



## Fixing Ties for Edges

### EdgeClip-Family

These cable ties and EdgeClip assemblies are ideal for use where holes are not acceptable or where due to temperature problems adhesives will fail. Once the cable tie is fastened around the cables the EdgeClip is presented ready for attaching to the panel. Widely used within the automotive and panel building industries these cable ties and EdgeClips save time and money.

### Features and benefits

- Easy assembly, just clip on per hand
- For edges of 1 – 3 mm or 3 – 6 mm
- Integrated metal clamp holds clip firmly in place
- Clamp consists of double tempered steel spring
- Ideal for applications where holes or adhesives are not suitable



One Step to the Web!



T50ROSEC10 fitted onto a plastic panel to hold a Ø 6 mm harness.



1-Piece Fixing Tie T50SOSEC12 can be pushed easily on edges.

The silver-grey clamp, the heart of our EdgeClips, consists of double-tempered spring steel in accordance with DIN EN 10132-4 C75S. The spring steel gives the clamp both the necessary rigidity to provide high pull-off forces and also sufficient flexibility for various possible applications.

The double coating is applied initially with a zinc plate system followed by inorganic surface sealing. Naturally, no chromium (VI) is used in this

process. The clamp therefore complies with the current EU Directive 200/53/EC on end of life vehicles and the prohibition on heavy metals. The refined spring-steel clamp also fulfils the requirements for resistance to salt spray stipulated in DIN EN ISO 9227 NSS (min. 840 h without corrosion of base metal) and DIN EN ISO 6270-Z-CH (min. 720 h without corrosion of base material). This solution has therefore been approved by many OEMs for exposed installation locations, e.g. in engine compartments and the running-gear area.

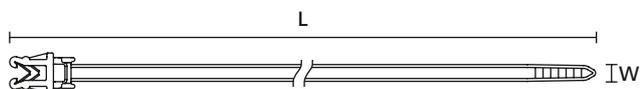


## Fixing Ties for Edges

## EdgeClip-Family



Material specification  
please see page 26.



T50SOSEC12E



EdgeClips are also available on request  
for panel thickness from 4 - 7 mm.

| TYPE         | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Panel Thickness | Material | Colour     | Tools | Article-No. |
|--------------|---------|-----------|------------|---------------|-----|-----------------|----------|------------|-------|-------------|
| T50SOSEC12E  |         | 4.6       | 160.0      | 35.0          | 150 | 1.0 - 3.0       | PA66HS   | Black (BK) | 2-10  | 148-00200   |
|              |         | 4.6       | 160.0      | 35.0          | 150 | 1.0 - 3.0       | PA46     | Grey (GY)  | 2-10  | 126-00253   |
| T50SOSEC13E  |         | 4.6       | 160.0      | 35.0          | 180 | 1.0 - 3.0       | PA66HS   | Black (BK) | 2-10  | 126-00000   |
| T40XEC5SP-E  |         | 4.0       | 85.0       | 15.0          | 178 | 1.0 - 3.0       | PA66HS   | Black (BK) | 2;4-8 | 133-00059   |
| T50SOSEC34E  |         | 4.6       | 155.0      | 35.0          | 180 | 1.0 - 3.0       | PA66HS   | Black (BK) | 2-10  | 126-00036   |
| T50SOSEC20-E |         | 4.6       | 161.0      | 35.0          | 180 | 3.0 - 6.0       | PA66HS   | Black (BK) | 2-10  | 126-00235   |

All dimensions in mm. Subject to technical changes.

| Recommended Tools |      |      |       |          |      |       |      |     |      |
|-------------------|------|------|-------|----------|------|-------|------|-----|------|
|                   | 2    | 3    | 4     | 5        | 6    | 7     | 8    | 9   | 10   |
|                   | MK20 | MK21 | MK3SP | MK3PNSP2 | EVO7 | MK7HT | MK7P | MK6 | EVO9 |
|                   | 551  | 551  | 552   | 552      | 554  | 555   | 556  | 557 | 554  |

For more information on toolings please refer to the Application Tooling chapter.

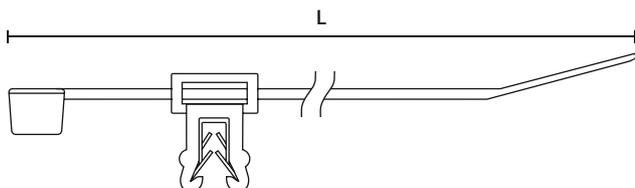


### 2-Piece Fixing Ties for Edges, 1.0 - 3.0 mm, Top Fixing

#### EdgeClip-Family

#### Features and benefits

- Pre-assembled 2-piece fixing tie with EdgeClip
- Cable tie head can be moved after bundling
- EC9, EC10, EC21 and EC22 are for minimum bundle diameters of 1 mm
- For edges of 1 – 3 mm



Fixing Tie with EC4



T50ROSEC10 fitted onto a plastic panel to hold a Ø 6 mm harness.

| TYPE         | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Material Cable Tie | Material Foot Part | Colour                   | Tools   | Article-No. |
|--------------|---------|-----------|------------|---------------|-----|--------------------|--------------------|--------------------------|---------|-------------|
| T30REC4A     |         | 3.6       | 148.0      | 33.0          | 135 | PA66HS             | PA66HIRHS          | Black (BK)               | 2;4-6   | 150-76090   |
| T50SOSEC4A   |         | 4.6       | 150.0      | 35.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 150-76093   |
| T50ROSEC4A   |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 150-76099   |
| T50ROSEC4A-W |         | 4.6       | 200.0      | 45.0          | 225 | PA66W              | PA66W              | Black (BK)               | 2-10    | 156-00570   |
| T50REC4A     |         | 4.6       | 202.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 150-76091   |
| T50RDHEC4A   |         | 4.7       | 210.0      | 19.0          | 225 | PA66               | PA66HIRHS          | Natural (NA), Black (BK) | 2-10    | 156-01721   |
| T30REC4B     |         | 3.6       | 148.0      | 35.0          | 135 | PA66HS             | PA66HIRHS          | Black (BK)               | 2;4-6;8 | 150-76080   |
| T50SOSEC4B   |         | 4.6       | 150.0      | 35.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-00109   |
| T50ROSEC4B   |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 150-76079   |
| T18REC10SD   |         | 2.5       | 100.0      | 22.0          | 80  | PA66HS             | PA66HIRHS          | Black (BK)               | 2;4-6;8 | 155-38304   |
| T50SOSEC10   |         | 4.6       | 150.0      | 31.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-00015   |
| T50ROSEC10   |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-05904   |
| T18REC9SD    |         | 2.5       | 100.0      | 22.0          | 80  | PA66HS             | PA66HIRHS          | Black (BK)               | 2;4-6;8 | 155-37104   |
| T50SOSEC9SD  |         | 4.6       | 150.0      | 31.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-00019   |
| T50ROSEC9    |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-05903   |
| T50REC9SD    |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10    | 156-01280   |
| Q50REC4A     |         | 4.7       | 210.0      | 45.0          | 220 | PA66W              | PA66W              | Black (BK)               | 2-10    | 156-01085   |
| Q50REC4B     |         | 4.7       | 210.0      | 45.0          | 220 | PA66W              | PA66W              | Black (BK)               | 2-10    | 156-01086   |

All dimensions in mm. Subject to technical changes.



#### 2-Piece Fixing Ties for Edges, 1.0 - 3.0 mm, Side Fixing

##### EdgeClip-Family

##### Features and benefits

- Pre-assembled 2-piece fixing tie with EdgeClip
- Cable tie head can be moved after bundling
- EC9, EC10, EC21 and EC22 are for minimum bundle diameters of 1 mm
- For edges of 1 – 3 mm



**Material specification please see page 26.**



T50ROSEC23 - the cable bundle runs parallel with the edge.

| TYPE       | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Material Cable Tie | Material Foot Part | Colour                   | Tools | Article-No. |
|------------|---------|-----------|------------|---------------|-----|--------------------|--------------------|--------------------------|-------|-------------|
| T30REC5A   |         | 3.6       | 148.0      | 33.0          | 135 | PA66HS             | PA66HIRHS          | Black (BK)               | 2;4-6 | 156-00003   |
| T50SOSEC5A |         | 4.6       | 150.0      | 31.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 150-40593   |
| T50ROSEC5A |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 150-40591   |
| T50SOSEC5B |         | 4.6       | 150.0      | 31.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 150-40583   |
| T50REC5B   |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 150-40582   |
| T50ROSEC5B |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 150-40581   |
| T18REC21   |         | 2.5       | 100.0      | 18.0          | 80  | PA66W              | PA66HIRHS          | Black (BK)               | 2;4-6 | 156-01231   |
| T50SOSEC21 |         | 4.6       | 150.0      | 35.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 156-00017   |
| T50ROSEC21 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 156-00010   |
| T80REC21   |         | 4.7       | 205.0      | 55.0          | 355 | PA66HS             | PA66HIRHS          | Natural (NA), Black (BK) | 2-10  | 156-01728   |
| T50ROSEC22 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 156-00011   |
| T50REC22   |         | 4.6       | 200.0      | 45.0          | 225 | PA66W              | PA66HIRHS          | Black (BK)               | 2-10  | 156-00576   |
| Q50REC5A   |         | 4.7       | 210.0      | 45.0          | 220 | PA66W              | PA66W              | Black (BK)               | 2-10  | 156-01087   |
| Q50REC5B   |         | 4.7       | 210.0      | 45.0          | 220 | PA66W              | PA66W              | Black (BK)               | 2-10  | 156-01088   |

All dimensions in mm. Subject to technical changes.

| Recommended Tools |      |      |       |          |      |       |      |     |      |  |
|-------------------|------|------|-------|----------|------|-------|------|-----|------|--|
|                   | 2    | 3    | 4     | 5        | 6    | 7     | 8    | 9   | 10   |  |
|                   | MK20 | MK21 | MK3SP | MK3PNSP2 | EVO7 | MK7HT | MK7P | MK6 | EVO9 |  |
|                   | 551  | 551  | 552   | 552      | 554  | 555   | 556  | 557 | 554  |  |

For more information on toolings please refer to the Application Tooling chapter.



### 2-Piece Fixing Ties for Edges, 3.0 - 6.0 mm, Top Fixing

#### EdgeClip-Family

#### Features and benefits

- Pre-assembled 2-piece fixing tie with EdgeClip
- Cable tie head can be moved after bundling
- For minimum bundle diameters of 1 mm
- For edges of 3 – 6 mm



Pre-assembled 2-piece fixing tie with EdgeClip.

| TYPE       | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Material Cable Tie | Material Foot Part | Colour     | Tools | Article-No. |
|------------|---------|-----------|------------|---------------|-----|--------------------|--------------------|------------|-------|-------------|
| T18ROSEC19 |         | 2.5       | 100.0      | 20.0          | 80  | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-04600   |
| T50SOSEC19 |         | 4.6       | 150.0      | 35.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-04601   |
| T50ROSEC19 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-04602   |
| T50SOSEC20 |         | 4.6       | 150.0      | 35.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-00016   |
| T50ROSEC20 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-00020   |

All dimensions in mm. Subject to technical changes.



Other combinations between cable tie and foot part available on request.

### 2-Piece Fixing Ties for Edges, 3.0 - 6.0 mm, Side Fixing

| TYPE       | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Material Cable Tie | Material Foot Part | Colour                   | Tools | Article-No. |
|------------|---------|-----------|------------|---------------|-----|--------------------|--------------------|--------------------------|-------|-------------|
| T50ROSEC23 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 156-00006   |
| T80REC23   |         | 4.7       | 205.0      | 55.0          | 355 | PA66HS             | PA66HIRHS          | Natural (NA), Black (BK) | 2-10  | 156-01729   |
| T50ROSEC24 |         | 4.6       | 200.0      | 45.0          | 225 | PA66HS             | PA66HIRHS          | Black (BK)               | 2-10  | 156-00007   |

All dimensions in mm. Subject to technical changes.

#### Recommended Tools

|  | 2    | 3    | 4     | 5        | 6    | 7     | 8    | 9   | 10   |
|--|------|------|-------|----------|------|-------|------|-----|------|
|  | MK20 | MK21 | MK35P | MK3PNSP2 | EVO7 | MK7HT | MK7P | MK6 | EVO9 |
|  | 551  | 551  | 552   | 552      | 554  | 555   | 556  | 557 | 554  |

For more information on toolings please refer to the Application Tooling chapter.



#### 2-Piece Fixing Ties for Edges, 0.5 - 2.5 mm, Top Fixing

##### EdgeClip-Family for flat and thin edges

These cable ties and EdgeClip assemblies are ideal for use where holes are not acceptable or where due to temperature problems adhesives will fail. These assemblies are widely used for fixing and bundling cables, pipes and hoses within the automotive industry, harness making, panel building and electrical industry. These EdgeClips are specially designed for applications where space is limited such as in mirrors and headlights.

##### Features and benefits

- For flat edges
- For thin edges 0.5 - 2.5 mm
- Small housing for limited space
- Pre-assembled 2-piece fixing tie with EdgeClip
- Cable tie head can be moved after bundling



T30ROSEC0,5-2,5SPV for application on thin edges.



The capabilities of our popular Edge Clip family have been enhanced with the introduction of new, smaller clips. These smaller clips allow bundles to run more safely on thin or flat edges.

| TYPE                 | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Panel Thickness | Material Cable Tie | Material Foot Part | Colour     | Tools | Article-No. |
|----------------------|---------|-----------|------------|---------------|-----|-----------------|--------------------|--------------------|------------|-------|-------------|
| T30ROSEC0.5-2.5TP-SD |         | 3.4       | 145.0      | 35.0          | 135 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01543   |
| T30ROSEC0.5-2.5TV-SD |         | 3.4       | 145.0      | 35.0          | 135 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01545   |
| T30ROSEC0.5-2.5TPVA  |         | 3.4       | 145.0      | 35.0          | 135 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01542   |

All dimensions in mm. Subject to technical changes.

#### 2-Piece Fixing Ties for Edges, 0.5 - 2.5 mm, Side Fixing

| TYPE                  | Drawing | Width (W) | Length (L) | Bundle Ø max. | N   | Panel Thickness | Material Cable Tie | Material Foot Part | Colour     | Tools | Article-No. |
|-----------------------|---------|-----------|------------|---------------|-----|-----------------|--------------------|--------------------|------------|-------|-------------|
| T30ROSEC0.5-2.5SP-SVB |         | 3.4       | 145.0      | 35.0          | 135 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01546   |
| T30ROSEC0.5-2.5SPSVA  |         | 3.4       | 145.0      | 35.0          | 133 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01797   |
| T30ROSEC0.5-2.5SPVA   |         | 3.4       | 145.0      | 35.0          | 135 | 0.5 - 2.5       | PA66HS             | PA66HIRHS          | Black (BK) | 2;4-6 | 156-01544   |

All dimensions in mm. Subject to technical changes.

| Recommended Tools |      |       |          |      |
|-------------------|------|-------|----------|------|
|                   | 2    | 4     | 5        | 6    |
|                   | MK20 | MK3SP | MK3PNSP2 | EVO7 |
|                   | 551  | 552   | 552      | 554  |

For more information on toolings please refer to the Application Tooling chapter.



### 2-Piece Fixing Ties for Edges, twistable

#### EdgeClip-Family

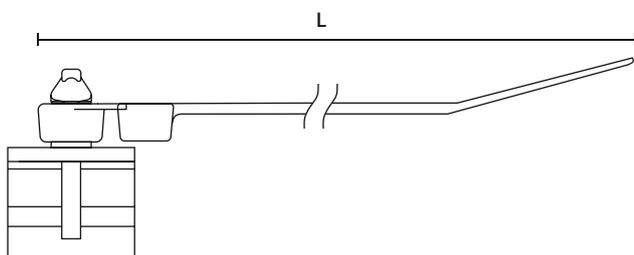
These cable ties and Edge Clip assemblies are ideal for use where holes are not acceptable or where due to temperature problems adhesives will fail. These assemblies are widely used for fixing and bundling cables, pipes and hoses within the automotive industry, harness making, panel building and electrical industry.

#### Features and benefits

- Pre-assembled 2-piece fixing tie with EdgeClip
- Easy to assemble by hand
- Cable tie head can be moved after bundling
- For edges of 1 – 2.5 mm or 1 – 3 mm
- Can be rotated to the desired position during mounting



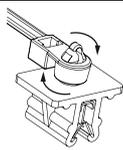
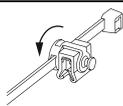
EdgeClip CBTO50R, rotatable 90°.



CBT30MR



**Material specification please see page 26.**

| TYPE          | Drawing   | Width (W) | Length (L) | Bundle Ø max. |  | Panel Thickness | Material Cable Tie | Material Foot Part | Colour     | Tools | Article-No. |
|---------------|---|-----------|------------|---------------|---|-----------------|--------------------|--------------------|------------|-------|-------------|
| CBT30MR       |  | 3.5       | 160.0      | 32.0          | 135   | 2.5             | PA66HS             | POM                | Black (BK) | 2;5-6 | 156-00049   |
| CBTO50R       |  | 4.6       | 202.0      | 47.0          | 225   | 3.0             | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-01601   |
| CBTOS50RSTUD5 |  | 4.6       | 200.0      | 47.0          | 225   | 3.0             | PA66HS             | PA66HIRHS          | Black (BK) | 2-10  | 156-00380   |

All dimensions in mm. Subject to technical changes.

| Recommended Tools   |      |      |       |          |      |       |      |     |      |  |
|---|------|------|-------|----------|------|-------|------|-----|------|--|
|   | 2    | 3    | 4     | 5        | 6    | 7     | 8    | 9   | 10   |  |
|   | MK20 | MK21 | MK3SP | MK3PNSP2 | EVO7 | MK7HT | MK7P | MK6 | EVO9 |  |
|  | 551  | 551  | 552   | 552      | 554  | 555   | 556  | 557 | 554  |  |

For more information on toolings please refer to the Application Tooling chapter.

## Material Specification Overview

| MATERIAL  | Material Shortcut  | Operating Temperature                       | Colour**                 | Flammability | Material Properties*  | Material Specifications |
|---|--------------------|---|--------------------------|--------------|---|-------------------------|
| Aluminium-alloy   | AL                 | -40 °C to +180 °C                           | Natural (NA)             |              | <ul style="list-style-type: none"> <li>Corrosion resistant</li> <li>Antimagnetic</li> </ul>   | RoHS                    |
| Chloroprene   | CR                 | -20 °C to +80 °C                            | Black (BK)               |              | <ul style="list-style-type: none"> <li>Weather-resistant</li> <li>High yield strength</li> </ul>  | RoHS                    |
| Ethylene Tetrafluoroethylene (Tefzel®)                      | E/TFE              | -80 °C to +170 °C                           | Blue (BU)                | UL 94 V0     | <ul style="list-style-type: none"> <li>Resistance to radioactivity</li> <li>UV-resistant, not moisture sensitive</li> <li>Good chemical resistance to: acids, bases, oxidizing agents</li> </ul>  | RoHS                    |
| Polyacetal  | POM                | -40 °C to +90 °C, (+110 °C, 500 h)          | Natural (NA)             | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Flexible at low temperature</li> <li>Not moisture sensitive</li> <li>Robust on impacts</li> </ul>   | RoHS                    |
| Polyamide 11  | PA11               | -40 °C to +85 °C, (+105 °C, 500 h)          | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Bio-plastic, derived from vegetable oil</li> <li>Strong impact resistance at low temperature</li> <li>Very low moisture absorption</li> <li>Weather-resistant</li> <li>Good chemical resistance</li> </ul> | HF<br>RoHS              |
| Polyamide 12  | PA12               | -40 °C to +85 °C, (+105 °C, 500 h)          | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Good chemical resistance to: acids, bases, oxidizing agents</li> <li>UV-resistant</li> </ul>   | HF<br>RoHS              |
| Polyamide 4.6   | PA46               | -40 °C to +150 °C (5000 h), +195 °C (500 h) | Natural (NA), Grey (GY)  | UL 94 V2     | <ul style="list-style-type: none"> <li>Resistance to high temperatures</li> <li>Very moisture sensitive</li> <li>Low smoke sensitiv</li> </ul>  | HF<br>LFH<br>RoHS       |
| Polyamide 6   | PA6                | -40 °C to +80 °C                            | Black (BK)               | UL 94 V2     | <ul style="list-style-type: none"> <li>High yield strength</li> </ul>   | RoHS                    |
| Polyamide 6, high impact modified                           | PA6HIR             | -40 °C to +80 °C                            | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Higher flexibility at low temperature</li> </ul>  | RoHS                    |
| Polyamide 6.6   | PA66               | -40 °C to +85 °C, (+105 °C, 500 h)          | Black (BK), Natural (NA) | UL 94 V2     | <ul style="list-style-type: none"> <li>High yield strength</li> </ul>   | HF<br>RoHS              |
| Polyamide 6.6, glass-fibre reinforced                       | PA66GF13, PA66GF15 | -40 °C to +105 °C                           | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Good resistance to: lubricants, vehicle fuel, salt water and a lot of solvent</li> </ul>   | HF<br>RoHS              |
| Polyamide 6.6, heat and UV stabilised                       | PA66HSW            | -40 °C to +105 °C                           | Black (BK)               | UL 94 V2     | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Modified elevated max. temperature</li> <li>UV-resistant</li> </ul>   | HF<br>RoHS              |
| Polyamide 6.6, heat stabilised                              | PA66HS             | -40 °C to +105 °C                           | Black (BK), Natural (NA) | UL 94 V2     | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Modified elevated max. temperature</li> </ul>   | HF<br>RoHS              |
| Polyamide 6.6, high impact modified                         | PA66HIR            | -40 °C to +80 °C, (+105 °C, 500 h)          | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Higher flexibility at low temperature</li> </ul>  | RoHS                    |
| Polyamide 6.6, high impact modified, heat and UV stabilised | PA66HIRHSW         | -40 °C to +110 °C                           | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Higher flexibility at low temperature</li> <li>Modified elevated max. temperature</li> <li>High yield strength, UV-resistant</li> </ul>                           | RoHS                    |
| Polyamide 6.6, high impact modified, heat stabilised        | PA66HIRHS          | -40 °C to +105 °C                           | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Higher flexibility at low temperature</li> <li>Modified elevated max. temperature</li> </ul>  | RoHS                    |
| Polyamide 6.6, high impact modified, ScanBlack              | PA66HIR(S)         | -40 °C to +80 °C, (+105 °C, 500 h)          | Black (BK)               | UL 94 HB     | <ul style="list-style-type: none"> <li>Limited brittleness sensitivity</li> <li>Higher flexibility at low temperature</li> </ul>  | RoHS                    |
| Polyamide 6.6, UV-resistant                                 | PA66W              | -40 °C to +85 °C, (+105 °C, 500 h)          | Black (BK)               | UL 94 V2     | <ul style="list-style-type: none"> <li>High yield strength</li> <li>UV-resistant</li> </ul>   | HF<br>RoHS              |

| MATERIAL  | Material Shortcut | Operating Temperature                 | Colour**                    | Flammability        | Material Properties*   | Material Specifications                |
|---|-------------------|---------------------------------------|-----------------------------|---------------------|--|--|
| <b>Polyamide 6.6,</b><br>with metal particles   | PA66MP            | -40 °C to +85 °C,<br>(+105 °C, 500 h) | Blue (BU)                   | UL 94 HB            | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Metal and X-Ray detectable</li> </ul>  | <b>HF</b><br><b>RoHS</b>               |
| <b>Polyamide 6.6,</b><br>with metal particles   | PA66MP+           | -40 °C to +85 °C                      | Blue (BU)                   | not flame retardant | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Metal and x-ray detectable</li> </ul>  | <b>HF</b><br><b>RoHS</b>               |
| <b>Polyamide 6.6 V0</b>   | PA66V0            | -40 °C to +85 °C                      | White (WH)                  | UL 94 V0            | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Low smoke emission</li> </ul>  | <b>HF</b><br><b>LFH</b><br><b>RoHS</b> |
| <b>Polyester</b>  | SP                | -50 °C to +150 °C                     | Black (BK)                  | halogen free        | <ul style="list-style-type: none"> <li>UV-resistant</li> <li>Good chemical resistance to: most acids, alkalis and oils</li> </ul>  | <b>HF</b><br><b>LFH</b><br><b>RoHS</b> |
| <b>Polyetheretherketone</b>   | PEEK              | -55 °C to +240 °C                     | Beige (BGE)                 | UL 94 V0            | <ul style="list-style-type: none"> <li>Resistance to radioactivity</li> <li>Not moisture sensitive</li> <li>Good chemical resistance to: acids, bases, oxidizing agents</li> </ul> | <b>HF</b><br><b>LFH</b><br><b>RoHS</b> |
| <b>Polyethylene</b>   | PE                | -40 °C to +50 °C                      | Black (BK),<br>Grey (GY)    | UL 94 HB            | <ul style="list-style-type: none"> <li>Low moisture absorption</li> <li>Good chemical resistance to: most acids, alcohol and oils</li> </ul>                                       | <b>HF</b><br><b>RoHS</b>               |
| <b>Polyolefin</b>   | PO                | -40 °C to +90 °C                      | Black (BK)                  | UL 94 V0            | <ul style="list-style-type: none"> <li>Low smoke emissions</li> </ul>  | <b>HF</b><br><b>LFH</b><br><b>RoHS</b> |
| <b>Polypropylene</b>  | PP                | -40 °C to +115 °C                     | Black (BK),<br>Natural (NA) | UL 94 HB            | <ul style="list-style-type: none"> <li>Floats in water</li> <li>Moderate yield strength</li> <li>Good chemical resistance to: organic acids</li> </ul>                             | <b>HF</b><br><b>RoHS</b>               |
| <b>Polypropylene,<br/>Ethylene-Propylene-<br/>Dien-Terpolymere-<br/>rubber</b><br>free of Nitrosamine | PP, EPDM          | -20 °C to +95 °C                      | Black (BK)                  | UL 94 HB            | <ul style="list-style-type: none"> <li>Good resistance to high temperatures</li> <li>Good chemical and abrasion resistance</li> </ul>  | <b>HF</b><br><b>RoHS</b>               |
| <b>Polypropylene</b><br>with metal particles  | PPMP              | -40 °C to +115 °C                     | Blue (BU)                   | UL 94 HB            | <ul style="list-style-type: none"> <li>Metal and X-Ray detectable</li> <li>Heat resistant</li> <li>Moderate yield strength</li> <li>Good chemical resistance</li> </ul>            | <b>RoHS</b>                            |
| <b>Polypropylene</b><br>with metal particles  | PPMP+             | -40 °C to +85 °C                      | Blue (BU)                   | not flame retardant | <ul style="list-style-type: none"> <li>High yield strength</li> <li>Metal and x-ray detectable</li> </ul>  | <b>HF</b><br><b>RoHS</b>               |
| <b>Polyvinylchloride</b>  | PVC               | -10 °C to +70 °C                      | Black (BK),<br>Natural (NA) | UL 94 V0            | <ul style="list-style-type: none"> <li>Low moisture absorption</li> <li>Good chemical resistance to: acids, ethanol and oil</li> </ul>   | <b>RoHS</b>                            |
| <b>Stainless Steel</b>  | SS304,<br>SS316   | -80 °C to +538 °C                     | Natural (NA)                | non-burning         | <ul style="list-style-type: none"> <li>Corrosion resistant</li> <li>Antimagnetic</li> <li>Weather resistant</li> <li>Outstanding chemical resistance</li> </ul>                    | <b>HF</b><br><b>LFH</b><br><b>RoHS</b> |
| <b>Thermoplastic<br/>Polyurethane</b>   | TPU               | -40 °C to +85 °C                      | Black (BK)                  | UL 94 HB            | <ul style="list-style-type: none"> <li>High elastic</li> <li>Good chemical resistance to: acids, bases and oxidizing agents</li> </ul>   | <b>HF</b><br><b>RoHS</b>               |

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\*\*More colours on request.

 = Minimum Loop Tensile Strength for Cable Ties (Newton)

**HF = Halogenfree**

**LFH = Limited Fire Hazard**

**RoHS = Restriction of Hazardous Substances**