>REZ Series</b>	64	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>RS1 Series</b>	64	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)



- 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 suitability test. Please see our datasheets for further details.

Typ	Page	Material	Operating Temperature [°C]
<b>Fixing Ties</b>			
<b>With Arrowhead (with Wings)</b>	88	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Arrowhead (with Wings)</b>	88	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Arrowhead (with Wings)</b>	88	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>With Arrowhead (with Wings)</b>	107	PA66HIRHS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Arrowhead and Disc</b>	92	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Arrowhead and Disc</b>	92	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Arrowhead and Disc</b>	92	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>With Arrowhead in the Strap</b>	91	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Arrowhead in the Strap</b>	91	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>With Arrowhead and Disc in the Strap</b>	92	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Arrowhead and Disc in the Strap</b>	92	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>Arrowhead Mount Assemblies with turnaround clip</b>	93	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Arrowhead</b>	107	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Arrowhead</b>	87	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Arrowhead</b>	87	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Fir Tree Mount</b>	95	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>Fir Tree Mount Assemblies</b>	96	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>Fir Tree Mount Assemblies</b>	96	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>Fir Tree Mount Assemblies</b>	96	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Rivet</b>	94	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Rivet</b>	94	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Stud Fixing</b>	101	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>With Stud Fixing</b>	101	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>With Stud Fixing</b>	101	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>With Stud Fixing in the Strap</b>	104	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>Weld Stud Fixing Assemblies</b>	105	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>Double Mounting Base for Weld Studs</b>	106	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>MR range of Mounting Head Ties</b>	112	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>MR range of Mounting Head Ties</b>	112	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>WPT</b>	113	PA66HIR	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
<b>Self Adhesive Fixing Tie T18RSA</b>	113	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>Edge Clip Family</b>	108	PA66HS, PA66HIRHS	-40 °C to +105 °C
<b>TAS Aerial Support Tie</b>	74	PA66HIR	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
<b>CT and BHT Series of Chassis Ties</b>	76	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
<b>Fixing Ties for Cable Tray CTF</b>	75	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)



- suitable
- of limited suitability
- ▣ partly suitable
- ++ very good
- + good
- o limited

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Type	Page	Material	Operating Temperature [°C]
<b>Special Cable Ties</b>			
PEEK	65	PEEK	-55 °C to +260 °C
SpeedyTie®	66	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
SpeedyTie®	66	PA66HIR(S)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)
MCT-Series	67	PA66MP	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	68	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	68	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
KR Series	68	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	68	PA12	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KR Series	69	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
EL, TY Series	71	POM	-40 °C to +85 °C
TEXTIES	72	PA, PE	-20 °C to +75 °C
TPT300	73	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
M Series	80	SS304	-80 °C to +538 °C
M Series	80	SS316	-80 °C to +538 °C
Protection Profile LFPC Series	84	PO	-40 °C to +90 °C Continuous, (+160 °C for 200 h)
AMTS System	78	SS316	-80 °C to +538 °C
<b>Mounts for Cable Ties</b>			
Self Adhesive / Screw Fixing MB	116	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive / Screw Fixing TY	117	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive / Screw Fixing TY	117	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR, LKC, NY	118	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR	119	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Screw Fixing KR	119	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing KR	119	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CTAM, MB, TY, CTAP	120	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CL8, FH, LKM, LKM	122	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing CL8	122	PA66W	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Fixing MP, MSMP	123	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
With Arrowhead TM1SF	123	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
SFC Arrowhead Cradle	124	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
TapeClip TC and CH Series	125	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
TapeClip TC and CH Series	125	PA66HIRHS	-40 °C to +105 °C
Cable Fixing Accessories Tape Clip, COW Series and CH Series	126	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Cable Fixing Accessories Tape Clip, COW Series and CH Series	126	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
EdgeClip EC	127	PA66HIRHS	-40 °C to +105 °C
TY Plastic Rivets	145	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)














- 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 suitability test. Please see our datasheets for further details.

Typ	Page	Shortcut	Operating Temperature [°C]
<b>Mounts for Cables and Wires</b>			
Self Adhesive / Screw Fixing TY8H1S, RA, RB	133	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Self Adhesive 130100	134	PVC	-25 °C to +65 °C
Self Adhesive SAC	134	ST	-40 °C to +70 °C
Self Adhesive RA, RB	133	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
FKH Series	135	PA66HIR	-40 °C to +80 °C
With Arrowhead WPC	136	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Screw Mount D-Clip	137	POM	-40 °C to +90 °C Continuous, (+110 °C for 500 h)
PC Series	139	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
PC Series	139	PA46	-40 °C to +150 °C for 5000 h, (+195 °C for 500 h)
<b>Clips and Snappers</b>			
CTC Series	138	PA66HIRHS	-40 °C to +105 °C
Metal P-Clips	146	ALU	-40 °C to +180 °C
Metal P-Clips ALU with a Chloroprene Insert	146	ALU, CR	-20 °C to +80 °C
Plastic P-Clips HP	148	PA66HS	-40 °C to +105 °C Continuous, (+145 °C for 500 h)
Plastic P-Clips HP	148	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Cradle Clips	152	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KlamKlips	153	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Snapper SNP	150	POM	-40 °C to +85 °C
Snapper SNP (E)	150	PA66GF13	-40 °C to +105 °C
<b>Mounts for Special Requirements</b>			
Mounts with Stud Fixings SBH, SBF, CTMS	144	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Automatic Harness Clips	141	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
LOK01 Fixing Base	143	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
KM Series	154	PA66HIRHS	-40 °C to +105 °C
KM Series	154	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)
Plastic Rivets TY, R4, R6	145	PA66	-40 °C to +85 °C Continuous, (+105 °C for 500 h)



Material specifications				
Material	Operating Temperature	Colour	Flammability	Chem. Material Properties
Ethylentetrafluorine-ethylene - Tefzel® (E/TFE) 	-80 °C to +150 °C	Blue (BU)	UL94 V0	This material absorbs radioactive and electron beams as well as UV radiation. It has very good chemical resistance, particularly with respect to acids, bases and oxidizing agents. It does not absorb water.
Polyamide 6.6 High Impact Modified (PA66HIR) 	-40 °C to +80 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 HB	The slightly impact-modified polyamide 6.6 (HIR) can also be processed at low temperatures.
Polyamide 6.6 High Impact Modified, Heat Stabilised (PA66HIRHS) 	-40 °C to +105 °C	Black (BK)	UL94 HB	This material has the same properties as polyamide 6.6 HIR but, through the use of additives, has a temperature range extending to + 105 °C.
Polyacetal (POM) 	-40 °C to +90 °C Continuous, (+110 °C for 500 h)	Natural (NA)	UL94 HB	This highly flexible material is resistant to both UV radiation and to the effect of chemicals. The slightly impact-modified POM has a high tensile strength and remains flexible even at low temperatures. The technical properties of POM are not affected by moisture.
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	Polyamides 11 and 12 have good chemical resistance. They have limited resistance to acids, bases and oxidizing agents but very good UV stability. The melting of N11 (185 °C) is higher than that of N12 (175 °C).
Polyamide 6.6 (PA66) 	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	This material has a very high tensile strength and can be used up to a temperature of +85 °C.
Polyamide 6.6 Heat Stabilised (PA66HS) 	-40 °C to +105 °C Continuous, (+145 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	This material has the same properties as polyamide 6.6 (N66) but, through the use of additives in the material, the temperature range has been extended up to + 105 °C.
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	Polypropylene has a good resistance to organic acids. The density of the material is less than that of water and so polypropylene floats.
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.

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	This material conforms with both the UL94 V0 standards and the requirements relating to low smoke generation and evolution of toxic gases and corrosive acids in the event of a fire.
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.

Tefzel® is a registered trademark of DuPont.

\* 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.



MK10-SB  
see page 402.



MK20  
MK21 see page 402.



MK3SP  
see page 403.



MK7  
see page 403.



MK7HT  
see page 403.



MK6  
see page 404.



MK9  
see page 404.



MK9HT  
see page 404.



MK9SST  
see page 409.



MK3PNP2  
see page 405.



MK7P  
see page 406.



MK9P  
see page 407.



KR6/8  
see page 408.



KR8PNSE  
see page 408.

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



## 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

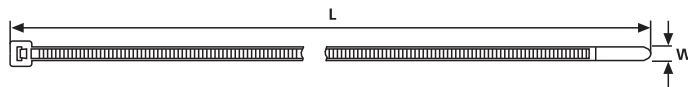
For the routing, bundling and securing of cables, pipes and hoses.



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

Application Tool	Registration Numbers
MK35P	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 388.

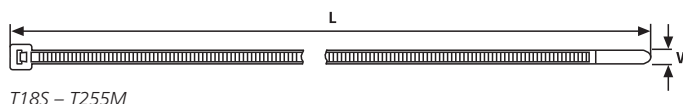


*T18S – T255M*



Please Note for Product Specific Approvals please refer to the Appendix

### T Series, Polyamide 6.6 (PA66) - Standard



T18S – T255M

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	<b>T18S</b>	83	2.3	16	80	PA66	Natural (NA)	1–3, 5
111-02811	<b>T18S</b>	83	2.3	16	80	PA66	Black (BK)	1–3, 5
111-01910	<b>T18R</b>	100	2.5	22	80	PA66	Black (BK)	1–3, 5
111-01919	<b>T18R</b>	100	2.5	22	80	PA66	Natural (NA)	1–3, 5
111-02319	<b>T18I</b>	140	2.5	35	80	PA66	Natural (NA)	1–3, 5
111-02370	<b>T18I</b>	140	2.5	35	80	PA66	Black (BK)	1–3, 5
111-02010	<b>T18L</b>	205	2.5	55	80	PA66	Black (BK)	1–3, 5
111-02019	<b>T18L</b>	205	2.5	55	80	PA66	Natural (NA)	1–3, 5
111-02519	<b>T25L</b>	240	2.8	65	110	PA66	Natural (NA)	1–3, 5
111-02500	<b>T25L</b>	240	2.8	65	110	PA66	Black (BK)	1–3, 5
111-02619	<b>T25LL</b>	330	2.8	95	110	PA66	Natural (NA)	1–3, 5
111-02601	<b>T25LL</b>	330	2.8	95	110	PA66	Black (BK)	1–3, 5
111-03009	<b>T30R</b>	150	3.5	35	135	PA66	Natural (NA)	1–3, 5
111-03011	<b>T30R</b>	150	3.5	35	135	PA66	Black (BK)	1–3, 5
111-03410	<b>T30L</b>	190	3.5	50	135	PA66	Black (BK)	1–3, 5
111-03419	<b>T30L</b>	190	3.5	50	135	PA66	Natural (NA)	1–3, 5
111-04400	<b>T30LR</b>	260	3.3	65	135	PA66	Natural (NA)	1–5
111-03500	<b>T30LL</b>	290	3.5	80	135	PA66	Black (BK)	1–3, 5
111-03529	<b>T30LL</b>	290	3.5	80	135	PA66	Natural (NA)	1–3, 5
111-02900	<b>T30XL</b>	365	3.5	105	135	PA66	Natural (NA)	1–3, 5
111-02901	<b>T30XL</b>	365	3.5	105	135	PA66	Black (BK)	1–3, 5
111-03819	<b>T40R</b>	175	4.0	40	180	PA66	Natural (NA)	1–5
111-03801	<b>T40R</b>	175	4.0	40	180	PA66	Black (BK)	1–5
111-04600	<b>T40I</b>	290	4.0	80	180	PA66	Black (BK)	1–5
111-04609	<b>T40I</b>	290	4.0	80	180	PA66	Natural (NA)	1–5
111-04300	<b>T40L</b>	365	4.0	105	180	PA66	Natural (NA)	1–5
111-04301	<b>T40L</b>	365	4.0	105	180	PA66	Black (BK)	1–5

All dimensions in mm. Subject to technical changes.

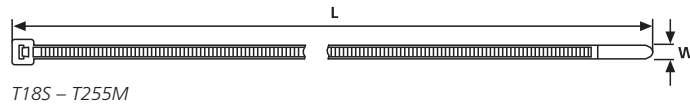
Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

### T Series, Polyamide 6.6 (PA66) - Standard



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	225	PA66	Natural (NA)	1–10
111-05810	T50S	150	4.6	35	225	PA66	Black (BK)	1–10
111-05000	T50R	200	4.6	50	225	PA66	Black (BK)	1–10
111-05013	T50R	200	4.6	50	225	PA66	Natural (NA)	1–10
111-06200	T50M	245	4.6	65	225	PA66	Black (BK)	1–10
111-06201	T50M	245	4.6	65	225	PA66	Natural (NA)	1–10
111-05210	T50I	300	4.6	85	225	PA66	Black (BK)	1–10
111-05219	T50I	300	4.6	85	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
111-00269	T50LL	445	4.6	130	225	PA66	Natural (NA)	1–10
111-05019	T80R	210	4.7	55	355	PA66	Natural (NA)	1–10
111-08010	T80R	210	4.7	55	355	PA66	Black (BK)	1–10
111-08210	T80I	300	4.7	85	355	PA66	Black (BK)	1–10
111-08229	T80I	300	4.7	85	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	535	PA66	Natural (NA)	6–10
111-00179	T120S	225	7.6	55	535	PA66	Black (BK)	6–10
111-12210	T120I	300	7.6	80	535	PA66	Black (BK)	6–10
111-12219	T120I	300	7.6	80	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.

Material Data

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

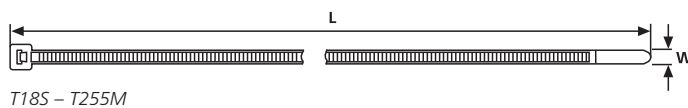
**RoHS**

**HF**  
(halogen free)



Please Note for Product Specific Approvals please refer to the Appendix

### T Series, Polyamide 6.6 (PA66) - Standard



T18S – T255M

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	<b>T150R(U)</b>	390	8.8	105	780	PA66	Black (BK)	6-10
111-15203	<b>T150R(U)</b>	390	8.8	105	780	PA66	Natural (NA)	6-10
111-15619	<b>T150M</b>	530	8.9	150	780	PA66	Natural (NA)	6-9
111-00124	<b>T150M</b>	530	8.9	150	780	PA66	Black (BK)	6-9
111-15419	<b>T150L</b>	820	8.9	245	780	PA66	Natural (NA)	6-9
111-15405	<b>T150L</b>	820	8.9	245	780	PA66	Black (BK)	6-9
111-15719	<b>T150LL</b>	925	8.9	275	780	PA66	Natural (NA)	6-9
111-15700	<b>T150LL</b>	925	8.9	275	780	PA66	Black (BK)	6-9
111-15519	<b>T150XL</b>	1095	8.9	330	780	PA66	Natural (NA)	6-9
111-15500	<b>T150XL</b>	1095	8.9	330	780	PA66	Black (BK)	6-9
111-15300	<b>T150XLL</b>	1325	8.9	405	780	PA66	Black (BK)	6-9
111-15304	<b>T150XLL</b>	1325	8.9	405	780	PA66	Natural (NA)	6-9
111-24704	<b>T250S</b>	225	12.5	55	1115	PA66	Black (BK)	7-9
111-24705	<b>T250S</b>	225	12.5	55	1115	PA66	Natural (NA)	7-9
111-25102	<b>T250X</b>	370	12.5	100	1115	PA66	Black (BK)	7-9
111-25103	<b>T250X</b>	370	12.5	100	1115	PA66	Natural (NA)	7-9
111-24801	<b>T250R</b>	520	12.5	145	1115	PA66	Black (BK)	7-9
111-24803	<b>T250R</b>	520	12.5	145	1115	PA66	Natural (NA)	7-9
111-25001	<b>T250M</b>	565	12.5	150	1115	PA66	Black (BK)	7-9
111-25002	<b>T250M</b>	565	12.5	150	1115	PA66	Natural (NA)	7-9
111-25219	<b>T250I</b>	725	12.5	203	1115	PA66	Natural (NA)	7-9
111-24600	<b>T250L</b>	880	12.5	254	1115	PA66	Natural (NA)	7-9
111-24601	<b>T250L</b>	880	12.5	254	1115	PA66	Black (BK)	7-9
111-25200	<b>T250XL</b>	1030	12.5	305	1115	PA66	Black (BK)	7-9
111-00466	<b>T250XL</b>	1030	12.5	305	1115	PA66	Natural (NA)	7-9

All dimensions in mm. Subject to technical changes.

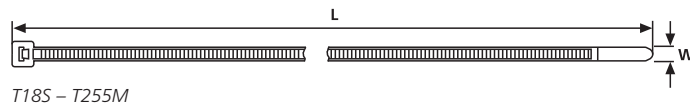
Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

## T Series, Polyamide 6.6 - UV Stabilised



T18S – T255M

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	<b>T18S</b>	83	2.3	16	80	PA66W	Black (BK)	1–3, 5
111-01960	<b>T18R</b>	100	2.5	22	80	PA66W	Black (BK)	1–3, 5
111-02360	<b>T18I</b>	140	2.5	35	80	PA66W	Black (BK)	1–3, 5
111-02012	<b>T18L</b>	205	2.5	55	80	PA66W	Black (BK)	1–3, 5
111-02560	<b>T25L</b>	240	2.8	65	110	PA66W	Black (BK)	1–3, 5
111-02660	<b>T25LL</b>	330	2.8	95	110	PA66W	Black (BK)	1–3, 5
111-03030	<b>T30R</b>	150	3.5	35	135	PA66W	Black (BK)	1–3, 5
111-03460	<b>T30L</b>	190	3.5	50	135	PA66W	Black (BK)	1–3, 5
111-04402	<b>T30LR</b>	260	3.3	65	135	PA66W	Black (BK)	1–5
111-03570	<b>T30LL</b>	290	3.5	80	135	PA66W	Black (BK)	1–3, 5
111-03860	<b>T40R</b>	175	4.0	40	180	PA66W	Black (BK)	1–5
111-05860	<b>T50S</b>	150	4.6	35	225	PA66W	Black (BK)	1–10
111-04889	<b>T50R</b>	200	4.6	50	225	PA66W	Black (BK)	1–10
111-06206	<b>T50M</b>	245	4.6	65	225	PA66W	Black (BK)	1–10
111-05260	<b>T50I</b>	300	4.6	85	225	PA66W	Black (BK)	1–10
111-05440	<b>T50L</b>	390	4.6	110	225	PA66W	Black (BK)	1–10
111-06000	<b>T50LL</b>	445	4.6	130	225	PA66W	Black (BK)	1–10

All dimensions in mm. Subject to technical changes.

### Application Tool Registration Numbers

MK3SP	<b>1</b>
MK3PNSP2, MK7P	<b>2</b>
MK7	<b>3</b>
MK7HT	<b>4</b>
MK20	<b>5</b>
MK6	<b>6</b>
MK9P, MK6PN	<b>7</b>
MK9	<b>8</b>
MK9HT	<b>9</b>
MK21	<b>10</b>
Autotool 2000	<b>11</b>

For more information please turn to page 388.

### Material Data

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

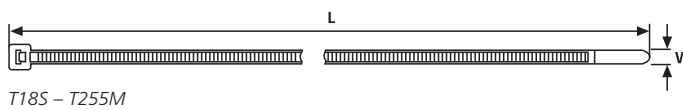
RoHS

HF (halogenfree)



Please Note for Product Specific Approvals please refer to the Appendix

### T Series, Polyamide 6.6 - UV Stabilised



T18S – T255M

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	<b>T80R</b>	210	4.7	55	355	PA66W	Black (BK)	1–10
111-08290	<b>T80I</b>	300	4.7	85	355	PA66W	Black (BK)	1–10
111-05460	<b>T80L</b>	390	4.7	110	355	PA66W	Black (BK)	1–10
111-12830	<b>T120S</b>	225	7.6	55	535	PA66W	Black (BK)	6–10
111-12230	<b>T120I</b>	300	7.6	80	535	PA66W	Black (BK)	6–10
111-12060	<b>T120R(E)</b>	380	7.6	100	535	PA66W	Black (BK)	6–10
111-12660	<b>T120M</b>	460	7.6	130	535	PA66W	Black (BK)	6–10
111-00171	<b>T120XM</b>	600	7.6	175	535	PA66W	Black (BK)	6–10
111-12430	<b>T120L</b>	760	7.6	225	535	PA66W	Black (BK)	6–10
111-15206	<b>T150R(U)</b>	390	8.9	105	780	PA66W	Black (BK)	6–10
111-15660	<b>T150M</b>	530	8.9	150	780	PA66W	Black (BK)	6–9
111-15460	<b>T150L</b>	820	8.8	245	780	PA66W	Black (BK)	6–9
111-15704	<b>T150LL</b>	925	8.9	275	780	PA66W	Black (BK)	6–9
111-15502	<b>T150XL</b>	1095	8.9	330	780	PA66W	Black (BK)	6–9
111-15305	<b>T150XLL</b>	1325	8.9	405	780	PA66W	Black (BK)	6–9
111-25100	<b>T250X</b>	370	12.5	100	1115	PA66W	Black (BK)	7-9
111-24805	<b>T250R</b>	520	12.5	145	1115	PA66W	Black (BK)	7-9

All dimensions in mm. Subject to technical changes.



#### Application Tool Registration Numbers

MK3SP	<b>1</b>
MK3PNSP2, MK7P	<b>2</b>
MK7	<b>3</b>
MK7HT	<b>4</b>
MK20	<b>5</b>
MK6	<b>6</b>
MK9P, MK6PN	<b>7</b>
MK9	<b>8</b>
MK9HT	<b>9</b>
MK21	<b>10</b>
Autotool 2000	<b>11</b>

For more information please turn to page 388.

#### Material Data

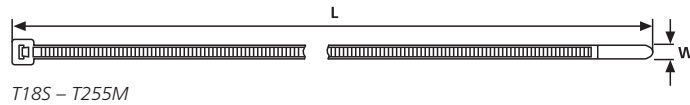
Material	<b>Polyamide 6.6 UV Resistant (PA66W)</b>
Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
Flammability	<b>UL94 V2</b>



Please Note for Product Specific Approvals please refer to the Appendix

## T Series, Polyamide 6.6 - Heat Stabilised



T18S – T255M

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	<b>T18S</b>	83	2.3	16	80	PA66HS	Black (BK)	1–3, 5
111-01803	<b>T18R</b>	100	2.5	22	80	PA66HS	Black (BK)	1–3, 5
111-01959	<b>T18R</b>	100	2.5	22	80	PA66HS	Natural (NA)	1–3, 5
111-02306	<b>T18I</b>	140	2.5	35	80	PA66HS	Natural (NA)	1–3, 5
111-02358	<b>T18I</b>	140	2.5	35	80	PA66HS	Black (BK)	1–3, 5
111-02059	<b>T18L</b>	205	2.5	55	80	PA66HS	Natural (NA)	1–3, 5
111-02005	<b>T18L</b>	205	2.5	55	80	PA66HS	Black (BK)	1–3, 5
111-02501	<b>T25L</b>	240	2.8	65	110	PA66HS	Natural (NA)	1–3, 5
111-02602	<b>T25LL</b>	330	2.8	95	110	PA66HS	Natural (NA)	1–3, 5
111-03049	<b>T30R</b>	150	3.5	35	135	PA66HS	Natural (NA)	1–3, 5
111-03050	<b>T30R</b>	150	3.5	35	135	PA66HS	Black (BK)	1–3, 5
111-03459	<b>T30L</b>	190	3.5	50	135	PA66HS	Natural (NA)	1–3, 5
111-03450	<b>T30L</b>	190	3.5	50	135	PA66HS	Black (BK)	1–3, 5
111-04401	<b>T30LR</b>	260	3.3	65	135	PA66HS	Natural (NA)	1–5
111-04404	<b>T30LR</b>	260	3.3	65	135	PA66HS	Black (BK)	1–5
111-03569	<b>T30LL</b>	290	3.5	80	135	PA66HS	Natural (NA)	1–3, 5
111-00278	<b>T30LL</b>	290	3.5	80	135	PA66HS	Black (BK)	1–3, 5
111-03859	<b>T40R</b>	175	4.0	40	180	PA66HS	Natural (NA)	1–5
111-03970	<b>T40R</b>	175	4.0	40	180	PA66HS	Black (BK)	1–5
111-04614	<b>T40I</b>	290	4.0	80	180	PA66HS	Black (BK)	1–5
111-04314	<b>T40L</b>	365	4.0	105	180	PA66HS	Black (BK)	1–5
111-05850	<b>T50S</b>	150	4.6	35	225	PA66HS	Black (BK)	1–10
111-05859	<b>T50S</b>	150	4.6	35	225	PA66HS	Natural (NA)	1–10
111-04950	<b>T50R</b>	200	4.6	50	225	PA66HS	Black (BK)	1–10
111-04882	<b>T50R</b>	200	4.6	50	225	PA66HS	Natural (NA)	1–10
111-06205	<b>T50M</b>	245	4.6	65	225	PA66HS	Natural (NA)	1–10

All dimensions in mm. Subject to technical changes.

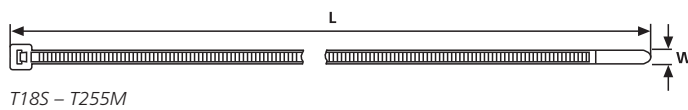
### Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

### T Series, Polyamide 6.6 - Heat Stabilised



T18S – T255M

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	225	PA66HS	Natural (NA)	1–10
117-05250	T50I	300	4.6	85	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	355	PA66HS	Natural (NA)	1–10
111-08005	T80R	210	4.7	55	355	PA66HS	Black (BK)	1–10
111-08259	T80I	300	4.7	85	355	PA66HS	Natural (NA)	1–10
111-08250	T80I	300	4.7	85	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	535	PA66HS	Black (BK)	6–10
111-12824	T120S	225	7.6	55	535	PA66HS	Natural (NA)	6–10
111-12240	T120I	300	7.6	80	535	PA66HS	Black (BK)	6–10
111-12249	T120I	300	7.6	80	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
111-00280	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.

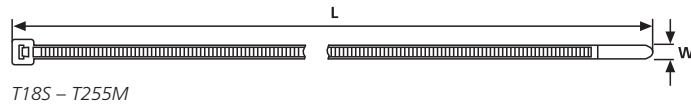
Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

## T Series




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	<b>T18R</b>	100	2.5	22	80	PA66HSW	Black (BK)	1–3, 5
111-03071	<b>T30R</b>	150	3.5	35	135	PA66HSW	Black (BK)	1–3, 5
111-04907	<b>T50R</b>	200	4.6	50	225	PA66HSW	Black (BK)	1–10
111-05253	<b>T50I</b>	300	4.6	85	225	PA66HSW	Black (BK)	1–10
111-05472	<b>T50L</b>	390	4.6	110	225	PA66HSW	Black (BK)	1–10
111-12822	<b>T120S</b>	225	7.6	55	535	PA66HSW	Black (BK)	6–10
Polyamide 6.6 High Impact Modified								
111-25500	<b>T255S</b>	225	12.5	55	1115	PA66HIRHS	Black (BK)	7-9
111-25400	<b>T255R</b>	515	12.5	145	1115	PA66HIR	Black (BK)	7-9
111-25300	<b>T255M</b>	560	12.5	160	1115	PA66HIR	Black (BK)	7-9
Polyamide 6.6 V0 rated								
111-91819	<b>T18R</b>	100	2.5	22	80	PA66V0	White (WH)	1–3, 5
111-02043	<b>T18L</b>	205	2.5	55	80	PA66V0	White (WH)	1–3, 5
111-93019	<b>T30R</b>	150	3.5	35	135	PA66V0	White (WH)	1–3, 5
111-95019	<b>T50R</b>	200	4.6	50	225	PA66V0	White (WH)	1–10
111-00317	<b>T50I</b>	300	4.6	85	225	PA66V0	White (WH)	1–10
111-91210	<b>T120R(E)</b>	380	7.6	100	535	PA66V0	White (WH)	6–10

All dimensions in mm. Subject to technical changes.


Material Data

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

Material Data

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

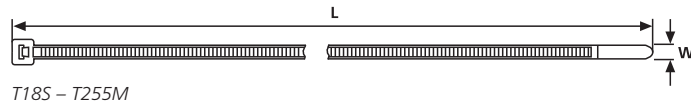
Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

#### T Series



Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
TEFZEL/ETFE								
111-01923	<b>T18R(U)</b>	100	2.5	22	40	E / TFE	Blue (BU)	1–3, 5
111-03343	<b>T30L</b>	198	3.6	50	66.7	E / TFE	Blue (BU)	1–3, 5
111-05026	<b>T50R(U)</b>	200	4.6	50	158	E / TFE	Blue (BU)	1–10
111-12826	<b>T120S</b>	225	7.6	55	311	E / TFE	Blue (BU)	6–10
111-12026	<b>T120R</b>	380	7.6	100	311	E / TFE	Blue (BU)	6–10
Polyamide 4.6 High Temp.								
111-01831	<b>T18R</b>	100	2.5	22	80	PA46	Natural (NA)	1–3, 5
114-03379	<b>T30R</b>	150	3.5	35	135	PA46	Natural (NA)	1–3, 5
111-00264	<b>T30R</b>	150	3.5	35	135	PA46	Grey (GY)	1–3, 5
114-04979	<b>T50R</b>	200	4.6	50	225	PA46	Natural (NA)	1–10
111-05220	<b>T50I</b>	300	4.6	85	225	PA46	Natural (NA)	1–10
114-05779	<b>T50L</b>	390	4.6	110	225	PA46	Natural (NA)	1–10
114-12179	<b>T120R(E)</b>	380	7.6	100	535	PA46	Natural (NA)	6–10
111-12401	<b>T120L</b>	760	7.6	225	535	PA46	Black (BK)	6–10

All dimensions in mm. Subject to technical changes.

Material Data

	Material	<b>Ethylentetrafluorineethylene - Tefzel (E/TFE)</b>
	Operating Temperature	<b>-80 °C to +150 °C continuous</b>
	Flammability	<b>UL94 V0</b>

Tefzel® is a registered trademark of DuPont.

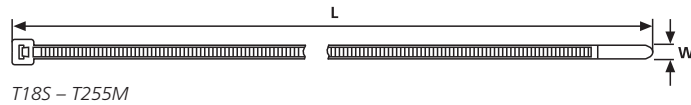
Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

## T Series



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))						PA66HIR(S)	Black (BK)	1–10
111-04890	T50R	200	4.6	50	225			
111-00222	T50I	300	4.6	85	225			
111-05441	T50L	390	4.6	110	225			
111-12203	T120I	300	7.6	80	535			
111-12032	T120R(E)	380	7.6	100	535			
111-12402	T120L	760	7.6	225	535	PA66HIR(S)	Black (BK)	6–10
Polypropylene (PP)						PP	Black (BK)	1–3, 5
111-01918	T18R	100	2.5	19	49			
111-01922	T18R	100	2.5	19	49			
111-00471	T30R	150	3.5	35	89			
111-00472	T30R	150	3.5	35	89			
111-04928	T50R	200	4.6	50	133			
111-04931	T50R	200	4.6	50	133			
111-12827	T120S	225	7.6	55	267			
111-00475	T120R	380	7.6	100	267			
111-12066	T120R	380	7.6	100	267			

All dimensions in mm. Subject to technical changes.

Material Data

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



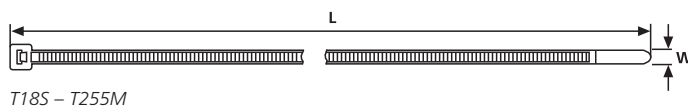
Material Data

RoHS	Material	<b>Polypropylene (PP)</b>
	Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
	Flammability	<b>UL94 HB</b>



Please Note for Product Specific Approvals please refer to the Appendix

## T Series



Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
Polyamide 6.6 Colours								
111-01816	T18R	100	2.5	22	80	PA66	Blue (BU)	1–3, 5
111-01815	T18R	100	2.5	22	80	PA66	Green (GN)	1–3, 5
111-01812	T18R	100	2.5	22	80	PA66	Red (RD)	1–3, 5
111-01810	T18R	100	2.5	22	80	PA66	Yellow (YE)	1–3, 5
111-03008	T30R	150	3.5	35	135	PA66	Blue (BU)	1–3, 5
111-03014	T30R	150	3.5	35	135	PA66	Green (GN)	1–3, 5
111-03004	T30R	150	3.5	35	135	PA66	Red (RD)	1–3, 5
111-03006	T30R	150	3.5	35	135	PA66	Yellow (YE)	1–3, 5
111-03312	T30L	190	3.5	50	135	PA66	Blue (BU)	1–3, 5
111-00193	T30L	190	3.5	50	135	PA66	Green (GN)	1–3, 5
111-00196	T30L	190	3.5	50	135	PA66	Red (RD)	1–3, 5
111-03309	T30L	190	3.5	50	135	PA66	Yellow (YE)	1–3, 5
111-04800	T50R	200	4.6	50	225	PA66	Blue (BU)	1–10
111-04801	T50R	200	4.6	50	225	PA66	Green (GN)	1–10
111-04804	T50R	200	4.6	50	225	PA66	Red (RD)	1–10
111-04805	T50R	200	4.6	50	225	PA66	Yellow (YE)	1–10
111-05202	T50I	300	4.6	85	225	PA66	Blue (BU)	1–10
111-00284	T50I	300	4.6	85	225	PA66	Green (GN)	1–10
111-05203	T50I	300	4.6	85	225	PA66	Red (RD)	1–10
111-05208	T50I	300	4.6	85	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	355	PA66	Blue (BU)	1–10
116-08015	T80R	210	4.7	55	355	PA66	Green (GN)	1–10
116-08012	T80R	210	4.7	55	355	PA66	Red (RD)	1–10
116-08014	T80R	210	4.7	55	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.

## Material Data

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



Please Note for Product Specific Approvals please refer to the Appendix

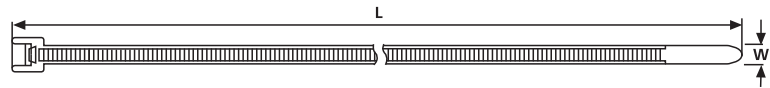
## LK Series Industrial Ties

### 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	<b>Polyamide 6.6 UV Resistant (PA66W)</b>
Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
Flammability	<b>UL94 V2</b>

RoHS (halogenfree) HF

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

RoHS (halogenfree) HF

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

RoHS (halogenfree) HF

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	135	PA66	Natural (NA)	1-10
111-60210	LK2	120	4.8	28	135	PA66	Black (BK)	1-10
111-60205	LK2	120	4.8	28	135	PA66W	Black (BK)	1-10
LK2A								
111-60119	LK2A	270	4.6	73	225	PA66	Natural (NA)	1-10
111-60110	LK2A	270	4.6	73	225	PA66	Black (BK)	1-10
111-60160	LK2A	270	4.6	73	225	PA66W	Black (BK)	1-10
111-60159	LK2A	270	4.6	73	225	PA66HS	Natural (NA)	1-10
111-60150	LK2A	270	4.6	73	225	PA66HS	Black (BK)	1-10
111-00127	LK2A	270	4.6	73	225	PA66HIR(S)	Black (BK)	1-10
LK2L								
111-60001	LK2L	350	4.8	95	225	PA66	Natural (NA)	1-10
111-60000	LK2L	350	4.8	95	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.

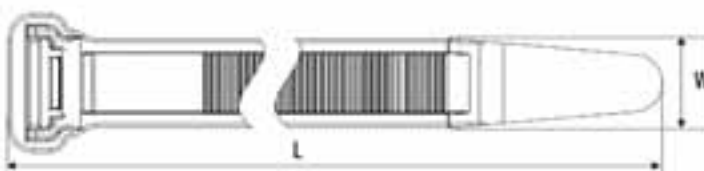
- Wide strap is designed to minimize pinching of soft hoses and convoluted tubing.
- Low profile head.
- Clamping rails on the bottom of head to increase grip on round bundles.
- Accommodates a large range of bundle diameters: 9.5mm - 104mm.
- Flexible strap.

### 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: 9.5mm - 104mm.



Wide Strap Heavy Duty Cable Ties

Material Data	
Material	<b>Polyamide 6.6 High Impact Modified, Heat and UV Stabilised (PA66HIRHSW)</b>
Operating Temperature	<b>-40 °C to +110 °C</b>
Flammability	<b>UL94 HB</b>

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

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
111-12303	<b>WSS</b>	231.14	12.7	57.15	534	PA66HIRHS	Black (BK)
111-12300	<b>WSS</b>	231.14	12.7	57.15	534	PA66HIRHSW	Black (BK)
111-12304	<b>WSI</b>	307.34	12.7	82.55	534	PA66HIRHS	Black (BK)
111-12301	<b>WSI</b>	307.34	12.7	82.55	534	PA66HIRHS	Black (BK)
111-12305	<b>WSR</b>	383.54	12.7	104.78	534	PA66HIRHS	Black (BK)
111-12302	<b>WSR</b>	383.54	12.7	104.78	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.

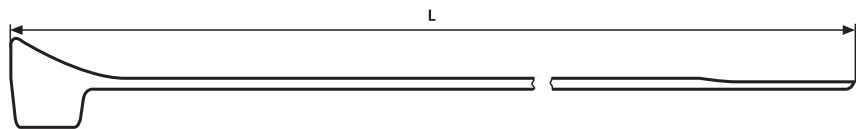
### Application

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.



CTT Hose Ties

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



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



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



Technical Table								
Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
CTT20R								
112-51919	<b>CTT20R</b>	100	2.5	13	90	PA66	Natural (NA)	1-3, 5
112-51900	<b>CTT20R</b>	100	2	13	90	PA66	Black (BK)	1-3, 5
112-51960	<b>CTT20R</b>	100	2.5	13	90	PA66HS	Black (BK)	1-3, 5
CTT60R								
112-52104	<b>CTT60R</b>	205	4.7	45	265	PA66	Natural (NA)	1-10
112-56019	<b>CTT60R</b>	205	4.7	45	265	PA66	Natural (NA)	1-10
112-52112	<b>CTT60R</b>	205	4.7	45	265	PA66HS	Black (BK)	1-10
112-56060	<b>CTT60R</b>	205	4.7	45	265	PA66HSW	Black (BK)	1-10
HRT50R								
112-00001	<b>HRT50R</b>	275	4.7	70	225	PA66	Natural (NA)	1-10
HT120R								
112-00100	<b>HT120R</b>	340	7.6	90	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.

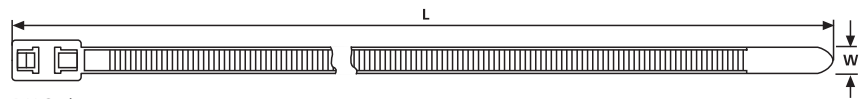
##### Application

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	<b>Polyamide 6.6 (PA66)</b>
Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
Flammability	<b>UL94 V2</b>

RoHS (in a circle) HF (halogen free) (in a circle)

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

RoHS (in a circle) HF (halogen free) (in a circle)

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

RoHS (in a circle) HF (halogen free) (in a circle)

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

RoHS (in a circle) LFH (Limited Fire Hazard) (in a circle)

## DH Series Double Headed Ties

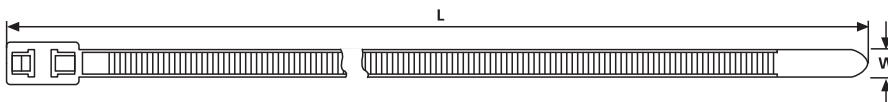


Bundling two cable runs using the DH ties.

Application Tool	Registration Numbers
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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 388.



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	50	225	180	PA66	Natural (NA)	1-10
117-05000	T50RDH	210	4.7	50	225	180	PA66	Black (BK)	1-10
117-05060	T50RDH	210	4.7	50	225	180	PA66W	Black (BK)	1-10
117-05050	T50RDH	210	4.7	50	225	180	PA66HS	Black (BK)	1-10
117-00004	T50RDH	210	4.7	50	225	180	PA46	Grey (GY)	1-10
117-05302	T50IDH	305	4.7	38	225	180	PA66	Natural (NA)	1-10
117-05362	T50IDH	305	4.7	38	225	180	PA66	Black (BK)	1-10
117-05360	T50IDH	305	4.7	38	225	180	PA66W	Black (BK)	1-10
117-05402	T50LDH	395	4.7	50	225	180	PA66	Natural (NA)	1-10
117-05400	T50LDH	395	4.7	50	225	180	PA66	Black (BK)	1-10
117-05460	T50LDH	395	4.7	110	225	180	PA66W	Black (BK)	1-10
117-00008	T50LDH	395	4.7	110	225	180	PA66HS	Black (BK)	1-10

All dimensions in mm. Subject to technical changes.



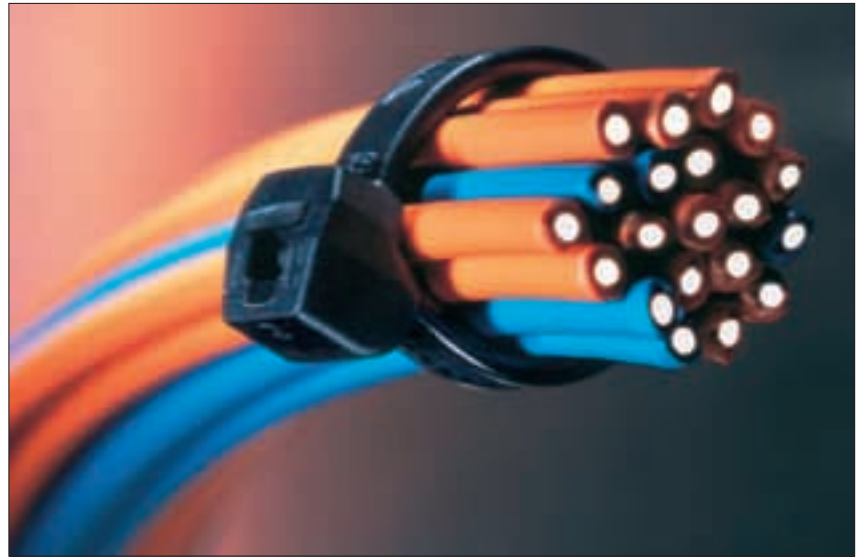
Please Note for Product Specific Approvals please refer to the Appendix

#### 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 inside serrated cable tie design causing damage to cable insulations, especially in vibration environments.

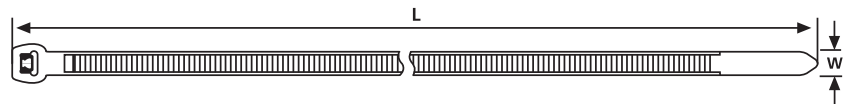
The OS range of outside serrated cable ties have overcome these problems. The design offers high tensile strengths, low insertion forces and a smooth surface to the cable insulation - minimising any indentation or damage. The curved shape of the head allows the tie to follow the contours of the cable 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	<b>Polyamide 6.6 UV Resistant (PA66W)</b>
Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
Flammability	<b>UL94 V2</b>

**RoHS** (halogenfree)

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

**RoHS** (halogenfree)

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

**RoHS** (Limited Fire Hazard)

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

**RoHS** (Limited Fire Hazard)

## OS Series Outside Serrated Ties

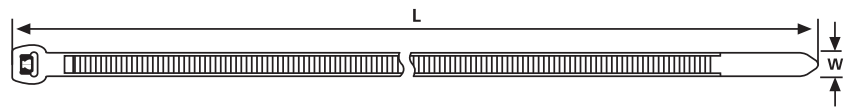


Smooth surface prevents insulation damage by chafe and indentation.

Application Tool	Registration Numbers
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MK3SP	1
MK3PNP2, 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 388.



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	80	PA66W	Black (BK)	1-3, 5
118-05060	T50ROS	200	4.6	1.6	50	225	PA66W	Black (BK)	1-5
118-05860	T50SOS	150	4.6	1.6	35	225	PA66W	Black (BK)	1-5
Polyamide 6.6 Heat Stabilised									
118-00035	T18ROS	100	2.5	1.6	20	80	PA66HS	Natural (NA)	1-3, 5
118-04702	T18ROS	100	2.5	1.6	20	80	PA66HS	Black (BK)	1-3, 5
118-00064	T30ROS	148	3.4	1.6	35	135	PA66HS	Natural (NA)	1-3, 5
118-04800	T30ROS	145	3.4	1.6	35	135	PA66HS	Black (BK)	1-3, 5
118-00044	T30LOS	200	3.4	1.6	50	135	PA66HS	Natural (NA)	1-3, 5
118-04900	T30LOS	200	3.4	1.6	50	135	PA66HS	Black (BK)	1-3, 5
118-05859	T50SOS	150	4.6	1.6	35	225	PA66HS	Natural (NA)	1-5
118-05850	T50SOS	150	4.6	1.6	35	225	PA66HS	Black (BK)	1-5
118-05059	T50ROS	200	4.6	1.6	50	225	PA66HS	Natural (NA)	1-5
118-05050	T50ROS	200	4.6	1.6	50	225	PA66HS	Black (BK)	1-5
118-00055	T50MOS	245	4.6	1.6	66	225	PA66HS	Natural (NA)	1-5
118-00018	T50MOS	245	4.6	1.6	66	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	135	PA66V0	White (WH)	1-3, 5
118-00021	T50MOS	245	4.6	1.6	66	225	PA66V0	White (WH)	1-5
Polyamide 4.6 High Temp.									
118-05878	T50SOS	150	4.6	1.6	35	225	PA46	Grey (GY)	1-5
118-00040	T50ROS	200	4.6	1.6	50	225	PA46	Natural (NA)	1-5
118-05078	T50ROS	200	4.6	1.6	50	225	PA46	Grey (GY)	1-5
118-00022	T50MOS	245	4.6	1.6	66	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.



RPE, PE Series.

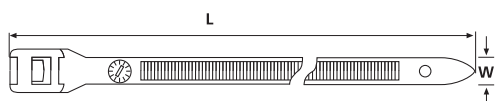
Coloured versions of PE400 are ideal for securing foam padding to playground equipment, by effectively applying the tie

'inside out'. This ensures there are no sharp edges and ultimate safety. PE400 can also be colour matched for any application.

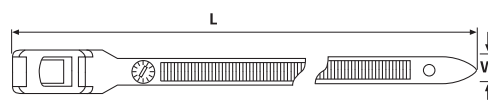
Material Data	
Material	<b>Polyamide 6.6 Heat and UV Stabilised (PA66HSW)</b>
Operating Temperature	<b>-40 °C to +85 °C Continuous, (+105 °C for 500 h)</b>
Flammability	<b>UL94 V2</b>



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



PE Series



RPE Series

##### Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour	Application Tool
112-18060	<b>PE180</b>	180	9.0	42	330	PA66HSW	Black (BK)	6-10
112-53060	<b>PE530</b>	535	9.0	146	445	PA66HSW	Black (BK)	6-10
112-18100	<b>PE400</b>	400	9.0	116	445	PA66	Green (GN)	6-10
112-18101	<b>PE400</b>	400	9.0	116	445	PA66	Blue (BU)	6-10
112-18102	<b>PE400</b>	400	9.0	116	445	PA66	Red (RD)	6-10
112-18103	<b>PE400</b>	400	9.0	116	445	PA66	Yellow (YE)	6-10
112-27560	<b>RPE275</b>	275	9.0	69	445	PA66HSW	Black (BK)	6-10
112-35060	<b>RPE350</b>	350	9.0	92	445	PA66HSW	Black (BK)	6-10

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

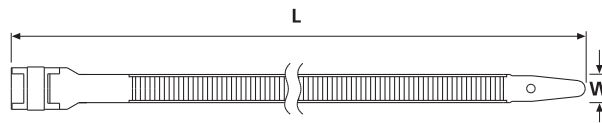
These cable ties are "outside serrated", presenting a smooth surface to the cable bundle and avoiding any problems with damage to the insulation, the width of the ties gives a broad contact area with the cable, again minimising the risk of damage. The PE/RPE ranges have the benefit of EDF (French Electricity 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

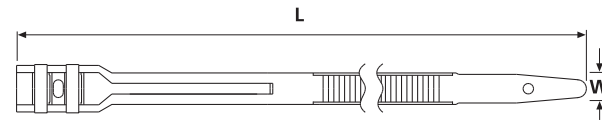
Designed primarily for use within the electrical supply industry these ties are particularly useful in areas with limited space, e.g. cable bundling in shafts and are particularly suitable for outdoor use.



LPH Series.



LPH175 Series



LPH275 Series, LPH350 Series

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

RoHS

HF (halogenfree)

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

RoHS

HF (halogenfree)

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	310	PA66	Black (BK)	6-10
112-00204	LPH175	175	9	40	310	PA66W	Black (BK)	6-10
112-00301	LPH275	265	9	62	480	PA66	Black (BK)	6-10
112-00306	LPH275	265	9	62	480	PA66W	Black (BK)	6-10
112-00401	LPH350	355	9	92	480	PA66	Black (BK)	6-10
112-00404	LPH350	355	9	92	480	PA66W	Black (BK)	6-10

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

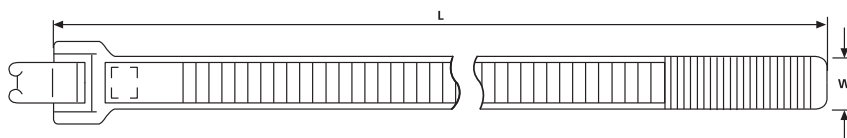
These easily released cable ties are manufactured in PA12 giving them excellent weather resistance, making them ideal for outdoor applications. The outside serrated design ensures that whilst gripping the bundle surface tightly they do not cause indentation or damage to the insulation or hose, especially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



RT Series

Material Data	
Material	Polyamide 12 (PA12)
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
131-11120	RT100	100	7.0	23	170	PA12	Black (BK)
131-11420	RT140	140	9.0	36	190	PA12	Black (BK)
131-12520	RT250	250	9.0	71	190	PA12	Black (BK)

All dimensions in mm. Subject to technical changes.

## RT, RELK, RLT Series Releasable Cable Ties

### Features and Benefits

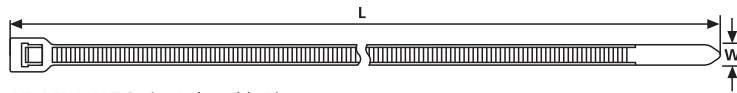
The extended pawl allows for the quick and simple release of the ties. Manufactured in various grades of PA66 these products are suitable for indoor, outdoor and high temperature applications.

### 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.



RT, RELK, RLT Series Releasable Ties

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



(halogenfree)

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



(halogenfree)

### Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Material	Colour
115-06219	<b>RT40R</b>	215	4.0	51	180	PA66	Natural (NA)
115-06200	<b>RT40R</b>	215	4.0	51	180	PA66	Black (BK)
115-06319	<b>RT50S</b>	165	4.6	35	225	PA66	Natural (NA)
115-06300	<b>RT50S</b>	165	4.6	35	225	PA66	Black (BK)
115-02202	<b>RELK2R</b>	200	4.6	50	200	PA66	Natural (NA)
115-02200	<b>RELK2R</b>	200	4.6	50	200	PA66	Black (BK)
115-06729	<b>RELK2M</b>	250	4.6	65	200	PA66	Natural (NA)
115-02000	<b>RELK2M</b>	250	4.6	65	200	PA66	Black (BK)
115-02101	<b>RELK2I</b>	300	4.6	81	200	PA66	Natural (NA)
115-06760	<b>RELK2I</b>	300	4.6	81	200	PA66	Black (BK)
115-06919	<b>RELK2L</b>	350	4.6	95	200	PA66	Natural (NA)
115-02300	<b>RELK2L</b>	350	4.6	95	200	PA66	Black (BK)
111-70319	<b>RLT120</b>	340	7.6	90	535	PA66	Natural (NA)
111-70361	<b>RLT120</b>	340	7.6	90	535	PA66	Black (BK)
111-70119	<b>RLT150</b>	770	8.9	225	670	PA66	Natural (NA)
111-70110	<b>RLT150</b>	770	8.9	225	670	PA66	Black (BK)
111-70160	<b>RLT150</b>	770	8.9	225	670	PA66W	Black (BK)
111-70159	<b>RLT150</b>	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

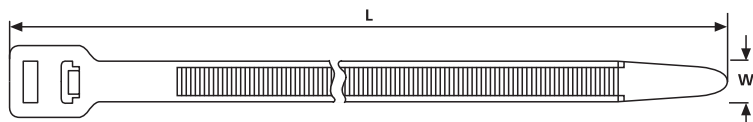
Used in a wide range of industries these releasable and reusable ties are ideal where temporary installation or the addition or removal of cables is required, for example: theatres, outdoor events or harness work. These ties are ideal for larger or heavier applications.



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

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



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	535	PA66	Black (BK)	6-9
131-75819	RT250S	230	12.5	50	1115	PA66	Natural (NA)	9
115-41800	RT250S	230	12.5	50	1115	PA66	Black (BK)	9
115-41803	RT250S	230	12.5	50	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.

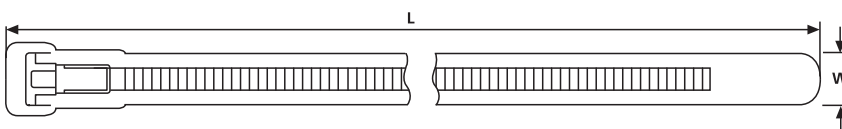
#### Material Data

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



#### Material Data

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



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	180	PA66	Natural (NA)
131-21010	REL100	100	6.7	21	180	PA66	Black (BK)
131-21419	REL140	140	7.5	35	200	PA66	Natural (NA)
131-21410	REL140	140	7.5	35	200	PA66	Black (BK)
131-21460	REL140	150	7.6	35	200	PA66W	Black (BK)
115-00027	REL180	180	6.5	46	150	PA66	Black (BK)
131-22519	REL250	250	7.6	68	200	PA66	Natural (NA)
131-22510	REL250	250	7.6	68	200	PA66	Black (BK)
131-22560	REL250	250	7.5	68	200	PA66W	Black (BK)
111-00074	REL250S	230	12.2	50	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

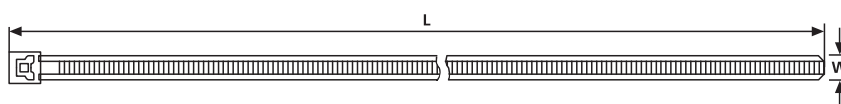
The extended pawl allows for quick and simple release of the ties. Manufactured in various colours these cable ties are ideal for applications where colour coding is required. Additionally, the LR55 Series are outside serrated, minimising the risk of damage to cable insulation.

##### 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 reusable and ideal for colour coding.



LR55 Series

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



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



#### 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	245	PA66	Red (RD)
115-00011	LR55S	145	4.7	35	245	PA66	Yellow (YE)
115-00012	LR55S	145	4.7	35	245	PA66	Green (GN)
115-00013	LR55S	145	4.7	35	245	PA66	Blue (BU)
115-00014	LR55S	145	4.7	35	245	PA66	Grey (GY)
115-00015	LR55S	145	4.7	35	245	PA66	Natural (NA)
115-00009	LR55S	145	4.7	35	245	PA66HS	Black (BK)
LR55R							
115-00003	LR55R	195	4.7	50	245	PA66	Red (RD)
115-00004	LR55R	195	4.7	50	245	PA66	Yellow (YE)
115-00005	LR55R	195	4.7	50	245	PA66	Green (GN)
115-00006	LR55R	195	4.7	50	245	PA66	Blue (BU)
115-00007	LR55R	195	4.7	50	245	PA66	Grey (GY)
115-00008	LR55R	195	4.7	50	245	PA66	Natural (NA)
115-00002	LR55R	195	4.7	50	245	PA66HS	Black (BK)

All dimensions in mm. Subject to technical changes.

## SRT Series Releasable Ties

### Features and Benefits

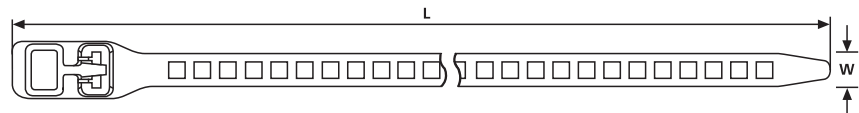
Manufactured from a soft, tear-resistant thermoplastic polyurethane these ties have several unique features: UV and weather resistant, strong yet elastic, and suitable for temperatures as low as -40 degrees C. The SRT ties are releasable and reusable which is ideal for bundling cables in temporary applications 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.



SRT Series

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



SOFTIX ties available in small quantities.

Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Pack Cont.
115-07190	SOFTFIX® XS	180	7	45	57	16
115-07270	SOFTFIX® S	260	7	79	57	12
115-11270	SOFTFIX® M	260	11	55	123	8
115-11350	SOFTFIX® L	340	11	90	123	6
115-28590	SOFTFIX® XL	580	28	150	360	3
115-28898	SOFTFIX® XXL	880	28	240	360	2

All dimensions in mm. Subject to technical changes.

### REZ Series Releasable Ties

#### Features and Benefits

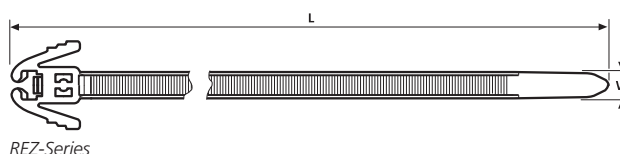
The unique, patented head design enables quick and simple use. The tie can be inserted in the normal way and pulled tight or the tail can be twisted into the open part of the head and locked into place. The quick-release mechanism can be released by one hand - even when the tie is under tension - by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



REZ-Series

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



Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Min. Tensile Strength (N)	Colour
115-40200	<b>REZ200</b>	200	4.7	50	135	Black (BK)
115-00032	<b>REZ300</b>	305	4.7	80	135	Natural (NA)
115-40300	<b>REZ300</b>	305	4.7	80	135	Black (BK)
115-00043	<b>REZ300</b>	305	4.7	80	135	Red (RD)

All dimensions in mm. Subject to technical changes.

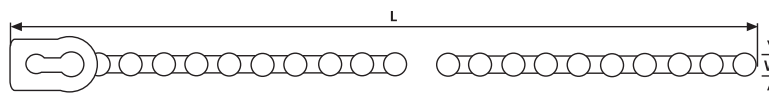
### RS1 Series

#### Features and Benefits

This bobble tie allows a simple and quick fixing.

#### Application

Ideal for temporary bundling or as a bag closure.



RS1 Series

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



Technical Table

Article-No.	Type	Length (L)	Width (W)	Bundle Ø max.	Colour
111-81100	<b>RS1</b>	110	2.0	31	Black (BK)
111-81103	<b>RS1</b>	110	2.0	31	Natural (NA)

All dimensions in mm. Subject to technical changes.