
*Technical data*

# AUTOMOTIVE

Moulded seals made of LSR and HTV, silicone extrudates and a comprehensive range of cable protection systems/technical textiles

biw

*When it comes to competence*

## *BIW. WHEN IT COMES TO COMPETENCE*

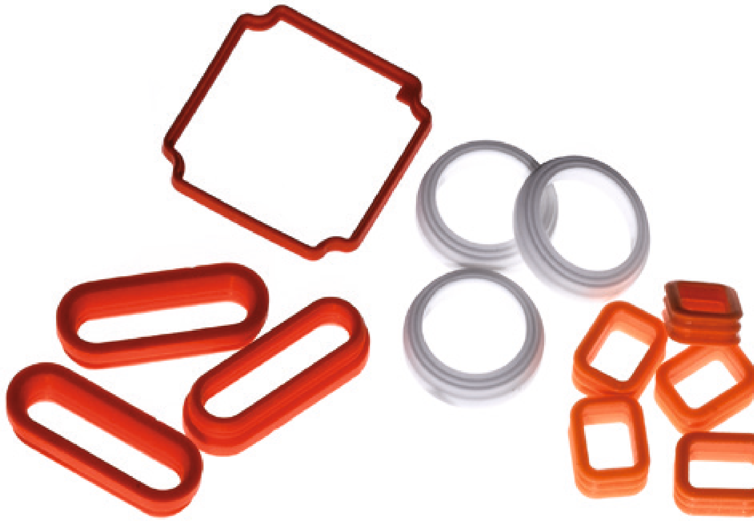
BIW products can be found in almost every industry. That's because our product range is as diverse as the applications and areas in which it can be used.

With over 4,500 tonnes of silicone processed, BIW is the European market leader for cable protection systems and one of the three largest suppliers worldwide. Our profiles and silicones are the answer to a variety of technical challenges and therefore ensure that your technology and machines are reliable and have a long service life. Depending on the requirements, they are temperature-resistant, remain flexible in low temperatures, are chemically resistant, electrically insulating, abrasion-resistant and/or highly elastic.

Our aim is to offer modern and specialized products that meet your technical and operational requirements. We do everything to ensure that you receive your goods quickly and in the desired quantity.

**600**
employees

**46,000**
$m^2$ of production area



## *MOULDS AND PROTECTION FOR THE AUTOMOTIVE INDUSTRY*

Whether for cars, lorries, buses or caravans, for internal combustion engines, plug-in hybrids or electric vehicles, our moulded seals made of LSR and HTV, our silicone extrudates and cable protection systems as well as technical textiles defy high temperatures and severe stresses. They therefore provide long-term protection for vehicles and people.

The automotive sector places the highest demands on mechanical stability, temperature resistance, noise insulation as well as abrasion and crash resistance: Our sealing, insulation and protection solutions meet these demands. We are certified according to the automotive standard IATF 16949 and meet the requirements and test catalogue according to "Original Equipment Manufacturer" (OEM). For decades, we have been impressing our partners as an OEM, first-tier supplier, component supplier and assembler.

Our fabric-reinforced sleeves, moulded parts and profiles made of silicone, as well as our fabric sleeves, can be found throughout the entire vehicle. They seal plugs, protect flap and controller seals, insulate air-conditioning technology, encase lighting technology and fill airbag generators. Our silicone products can be dyed in all RAL colours and thus adapted precisely to your requirements in terms of appearance. In short: there are virtually no limits to the possible applications of our silicones in the automotive industry.

# ALL-ROUND PROTECTION: SILICONE

Connecting leads and cables in automotive electrical systems require special protection.
We use very durable silicones for this. These have unique material properties.

We impregnate or coat braided and knitted cable protection sleeves for lines with silicone elastomers. This stabilises their diameter, allowing us to calibrate to the target dimension. It also makes the surfaces cut-resistant, preventing fraying and, most importantly, providing impermeability to water.

Our silicones are highly resistant to aggressive media and offer high-temperature flexibility. The good electrical properties of the material ensure remarkable electrical insulation of cables and wires. The silicones used are also characterised by excellent UV and ozone resistance and a high level of resilience. As special protection against marten bites, we also offer various marten protection sleeves that are institute-tested against marten bites (*www.youtube.com/watch?v=aDIUGD1s3BQ*). No matter what product you need, you can count on a long service life.



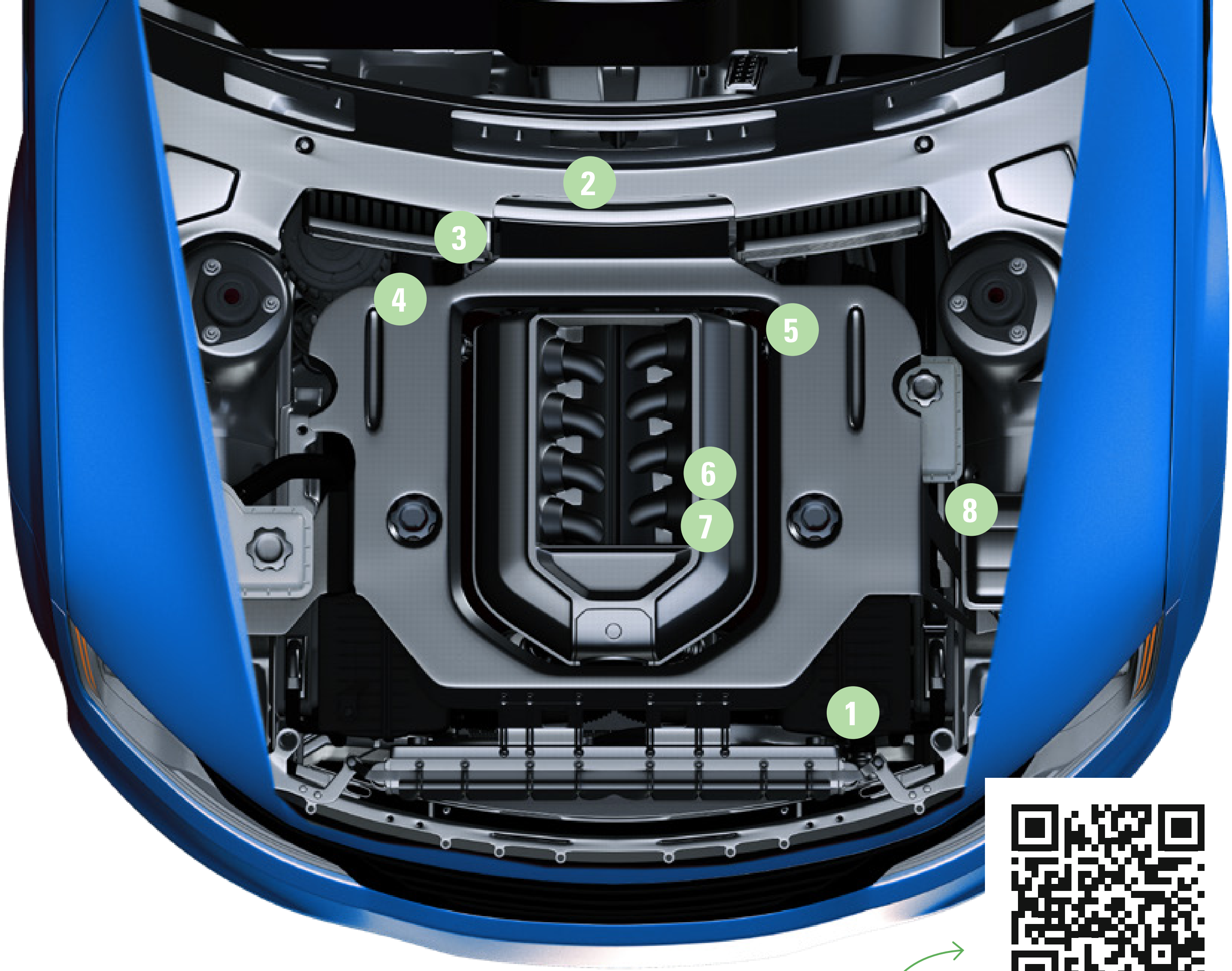
## THE POSSIBLE AREAS OF APPLICATION ARE MANIFOLD, HERE ARE SOME EXAMPLES:

- Electrical wiring systems
- Temperature sensors
- Engine/motor cabling
- Battery cables
- Seat cabling
- Airbags
- Brake lines
- Door locking systems
- Air-conditioning lines
- Sliding roof systems (frame seal)
- Moulded seals
- Lighting systems
- Rainwater drain hoses
- Spark plug connector gaskets
- 2-component parts
- Door and window seals
- Windshield washer systems
- Housing seals
- Impact protection
- Fittings
- Edge protection


*Scan the QR code now and learn about our basalt-fibre products.*


*Scan the QR code now for an overview of the products offering protection against marten damage.*

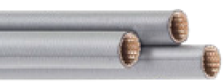

*Scan the QR code now and take a look at our e. g. protection profile brochure.*




*Scan the QR code now and discover more products presented in an interactive car.*

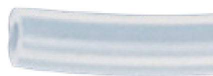
**1** **CRASH PROTECT R**
cost-efficient crash protection (short-circuit- and marten-protection) with many flexible applications

**2** **FLEXTEX SK**
self-closing, abrasion-resistant line protection



**3** **ISOTEX 300R / ISOFLEX 300R**
optimal heat reflection protection

**4** **EXPANDEX PET / PA6.6**
our classic abrasion protection

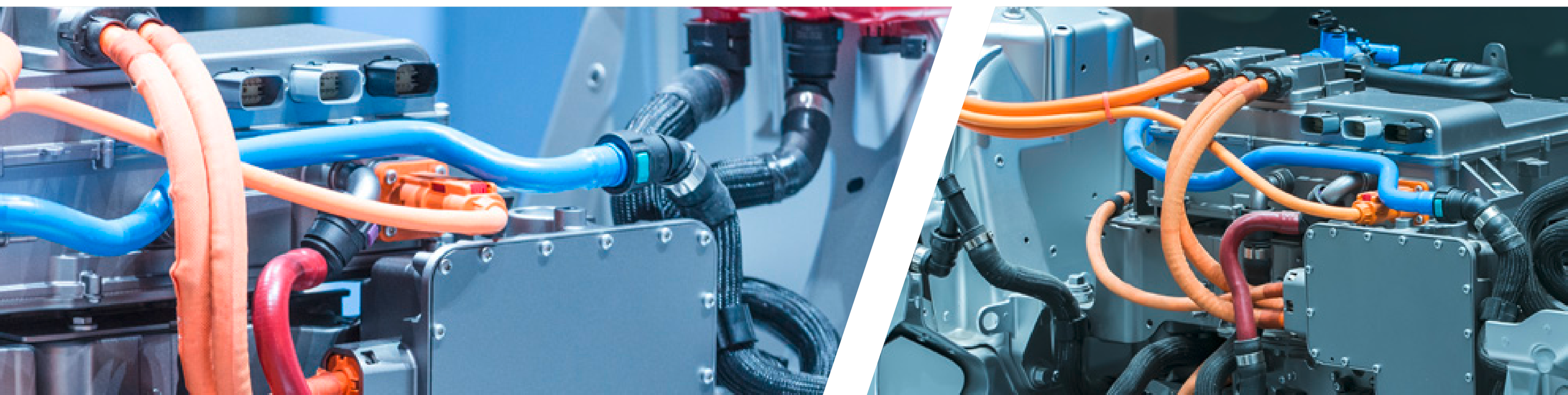


**5** **SILICONE SLEEVES**
high-quality temperature and abrasion protection

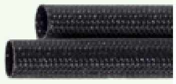
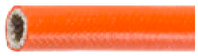
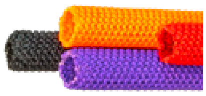
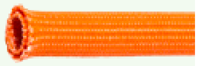
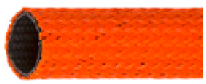
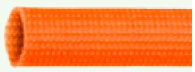
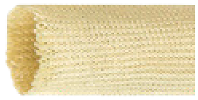
**6** **ISOTEX H250 PERFORATED**
special hybrid protection

**7** **ISOFLEX**
cost-effective standard line protection

**8** **THERMOFLEX RI (MARTEN)**
accident/crash protection (marten protection sleeve)



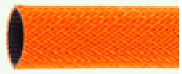
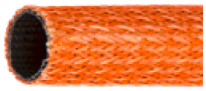
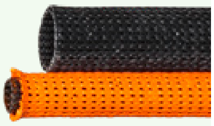
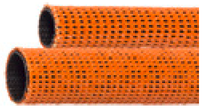
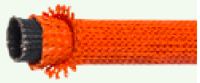
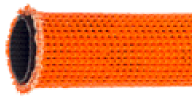
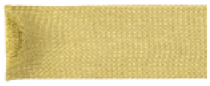
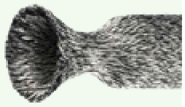
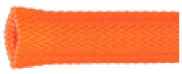
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ACRYTEX** | E-glass<br>Acrylic resin | Ø (inside) 0.5 – 30<br>wall thickness 0.3 – 1.2 | 155 | 180 | | |
| **ALUFLEX A** | E-glass<br>Pure aluminium | Ø (inside) 8 – 35<br>wall thickness 0.5 – 2.0 | * 200 | * 220 | 600 | |
| **ALUTEX** | E-glass<br>Pure aluminium | Ø (inside) 10 – 35<br>wall thickness 0.4 – 1.6 | * 200 | * 220 | 600 | |
| **ARA-ISOTEX** | Aramid<br>E-glass<br>Silicone | Ø (inside) 10 – 30<br>wall thickness 1.0 – 2.5 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ARA-ISOTEX L** | Aramid<br>E-glass<br>Liquid silicone | Ø (inside) 10 – 30<br>wall thickness 1.0 – 2.5 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ARA-PETFLEX reverse** | Aramid<br>Polyester<br>Silicone resin | Ø (inside) 11 – 22<br>wall thickness 1.2 – 1.8 | 180 | 205 | | |
| **ARA-TEX DUO** | Aramid<br>E-glass<br>Silicone resin | Ø (inside) 10 – 24<br>wall thickness 1.0 – 2.5 | 210 | 235 | | |
| **ARA-TEX DUO L** | Aramid<br>E-glass<br>Liquid silicone | Ø (inside) 10 – 24<br>wall thickness 1.0 – 2.5 | 210 | 235 | | |
| **ARA-TEX RI** | Aramid<br>E-glass<br>Silicone resin | Ø (inside) 5 – 30<br>wall thickness 0.5 – 1.5 | 210 | 235 | | |
| **ARA-TEX ROH** | Aramid<br>E-glass | Ø (inside) 5 – 30<br>wall thickness 1.0 – 1.5 | 250 | 275 | | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302/TL1010<br>LV 312-3<br>DIN EN 60684<br>Bosch standard 5 997 447 | easy assembly of long cable sets, suitable for e-mobility, can be used in sensor area, textile glass sleeve temperature resistance up to + 450 °C |  |
| | | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for applications involving reflection of thermal radiation, radiant heat up to + 600 °C, thanks to the aluminium foil wrapped in longitudinal direction, the sleeve can be easily installed in narrow bend radii |  |
| | | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for applications involving reflection of thermal radiation, radiant heat (up to + 600 °C), wrapped aluminium foil |  |
| x | x | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, suitable for high-voltage applications, flexible and expandable, crash protection, thick-walled, thermally insulating, signal colour orange |  |
| x | x | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, suitable for high-voltage applications, extremely flexible and expandable, crash protection, thick-walled, thermally insulating, signal colour orange |  |
| x | x | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility applications, extremely high abrasion resistance, crash protection, suitable for high-voltage applications, very smooth inner surface of the sleeve, making it very easy to install in long cable harnesses, drop tower tested, available in orange, violet, red and black |  |
| x | x | suitable but not institute tested | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extremely high demands, e-mobility, hybrids, commercial vehicles, especially suitable for high-voltage applications, double-layer protective sleeve, thermally insulating, abrasion and crash protection, very good protection against marten damage, signal colour orange |  |
| x | x | x | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extremely high demands, e-mobility, hybrids, commercial vehicles, especially suitable for high-voltage applications, double-layer protective sleeve, thermally insulating, abrasion and crash protection, institute tested against marten damage, signal colour orange |  |
| | x | x | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, thermally insulating, good abrasion protection, institute tested against marten damage, drop tower tested, signal colour orange |  |
| | x | | | FMVSS 302/TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | thermally insulating, suitable for very high mechanical and chemical stress, extremely flexible, suitable for e-mobility, good abrasion protection |  |


**Temperature resistance on the sleeve surface*
***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

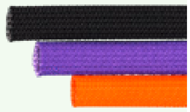
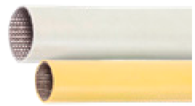
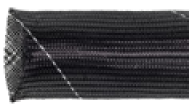
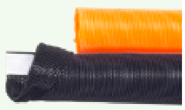
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ARA-TEX TRIO** | Aramid<br>E-glass<br>Silicone resin | Ø (inside) 10 – 20<br>wall thickness 1.0 – 3.5 | 210 | 235 | | |
| **ARA-TEX TRIO L** | Aramid<br>E-glass<br>Liquid silicone | Ø (inside) 10 – 20<br>wall thickness 1.0 – 3.5 | 210 | 235 | | |
| **ARA-TEXFLEX DUO** | Aramid<br>E-glass<br>Silicone resin | Ø (inside) 10 – 22<br>wall thickness 1.6 – 2.2 | 210 | 235 | | |
| **ARA-TEXFLEX DUO L** | Aramid<br>E-glass<br>Liquid silicone | Ø (inside) 10 – 22<br>wall thickness 1.6 – 2.2 | 210 | 235 | | |
| **ARA-TEXFLEX TRIO** | Aramid<br>E-glass<br>Silicone resin | Ø (inside) 10 – 20<br>wall thickness 2.0 – 3.0 | 210 | 235 | | |
| **ARA-TEXFLEX TRIO L** | Aramid<br>E-glass<br>Liquid silicone | Ø (inside) 10 – 18<br>wall thickness 2.0 – 3.0 | 210 | 235 | | |
| **ARATEX RI** | Aramid<br>Silicone resin | Ø (inside) 5 – 30<br>wall thickness 0.5 – 1.5 | 250 | 275 | | |
| **ARATEX ROH** | Aramid | Ø (inside) 5 – 50<br>wall thickness 0.5 – 1.5 | 250 | 275 | | |
| **COLLECTIVE SHIELD** | Copper | Width 50 – 70<br>Thickness 0.6 – 1.3 | 180 | 205 | | |
| **CRASH PROTECT F** | Polyester<br>Acrylic resin | Ø (inside) 6 – 20<br>wall thickness 1.5 – 1.9 | 150 | 175 | | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| x | x | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme demands, e-mobility, hybrids, commercial vehicles, three-layer protective sleeve, thermally insulating, suitable for high-voltage applications, abrasion and crash protection, very good protection against marten damage, signal colour orange |  |
| x | x | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme demands, e-mobility, hybrids, commercial vehicles, three-layer protective sleeve, thermally insulating, suitable for high-voltage applications, abrasion and crash protection, very good protection against marten damage, signal colour orange |  |
| x | x | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extremely high demands, e-mobility, hybrids, commercial vehicles, suitable for high-voltage applications, thermally insulating, double-layer protective sleeve, abrasion and crash protection, very good protection against marten damage, available in signal colour orange as well as in black |  |
| x | x | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extremely high demands, e-mobility, hybrids, commercial vehicles, suitable for high-voltage applications, double-layer sleeve, thermally insulating, especially suitable as abrasion and crash protection, institute tested against marten damage, drop tower tested, available in signal colour orange as well as in black |  |
| x | x | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme demands and maximum line protection. e-mobility, hybrids, commercial vehicles, three-layer protective sleeve, thermally insulating, particularly suitable as abrasion and crash protection, institute tested against marten damage, available in signal colour orange as well as in black |  |
| x | x | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme demands and maximum line protection. e-mobility, hybrids, commercial vehicles, three-layer protective sleeve, thermally insulating, particularly suitable as abrasion and crash protection, institute tested against marten damage, drop tower tested, available in signal colour orange as well as in black |  |
| | x | | | FMVSS 302 / TL 1010 | designed for high-voltage applications, thermally insulating, suitable for very high mechanical and chemical stress, suitable for e-mobility, hybrids, commercial vehicles, good abrasion protection |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | designed for high-voltage applications, thermally insulating, suitable for very high mechanical and chemical stress, suitable for e-mobility, hybrids, commercial vehicles, good abrasion protection, peak temperature up to + 350 °C |  |
| | | | | DIN EN ISO-IEC 17025<br>EN 50289-1-6 | excellent, institute-tested EMC protection, extremely expandable and flexible, specially treated copper, high shielding effect and current carrying capacity |  |
| x | x | x | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | flat design (sleeve fabric): developed for the automotive industry, e-mobility, hybrids, commercial vehicles, extremely high abrasion protection, very good protection against impact, (short-circuit protection), institute tested against marten damage, low-shrinkage, high stength with low elongation, high sliding resistance, resistance and durability thanks to high thread density, available in the signal colours orange and purple and in black |  |

***distance between heat source and insulating tube: 20 mm*


*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

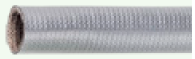
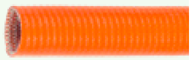
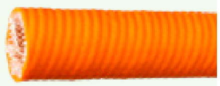
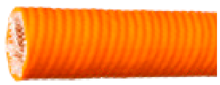
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **CRASH PROTECT R** | Polyester<br>Acrylic resin | Ø (inside) 6 – 20<br>wall thickness 1.5 – 1.9 | 150 | 175 | | |
| **Electric insulating sleeve** | Glass fibre<br>Silicone | Ø (inside) 0.5 – 25.4<br>wall thickness min. 0.279 | 250 | 275 | | > 7,0 kV |
| **EXPANDEX 66** | Polyamide | Ø (inside) 3 – 40<br>wall thickness 0.5 – 1.0 | 155 | 180 | | |
| **EXPANDEX FRV0** | PET | Ø (inside) 3 – 60<br>wall thickness 0.5 – 1.0 | 150 | 180 | | |
| **EXPANDEX PET** | Polyester | Ø (inside) 3 – 40<br>wall thickness 0.5 – 1.0 | 155 | 180 | | |
| **FLEXTEX** | Polyester | Ø (inside) 5 – 50<br>wall thickness 0.5 – 1.0 | 150 | 180 | | |
| **FLEXTEX SK** | Polyester | Ø (inside) 5 – 50<br>wall thickness 0.5 – 1.0 | 150 | 180 | | |
| **ISOFLEX** | E-glass<br>Silicone | Ø (inside) 3 – 35<br>wall thickness 0.5 – 1.6 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOFLEX 210** | E-glass<br>Silicone | Ø (inside) 3 – 35<br>wall thickness 0.5 – 1.6 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOFLEX 250** | E-glass<br>Silicone | Ø (inside) 3 – 35<br>wall thickness 0.5 – 1.6 | 250 | 275 | | > 2,50 kV<br>optionally<br>adjustable |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| x | x | x | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, hybrids, commercial vehicles, extremely high abrasion protection, very good protection against impact (short-circuit protection), institute tested against marten damage, drop tower tested, low-shrinkage thanks to its pronounced roundness, Crash Protect R is extremely easy to install when processing longer cable harnesses, available in the signal colours orange and violet as well as in black |  |
| | | | | GSN5A / GSN5A-FR UL1441<br>UL 1441 VW-1<br>(UL-Reg.-No. E165094 special version)<br>DIN EN 60684 | designed for electric motors, generators, transformers, chokes, UL 1441 approval, operating temperature - 40 °C to + 200 °C/600 V, suitable for long cable harnesses, smooth inner surface for easy installation |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for high quality line protection, e-mobility, hybrids, commercial vehicles, exceptional radial flexibility, highly mechanically resilient, abrasion protection, self-extinguishing, signal colour orange and black |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for high quality line protection, e-mobility, hybrids, commercial vehicles, exceptional radial flexibility, highly mechanically resilient, abrasion protection, self- extinguishing, PET monofilament yarn is classified by the manufacturer and rated according to UL94-V0, colour black |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for high quality line protection, e-mobility, hybrids, commercial vehicles, exceptional radial flexibility, highly mechanically resilient, abrasion protection, self-extinguishing, signal colour orange and black |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, hybrids, commercial vehicles, excellent abrasion protection, easy retrofitting on cables or cable harnesses, self-closing, available in signal colour orange, violet and black |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, hybrids, commercial vehicles, excellent abrasion protection, easy retrofitting on cables or cable harnesses, self-closing, self-adhesive, self-adhesive finish serves as mounting aid, available in signal colour orange and black |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed for the automotive industry as a high-quality insulating protective sleeve, all-rounder for versatile applications, very good price-performance ratio due to efficient knitting process, wide range of colours available |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed for the automotive industry as a high-quality insulating protective sleeve, all-rounder for versatile applications, very good price-performance ratio due to efficient knitting process, wide range of colours available |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed as a high-temperature protective sleeve for the automotive industry, high-quality insulation protective sleeve, all-rounder for versatile applications, very good price-performance ratio due to efficient knitting process |  |


***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

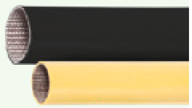
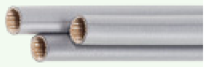
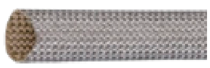
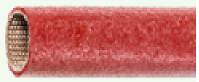
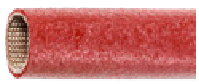
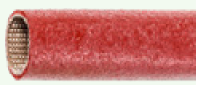
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ISOFLEX 300R** | E-glass<br>Silicone | Ø (inside) 3 – 35<br>wall thickness 0.5 – 1.6 | 200 | 225 | 330 | > 2,50 kV<br>optionally<br>adjustable |
| **ISOFLEX F** | E-glass<br>Silicone foam | Ø (inside) 4 – 30<br>wall thickness 1.0 – 5.0 | 180 | 205 | | |
| **ISOFLEX F 210** | E-glass<br>Silicone foam | Ø (inside) 4 – 30<br>wall thickness 1.0 – 5.0 | 210 | 235 | | |
| **ISOFLEX F 250** | E-glass<br>Silicone foam | Ø (inside) 4 – 30<br>wall thickness 1.0 – 5.0 | 250 | 275 | | |
| **ISOFLEX H** | E-glass<br>Silicone | Ø (inside) 3 – 35<br>wall thickness 0.5 – 1.6 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOFLEX H250 perforated** | E-glass<br>Silicone | Ø (inside) 12 – 17mm<br>wall thickness 0.5 – 1.6 | 250 | 275 | | |
| **ISOFLEX L reverse** | E-glass<br>Liquid silicone | Ø (inside) 10 – 22<br>wall thickness<br>1.50 – 3.0 | 180 | 205 | | > 1,50 kV |
| **ISOFLEX L reverse 210** | E-glass<br>Liquid silicone | Ø (inside) 10 – 22<br>wall thickness<br>1.50 – 3.0 | 210 | 235 | | > 1,50 kV |
| **ISOFLEX SX** | E-glass<br>Silicone | Ø (inside) 3 – 30<br>wall thickness 0.5 – 1.6 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOFLEX SX 210** | E-glass<br>Silicone | Ø (inside) 3 – 30<br>wall thickness 0.5 – 1.6 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed as a high-temperature protective sleeve for the automotive industry, self-extinguishing, very good price-performance ratio due to efficient knitting process |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, very good thermal insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick-walled, knitted base sleeve |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, very good thermal insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick-walled, knitted base sleeve |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, high-temperature resistant, very good heat insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick walled, knitted base sleeve |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, peak temperature up to + 250 °C, signal colour orange, very good price-performance ratio due to efficient knitting process |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, hybrids, commercial vehicles, drainage of liquids from the inside of the hose thanks to perforation, high-temperature resistant, peak temperature up to + 300 °C, signal colour orange, very good price-performance ratio due to efficient knitting process |  |
| x | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme ease of installation for long cable harnesses thanks to very smooth inner sleeve surface, crash protection, application in the high-voltage range, suitable for e-mobility, hybrids, commercial vehicles |  |
| x | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for extreme ease of installation for long cable harnesses thanks to very smooth inner sleeve surface, crash protection, application in the high-voltage range, suitable for e-mobility, hybrids, commercial vehicles |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed for the automotive industry as a sensor protection sleeve, very fine-meshed knitted fabric for easy and quick assembly of bunched cables, smooth and even surface, very good price-performance ratio due to efficient knitting process |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed for the automotive industry as a sensor protection sleeve, very fine-meshed knitted fabric for easy and quick assembly of bunched cables, smooth and even surface, very good price-performance ratio due to efficient knitting process |  |

***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

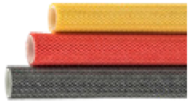
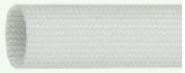
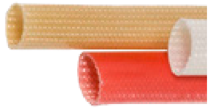
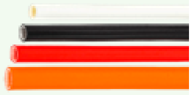
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ISOFLEX SX 250** | E-glass<br>Silicone | Ø (inside) 3 – 30<br>wall thickness 0.5 – 1.6 | 250 | 275 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOTEX** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.6 – 1.5 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOTEX 210** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.6 – 1.5 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOTEX 250** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.6 – 1.5 | 250 | 275 | | > 2,50 kV<br>optionally<br>adjustable |
| **ISOTEX 300R** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.6 – 1.5 | 200 | 225 | 330 | > 2,50 kV<br>optionally<br>adjustable |
| **ISOTEX 650R** | E-glass<br>Silicone resin | Ø (inside) 0.5 – 35<br>wall thickness 0.3 – 1.6 | 275 | 300 | 650 | |
| **ISOTEX F** | E-glass<br>Silicone foam | Ø (inside) 1 – 30<br>wall thickness 1.0 – 5.0 | 180 | 205 | | |
| **ISOTEX F 210** | E-glass<br>Silicone foam | Ø (inside) 1 – 30<br>wall thickness 1.0 – 5.0 | 210 | 235 | | |
| **ISOTEX F 250** | E-glass<br>Silicone foam | Ø (inside) 1 – 30<br>wall thickness 1.0 – 5.0 | 250 | 275 | | |
| **ISOTEX H** | E-glass<br>Silicone | Ø (inside) 0.5 – 35<br>wall thickness 0.6 – 1.5 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed for the automotive industry as a high-temperature resistant sensor protection sleeve, very fine mesh knitted fabric for quick and easy assembly of bunched cables, smooth even surface, very good price-performance ratio due to efficient knitting process |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed as an all-rounder for use in the automotive sector, e-mobility, hybrids, commercial vehicles, very smooth and even surface with pronounced roundness for easy processing in cable assembly, large colour spectrum |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed as an all-rounder for use in the automotive sector, e-mobility, hybrids, commercial vehicles, very smooth and even surface with pronounced roundness for easy processing in cable assembly, large colour spectrum |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684<br>ECE R118 | developed as a high-temperature protective sleeve, all-rounder for use in the automotive sector, e-mobility, hybrids, commercial vehicles, very smooth and uniform surface with pronounced roundness for easy processing in cable assembly |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed as a high-temperature protective sleeve for use in the automotive sector, e-mobility, hybrids, radiant heat up to +330°C, flexible sleeve, very smooth and uniform surface with pronounced roundness for easy processing in cable assembly, basic sleeve braided |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | very good ductility and flexibility, aluminium impregnation, radiant heat up to + 650 °C, thermally insulating |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, very good thermal insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick-walled, braided base sleeve, peak temperature up to + 250 °C |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, very good thermal insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick-walled, braided base sleeve, peak temperature up to + 280 °C |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, high-temperature resistant protective sleeve, very good thermal insulation e. g. at radiator systems, good acoustic damping, rattle and impact protection, thick walled, basic sleeve braided, peak temperature up to + 300 °C |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, very smooth and even surface with pronounced roundness for easy processing in cable assembly, braided base sleeve, signal colour orange |  |


***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

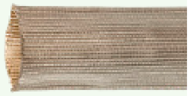
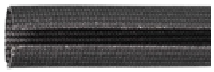
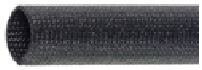
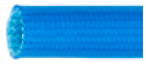
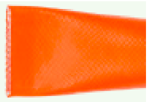
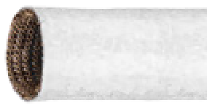
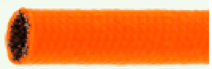
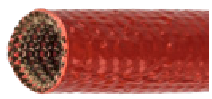
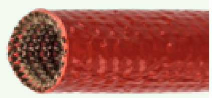
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ISOTEX H250 perforated** | E-glass<br>Silicone | Ø (inside) 12 – 17<br>wall thickness 0.5 – 1.6 | 250 | 275 | | |
| **ISOTEX L** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.3 – 3.0 | 180 | 205 | | > 2,50 kV optionally adjustable |
| **ISOTEX L 210** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.3 – 3.0 | 210 | 235 | | > 2,50 kV optionally adjustable |
| **ISOTEX L 250** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.3 – 3.0 | 250 | 275 | | > 2,50 kV optionally adjustable |
| **ISOTEX L 300R** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.3 – 3.0 | 180 | 205 | 330 | > 2,50 kV optionally adjustable |
| **ISOTEX L DUO** | E-glass<br>Liquid silicone | Ø (inside) 8.0 – 15 wall thickness 1.0 – 1.7 | 200 | 225 | | > 4,0 kV |
| **ISOTEX LI** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 30<br>wall thickness 0.3 – 1.0 | 180 | 205 | | |
| **ISOTEX LSI** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 12<br>wall thickness 0.5 – 1.0 | 180 | 205 | | > 2,50 kV optionally adjustable |
| **ISOTEX LSI A** | E-glass<br>Silicone | Ø (inside) 0.5 – 12<br>wall thickness 0.5 – 1.0 | 200 | 225 | | > 2,50 kV optionally adjustable |
| **ISOTEX RI** | E-glass<br>Silicone resin | Ø (inside) 0.5 – 30<br>wall thickness 0.3 – 1.6 | 350 | 450 | | |
| **ISOTEX RI DUO** | E-glass<br>Silicone resin | Ø (inside) 0.5 – 30<br>wall thickness 0.6 – 3.2 | 350 | 450 | | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, hybrids, commercial vehicles, drainage of liquids from the inside of the sleeve thanks to perforation, high-temperature resistant protective sleeve, peak temperature up to + 300 °C, braided base sleeve, signal colour orange |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for installation in tight bend radii, highly flexible sleeve, liquid-silicone coating, braided base sleeve |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for installation in tight bend radii, highly flexible sleeve, liquid-silicone coating, braided base sleeve |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for installation in tight bend radii, highly flexible sleeve, liquid-silicone coating, braided base sleeve |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for installation in tight bend radii, highly flexible sleeve, radiant heat up to + 330 °C, coating of liquid silicone, braided base sleeve |  |
| x | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for e-mobility, stator construction, electric motor construction, double-walled, thermally insulating |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312 -3<br>VW 60360-3<br>DIN EN 60684 | developed for e-mobility, stator construction, electric motor construction, very good impregnation of textile glass fibres |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for stator construction, e-mobility, very good impregnation of textile glass fibres, high mechanical quality |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | developed for e-mobility, stator construction, electric motor construction, very good impreg-nation of textile glass fibres, excellent for cable assembly |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the high-temperature range, mechanical protective sleeve, thermally insulating, good line protection |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the high-temperature range double-layered mechanical protective sleeve, thermally insulating |  |

***distance between heat source and insulating tube: 20 mm*


*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

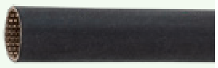
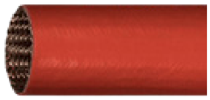
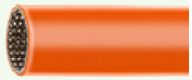
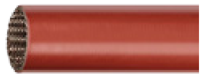
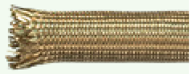
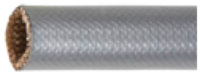
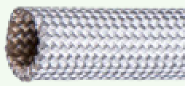
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ISOTEX ROH** | E-glass | Ø (inside) 0.5 – 60<br>wall thickness 0.3 – 2.0 | 350 | 450 | | |
| **ISOTEX T** | E-glass | Ø (inside) 0.5 – 40<br>wall thickness 0.3 – 2.0 | 350 | 450 | | |
| **MARTEN WRAP slotted** | E-glass | Ø (inside) 16 – 26<br>wall thickness 0.6 – 1.0 | 275 | 300 | | |
| **MARTEN WRAP SK** | E-glass | Ø (inside) 16 – 26<br>wall thickness 0.6 – 1.0 | 160 | 185 | | |
| **PEATEX** | Polyester<br>Acrylic resin | Ø (inside) 3.0 – 20<br>wall thickness 0.4 – 1.0 | 155 | 180 | | |
| **PET-TEX FR** | Polyester | Ø (inside) 3 – 40<br>wall thickness 0.5 – 1.0 | 155 | 180 | | |
| **POLYTEX HE** | E-glass<br>Acrylic PU resin | Ø (inside) 0.5 – 27<br>wall thickness 0.3 – 1.5 | 155 | 180 | | > 7,0 kV |
| **STAR POINT INSULATION** | E-glass<br>Silicone | Ø (inside) 5 – 15<br>wall thickness 1.0 – 1.5 | 200 | 225 | | > 1,5 kV bis 8 kV |
| **THERBAFLEX L** | Basalt fibres<br>Liquid silicone | Ø (inside) 10 – 40<br>wall thickness 1.5 – 3.0 | 180 | 205 | | > 1,50 kV |
| **THERBAFLEX L reverse** | Basalt fibres<br>Liquid silicone | Ø (inside) 10 – 22<br>wall thickness 1.5 – 3.0 | 180 | 205 | | > 1,50 kV |
| **THERBAFLEX LFP** | Basalt fibres<br>Liquid silicone | Ø (inside) 10 – 40<br>wall thickness 2.0 – 4.0 | 260 | 300 | | > 1,50 kV |
| **THERBAFLEX LFP reverse** | Basalt fibres<br>Liquid silicone | Ø (inside) 10 – 20<br>wall thickness 2.0 – 3.5 | 260 | 300 | | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>DIN EN ISO 2078 | non-flammable, 100 % radially expandable, thermally insulating |  |
| | | | | FMVSS 302 / TL 1010<br>DIN EN ISO 2078 | thermally desized, therefore no outgassing, non-flammable, radially expandable up to 100 % |  |
| | | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for retrofitting to cables and cable harnesses, thick-walled, thermally insulating, resistant to marten damage |  |
| | | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for retrofitting to cables and cable harnesses, thick-walled, thermally insulating, institute tested against marten damage, self-adhesive finish serves as installation aid, e-glass temperature resistant up to 450 °C |  |
| | x | | | Bosch standard 5 997 447<br>LV 312-3<br>DIN EN 60684 | suitable for the automotive industry, no swelling with diesel contact, abrasion protection, excellent for cable assembly |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3 | radially expandable up to approx. 30 %, abrasion protection, flame-retardant due to specially treated polyester |  |
| | | | | UL 1441 Approbation<br>File-No. E165094<br>DIN IEC 60684 (DIN 40620) | very good ductility, extreme flexibility, used in electrical insulation, electric motors and transformer construction, also used in the automotive sector |  |
| | | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>LV 312-3 | developed for use in stators and electric motor construction, extreme radial ductility, very good compressibility and flexibility, sealed at one end |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for environmentally conscious and ecological application, environmentally friendly knitted fabric made of basalt fibre (natural rock), outgassing-free, highly flexible sleeve, coating made of liquid silicone |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | designed for easy cable assembly due to an extremely smooth inner sleeve surface, highly flexible sleeve, liquid silicone coating, environmentally friendly, outgassing-free reverse knit of basalt fibre (natural rock) |  |
| | x | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>Basalt fibres:<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for high-temperature range, fire protection, thick-walled, thermally insulating, very good protection against metal spatter (welding beads), good arc resistance, environmentally friendly and outgassing-free basalt fibre knit from natural rock, colours: Black and reddish brown |  |
| | x | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>Basalt fibres:<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for high-temperature range, fire protection, thick-walled, thermally insulating, very good protection against metal spatter (welding beads), environmentally friendly and outgassing-free basalt fibre reversal knit from natural rock, extremely smooth sleeve inner surface for easy installation, good arc resistance, colours black and reddish brown |  |


***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

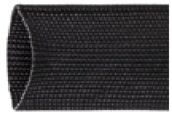
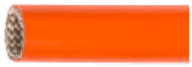
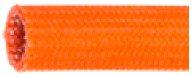
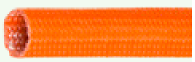
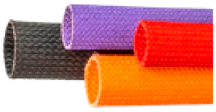
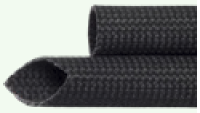
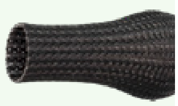
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **THERBAFLEX RAW** | Basalt fibres | Ø (inside) 10 – 50<br>wall thickness 1.0 – 2.0 | 700 | 900 | | |
| **THERBATEX** | Basalt fibres<br>Silicone | Ø (inside) 0.5 – 30<br>wall thickness 0.6 – 1.5 | 180 | 205 | | > 2,5 kV<br>optionally<br>adjustable |
| **THERBATEX FP** | Basalt fibres<br>Silicone | Ø (inside) 10 – 70<br>wall thickness 2.0 – 4.0 | 260 | 300 | | > 2,5 kV<br>optionally<br>adjustabler |
| **THERBATEX L** | Basalt fibres<br>Liquid silicone | Ø (inside) 0.5 – 40<br>wall thickness 0.6 – 3.0 | 180 | 205 | | > 1,50 kV |
| **THERBATEX LFP** | Basalt fibres<br>Liquid silicone | Ø (inside) 10 – 40<br>wall thickness 2.0 – 4.0 | 260 | 300 | | > 2,5 kV<br>optionally<br>adjustable |
| **THERBATEX RAW** | Basalt fibres | Ø (inside) 0.5 – 50<br>wall thickness 0.3 – 2.0 | 700 | 900 | | |
| **THERBATEX SH** | Basalt fibres<br>Silicone resin | Ø (inside) 0.5 – 30<br>wall thickness 0.3 – 2.0 | 700 | 900 | | |
| **THERMOFLEX** | E-glass<br>Silicone | Ø (inside) 3.0 – 30<br>wall thickness 1.2 – 2.0 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **THERMOFLEX 300R** | E-glass<br>Silicone | Ø (inside) 3.0 – 30<br>wall thickness 1.2 – 2.0 | 200 | 225 | 300 | > 2,50 kV<br>optionally<br>adjustable |
| **THERMOFLEX 650R** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.8 – 1.5 | 275 | 300 | 650 | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for environmentally conscious and ecological application and use in the high-temperature range (exhausts, manifolds), non-flammable, environmentally friendly and non-outgassing knitted fabric made of basalt fibre (natural rock), thick-walled, thermally insulating, temperature data based on fibre manufacturer's specifications |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for environmentally conscious and ecological application, very smooth and even surface with pronounced roundness for easy processing in cable assembly, non-flammable braiding made of basalt fibre (natural rock), environmentally friendly and outgassing-free |  |
| | x | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>Basalt fibres:<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for the high-temperature range, fire protection, thick-walled, thermally insulating, very good protection against metal spatter (welding beads), good arc resistance, environmentally friendly, non-flammable braiding made of basalt fibre (natural rock), outgassing-free |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for environmentally conscious and ecological application as well as for use in cable assembly, highly flexible sleeve, coating of liquid silicone, environmentally friendly, non-flammable braiding made of basalt fibre (natural rock), outgassing-free |  |
| | x | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>Basalt fibres:<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for high-temperature range, fire protection, thick-walled, thermally insulating, very good protection against metal spatter (welding beads), good arc resistance, liquid silicone coating, environmentally friendly, non-flammable braid made of basalt fibre (natural rock), outgassing-free, colours: Black and reddish brown |  |
| | | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for use in high-temperature applications (exhausts, manifolds), environmentally friendly, non-flammable braiding made of basalt fibre (natural rock), outgassing-free, thermally insulating, temperature data based on fibre manufacturer's specifications |  |
| | | | | FMVSS 302 / TL 1010<br>DIN EN 60684<br>DIN 4102 & ISO 137-1975<br>ISO 3795 | developed for use in high-temperature applications (exhaust, manifold), environmentally friendly, non-flammable braiding made of basalt fibre (natural rock), outgassing-free, thermally insulating, temperature data based on fibre manufacturer's specifications, basalt sleeve is temperature resistant up to + 700 °C |  |
| | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for applications involving thermal insulation, thick-walled, thermally insulating, optimal line protection, large colour spectrum |  |
| x | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for thermal insulation, thick-walled, thermally insulating, optimal line protection, radiant heat up to + 300 °C |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | aluminium impregnation, non-flammable, thick-walled, thermally insulating, radiant heat up to + 650 °C |  |

***distance between heat source and insulating tube: 20 mm*

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

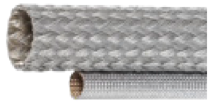
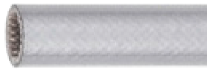
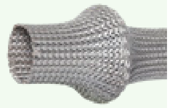
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **THERMOFLEX AC** | E-glass<br>Acrylic resin | Ø (inside) 5.0 – 50<br>wall thickness 0.7 – 1.3 | 155 | 180 | | |
| **THERMOFLEX F** | E-glass<br>Silicone foam | Ø (inside) 4.0 – 30<br>wall thickness 2.5 – 3.8 | 180 | 205 | | |
| **THERMOFLEX H** | E-glass<br>Silicone | Ø (inside) 3.0 – 30<br>wall thickness 1.2 – 2.0 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **THERMOFLEX HRI** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.7 – 1.3 | 210 | 235 | | |
| **THERMOFLEX HRI DUO** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 1.7 – 2.3 | 210 | 235 | | |
| **THERMOFLEX HRI DUO MARTEN** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 1.7 – 2.3 | 210 | 235 | | |
| **THERMOFLEX HRI MARTEN** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.7 – 1.3 | 210 | 235 | | |
| **THERMOFLEX RI** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.7 – 1.3 | 275 | 300 | | |
| **THERMOFLEX RI MARTEN** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.7 – 1.3 | 275 | 300 | | |
| **THERMOFLEX RI expandable** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 0.7 – 1.3 | 275 | 300 | | |

| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for non-silicone applications, very good mechanical and chemical protection, modified acrylic resin impregnation as coating, temperature resistance of glass fibre up to + 450 °C |  |
| | | | x | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for optimum thermal insulation e. g. on radiator systems, good acoustic damping, rattle and impact protection, thick-walled, braided base sleeve |  |
| x | x | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, very smooth and uniform surface with pronounced roundness for easy processing in cable assembly, thick-walled, thermally insulating, line protection, signal colour orange |  |
| x | | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, thick-walled, crash protection, thermally insulating, resistant to marten damage, signal colour orange |  |
| x | x | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, double-layered, thermally insulating, good crash protection, good protection against marten damage, signal colour orange |  |
| x | x | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, double-layered, thermally insulating, crash protection, institute tested against marten damage, signal colour orange |  |
| x | | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for e-mobility, hybrids, commercial vehicles, thermally insulating, crash protection, institute tested against marten damage, signal colour orange as well as red, purple and black |  |
| x | | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, commercial vehicles, crash protection, thick-walled, thermally insulating, resistant to marten damage, working temperature up to + 450 °C, peak temperature up to + 600 °C |  |
| x | | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, commercial vehicles, crash protection, thick-walled, thermally insulating, institute tested against marten damage, working temperature up to + 450 °C, peak temperature up to + 600 °C |  |
| x | | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, commercial vehicles, thick-walled, thermally insulating, extreme radial expansion, institute tested against marten damage, working temperature up to + 300 °C, peak temperature up to + 450 °C |  |

***distance between heat source and insulating tube: 20 mm*


*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

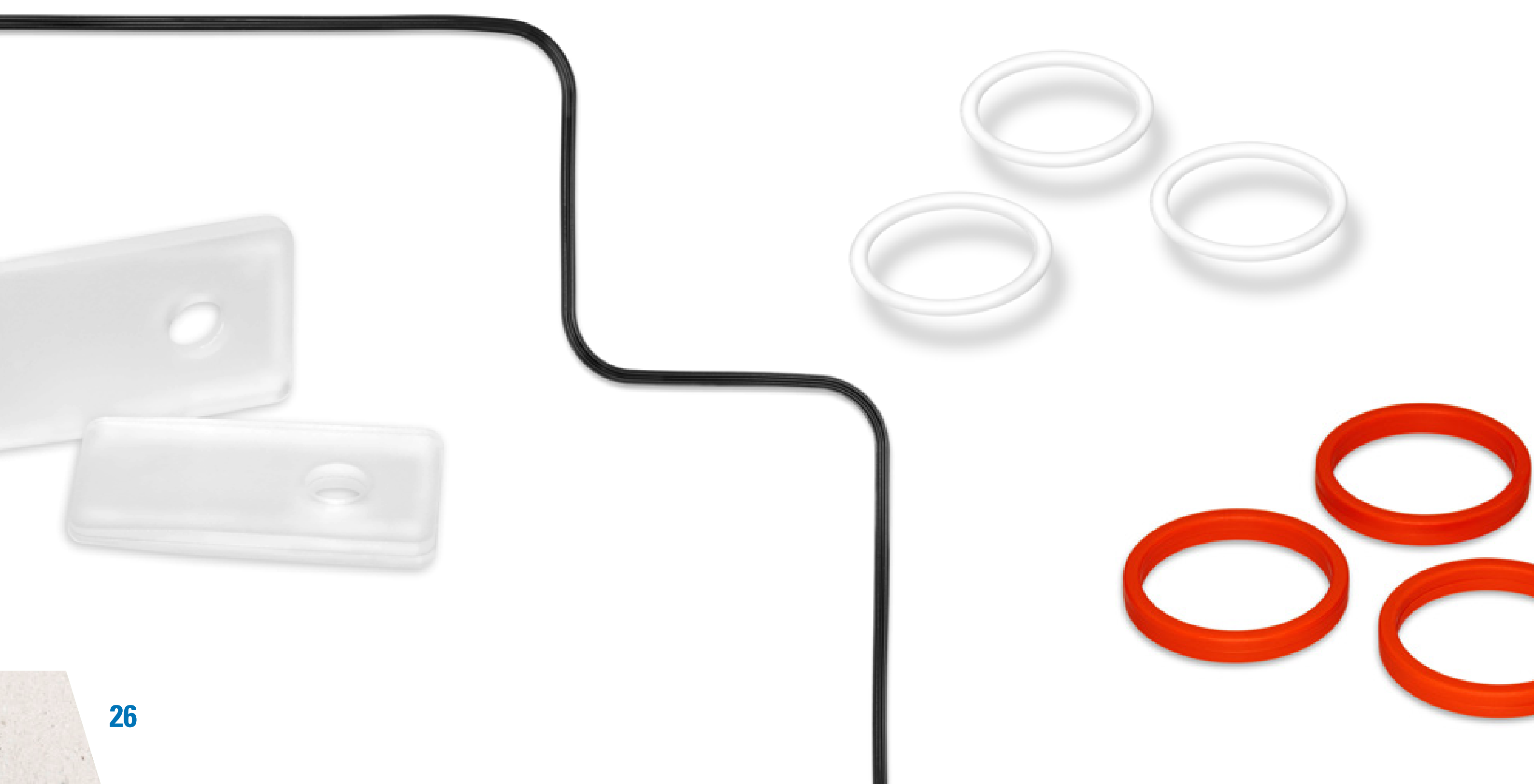
| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **THERMOFLEX RI DUO** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 1.7 – 2.3 | 275 | 300 | | |
| **THERMOFLEX RI DUO MARTEN** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 1.7 – 2.3 | 275 | 300 | | |
| **THERMOTEX 650R** | E-glass<br>Silicone resin | Ø (inside) 5.0 – 30<br>wall thickness 1.2 – 1.5 | 275 | 300 | 650 | |
| **ULTRAFLEX** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **ULTRAFLEX 210** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |
| **ULTRAFLEX 250** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 250 | 275 | | > 2,50 kV<br>optionally<br>adjustable |
| **ULTRAFLEX 300R** | E-glass<br>Silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 200 | 225 | 330 | > 2,50 kV<br>optionally<br>adjustable |
| **ULTRAFLEX 650R** | E-glass<br>Silicone resin | Ø (inside) 3.0 – 30<br>wall thickness 1.0 – 1.5 | 275 | 300 | 650 | |
| **ULTRAFLEX L** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 180 | 205 | | > 2,50 kV<br>optionally<br>adjustable |
| **ULTRAFLEX L 210** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 210 | 235 | | > 2,50 kV<br>optionally<br>adjustable |

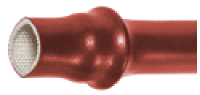
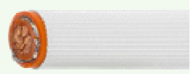
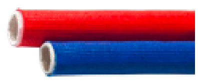
| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| x | x | suitable but not institute tested | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, commercial vehicles, double-layered, crash protection, thick-walled, thermally insulating, resistant to marten damage, working temperature up to + 450 °C, peak temperature up to + 600 °C |  |
| x | x | x | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, e-mobility, commercial vehicles, double-layered, crash protection, thick-walled, thermally insulating, institute tested against marten damage, working temperature up to + 450 °C, peak temperature up to + 600 °C |  |
| x | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | aluminium impregnation, non-flammable, thick-walled, thermally insulating, radiant heat up to + 650 °C |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, highly flexible sleeve, up to 100 % radial expansion on average, good compressibility and flexibility, can be easily routed around tight bend radii, optimal for use on plug connections |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, highly flexible sleeve, up to 100 % radial expansion on average, good compressibility and flexibility, can be easily routed around tight bend radii, optimal for use on plug connections |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed as high-temperature protective sleeve for the automotive industry, highly flexible sleeve, up to 100 % elongation on average, good compressibility and flexibility, can be routed excellently around tight bend radii, optimal for use on plug connections |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for the automotive industry, radiant heat up to + 330 °C, thick-walled, thermally insulating, excellent line protection |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | aluminium impregnation, non-flammable, thick-walled, thermally insulating, extreme ductility, radiant heat up to + 650 °C |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | highly flexible sleeve, up to 100 % expansion in Ø, developed for installation in tight bend radii, e. g. in the engine compartment, optimal for use on plug connections |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | highly flexible sleeve, up to 100 % expansion on average, developed for laying in tight bending radii e. g. in the engine compartment, optimal for use on plug connections |  |

***distance between heat source and insulating tube: 20 mm*

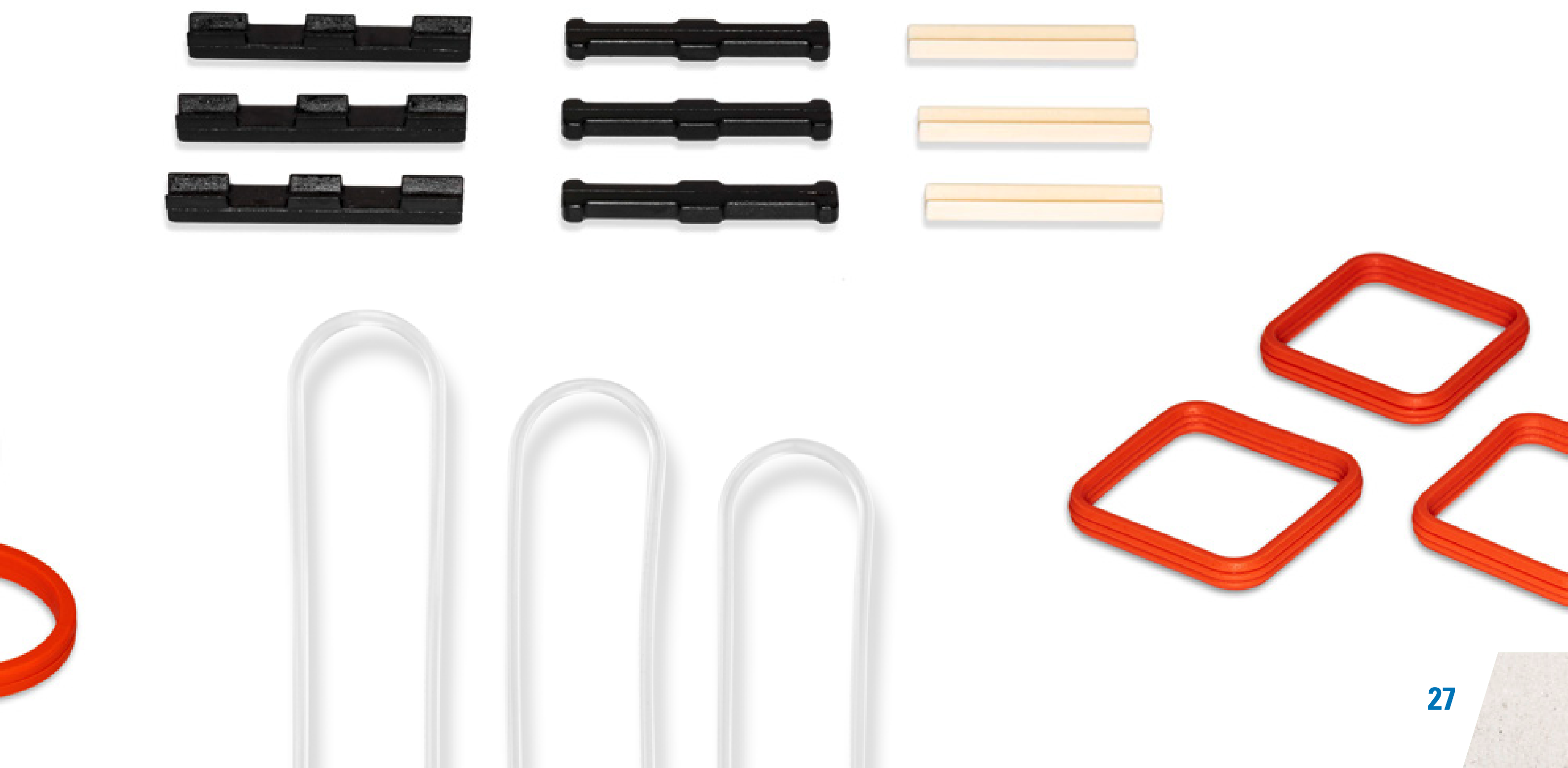

*The cable protection product data sheets can be found here:*
*https://www.biw.de/en/productselector-cable-protection-systems/*

| Product | Carrier material coating material | Dimensions [mm] | Continuous temperature contact heat [up to +...°C] | Short-term temperature contact heat [up to +...°C] | Radiation heat [°C] ** | Electrical insulation |
|---|---|---|---|---|---|---|
| **ULTRAFLEX L 250** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 250 | 275 | | > 2,50 kV<br>optionally adjustable |
| **ULTRAFLEX L300R** | E-glass<br>Liquid silicone | Ø (inside) 0.5 – 60<br>wall thickness 0.8 – 3.0 | 180 | 205 | 330 | > 2,50 kV<br>optionally adjustable |
| **ULTRAFLEX LSI A** | E-glass<br>Silicone | Ø (inside) 0.5 – 12<br>wall thickness 0.3 – 1.0 | 180 | 205 | | > 4,0 kV |
| **VARNITEX** | E-glass<br>PU resin | Ø (inside) 0.5 – 30<br>wall thickness 0.3 – 1.2 | 155 | 180 | | |
| **VARNITEX GENIUS SE** | E-glass<br>Silicone<br>Acrylic PU resin | Ø (inside) 3.5 – 30<br>wall thickness 1.5 – 3.0 | 155 | 180 | | > 7,0 kV |



| Crash protection | Abrasion protection | Marten protection | Noise insulation | Standards, tests (based on) Constituents compliant with VDA requirements, IMDS listed, RoHS and GADSL compliant | Special features | |
|---|---|---|---|---|---|---|
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed as high-temperature protective sleeve, highly flexible sleeve, up to 100 % expansion on average, developed for laying in tight bending radii e. g. in the engine compartment, optimal for use on plug connections, colour: black |  |
| | | | | FMVSS 302 / TL 1010<br>LV 312-3<br>VW 60360-3<br>DIN EN 60684 | highly flexible sleeve, up to 100 % expansion on average, developed for installation in tight bend radii e. g. in the engine compartment, radiant heat up to + 330 °C, optimal for use on plug connections, thermally insulating |  |
| | x | x | | FMVSS 302 / TL 1010<br>LV 312 -3<br>VW 60360-3<br>MBN LV 312-3<br>GS 95008-3-3<br>DIN EN 60684 | developed for use in e-mobility (stator construction), can also be used in electric motor and transformer construction, high ductility and very good mechanical properties, institute tested against marten damage |  |
| | | | | Siemens SN 56727<br>DIN EN 60684<br>self-extinguishing analogous to UL 94V0 | developed for non-silicone applications, used in electrical insulation and transformer construction as well as in the automotive sector, very good chemical resistance |  |
| x | x | | | DIN IEC 60684, (DIN 40620) | used in electrical insulation, transformer construction, wind power plants as well as in the automotive sector, very good chemical resistance, double-walled, thermally insulating, horizontally self-extinguishing, good ductility, outer layer silicone-free |  |

***distance between heat source and insulating tube: 20 mm*




When it comes to competence

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