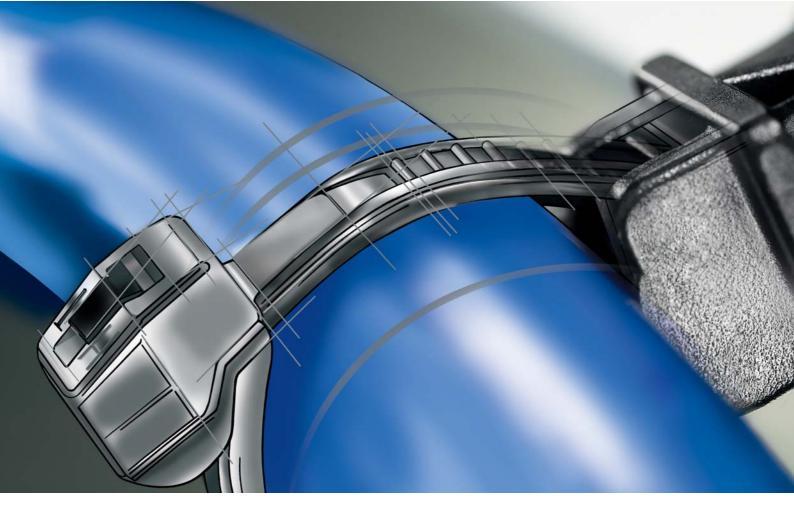


Cable Ties and Fixings





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Technical Information H-(O(CH)),(

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:

[-NH(CH2)6NH-CO(CH2)4CO]

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

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

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

- 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 64.



Properties of UV-stabilised polyamide (PA66W)

The question constantly arises as to whether a black cable tie is suitable for use outside. This is dependent 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 approx. 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 approx. 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 about 2% allow no light through and look black throughout. Standard black ties, however, are transparent on the flattened end.

Properties of polyamide PA12

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

[-NH(CH2)11CO-]

PA12 has the following advantages over PA66:

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

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

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

Properties of polyamide PA46

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

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

[NH-(CH2)4NH-CO-(CH2)4-CO-]

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

Advantages of PA46 over PA66:

- Greater rigidity, even at higher temperatres.
- 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 semicrystalline 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.

Radiation Resistance

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

Properties of Ethylenterafluorineethylen (E/TFE)

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

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

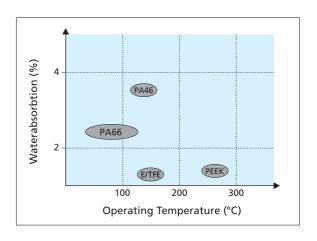
Summary of key properties:

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

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

General linguistic usage for cable ties made from raw material E/TFE is Tefzel-Tie. In addition to Tefzel from DuPont HellermannTyton is also using equivalent E/TFE raw material from other suppliers.

Tefzel® is a registered trademark of DuPont.





What does Flammability UL94 mean?

UL is the shortcut for Underwriters Laboratories. This is an independent organisation in the United States to control and certificate product safety.

Beside a lot of product standards UL also specified the flammability test UL94 for plastic materials. UL94 is a material burning test done on defined specimen of the raw material but not a test on final products.

UL94 differs between a horizontal burning test UL94 HB (picture 1) and a vertical burning test UL94 V (picture 2). For the vertical test UL94 V there are three flame ratings defined: UL94 V0, UL94 V1 and UL94 V2.

UL94 HB:

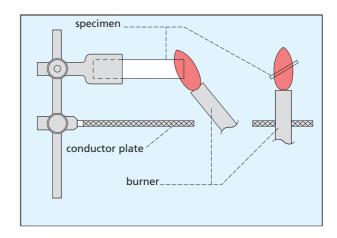
horizontal burning test

Test criteria:

• burning rate of specimen in mm/min.

Classification:

• according to HB



UL94 V:

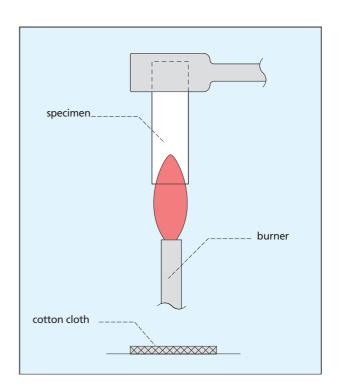
Vertical burning test

Test criteria:

- afterflame time of specimen
- drip of flaming particles

Classification:

• according to V0, V1 or V2



In all these burning test s an open flame is applied for a certain time to the specimen. As the burning behaviour also depends on the thickness of the material it is important to classify the material not only according to HB, V0, V1 or V2 but also to mention the thickness of specimen.



Following table is a summary of test procedures and requirements of the above four UL94 classification.

	Horizontal	l Test UL94	Vertical Test UL94						
Classification	н	В	V0	V1	V2				
Number of specimen	3	3	5	5	5				
Thickness of specimen	< 3 mm	3 to 13 mm		up to max. 13 mm					
1st flame application	30 sec.	30 sec.	10 sec.	10 sec.	10 sec.				
2nd flame application	-	-	10 sec.	10 sec.	10 sec.				
Burning rate	max. 75 mm/min	max. 40 mm/min	-	-	-				
Afterflame time after 1st flame application for each individual specimen	-	-	max. 10 sec.	max. 30 sec.	max. 30 sec.				
Afterflame time after 2nd flame application for each individual specimen	-	-	max. 30 sec.	max. 60 sec.	max. 60 sec.				
Total afterflame time for all 5 specimen after 1st and 2nd flame application	-	-	max. 50 sec.	max. 250 sec.	max. 250 sec.				
Afterflame or afterglow of any specimen up to its end allowed	yes	yes	no	no	no				
Cotton indicator ignited by flaming particles or drops allowed	-	-	no	no	yes				

Flammability behaviour on the following product pages are always related to the raw material burning rate according to UL94. Most commonly used raw materials for cable ties and fixing elements are Polyamide 6.6 standard, Polyamide 6.6 weather resistant and Polyamide 6.6 heat stabilised. These materials normally fulfill UL94 V2 requirement.

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Technical Information



Chemical resistances of various plastics

- = not resistant

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

Medium	Conc. [%]	Temp. [°C]	PA66	PA46	PA12	POM	PP	TPU	E/TFE (Tefzel®)	PEEK
Acetaldehyde, liquid	100	23	+	-		+	0	-	+	+
Acetone	100	23	+	+	+	+	+	-	+	+
Allyl chloride	100	23					+	-		
Formic acid	98	23	-		-	-	+	-	+	0
Aniline	100	23	+	0	0	0	+	-	+	+
Aromatic compounds						+	-		+	+
Benzaldehyde	any	23	+	0		+	+	-	+	+
Benzine/Benzol mix	2,	23	+	+	+	+	0	0	+	+
Benzol	100	23	+		+	0	0	-	+	+
Bromine	100	23		_	-	"	-	_		
Chlorine, gaesous	100	23					_	0	+	
Chlorine, liquefied	100	23		_			-		Т	
				-						
Chlorobenzene	100	23			-	0	+			
Chloroform	100	23		-	-	-	0			
Chromic acid	10	20	0	-		0	+		+	+
Chromic acid	20	23	-	-		-	+		+	+
Chromic acid	50	20	-	-		-	+		+	
CFC							0			
Cyclohexane	100	23	+			+	+	+	+	+
Cyclohexanone	100	23	+			+	+		+	+
Decahydronaphthlene	100	23	+			+	0		+	+
Diethyl ether	100	23	+			+	0		+	+
Di-isopropyl ether	100	23					0			
Dimethyl formamide	100	23	+	+		+	+		+	+
Dioctyl phthalate		23	+	+		+	+	-	+	+
Ethanonic acid	10	20	-	0	0	+	+		+	
Ethanonic acid	25	20	-			0	+		+	
Ethanonic acid	50	20	_			0	+		+	
Ethanonic acid	100	23	_	_		0	+		+	
Ethyl acetate	tech.pure	23		+	+	0	0			+
Freon	teen.pare	23		<u>'</u>	'		+			+
	100	23								
Heptane Potass Parmananata			+	+	+	+	+		+	+
Potass. Permanganate	<= 6	23	-	-	-	+	+		+	+
Ketone	400	22	+	+		+	+		+	+
Methylethylketone	100	23	+	+		0	+	-	+	+
Methyisobutylketone	100	23	+			+	+		+	+
Engine oil	100	23			+	+	+			+
Nitrobenzene	100	23	+	0		+	+	-	+	+
Ordinary petrol		23		+		+	+			+
Paraffin oil		23	+	+	+	+	+		+	+
Perchloroethylene		23	+		+	+	0	-	+	+
Petroleum		23	+	+	+	+	+		+	+
Phenol	approx. 70	23	-	-	-	-	+	-	+	
Nitric acid	10	20	-		-	-	+	-	+	+
Nitric acid	50	23	-		-	-	-	-	+	-
Carbon bisulphide	100	23	+	-	+	+	-	-	+	+
Sulphuric acid	10	20	-		0	-	+	+	+	0
Sulphuric acid	50	20	-			-	+	+	+	-
Sulphuric acid	96	23	-	-		-	-	+	+	-
Silicon oil		23	+	+	+	+	+	+	+	+
Salad oil		23	<u> </u>	0	<u> </u>	 	+	<u> </u>	· ·	+
Carbon tetrachloride	100	23	+	+	0	+	0	_	+	+
Toluol	100	23	+	+ -	+	+	0	-	+	+
								-		
Trichlorethylene	100	23	+	0	0	0	0	-	+	+
Water, cold			+		+	+				+
Water, hot	4 -				-	-	+			+
Hydrogen peroxide	10	20	0		-	+	+		+	
Hydrogen peroxide	30	23	-	-		+	+	+	+	
Xylene	100	23	+	+	+	+	0	-	+	+

Tefzel® is a registered trademark of DuPont.

General linguistic usage for cable ties made from raw material E/TFE is Tefzel-Tie. In addition to Tefzel from DuPont HellermannTyton is also using equivalent E/TFE raw material from other suppliers.





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 35).

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

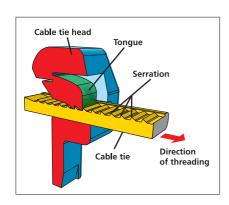
This patented lock technology takes advantage of the excellent deformation properties of polyamide (PA). Here, the glass fibre-reinforced (GRP) locking pin (yellow) is forced into the strap by the use of an application tool - either the KR6/8 or KR8PNSE (see page 105). The strap is deformed into the 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.

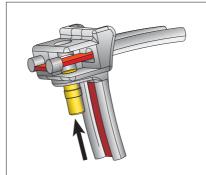
MBT series of cable ties

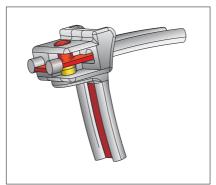
Made of stainless steel grades 304 or 316, the MBT range of cable ties have no serrations on the strap and are threaded parallel through the head, gliding under a metal ball-bearing locking mechanism. By using the MK9SST (see page 569) application tool the cable tie is tensioned and the strap cut to a flush finish.

Locking technology

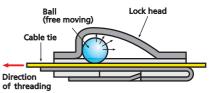
The strap is locked into the head by means of the small ball-bearing. The ball locks into the small end of the wedged shaped housing, forming a positive locking with the strap. This cable tie is not suitable for rigid objects. Retraction of the ball-bearing (see drawing) is required into the small end 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 120) 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 5400 Newton.



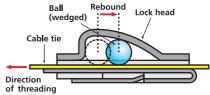




1. Initial position



2. Ball locks cable tie by wedging.



Technical Information



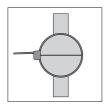
Determination of minimum tensile strength

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

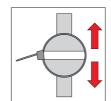
accordance with the Military Specification and Standards of the USA. Test conditions being laid down precisely in MIL-S-23190E:

- 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



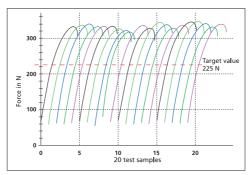
The cable tie is fixed onto a split mandrel test probe with the suitable cable tie application tool.



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:

Mass = minimum tensile strength/ acceleration due to gravity

The acceleration due to gravity is 9.81 m/s²:

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

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

Mass = 225 [kg * m/s^2] /9.81 [m/s^2]

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

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:

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

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

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







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!



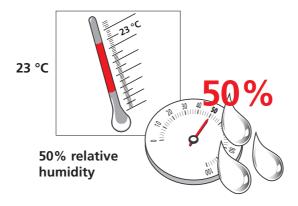
Do not store the product in sunlight; for example, on the windowsill!

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 are a supplier of highquality solutions for the routing, oganising and securing of cables, hoses and pipes. The level of quality has been inspected by the VDE (Verband der Elektrotechnik, Elektronik, Informationstechnik e.V) [German Association for Electrical, Electronic and Information Technologies]. Cable ties from the inside-serrated T-Series and the outside-serrated OS-Series have been tested in accordance to the cable tie standard DIN EN 50146 (VDE 0604 PART 201):2000-12; EN 50146:1999-08. The result of this independent testing is complete compliance:



These cable ties therefore qualify to bear the VDE symbol.

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

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

The standard includes the following tests:

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

The following HellermannTyton cable ties have been tested and certified: T-Series inside-serrated cable ties

(see page 67-73) 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 91-92)

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 64.





■ suitable	Material Data	Resistant properties	Possible applications
☐ of limited suitability			>
++ very good			industry
+ good			n pc
o limited	<u>ن</u>		
These details are only rough	ē		on utical
guide values. They should be	atu		ion eut
regarded as a material specifi- cation and are no substitute for	9	* w	ry lati
a suitability test. Please see our	E G		d ar d
datasheets for further details.	<u> </u>	ity	ind ins Sect
	ln gui	ght/ozone and grease ints mability	
	a 0 -	an an ligh	mic tric din d a
	pe at	ils olv	hel lec ooo
	e at a	UV-light, Oils and Solvents Petrol	od ild

Cable Ties Inside Serrated

Cable Ties Inside Serrated														
			-40 °C to +85 °C,											
T-Series PA66, natural	68	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+						
			-40 °C to +85 °C,											
T-Series PA66W, black	69	PA66W	Intermittent up to +105 °C (500h)	++	++	+	++	+						
			-40 °C to +85 °C,								_			
T-Series PA66, black	70	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+						
T-Series PA66, coloured	71	PA66	-40 °C to +85 °C, Intermittent up to +105 °C (500h)	0	++	+	++	+						
1-Series FA00, Colouled	/ /	FA00	-40 °C to +105 °C,	0	++	+	++	+		-	_			
T-Series PA66HS, natur	72	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	П	П		П	П	
	1		-40 °C to +105 °C,							_	_			
T-Series PA66HS, black	73	PA66HS	Intermittent up to +145 °C (500h)	О	++	+	++	+						
			-40 °C to +80 °C,											
T-Series PA66HIR(S)	74	PA66HIR(S)	Intermittent up to +105 °C (500h)	0	++	+	++	0						
			-40 °C to +85 °C,						_	_	_	_	_	
T-Series PA66V0	75	PA66V0	Intermittent up to +105 °C (500h)	0	++	+	++	++						
T-Series PA46	75	PA46	-40 °C to +150 °C für 5.000 h, Intermittent up to +195 °C (500h)	0	++	+	++	+	П	П		м	П	
T-Series E/TFE	76	E/TFE	-80 °C to +150 °C	++	++	++	++	++	-	П	_	_	_	
1 Selies B ITE	1	6/112	-40 °C up to +85 °C,	1)										
T-Series PP	76	PP	Intermittent up to +105 °C (500h)	++	++	+	++	0	П					
			-40 °C to +85 °C,											
MCT-Series	77	PA66MP	Intermittent up to +105 °C (500h)	0	++	+	++	+		_				
	l		-40 °C to +85 °C,							_	_			
LK-Series	78	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+						
LK-Series	78	PA66W	-40 °C to +85 °C, Intermittent up to +105 °C (500h)	++	++	+	++							
LK-Series	/6	FACOVV	-40 °C to +105 °C,	++	++	+	++	+		-	_			
LK-Series	78	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	П	П		П	П	
			-40 °C to +80 °C,											
LK-Series	78	PA66HIR(S)	Intermittent up to +105 °C (500h)	0	++	+	++	0						
			-40 °C to +85 °C,											
Q-ties, coloured	84	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+						
0.6 - 11-1	00	DACCIAL	-40 °C to +85 °C						_	_	_	_		
Q-ties, black	82	PA66W	Intermittent up to +105 °C (500h) -40 °C to +105 °C	++	++	+	++	+		_				
Q-ties, natural	83	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	П	П		М		
Q ties, Hatarai	05	1700113	-40 °C to +105 °C		111	-								
Q-ties, black	83	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						
Wide Strap Cable Ties	87	PA66HIRHS	-40 °C to +110 °C	0	++	+	++	+	П					
CTT-Series up to 265 N loop			-40 °C to +85 °C,											
tensile strengh	88	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+		_				
CTT-Series up to 265 N loop	00	DACCLIC	-40 °C to +105 °C,							П		П	П	
tensile strengh CTT-Series up to 265 N loop	88	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+					_	
tensile strengh	88	PA66HSW	-40 °C to +105 °C	++	++	+	++	+						
HT-Series up to 535 N loop		17 (00115	-40 °C up to +105 °C,											
tensile strengh	88	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	П					
			-40 °C to +85 °C,											
DH-Series	89	PA66W	Intermittent up to +105 °C (500h)	++	++	+	++	+		_				
DILC :	00	DAGG	-40 °C to +85 °C,							_	_			
DH-Series	89	PA66	Intermittent up to +105 °C (500h) -40 °C to +105 °C,	0	++	+	++	+						
DH-Series	89	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						
DIT SCIES		1,400113	-40 °C to +150 °C for 5.000 h,		7.7	T	7.7							
DH-Series	89	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+						

^{*} Only valid for Central European Climate 1) only PP black





		Poss	ible a	pplica	tions										Sa	ample	appli	cation	าร							
															carrier											
								S	S						& car			б		_						
			a)					Bundling of cables and wires	Bundling of optical cables						Cable routing on catenary &			Post-installation fastening		Switch cabinet installation		on				10
ogy	>	w	Ship-building/Marine		ions			ss and	ical c	es	tion	ace	N S		cate			fast		instal		Heavy duty application	ling	Temporary fastening		Turbines and engines
lou4:	dustr	hicle	ng/M	×.	nicat	ş	λ	cable	f opt	f hos	ısula	ed sk	oello		ng on	kers	no	latior	res	ineti	ø	арр	ackag	faste	_	nd en
al tec	ry inc	ay ve	iplin	enerç	mmu	good	enerç	ng of	ng o	ng o	ive ir	strict	ing k	tray	routi	ssma	ficati	ıstall	i W	cab	ixtur	duty	ng pa	rary	orme	es ar
Medical technology	Military industry	Railway vehicles	hip-b	Solar energy	Telecommunications	White goods	Wind energy	undli	undli	Bundling of hoses	Sensitive insulation	For restricted space	Fastening bellows	Cable tray	able	Harnessmakers	Identification	ost-iı	Parallel Wires	witch	Hose fixture	eavy	Securing packaging	empo	Transformer	urbin
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																		П								
		H	H		i			i		H					ė	H		H	i	i						

Material Overview



■ suitable	Material Data		Resista	nt propertie	S	Possible	applications	
☐ of limited suitability							5	
++ very good		U					industry	
+ good		0					i.	
o limited		ure			es	2	ca_	v
These details are only rough		rat			ustries	_ ;	Sector	ri e
guide values. They should be		be	* %		ngn	- 4	or	ust
regarded as a material specifi-		e B	ght/ozone and grease		>	5 5	cto	nd
cation and are no substitute for		L B	ozo		ve iii	. = .	Sec Ph	
a suitability test. Please see our	-	Ë	d	S.	abi	_ a	-	ace
datasheets for further details.	亡	at	ght and	ent	E E	je j		Sp
	ate	per	- S	olve	ammab	nemical	ildii od a	2
	Pa ⊠	O	V E	So	Fla	h C		Ae

Cable Ties Inside Serrated

Cable Ties Inside Serrated												
			-40 °C to +105 °C,									
OS-Series	91	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+				
		-HOI	-40 °C to +85 °C,									
OS-Series	91	PA66V0	Intermittent up to +105 °C (500h)	0	++	+	++	++				
			-40 °C to +150 °C for 5.000 h,									
OS-Series	91	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+		П	П	
PEEK Ties	93	PEEK	-55 °C to +240 °C	++	++	++	++	++				
			-40 °C to +105 °C,									
V-Series	94	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+				
			-40 °C to +150 °C for 5.000 h,									
V-Series	94	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+				
PE-Series			-40 °C to +85 °C,									
E.D.F. approved	95	PA66HSW	Intermittent up to +105 °C (500h)	++	++	+	++	+				
PE-Serie			-40 °C to +85 °C,									
E.D.F. approved	95	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+				
RPE-Series releaseable			-40 °C to +85 °C,									
E.D.F. approved	95	PA66HSW	Intermittent up to +105 °C (500h)	++	++	+	++	+				
			-40 °C to +85 °C,									
LPH-Series	96	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+				

Releasable Cable Ties

RELK-Series up to 200 N loop			-40 °C to +85 °C,										
tensile strengh	97	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+	П	П			
RLT-Series up to 670 N loop			-40 °C to +85 °C,										
tensile strengh	97	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
RLT-Series up to 670 N loop			-40 °C to +105 °C,										
tensile strengh	97	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+					
RLT-Series up to 670 N loop			-40 °C to +85 °C,										
tensile strengh	97	PA66W	Intermittent up to +105 °C (500h)	++	++	+	++	+					
			-40 °C to +85 °C,										
RT250-Series	98	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +85 °C,										
RT250-Series	98	PA66W	Intermittent up to +105 °C (500h)	++	++	+	++	+					
			-40 °C to +85 °C,										
REL-Series	99	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +85 °C,										
REL-Series	99	PA66W	Intermittent up to +105 °C (500h)	++	++	+	++	+					
			-40 °C to +80 °C,										
REL-Series	99	PA66HIR(S)	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +85 °C,										
LR55-Series	100	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +105 °C,										
LR55-Series	100	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+				П	
SOFTFIX-Family	101	TPU	-40 °C to +85 °C	++	+	0	0	+					
SRT-Series	101	TPU	-40 °C to +85 °C	++	+	0	0	+				П	
			-40 °C to +85 °C,										
REZ-Series	102	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +85 °C,										
SpeedyTie	103	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+					
			-40 °C to +80 °C,										
SpeedyTie	103	PA66HIR(S)	Intermittent up to +105 °C (500h)	0	++	+	++	+					
TEXTIE-Series	104	PA, PP	-20 °C to +75 °C	0	++	0	0	0					





			Possi	ible a	pplica	tions										Sa	mple	appli	catior	าร							<u>+</u>
			. 033.	DIC U	ppiica	uons			П						П		pic	ирр	cutioi	.5			П		П		
	Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Bundling of cables and wires	Bundling of optical cables	Bundling of hoses	Sensitive insulation	For restricted space	Fastening bellows	Cable tray	Cable routing on catenary & carrier	Harnessmakers	Identification	Post-installation fastening	Parallel Wires	Switch cabinet installation	Hose fixture	Heavy duty application	Securing packaging	Temporary fastening	Transformer	Turbines and engines
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	П										П							П	П					П	П		
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■ suitable		Material	Data	R	esista	nt pro	pertie	es		Poss	ible a	pplica	tions		
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++ very good													ij		
+ good													Sn C		
9			$\overline{\mathbf{c}}$										<u>=</u>		
o limited			<u></u>										-		
These details are only rough guide values. They should be			ıre						e s		_		ţ		
regarded as a material specifi-			atı						Ţ		. <u>ē</u>		en	<u>e</u>	
cation and are no substitute for			e c	*	S				<u>n</u> s	ţ	<u>a</u>		na	str	
a suitability test. Please see our			Ē	ne	ase				ino	ns	tal	ē	arr	np	
datasheets for further details.			Operating Temperature [°C]	UV-light/ozone*	greases			Flammability	Automotive industries	Chemical industry	Electrical installation	Building Sector	Food and pharmaceutical industry	Aerospace industries	
		_	bu	ţ	5	S		lig	Ę	a	a	9	ρL	ace	
		Material	ati	gh	and	Solvents	_	ш	Ĕ	ij	ŗ	=	a	sp	
	Page	ate	o e r	Ξ	Oils	<u>></u>	Petrol	E	약	eu	ect	≅	po	o c	
	Pa	Σ	ō	5	ō	S	Pe	正	Ā	Ò	亩	В	윤	ď	
Cable Ties without serration															
			-40 °C to +85 °C,												
KR-Series	105	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+							
14B 6 .		D. C.C. I.C.	-40 °C to +105 °C,						_	_				_	
KR-Series	105	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	_	_					
KD Cada	105	DACCIAL	-40 °C to +85 °C,												
KR-Series	105	PA66W	Intermittent up to +105 °C (500h) -40 °C to +85 °C,	++	++	+	++	+	ш						
KR-Series	106	PA12	Intermittent up to +105 °C (500h)	+	++	+	+	+							
KIN-Deries	100	FAIZ	-40 °C to +150 °C für 5.000 h,		++	-			_						
KR-Series	106	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+		П				П	
EL-TY-Series	108	POM	-40 °C to +85 °C	++	++	++	++	+							
				' '			1								
Cable Ties for direct fixation					ı			ı							
		PA66HIRHS,	'							_					
TAS-Series	109	PPW	-40 °C to +115 °C	0	+	+	+	0		ш					
CTE Corios	110	DAGG	-40 °C to +85 °C,				١								
CTF-Series BHT-Series,	110	PA66	Intermittent up to +105 °C (500h) -40 °C to +105 °C,	0	++	+	++	+							
with round head	111	PA66HS	Intermittent up to +145 °C (500h)	0	44		4.4	J.						П	
CT-Series,	111	TAUUN3	-40 °C to +105 °C,	0	++	+	++	+							
with square head	111	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+							
DE 863220,		7, 100, 15	-40 °C to +105 °C	Ŭ				·							
with square head	111	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+	П						
			,												
Stainless Steel Cable Ties															
AMT-Series, Metal Banding for															
Heavy Duty Application	113	SS316	-80 °C to +538 °C	++	++	++	++	++	Н						
MBT-Series with Ball-Lock	114	SS304	-80 °C to +538 °C	++	++	++	++	++				_	ш	_	
MBT-Series with Ball-Lock	115	SS316	-80 °C to +538 °C	++	++	++	++	++							
MBTXHD- / MBTUHD-Series, Double		66246	00.05 / 520.05						_	_		_	_	_	
Band Cable Ties with Ball-Lock	116		-80 °C to +538 °C	++	++	++	++	++	•	_				_	
MBT-FC-Series, Cable Ties with		SS316,	-80 °C to +538 °C,												

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117

118

118

119

119

120

SS316

SS316, SP

SS316

SS316,

SP

РО

-50 °C to +150 °C

-80 °C to +538 °C

-80 °C to +538 °C,

-50 °C to +150 °C

-80 °C to +538 °C

-80 °C to +538 °C,

-50 °C to +150 °C

-40 °C to +90 °C



Ball-Lock and Coating

Folt Locking

Folt Locking

Raster Locking

Raster Locking

MLT-Series, Cable Ties with

MLT-C-Series, Cable Ties with

MAT-Series, Cable Ties with

MAT-C-Series, Cable Ties with

LFPC Protective Channel

^{*} Only valid for Central European Climate



		Possi	ible a	pplica	tions										Sa	ample	appli	catio	ns							
Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Bundling of cables and wires	Bundling of optical cables	Bundling of hoses	Sensitive insulation	For restricted space	Fastening bellows	Cable tray	Cable routing on catenary & carrier	Harnessmakers	Identification	Post-installation fastening	Parallel Wires	Switch cabinet installation	Hose fixture	Heavy duty application	Securing packaging	Temporary fastening	Transformer	Turbines and engines
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Material Overview



■ suitable		Material [Data	ı	Resist	ant p	roper	ies		F	Possibl	e appl	ication	ıs	
☐ of limited suitability															
++ very good															
+ good															
o limited			ū												
These details are only rough			<u> </u>												
guide values. They should be			n re							es		6			
regarded as a material specifi-			atı							ţ		<u>ë</u> .			
cation and are no substitute for			ber	*	S					ng		sti	<u>></u>	v	
a suitability test. Please see our			Operating Temperature [°C]	UV-light/ozone*	ases					Automotive industries		Aerospace industries	Military industry	Public Buildings	
datasheets for further details.			<u>=</u>	020	grea			Flammability		e	S	=.	ηρι	9	
		_	6 u	ž	о 0	s		ig		Ç	n i	ace	. <u>=</u>	Bui	
	4.	Material	rat	igh	and	Solvents	_	Ĕ		Ĕ	Electronics	Sp	ar	.≌	
	Page	ate	e d	<u>-</u>	Oils	<u>~</u>	Petrol	am		utc	e C.	ero	Ξ	lqr	
	۵	Σ	0)	0	Š	۵	正		4	Ш	4	Σ	ڇ	
Fixing Ties															
1-Piece fixing ties with arrowhead			-40 °C to +85 °C,												
• with Disc	123	PA66	Intermittent up to +105 °C (500h	1)	0	++	+	++	+						
			-40 °C to +105 °C,												
• with Disc	123	PA66HS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+	_		•			
			-40 °C to +105 °C,												
• with Disc, releasable	123	PA66HS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+			ш			
a solub Diagonal and a solution of the solutio	, , ,	DACCUC	-40 °C to +105 °C,							_		_			
• with Disc, releasable, for oval Holes	123	PA66HS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+	_					
with Disc in the strap	125	PA66	-40 °C to +85 °C, Intermittent up to +105 °C (500h	,					.	П		М			
with bisc in the strap	125	PAGG	-40 °C to +150 °C for 5.000 h,	1)	0	++	+	++	+						
• with Disc in the strap	125	PA46	Intermittent up to +195 °C (500h	<i>''</i>	0	++	+	++	+						
- With Disc in the strap	123	1740	-40 °C to +85 °C,	'/						-					
• with Wings	126	PA66	Intermittent up to +105 °C (500h	1)	0	++	+	++	+	П					
			-40 °C to +85 °C,	,											
with Wings	126	PA66W	Intermittent up to +105 °C (500h	n)	++	++	+	++	+						
			-40 °C to +150 °C for 5.000 h,												
• with Wings	126	PA46	Intermittent up to +195 °C (500h	1)	0	++	+	++	+						
			-40 °C to +105 °C,												
• with Wings	126	PA66HS	Intermittent up to +145 °C (500h	۱)	0	++	+	++	0						
										_		l _			
• with Wings	127	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	+	ш		ш			
• with Wings, releasable	128	PA66	-40 °C to +85 °C, Intermittent up to +105 °C (500h	'		_ ,		, ,	_ ,						
 with Wings, releasable with Wings, releasable, 	128	FA00	-40 °C to +85 °C,	17	0	++	+	++	+						
for Oval Holes	127	PA66	Intermittent up to +105 °C (500h	1)	0	++	+	++	+	П		М			
• with Wings, releasable,			-40 °C to +150 °C for 5.000 h,			- 1						_			
for Oval Holes	127	PA46	Intermittent up to +195 °C (500h	n)	0	++	+	++	+						
• with Wings in the strap			-40 °C to +105 °C,												
T80RSF6.5F/W	129	PA66HS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+						
• with Wings in the strap			-40 °C to +150 °C for 5.000 h,												
T80RSF6.5F	129	PA46	Intermittent up to +195 °C (500h	1)	0	++	+	++	+	_		•			
T20DCF(II) T20DCF(F)	42.5	D. C.	-40 °C to +85 °C,							_		_			
• T30RSF(U), T50RSF(E)	130	PA66	Intermittent up to +105 °C (500h	1)	0	++	+	++	+	ш		ш			
T20DSE/LI)	120	DVCCIIC	-40 °C to +105 °C,	'		_,		.,	.	_					
• T30RSF(U) 2-Piece fixing ties with arrowhead	130	PA66HS PA66HS,	Intermittent up to $+145$ °C (500h -40 °C to $+105$ °C,	1)	0	++	+	++	+	-					
• with Disc	131	PA66HIRHS	Intermittent up to +145 °C (500h	2)	0	++	+	++	+	П		М			
With Disc	131	PA66HS,	-40 °C to +105 °C,	'/		1.5	F	IT	-						
• with Disc, sealed	131	PA66HIRHS	Intermittent up to +145 °C (500h	n)	0	++	+	++	+						
		PA66HS,	-40 °C to +105 °C,												
• with Disc, for Oval Holes	132	PA66HIRHS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+	П		П			
		PA66HS,	-40 °C to +105 °C,												
• for parallel routing	132	PA66HIRHS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+						
with Disc, for high temperature		PA46,	-40 °C to +150 °C for 5.000 h,												
applications (T50ROSP1/2SFT65)	133	PEEK	Intermittent up to +195 °C (500h	1)	0	++	+	++	+	П					

^{*} Only valid for Central European Climate





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P	ossible	e appl	ication	าร										Sam	ple ap	oplica	tions									
Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	Wind energy	Edge Fastening on steel plate	Fixing with self adhesive base	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	Bundling of optical cables	Fastening bellows	For thin, sensitive insulation	For restricted space	Harnessmakers	Identification of packaging	Post-installation fastening	Parallel Wires	Switch cabinets	Welded or threaded studs	Blind hole with thread	Securing packaging	Underwater use	Temporary fastening	Turbines and Engines	Strain relief
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Material Overview



suitable		Material I	Data	Re	sistant	proper	ties		P	ossible	e appl	ication	ıs	
☐ of limited suitability														
++ very good														
+ good														
o limited			ਹ											
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guide values. They should be			a.						es		S			
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a suitability test. Please see our			e B		greases		>		₽.		ngı	usi	in 5	
datasheets for further details.			T G	1	gre		= =		<u>×</u>	S	. <u>-</u>	nd	<u> </u>	
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	Page	Material	Operating Temperature [°C]	,	Oils and	Petrol	Flammability		Automotive industries	Electronics	Aerospace industries	Military industry	Public Buildings	
Fixing Ties														
1-Piece fixing ties with														
Fir Tree Mount														
• with Disc	134	PA66	-40 °C to +85 °C,	0			١							
• With DISC	134	PADO	Intermittent up to $+105$ °C (500h) -40 °C to $+105$ °C,	0	++	+	++	+		-	-			
• with Disc	134	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+			П			
Will Disc		17100115							_		_			
with Disc	135	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+						
			-40 °C to +150 °C for 5.000 h,											
• with Disc	135	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+						
• with Disc,			-40 °C to +85 °C,						_	_	_			
releasable	135	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+						
with Disc, for Oval Holes	135	PA66HIRHS	-40 °C to +105 °C	0	++	_	++	+		П	П			
• with Disc,	133	r Addi IIIVI 13	-40 °C to +150 °C for 5.000 h,	0	++	+	++	+						
for Oval Holes	135	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+						
2 Pieces Fixing Ties with Fir Tree			-40 °C to +105 °C,											
• with Disc	136	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						
			-40 °C to +150 °C for 5.000 h,											
with Disc	136	PA46	Intermittent up to +195 °C (500h)	0	++	+	++	+						
			-40 °C to +85 °C,											
with Disc	136	PA66	Intermittent up to +105 °C (500h)	0	++	+	++	+			ш			
W. B.	427	DA CCLUD(C)	-40 °C to +80 °C,						_	_				
• with Disc	137	PA66HIR(S)	Intermittent up to +105 °C (500h)	0	++	+	++	+						
• with Fir Tree,		PA66HS,	-40 °C to +105 °C, Intermittent up to +145 °C (500h),											
with Disc, for oval Holes	137		-40 °C to +105 °C	0	++	+	++	+						
1-Piece Fixing Ties for Weld Studs	157	., (00) 111(1)	.0 0 1103		1.5			'	_	_	_			
with plate to fix isolation material			-40 °C to +105 °C,											
T50SOSSBH5E	138	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						
• for cable routing above the stud			-40 °C to +105 °C,											
T50SOSSBS5OTE	138	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						
 for cable routing alongside the stud, 			-40 °C to +105 °C,											
T50SOSSBS5E	139	PA66HS	Intermittent up to +145 °C (500h)	0	++	+	++	+						

^{*} Only valid for Central European Climate



• moveable,

• moveable T50SOSSB6HE

• moveable,

WSP- Series

LFC Series

LFC Series

T50SOSSB5-High-E-C-CC

• for routing close to the stud,

• for routing close to the stud,

• for Heavy Duty Applications,

WS-Series for 6 mm studs

• for Heavy Duty Applications, WSI380 for 9 mm studs

Date of issue: April 2011

-40 °C to +105 °C,

-40 °C to +85 °C,

Intermittent up to +145 °C (500h)

Intermittent up to +105 °C (500h)

0 ++

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0 ++

0 ++

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139

140

140

PA66HS

PA66HS

PA66HS

PA66HS

PA66

141 PA66HIRHS -40 °C to +110 °C

141 PA66HIRHS -40 °C to +110 °C



P	ossible	e appl	icatior	ns										Samı	ple ap	oplicat	ions									
Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	Wind energy	Edge Fastening on steel plate	Fixing with self adhesive base	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	Bundling of optical cables	Fastening bellows	For thin, sensitive insulation	For restricted space	Harnessmakers	Identification of packaging	Post-installation fastening	Parallel Wires	Switch cabinets	Welded or threaded studs	Blind hole with thread	Securing packaging	Underwater use	Temporary fastening	Turbines and Engines	Strain relief
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Material Overview



		Material [) ata		Pociet	ant n	ronori	tion			Possibl	a anni	ication	
suitable		iviateriai L	Jata		ve515[ant pi	ropert	162			Possibl	e appi	icatior	13
□ of limited suitability														
++ very good														
+ good														
o limited			Temperature [°C]											
These details are only rough			<u> </u>											
guide values. They should be			in in							<u>e</u>		S		
regarded as a material specifi-			rat							str		ī.		
cation and are no substitute for			9	*	es					np		ıst	r.	S
a suitability test. Please see our			e	o n c	greases			>		₽.		ng	nsı	i.
datasheets for further details.			—	020	gre			Ξ		v e	S	. <u>=</u>	nd	<u>P</u>
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	d)	e r.	rat	ig	and	en	-	Ē		E	tro	Sp	tar	.2
	Page	Material	Operating	UV-light/ozone*	Oils	Solvents	Petrol	Flammability		Automotive industries	Electronics	Aerospace industries	Military industry	Public Buildings
	۵	2	0	D	0	Š	۵	ᇤ		4	ш	⋖	2	۵
ixing Ties														
for Heavy Duty Applications,			-40 °C to +80 °C,											
for parallel routing DCT-series	142	PA66HIR	Intermittent up to +110 °C (500)	1)	0	++	+	++	+					
for Heavy Duty Applications,														
for parallel routing,														
SDCTR312 for 8.0 mm studs	143	PA66HIRHSW			++	++	+	++	+					
			-40 °C to +85 °C,											
in the strap	144	PA66	Intermittent up to +105 °C (500)	1)	0	++	+	++	+					
in the strap,			-40 °C to +85 °C,											
releasable RT50RS5	144	PA66	Intermittent up to +105 °C (500)	1)	0	++	+	++	+					
releasable,			-40 °C to +85 °C,											
with flexible strap	145	PA66	Intermittent up to +105 °C (500)	1)	0	++	+	++	+	ш	ш	ш		
releasable,		D. C.C. I.C.	-40 °C to +105 °C,							_	l _	_		
Hard Push	145	PA66HS	Intermittent up to +145 °C (500l	ገ)	0	++	+	++	+	_	_	_		
releasable,	445	DA 46	-40 °C to +150 °C for 5.000 h,									_		
Hard Push	145	PA46	Intermittent up to +195 °C (500l	1)	0	++	+	++	+	Ш		ш		
-Piece Fixing Ties for Weld Studs	146	PA66HS, PA66	-40 °C to +105 °C,	۱,				١	.					
-Piece Fixing fies for Weid Studs	140	PAGG	Intermittent up to $+145$ °C (500l -40 °C to $+105$ °C,	1)	0	++	+	++	+	-	-	-		
with Plate (for isolation material)	147	PA66HS	Intermittent up to +145 °C (500)	۱ (د	0	++	+	++	+	П		М		
With Flate (101 isolation material)	147	1700113	-40 °C to +105 °C,	1/	0	TT	т	TT	т					
			Intermittent up to +145 °C (500)	2)										
		PA66HS,	-40 °C to +90 °C,	"										
• moveable	146	POM	Intermittent up to +110 °C (500)	n)	0	++	+	++	+					
		2.77	-40 °C to +150 °C for 5.000 h,											
• moveable	146	PA46	Intermittent up to +195 °C (500)	1)	0	++	+	++	+			П		
for parallel routing,		PA66HS,	-40 °C to +105 °C,											
T50SDSBS5	148		Intermittent up to +145 °C (500)	n)	0	++	+	++	0					
for parallel routing,		PA66HS,	-40 °C to +105 °C,											
T50ROSDSBS5	148	PA66HIRHS	Intermittent up to +145 °C (500)	1)	0	++	+	++	+					
			-40 °C to +105 °C,											
ixing Ties for Edges		PA66HS,	Intermittent up to +145 °C (500)	า),										
1-Piece, 1.0 - 3.0 mm, Edge Clip	149	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	0	_		•	•	
			-40 °C to +105 °C,											
2-Piece,		PA66HS,	Intermittent up to +145 °C (500)	า),										
1.0 - 3.0 mm, Edge Clip	151	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	0			ш		
2-Piece, 1.0 - 3.0 mm, Edge Clip			-40 °C to +85 °C,							_	_	_		
1.0 - 3.0 mm	151	PA66W	Intermittent up to +105 °C (500)	1)	++	++	+	++	+			_		
2-Piece,	450	PA66HS,	-40 °C to +105 °C,	,						_		_	_	
3.0 - 6.0 mm, Edge Clip	152	PA66HIRHS	Intermittent up to +145 °C (500l	1)	0	++	+	++	0	Ш	ш	ш		
2-Piece, twistable,	153	PA66HS,	-40 °C to +105 °C,	_			,			_		_		
CBT30MR, rotatable 360°	153	POM	Intermittent up to +145 °C (500l	1)	0	++	+	++	+			_		
• 2-Piece, twistable,	153	PA66HS,	-40 °C to +105 °C,	2)	0	1.1						М		
CBTO50R, rotatable 90° • 2-Piece, twistable,	133	PA66HIRHS PA66HS,	Intermittent up to $+145$ °C (500l -40 °C to $+105$ °C,	1)	0	++	+	++	+					
 Z-Piece, twistable, CBTOS50RStud5, for parallel routing 	152		Intermittent up to $+145$ °C (500)	₂)	0		_	ر بر	_					
- C. D. COOLORO COLORO DE LA COLORO DEL COLORO DE LA COLORO DEL LA COLORO DEL LA COLORO DE LA COLORO DEL LA COLORO DE LA C	1172	1 VOOI 11VU2	micrimitem up to +145 C (500)	17	U	++	+	++	+	_				

^{*} Only valid for Central European Climate





P	ossible	e appl	ication	าร										Sam	ple ap	plicat	tions									
Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	Wind energy	Edge Fastening on steel plate	Fixing with self adhesive base	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	Bundling of optical cables	Fastening bellows	For thin, sensitive insulation	For restricted space	Harnessmakers	Identification of packaging	Post-installation fastening	Parallel Wires	Switch cabinets	Welded or threaded studs	Blind hole with thread	Securing packaging	Underwater use	Temporary fastening	Turbines and Engines	Strain relief
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Material Overview



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suitable						p	- Cpcrt				223.01			
of limited suitability														
++ very good														
+ good														
o limited			Temperature [°C]											
These details are only rough			ē							S				
guide values. They should be			atu							Automotive industries		Aerospace industries		
regarded as a material specifi-			9		S					ust		str	>	
cation and are no substitute for a suitability test. Please see our			d w	UV-light/ozone*	greases					nd		qui	Military industry	Public Buildings
datasheets for further details.				20	rea			Ę.		. <u> </u>		.⊑	np	ë
datasneets for further details.		_	ō u	t/0				Pil		÷	<u>:</u>	ce	ء.	Ë
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	Page	Material	Operating	Ξ	Oils	Solvents	Petrol	Flammability		5	Electronics	0	≝	b
	Ра	Σ	0	5	Ö	So	Pe	표		Αn	亩	Ae	Ξ	Pu
Fixing Ties														
• 2-Piece, for Holes														
T50ROSEC2.5A		PA66HS,	-40 °C to +105 °C,											
for routing parallel to an edge	154	PA66HIRHS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+					
• 2-Piece, for Holes														
T50REC2.5B,		PA66HS	-40 °C to +105 °C,							_	_	_		
for routing horizontal to an edge	154	PA66HIRHS	Intermittent up to +145 °C (500h	۱)	0	++	+	++	+	_	_	_		
2-Piece Fixing Ties with Pipe Clip	155	PA46	-40 °C to +150 °C for 5.000 h, Intermittent up to +195 °C (500h	,	0	4.1	,	4.		П		П		
2-riece rixing ries with ripe Clip	133	PA46 PA66HS,	-40 °C to +105 °C,	1)	0	++	+	++	+					
• twistable 90°	155	PA66HIRHS	Intermittent up to +145 °C (500h	n)	0	++	+	++	+					
		PA66HS,	-40 °C to +105 °C,											
• twistable 360°	156	PP	Intermittent up to +145 °C (500h	۱),	0	++	+	++	+			П		
		PA66HS,	-40 °C to +105 °C											
• twistable 360°	156	PA66HIRHS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+			•		
	1.55	DAGGUG	-40 °C to +105 °C,							_		_		
• twistable 360°	156	PA66HS	Intermittent up to +145 °C (500h	1)	0	++	+	++	+	Ш		ш		
• twistable 360°	156	PA46	-40 °C to +150 °C for 5.000 h, Intermittent up to +195 °C (500h	,	0	++	+	++	+					
2-Piece Fixing Ties for Heavy	130	1740	intermittent up to 1133 °C (300)	"			'			-				
Duty Applications, for Screws			-40 °C to +150 °C for 5.000 h,											
HDM6-Series for M6 screws	157	PA46	Intermittent up to +195 °C (500h	n)	0	++	+	++	+					
			-40 °C to +105 °C		0	++	+	++	+					
• HDM6-Series for M6 screws	157	PA66HIRHS	-40 °C to +150 °C for 5.000 h,											
HDM8-Series for M8 screws	157	PA46	Intermittent up to +195 °C (500h	1)	0	++	+	++	+					
HDM8-Series for M8 screws	157	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	+			_		
1-Piece Fixing Ties	150	DACC	-40 °C to +85 °C,	,								_		
• with Mounting Head for Screws	158	PA66	Intermittent up to $+105$ °C (500h -40 °C to $+85$ °C,	1)	0	++	+	++	+					
with Mounting Head for Screws	158	PA66W	Intermittent up to +105 °C (500h	1)	++	++	+	++	+					
			-40 °C to +85 °C,							_				
• with flexible strap, releasable	159	PA66	Intermittent up to +105 °C (500h	1)	0	++	+	++	+					
			-40 °C to +85 °C,											
• with flexible strap, releasable	159	PA12	Intermittent up to +105 °C (500h	1)	+	++	+	+	+			•		
a with the AMERICA	1.00	DA CCI III	-40 °C to +80 °C,											_
• with peg, WPT230	160	PA66HIR	Intermittent up to $+105$ °C (500h -40 °C to $+85$ °C,	1)	0	+	+	+	0					
with Self Adhesive Socket, T18RSA	160	PA66	Intermittent up to +105 °C (500h	n)	0	++	+	++	+					
2-Piece Fixing Ties	1.00	1,100	c.mc.n. up to 1105 C (5001	'/										
• for parallel separation, T50RCoupler	161	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	+			П		
			-40 °C to +150 °C for 5.000 h,											
• for parallel separation, T50RCoupler	161	PA46	Intermittent up to +195 °C (500h	1)	0	++	+	++	+			•		
		D. 66:	40.00 . 405.55							_	_	_		
 for parallel separation, T120RCoupler 	161	PA66HIRHS	-40 °C to +105 °C		0	++	+	++	+					

^{*} Only valid for Central European Climate





P	ossible	e appl	ication	ns										Sam	ple ap	oplicat	tions									
Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	Wind energy	Edge Fastening on steel plate	Fixing with self adhesive base	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	Bundling of optical cables	Fastening bellows	For thin, sensitive insulation	For restricted space	Harnessmakers	Identification of packaging	Post-installation fastening	Parallel Wires	Switch cabinets	Welded or threaded studs	Blind hole with thread	Securing packaging	Underwater use	Temporary fastening	Turbines and Engines	Strain relief
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Material Overview



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suitable		Mater	ial Data	R	esista	nt pro	pertie	es		Poss	ible a _l	oplica	tions		
of limited suitability													5		
++ very good													Food and pharmaceutical industry		
+ good			°CI										pu		
o limited			• 1										=		
These details are only rough			ē						S				. <u>;</u>		
guide values. They should be			tu						rie.		on		ent	es	
regarded as a material specifi-			e L						ıst	~	ati		acc	Ë	
cation and are no substitute for			Temperature	UV-light/ozone*	greases				Automotive industries	Chemical industry	Electrical installation	ō	Ē	Aerospace industries	
a suitability test. Please see our datasheets for further details.			Ter	ZOL	,ea			₹	.= •	η	nst	Building Sector	ha	Ξ.	
datastieets for further details.				0/		10		Flammability	÷	=	=	Š	Б	e	
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Cable Tie Manue															
Cable Tie Mounts			1 10 05 1 05 05		ı		ı			ı	ı	1			ı
Fixing Parts with Special Adhesive	162	DAGG	-40 °C to +85 °C,	_					П			П			
SolidTack-Series	163	PA66	interm. up to +105 °C (500h) -40 °C to +80 °C,	0	++	+	++	+							
SolidTack-Series	163	PA66HIR	interm. up to +105 °C (500h)	0	+	+	+	o							
Screw Fixing Cable Tie Mounts	. 55		-40 °C to +85 °C,												
MB-Series Square-Cut	164	PA66	interm. up to +105 °C (500h)	0	++	+	++	+				П			
			-40 °C to +85 °C,												
TY-Series longish design	165	PA66	interm. up to +105 °C (500h)	0	++	+	++	+	•						
			-40 °C to +85 °C,											_	
TY-Series longish design	165	PA66W	interm. up to +105 °C (500h)	++	++	+	++	+	ш		Ш	ш			
O Mounts Sovies OM notural	166	PA66	-40 °C to +85 °C,												
Q-Mounts Series QM, natural	166	PAGG	Interm. up to +105 °C (500h) -40 °C to +85 °C,	0	++	+	++	+	-					-	
Q-Mounts Series QM, black	166	PA66	Interm. up to +105 °C (500h)	0	++	+	++	+	П		П	П			
Paste Adhesive Mount			-40 °C to +105 °C,												
• PMB5	167	PA66HS	interm. up to +145 °C (500h)	0	++	+	++	0							
Screw Fixing Mounts			-40 °C to +85 °C,												
LKC with overlapping curved design	168	PA66	interm. up to +105 °C (500h)	0	++	+	++	+							
a NIV with a survey of all aircon	1.00	DACC	-40 °C to +85 °C,						_		_	_		_	
NY with curved design	168	PA66	interm. up to +105 °C (500h) -40 °C to +85 °C,	0	++	+	++	+						-	
KR with curved design for KR-Ties	169	PA66	interm. up to +105 °C (500h)	0	++	+	++	+	П		П	П		П	
TAX WALL CULVED DESIGN TO TAX TIES	103	1,400	-40 °C to +85 °C,	0	1.1	-	1.1		_						
KR with curved design for KR-Ties	169	PA66W	interm. up to +105 °C (500h)	++	++	+	++	+							
			-40 °C to +105 °C,												
KR with curved design for KR-Ties	169	PA66HS	interm. up to +145 °C (500h)	0	++	+	++	+							
• KR-E/TFE for a broad temperature range	169	E-TFE	-80 °C to +170 °C	++	++	++	++	++	_					_	
CTM with curved design for big bundle diameters	171	DVCC	-40 °C to +85 °C, interm. up to +105 °C (500h)	_	, .	,			П		П	П		п	
big buridle diameters	171	PA66	-40 °C to +85 °C.	0	++	+	++	+							
CTQM with curved design for Q-ties	170	PA66	interm. up to +105 °C (500h)	0	++	+	++	+							
2. Q.M. Man carred design for Q ties			-40 °C to +85 °C,					,							
CTAM with small space requirement	172	PA66	interm. up to +105 °C (500h)	0	++	+	++	+				П			
CTAM-PEEK for high temperature															
applications up to +240 °C	172	PEEK	-55 °C to +240 °C	+	++	++	++	++	•	•					
			-40 °C to +85 °C,												
MB with flat design	173	PA66	interm. up to +105 °C (500h)	0	++	+	++	+							
TV with compact our indicate	177	DACC	-40 °C to +85 °C,	_					_			_		_	
TY with compact curved design LKM / CL with curved design	173	PA66	interm. up to +105 °C (500h) -40 °C to +85 °C,	0	++	+	++	+						-	
for sideways fixing	174	PA66	interm. up to +105 °C (500h)	0	++	+	++	+	П		П	П			
LKM / CL with curved design			-40 °C to +85 °C,	5		•		,	_		_	_			
for sideways fixing	174	PA66W	interm. up to +105 °C (500h)	++	++	+	++	+							
			-40 °C to +85 °C,												
• FH for sideways fixing	174		-40 C 10 +65 C,												

^{*} Only valid for Central European Climate





		Poss	ible a _l	nnlica	tions										Ç:	ample	annli	cation	nc							
		1 033	ible a	ррпса	tions				П			П			36	ampie	арріі		15			П			П	
Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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Material Overview



■ suitable	Mater	ial Data	Res	sistant pr	operti	es		Poss	ible ap	oplica	tions	
☐ of limited suitability											Z.	
++ very good											ustr	
+ good											npu	
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guide values. They should be		atul					Ē.		on		eut	e s
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cation and are no substitute for		Тетре	*	ses			ηdι	ndustry	= =	ŗ	Ē	gne
a suitability test. Please see our		Ter	zone	ea		₹	.= •	of I	instal	Secto	pha	<u>=</u> .
datasheets for further details.		, <u>6</u>	0/	g		pilli	ţ		= =		9	e
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Cable Tie Mounts

Cable He Woulds												
Harness Clip for Heavy Duty Applications,												
for Screws or Studs			-40 °C to +80 °C,									
Standard Torque Mounts	175	PA66HIR	interm. up to +105 °C (500h)	0	++	+	++	+				
Medium Torque Mounts	175	PA66HIR	interm. up to +105 °C (500h)	0	++	+	++	+				
High Torque Mounts	176	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	ш	ш		
High Torque Double Mounts	176	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+				
for parallel separation	177	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+				
• for Edges	178	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+				
Mounting Plates for Screw Fixing			-40 °C to +85 °C,									
MP-Series for M3 screws	179	PA66	interm. up to +105 °C (500h)	0	++	+	++	+				
			-40 °C to +85 °C,									
 MSMP-Series for M5 screws 	179	PA66	interm. up to +105 °C (500h)	0	++	+	++	+				

^{*} Only valid for Central European Climate



ellermannTyton Date of issue: April 2011



		Possi	ible a	pplica	tions										Sa	ample	appli	icatio	ns							
Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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Material Overview



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suitable		Materi	al Data	R	esista	nt pro	opertie	es		Poss	ible a	pplica	tions	
☐ of limited suitability													>	
++ very good													Food and pharmaceutical industry	
+ good			_										٦	
o limited			[-0]										=	
These details are only rough			ė –						10				ica	
guide values. They should be			Ę						<u>e</u> .		u		T.	S
regarded as a material specifi-			G						str	>	ţ		Ce	Ë
cation and are no substitute for			be l	*	es				пр	str	=	_	Ĕ	ust
a suitability test. Please see our			Temperature	on	greases			>	Ξ.	np	ste	£	har	nd
datasheets for further details.				, o z	g			≝	<u>×</u>	Ξ.	<u>=</u> .	Se	٥	. <u> </u>
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	Page	Material	Operating	UV-light/ozone*	Oils and	Solvents	Petrol	Flammability	Automotive industries	Chemical industry	Electrical installation	Building Sector	00	Aerospace industries
	-	_	O			O1	4		4	O	ш	ш	ш.	1
Fixing Elements														
Cable Fixing Cradle			-40 °C to +85 °C											
• TM1SF for cable ties width up to 5,2 mm	180	PA66	interm. to +105 °C (500h)	0	++	+	++	+						
Arrowhead Cradle			-40 °C to +85 °C,											
• SFC	181	PA66	interm. to +105 °C (500h)	0	++	+	++	+	_					
			-40 °C to +85 °C,											
Bundling Clips with Arrowhead	182	PA6	interm. to +105 °C (500h)	0	++	+	++	+	Н					Н
Bundling Clips with Arrowhead			-40 °C to +105 °C	0	++	+	++	+	÷					Н
• sealed			-40 °C to +105 °C	0	++	+	++	+	Н		Н			Н
with Harness Clip	103	r AUOMIKHS	-40 °C to +105 °C -40 °C to +105 °C,	0	++	+	++	+						
• moveable, CHA 1	184	PA66HS	interm. to +145 °C (500h)	0	++	+	++	+	П					П
moreusie, ern ()	104	17 (00) 13	-40 °C to +105 °C,				1 -				_			
• moveable, TCSFT6.5CHAMD with foam	184	PA66HS	interm. to +145 °C (500h)	0	++	+	++	+						
			-40 °C to +85 °C,											
• moveable, CHA 2	184	PA66	interm. to +105 °C (500h)	0	++	+	++	+	П					П
,			-40 °C to +150 °C,											
• for Distance Routing, SOC for 31.0 mm	185	PA46	interm. to +195 °C (500h)	0	++	+	++	+						
• for Distance Routing, SOC for 31.0 mm	185	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+						
• for Distance Routing, SOC2 for 25.0 mm	185	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	_					
Donalling Cline with 5's Torre	100	DACCLUBUG	40.9C to .10F.9C						_					
Bundling Clips with Fir Tree	186	rAbbHIKHS	-40 °C to +105 °C -40 °C to +85 °C,	0	++	+	++	+	ш					
Rundling Clins with Fir Tree	186	PA66	-40 °C to +85 °C, interm. to +105 °C (500h)											
Bundling Clips with Fir Tree	100	FAUD	11111111111111111111111111111111111111	0	++	+	++	+						
• for Oval Holes	186	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	П					П
is. Graining	130		-40 °C to +103 °C,			1		'	_		_			
for Distance Routing	187	PA66	interm. to +105 °C (500h)	0	++	+	++	+						
			-40 °C to +105 °C,											
for Distance Routing	187	PA66HS	interm. to +145 °C (500h)	0	++	+	++	+						
for Distance Routing	187	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	_					
Bundling Clips for Weld Studs			40.00						_		_			_
• movable	189	PA66HS	-40 °C to +105 °C	0	++	+	++	+						
	100	DA CCI IIS	40.00 +- 405.00						_		_			_
movable, for Connectors	189	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+						
• movable, with Harness Clip	189	POM	-40 °C to +90 °C, interm. to +110 °C (500h)						П					П
movable, with Harness Clip Bundling Clips for Weld Studs			-40 °C to +105 °C	0	++	+	++	+	н					Н
movable, BC2212	נטו	I WOOI IIVUS	-40 °C to +105 °C,		++	+	++	+						
for distance routing 12.0 and 22.0 mm	190	PA66HIRHS	interm. to +145 °C (500h)	0	++	+	++	+	П					П
• movable, BC30	.50		2 12 17 13 2 (3001)								_			_
-	190	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+						
for distance 30.0 mm				1										
Bundling Clips for Screws														

^{*} Only valid for Central European Climate





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Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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o limited These details are only rough			<u>°</u>										Food and pharmaceutical industry		
guide values. They should be			Temperature						es		_		ij	10	
regarded as a material specifi-			atı						Ξ		ë		Cen	<u>ë</u> .	
cation and are no substitute for) e r	*	Ś				<u>n</u> s	ţ	<u>a</u>		na	str	
a suitability test. Please see our			Ē	ne	ase				ino	ns	tal	tor	arr	np	
datasheets for further details.				UV-light/ozone*	greases			Flammability	Automotive industries	Chemical industry	Electrical installation	Building Sector	ph	Aerospace industries	
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	Page	Materia	Operating	-	Oils and	Solvents	Petrol	аш	t c	Je.	ect	≝	00	e ro	
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Fixing Elements															
Bundling Clips for Edges									_		_			_	
• 1,0 - 3,0 mm, Edge Clip	191	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+			ш				
a 1.0 3.0 mans Edga Clin	101	DA 46	-40 °C to +150 °C,					١.	_						
1,0 - 3,0 mm, Edge Clip1,0 - 3,0 mm, for Distance Routing,	191	PA46	interm. to +195 °C (500h)	0	++	+	++	+	_					-	
Edge Clip	191	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	П					П	
Bundling Clips for Connectors	191	AUUIIIIII	-40 °C to +105 °C,		TT	т .	77								
Yaz-Conn-Tape-Clip	192	PA66HS	interm. to +145 °C (500h)	0	++	+	++	+							
ConnectorClip movable	192	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+			П				
			-40 °C to +105 °C,												
• Rivet Mount, TY5-Series	193	PA66HS	interm. to +145 °C (500h)	0	++	+	++	+							
Fixing elements															
• for Parallel Routing, twistable,		PA66HS,	-40 °C to +105 °C						_		_				
DSWS4 with seperation 17.8 mm	194	POM	-40 °C to +85 °C	0	++	+	++	+	ш		ш				
 for Parallel Routing, twistable DSWS5 with separation 23.6 mm 	194	PA66HS	-40 °C to +105 °C, interm. to +145 °C (500h)		١	١.		١.							
• for BHT-Ties for Distance Routing,	194	PAUUIIS		0	++	+	++	+	-		-				
MSBT120 usable with max. 3 cable ties	195	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+							
• with Fir Tree, for Distance Routing,	133	17 (00) 111(11)	10 C to 1103 C								_				
S3STM50	196	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+							
BHT-Ties, for Distance Routing,															
CGS1	197	PA66HIRHSW	-40 °C to +105 °C	0	++	+	++	+							
Connector Clips															
• with Fir Tree, round hole	198	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+			•				
			-40 °C to +85 °C,												
• with Fir Tree, round hole	198	PA66	interm. to +105 °C (500h)	0	++	+	++	+	ш		ш				
a codela Elia Tanan ancienal la alla	100	DACCLUB	-40 °C to +80 °C,						_		_				
with Fir Tree, round hole	199	PA66HIR	interm. to +105 °C (500h)	0	++	+	++	+	-						
• with Fir Tree, for Oval Holes	200	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+							
			-40 °C to +80 °C,												
• with Fir Tree, for Oval Holes	200	PA66HIR	interm. to +105 °C (500h)	0	++	+	++	+			•				
(5) 5) 6	201	DA CCLUBIT	40.00 4 405.00						_		_				
for Edges, Edge Clip Plactic Nuts	201	PA66HIKHS	-40 °C to +105 °C	0	++	+	++	+	_		ш				
Plastic Nuts • KM	202	DVECHIDITIC	-40 °C to +105 °C	0	++	+	++	+							
	1/0/	CHAIDOORIL	1-40 C 10 + 100 C	()	++	. +	++				1	1			1

^{*} Only valid for Central European Climate





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Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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☐ of limited suitability													_		
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These details are only rough													a		
guide values. They should be			ž n						es		_		ij	S	
regarded as a material specifi-			rat						ij	_	ti o		cer	Ē.	
cation and are no substitute for			D e	*	S				que	t.	<u>=</u>	_	шa	ıst	
a suitability test. Please see our			Temperature	one	ase			>	Ξ.	gns	sta	5	ar	ηdι	
datasheets for further details.				020	greases			=	8	<u>.</u>	Ξ.	Sec	p	.= o	
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	Page	Material	Operating	UV-light/ozone*	Oils and	Solvents	Petrol	Flammability	Automotive industries	Chemical industry	Electrical installation	Building Sector	Food and pharmaceutical industry	Aerospace industries	
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Climps and Clamps			40.06 / 05.06		l										
Screw Clips	203	PA66	-40 °C to +85 °C,											П	
TY8H1 with flat design	203	PAGG	interm. to +105 °C (500h) -40 °C to +80 °C,	0	++	+	++	+	-			-			
• ASI-Clip	203	PA66HIR	interm. to +105 °C (500h)	0	++	+	++	+							
Self Adhesive Clips	203	17 (001111)	-40 °C to +85 °C,												
RA-Series with round design	204	PA66	interm. to +105 °C (500h)	0	++	+	++	+	П			П		П	
9			-40 °C to +85 °C,												
• RB-Series with flat design	204	PA66	interm. to +105 °C (500h)	0	++	+	++	+	_					•	
SAC with flexible flat design	205	ST	-40 °C to +70 °C	0	++	+	++	+	П		П	П		П	
- SAC With Hexible hat design	203	31	40 C to 170 C			'									
• 130100 for Flat Ribbon Cables	205	PVC	-25 °C to +65 °C	0	++	+	++	0							
Flat Ribbon															
Cables Self Adhesive/Screw Fixing,	206	DACCLUD	40.9C to 190.9C									М		П	
• FKH-Series Wire Push In Clips	206	PA66HIR	-40 °C to +80 °C -40 °C to +85 °C,	0	++	+	++	+			ш			_	
• WPC	207	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
Screw Mount			-40 °C to +90 °C,								_				
D-Clip Series	208	POM	interm. to +110 °C (500h)	0	++	+	++	+							
Fixing Elements for Tubes and Harnesses			-40 °C to +85 °C,												
PC-Series with Arrowhead	209	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
			-40 °C to +85 °C,								_				
PC-Series with Firtree	209	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
PC-Series with Firtree	200	DA 46	-40 °C to +150 °C,								_				
• rc-series with Firtree	209	PA46	interm. to +195 °C (500h)	0	++	+	++	+							
PC-Series with Firtree	209	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+							
		2	-40 °C to +85 °C,								_				
• interconnectable, IPC-Series	210	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
			-40 °C to +80 °C,												
• interconnectable, IPC-Series	210	PA66HIR	interm. to +105 °C (500h)	0	++	+	++	+							
KSFT6.5OC1-3 with Arrowhead															
for bundle diameter 1.0 - 3.0 mm	211	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	_						
KSFT6.5OC7-9 with Arrowhead	244	DACCLUST	40.06 +- 405.06						_		_				
for bundle diameter 7.0 - 9.0 mm	211	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	ш						
HC48FT6 with Firtree or hundle diameter 4.8 mm.	211	DVECTIBLIC	10 °C to +10E °C					.	_						
or bundle diameter 4.8 mm	211	гдоонікна	-40 °C to +105 °C	0	++	+	++	+	-						
• with Automatic Locking Feature, AHC, IAH	212	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	П		П				
man Automatic Locating Feature, Arie, IAIT	212		-40 °C to +80 °C,			1		'	_		_				
• with Automatic Locking Feature, AHC, IAH	212	PA6HIR	interm. to +105 °C (500h)	0	++	+	++	+							
• for Edges, Edge Clip	213	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+							
• for Edges, Edge Clip	2	DA 551 ::-	-40 °C to +80 °C,						_		_				
	1717	PASSHIR	interm. to +105 °C (500h)	0	++	+	++	+							

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		Poss	ible a _l	pplicat	tions										Sa	ample	appli	catior	าร							
Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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Material Overview



suitable		Mater	ial Data	R	lesista	nt pro	opertie	es		Poss	ible a	pplica	tions		
suitable of limited suitability ++ 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.			Temperature [°C]	UV-light/ozone*	greases			Flammability	Automotive industries	Chemical industry sod	Electrical installation alp	Sector	and pharmaceutical industry so	Aerospace industries	
Climps and Clamps	Page	Material	Operating	UV-lig	Oils and	Solvents	Petrol	Flamm	Autom	Chemi	Electri	Building	Food	Aeros	
Fixing Elements for Corrugated Tubing															
• with Fir Tree, CTC-Series	214	PA66HIRHS	-40 °C to +105 °C	0	++	+	++	+	п						
• with Arrowhead			-40 °C to +105 °C	0	++	+	++	+							
• for Weld Studs, CTC-Series			-40 °C to +105 °C	0	++	+	++	+							
Fixing Base			-40 °C to +85 °C,												
• LOK-Series	217	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
• LOK-Series	217	PA6HIR	-40 °C to +80 °C	0	+	+	++	+							
Fixing Elements for Weld Studs			-40 °C to +85 °C,												
• SBH, SBF, CTMS	218	PA66	interm. to +105 °C (500h)	0	++	+	++	+							
Plastic Rivets		PA66	-40 °C to +85 °C,												
• TY	219		interm. to +105 °C (500h)	0	++	+	++	+							
Clips															
Aluminium "P-Clips"	220	ALU	-40 °C to +180 °C	++	++	++	++	++							
• Aluminium "P-Clips", with a Rubber Insert	221	ALU, CR	-20 °C to +80 °C	0	++	+	++	+							
AFCS Fixing Clip,															
	1	l	1	1	1	1	1	l	l	1		_	1	1	1

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for Tubes and Harnesses	225	DOM 4	40.05 / 05.05						_			_	
• SNP-Series	225	POM	-40 °C to +85 °C	0	++	+	++	+				_	
• SNP-Series	226	PA66GF13	-30 °C to +105 °C	0	+	+	+	0					
		PA66	-40 °C to +85 °C,										
Clips with elasicticated loop			interm. to +105 °C (500h)										
Cradle Clip	227	PVC	-35 °C to +85 °C	0	++	+	++	+					
Strain Relief Clips													
Klam-Klip (KK)	228	PA6HIR	-40 °C to +80 °C	0	+	+	++	+					

222 GS, PVC -20 °C to +105 °C

-100 °C to +400 °C

-40 °C to +105 °C,

-40 °C to +85 °C, interm. to +105 °C (500h)

interm. to +145 °C (500h)

SS316

PA66

PA66HS

222

223

Plated Steel and PVC Liner

• Plastic P-Clips, HP-Series

• Plastic P-Clips, HP-Series

Snapper Hose Clips

• AFCSS Fixing Clip Stainless Steel



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Possible applications					Sample applications																					
		PUSS	ible a	ppiica	LIONS																					
Medical technology	Military industry	Railway vehicles	Ship-building/Marine	Solar energy	Telecommunications	White goods	Wind energy	Edge Fastening on steel plate	Fixing on uneven surfaces	Fixing with self adhesive base	Fixing of Flat Ribbon Cables	Fastening optical cables	Drilled holes in sheet material	Bundling of cables and wires	Bundling of hoses	For restricted space	Harnessmakers	Adhesive bonding on low energy surfaces	Post-installation fastening	Parallel Wires	Blind hole with thread	Switch cabinets	Hose Connector	Welded or threaded studs	Heavy Duty Application	Turbines and engines
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Technical Information



Material specifications											
Material	Operating Temperature	Colour	Flammability	Material Properties*							
Ethylenterafluorine- ethylen - E/TFE (Tefzel®)	-80 °C to +150 °C continuous	Blue (BU)	UL94 V0	 Resistance to radioactivity UV- resistant, not moisture sentitive Good chemical resistance to: acids, bases, oxidizing agents 							
Polyamide 6.6 High Impact Modified (PA66HIR)	-40 °C to +80 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 HB	Limited brittlenes sensitivityGood at low temperature							
Polyamide 6.6 High Imp. Mod., Heat Stab. (PA66HIRHS)	-40 °C to +105 °C	Black (BK)	UL94 HB	Limited brittlenes sensitivityGood at low temperatureModified elevated max. temperature							
Polyacetal (POM)	-40 °C to +90 °C Continuous, (+110 °C for 500 h)	Natural (NA)	UL94 HB	 Limited brittlenes sensitivity Flexible at low temperature Not moisture sensitive Robust on impacts 							

		Material spe	ecifications, H	alogen Free		Rot
Material	Operating Temperature	Colour	Flammability	Material Properties*	halogenfree	
Polyamide 12 (PA12)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 HB	Good chemical resistance to: acids, bases, oxidizing agents UV- resistant		
Polyamide 6.6 (PA66)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	High yield strength		
Polyamide 6.6 Heat Stabilised (PA66HS)	-40 °C to +105 °C Continuous, (+145 °C for 500 h)	Natural (NA), Black (BK)**	UL94 V2	High yield strength Modified elevated max. temperature		
Polyamide 6.6 UV Resistant (PA66W)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Black (BK)	UL94 V2	High yield strength, UV-resistant		
Polypropylene (PP)	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Natural (NA), Black (BK)**	UL94 HB	Good chemical resistance to: organic acids Floats in water, moderate yield strength		
Thermoplastic Polyurethane (TPU)	-40 °C to +85 °C	Black (BK)	UL94 HB	High elastic, UV-resistantGood chemical resistance to: acids, bases, oxidizing agents		
Polyamide 6.6 with metal particles	-40 °C to +85 °C Continuous, (+105 °C for 500 h)	Blue (BU)	UL94 HB	High yield strength		

	M	aterial specif	ications, Limit	ed Fire Hazard
Material	Operating Temperature	Colour	Flammability	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	Resistant to high temperaturesVery moisture sensitive, low smoke sensitive
Polyamide 6.6 V0 (PA66V0)	-40 °C to +85 °C	White (WH)	UL94 V0	High yield strength, low smoke emissions
Polyolefin (PO)	-40 °C to +90 °C	Black (BK)	UL94 V0	• Low smoke emissions
Polyetheretherketone (PEEK)	-55 °C to +240 °C	Beige (BGE)	UL94 VO	 Resistance to radioactivity UV- resistant Good chemical resistance to: acids, bases, oxidizing agents Not moisture sentitive
Stainless Steel Type SS304, Type SS316	-80 °C to +538 °C	Metal (ML)	_	Corrosion resistant Antimagnetic

Tefzel® is a registered trademark of DuPont.

General linguistic usage for cable ties made from raw material E/TFE is Tefzel-Tie. In addition to Tefzel from DuPont HellermannTyton is also using equivalent E/TFE raw material from other suppliers.



^{*} 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.

Technical Information



Manual Processing Tools for Cable Ties



MK10-SB see page 561.



MK20, MK21 see page 561.



MK3SP see page 562.



see page 562.



MK7HT see page 563.



MK6 see page 563.



MK9 see page 564.



MK9HT see page 564.

Pneumatic Tensioning Tools for Cable Ties



MK3PNSP2 see page 565.



MK7P see page 566.



MK9P see page 567.

Processing Tools for Cable Ties KR-Series



KR6/8 see page 568.



KR8PNSE	
see page 568.	

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

For detailed information on Application Tools please refer to page 561.

Processing Tools for Metal Ties



MK9SST see page 569.



MTT4
see page 569.



KST-STG200 see page 569.



Technical Information



Flowchart for optimum tool selection

