

Single-core automotive cables

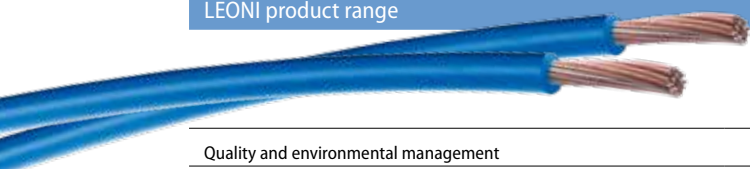


The Quality Connection

LEONI

Content	page
Single-core automotive cables Overview	3
The LEONI Group Cable expertise for the most varied industrial markets	4
Business Unit Automotive Standard Cables Our core competencies	5
Marking of automotive cables	6
Insulation materials	7
Insulation material properties	8
Conductor materials	10
Alternative conductor materials	12
Coding key	14
International standards – Automotive cables	16

**Automotive cables · single-core
LEONI product range** 18



Quality and environmental management	42
LEONI worldwide	43

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LEONI heating cables
for applications in the engine
compartment / interior

on page 19

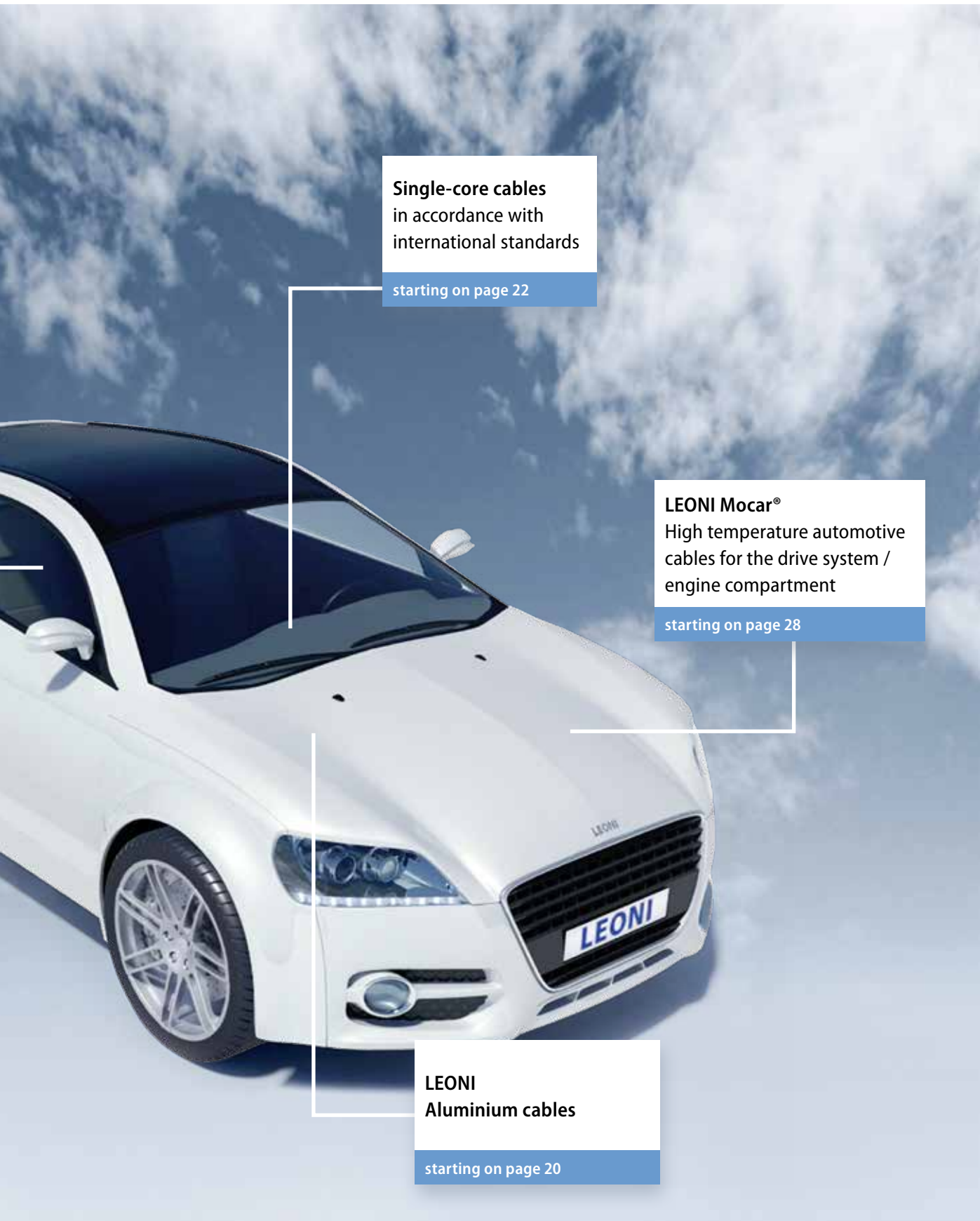
Alternative conductor materials
Low current and signal cables
CuAg · CuSn · CuMg · CCS

starting on page 12



Single-core automotive cables

Overview



Single-core cables
in accordance with
international standards

starting on page 22

LEONI Mocar®
High temperature automotive
cables for the drive system /
engine compartment

starting on page 28

LEONI
Aluminium cables

starting on page 20

The LEONI Group

Cable expertise for the most varied industrial markets

LEONI is a leading supplier of cable systems and related services for the automotive industry and various other industrial sectors.

Our group of companies employs more than 63,000 people in 31 countries. Corporate vision, highest quality and innovative power have made us one of the leading cable manufacturers in Europe. LEONI develops and produces technically sophisticated products ranging from wire and optical fibers to cables through to complete cable systems and also offers the related services. Moreover, the product portfolio comprises strands, standardised cables, hybrid cables, glass fiber as well as special cables, cable harnesses, wiring systems components and fully assembled systems for applications in various industrial markets.

Your markets – our strength.

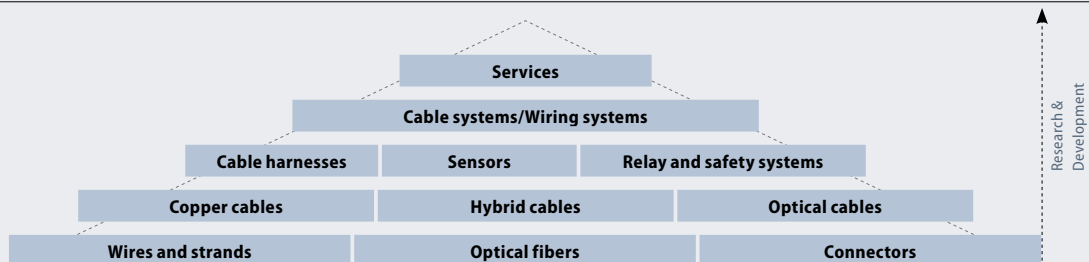
As diverse as our product and service range are the markets and sectors LEONI is supplying. We focus our activities on customers in the fields of Automotive & Commercial Vehicles, Industry & Healthcare, Communication & Infrastructure, Electrical Appliances and Conductors & Copper Solutions.

We are amongst the worldwide leaders in some product areas in the automotive market. Customers of our automotive cables business unit throughout the world benefit from innovative, reliable and long-lasting high-quality products.

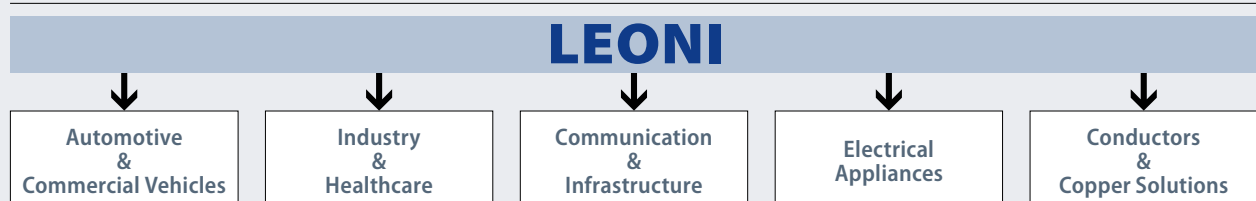
LEONI – we create the best connection for your future.

for further informations www.leoni.com

Products and services portfolio at a glance



LEONI's core markets



Business Unit Automotive Standard Cables

Our core competencies



Since 1931 LEONI is a leading manufacturer of cables and conductors for the automotive industry and has advanced to become the world's largest and most successful supplier – a truly global player.

The Business Unit Automotive Standard Cables is among the global market leaders for single-core automotive cables and supports you through its comprehensive product range with a wide variety of approvals from OEMs and Tier 1 customers.



→ Global presence:

Proximity to the customer is a key part of our corporate policy. In addition to production facilities in China, Germany, India, Morocco, Mexico, Poland, Turkey and Hungary, LEONI offers you a global marketing and product management network which advises and supports you the world over.

→ Extensive product range:

LEONI supplies cables in accordance with international standards, such as ISO (Europe), JASO (Japan) and SAE (United States) and based on the specifications of all major international car-makers.

→ High quality standard:

Standardisation of methods and the clear definition of processes ensure a consistently high level of LEONI quality at all production facilities in all corners of the globe.

In short:

The broad and varied range of services offered by the Business Unit Automotive Standard Cables makes it a sought-after partner of wiring systems manufacturers and assemblers around the world.

Marking of automotive cables

Manufacturer's markings

1. Single-core cables with a nominal cross-section of 0.5 mm² and more are permanently marked with the manufacturer's logo "LEONI" at maximum intervals of 200 mm (embossed or printed).

The marking of wires with a nominal cross-section smaller than 0.5 mm² is the subject of agreement between the customer and supplier.

2. In addition to this marking, the identification for the individual plants can be expressed by an additional letter.

Colour coding

1. The colours commonly used for the insulation of automotive cables are: white, yellow, grey, green, red, violet, brown, blue, black, orange (DIN 72551-7 and DIN IEC 304). Other colour identifications are permissible on request.

2. Two-colour automotive cables are marked by two diametrically opposed extruded longitudinal stripes. The width of every stripe must cover at least 7 % of the surface of the wire, with both marking stripes together covering at most 35 % of the surface.

3. Tricolour automotive cables are marked according to LV 112-1:

- 1. First colour: primary colour
- 2. Second colour: longitudinal stripes (as under 2 above)
- 3. Third colour: in the form of rings

Width of rings 3±1 mm. Distance between two successive rings: 6 to 20 mm. An offset of maximum 1 mm between the two ring halves is permissible.



Other markings

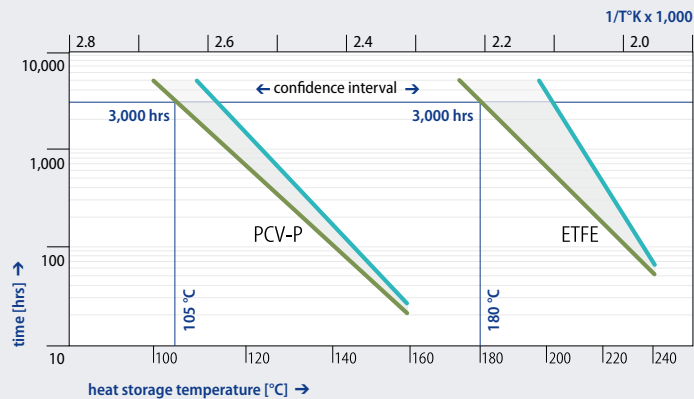
On request the wires can also be supplied with numbers printed on them. Since automotive cables fall into the class of low-voltage wires, no CE marking is needed. Cables in the high-voltage range should be provided with orange as a primary colour.



Insulation materials

How to determine the continuous service temperature.

temperature/time curve 
measurement curve 



LEONI develops and uses insulation materials that provide high reliability and durability under operating conditions. The structure and properties of the materials used are listed below and in the table on page 8–9.

Thermoplastics

- Plasticized or semi-crystalline polymers
- Viscoplastic properties in the service temperature range
- Plastically ductile at temperatures above the yield limit

Thermoplastic elastomers

- Polymer soft and hard segments
- Rubber-like elastic properties in the service temperature range
- Plastically ductile at temperatures above the yield limit

Elastomers/crosslinked plastics

- Crosslinked polymer soft and hard segments
- Rubber-like elastic properties with high reversible deformability in the service temperature range
- No thermoplastic flow properties – the crosslinked structure is retained up to decomposition temperature, i.e. well above service temperature

Requirements and quality

- Material testing and development according to customer specifications and/or national and international standards
- Optimisation of properties to meet changed or new requirements
- Regular quality control in the form of product audits

Selection criteria

- Service temperatures
- Electrical values
- Flexibility/hardness
- Mechanical stability under load
- Wear resistance
- Resistance to oil, fuels, brake fluid, acids/alkalis, organic agents
- Flame-retardant
 - halogen-free
 - low halogen

Service temperatures

The low service temperature range is determined by cold strength tests, dynamic bending strength tests or by wrapping tests at low temperature in accordance with ISO 6722-1.

The maximum continuous service temperature for materials with impairment of specific material properties is defined by the temperature index according to DIN ISO 2578.

Temperature-time curves with a 50 % reduction of the original elongation at break after heat storage define the temperature index at 3,000 hrs. Higher temperatures are permitted for shorter time intervals (thermal overload capacity).

The diagram above shows examples of how to determine the continuous service temperature. The measurement curves lie above the temperature-time curves specified for the material. The zone in between represents the confidence interval.

Insulation material properties

All compounds used are lead free.



Symbol	Name	Code	Density	Halogen content	Hardness Shore A/D	Tensile strength	Elongation at break
	e.g. DIN ISO 1629 and 7728	DIN 76722	ISO 11183		ISO 868	ISO 527	ISO 527 DIN 53504
			g/cm ³	approx. %		MPa	%
PVC-P	Polyvinyl chloride (plasticized)	Y	1.30–1.45	30	80A–60D	>10	>150
PVC-P	Polyvinyl chloride, cold-resistant	YK	1.24–1.34	30	80A–95A	>10	>150
PVC-P	Polyvinyl chloride, heat-resistant	YW	1.24–1.34	30	87A–95D	>15	>150
PE	Polyethylene	2Y	0.92–0.95	0	50D–62D	>15	>300
PA	Polyamide	4Y	1.01	0	72D	>40	>300
PTFE	Polytetrafluoroethylene	5Y	2.12–2.17	75	55D–65D	>20	>200
FEP	Fluorinated ethylene propylene	6Y	2.14	75	55D	>15	>200
ETFE	Ethylen tetrafluoroethylene	7Y	1.70	60	75D	>30	>200
PP-FR	Polypropylene, flame-retardant	9Y	1.05–1.3	12	42D–60D	>15	>200
PVDF	Polyvinylidene fluoride	10Y	1.8	35	78D	>25	>100
PFA	Perfluoroalkoxy copolymer	51Y	2.15	75	55D	>20	>200
			g/cm ³	approx. %		MPa	%
TPE-U	Thermoplastic polyether polyurethane	11Y	1.12	0	75A–54D	>30	>400
TPE-E	Thermoplastic polyether ester elastomer	12Y	1.16–1.25	0	40D–82D	>25	>400
TPE-E	Thermoplastic polyether elastomer	13Y	1.25–1.28	0	55D–62D	>30	>300
TPE-S	Thermoplastic polystyrene block copolymer	31Y	1.10–1.30	0–10	50D–65D	>15	>200
TPE-A	Thermoplastic polyamide elastomer	41Y	1.01–1.06	0	63D	>25	>400
			g/cm ³	approx. %		MPa	%
SIR	Silicone rubber	2G	1.20–1.30	0	40A–90A	6–20	>200
EVA	Ethylene vinyl acetate	4G	1.30–1.40	0	80A–87A	>7	>150
PVC-X	Polyvinyl chloride, crosslinked	X	1.35	30	95A	>10	>150
PE-X	Polyethylene, crosslinked (XLPE)	2X	1.1	10	60D	>10	>200
PE-X	Polyethylene, crosslinked, halogen-free (XLPE)	2X	1.4	0	50D–62D	>10	>200



Service temperatures			Resistance to							
Temperature Index	Thermal overload capacity	Cold winding test	Specific volume resistance	Abrasion	Flame retardation	Oil	Fuels	Brake fluid	Acids/alkalis	Organic agents
ISO 6722-1			IEC 93 DIN 53482	ISO 6722-1						
°C/3,000 hrs	°C/48 hrs	°C	Ω · cm							
100/105	125	-40	>10 ¹²	+	+	+	+	-	+	-
105	110	-50	>10 ¹²	+	+	+	+	-	+	-
125	140	-40	>10 ¹²	+	+	+	+	-	+	-
90	100	-40	>10 ¹⁶	+	--	-	+	--	+	-
105	140	-40	>10 ¹²	++	-	++	++	+	+	+
260	305	-90	>10 ¹⁸	++	++	++	++	++	++	++
210	260	-65	>10 ¹⁵	++	++	++	++	++	++	++
180	230	-65	>10 ¹⁵	++	++	++	++	++	++	++
125	150	-40	>10 ¹⁴	+	+	+	+	-	+	+
150	160	-30	>10 ¹⁴	++	++	++	++	++	+	+
260	290	-90	>10 ¹⁵	++	++	++	++	++	++	++
°C/3,000 hrs	°C/48 hrs	°C	Ω · cm							
110/125	150	-40	>10 ⁹	++	+	++	++	+	+	+
90	150	-40	>10 ⁹	++	-	++	++	+	-	+
150	180	-40	>10 ⁹	++	+	++	++	+	+	+
125	150	-40	>10 ¹⁰	-	+	+	+	-	+	-
90	120	-40	>10 ¹⁰	++	-	++	++	+	-	+
°C/3,000 hrs	°C/48 hrs	°C	Ω · cm							
200	225	-80	>10 ¹⁶	-	+	+	+	++	+	+
140	180	-40	>10 ¹⁰	-	-	-	-	-	-	-
105	140	-40	>10 ¹²	++	+	+	+	-	+	+
125	150	-40	>10 ¹⁴	+	+	+	+	-	+	+
125	150	-40	>10 ¹⁴	+	+	+	+	-	+	+

++ excellent
+ good
- fair
-- poor

Conductor materials

Most of our conductor material is copper (Cu). For the production of our wires we mainly use **Cu-ETP1 (oxygenic copper)** and **Cu-OF 1 oxygen-free copper** for special applications (e. g. hydrogen resistance).

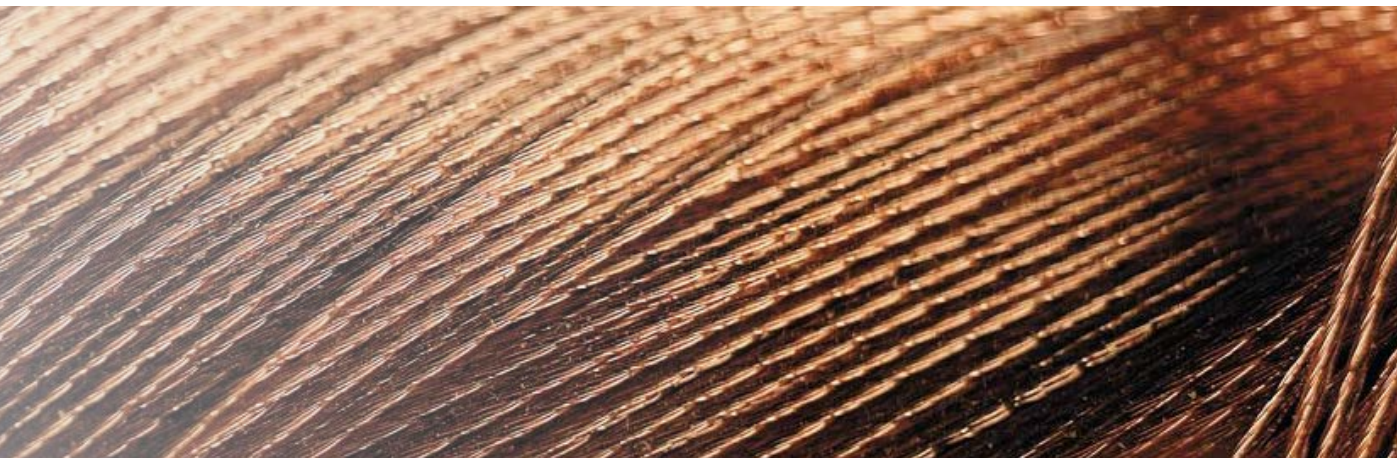
In addition to pure copper we also process a variety of copper alloys for special applications.

Extract from EN 1977 – copper and copper alloys – raw wire made of copper

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Notes on properties and use
		in % by weight	g/cm ³			
Oxygenic copper						
Cu-ETP1 (E-Cu)	CW 003 A	Cu ≥ 99.90 oxygen max. 0.040	8.9	1,083 °C	101	Oxygenic (tough-pitch) copper with an electrical conductivity in the soft condition of ≥ 58.58 m/Ωmm ² at 20 °C.
Oxygen-free copper, non-deoxidized						
Cu-OF1 (OF-Cu)	CW 007 A	Cu 99.95	8.9	1,083 °C	101	High-purity copper, largely free of elements that evaporate in vacuum, with an electrical conductivity in the soft condition ≥ 58.58 m/Ωmm ² at 20 °C. Intermediate material meeting high requirements on hydrogen resistance; welding and hard soldering capability. For vacuum systems and electronics.

International Annealed Copper Standard = IACS

Electrical conductivity of copper = min. 58 m/Ωmm² = 100 % IACS



Excerpt from DIN CEN/TS 13388 and EN 1977 – Alloys

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Information regarding properties and use
		in % by weight	g/cm ³			
CuAg 0.1	CW 013 A	Ag min. 0.08 max. 0.12	8.9	1,083 °C	98	Copper alloys with high tensile strength electrical conductivity of ≥ 57 m/ Ω mm ² at 20 °C in a soft condition.
CuMg 0.2	CW 127 C	Mg* min. 0.14 max. 0.26	8.9	1,078 °C	75	Copper alloys with high tensile strength electrical conductivity of ≥ 44 m/ Ω mm ² at 20 °C in a soft condition.
CuSn 0.3**	CW 129 C	Sn* min. 0.25 max. 0.35	8.9	1,065 °C	72	Copper alloys with high tensile strength electrical conductivity of ≥ 42 m/ Ω mm ² at 20 °C in a soft condition.

* Tolerance deviating from DIN CEN/TS 13388

** Symbol deviating from DIN CEN/TS 13388

Excerpt from EN 573 – Aluminium

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Information regarding properties and use
		in % by weight	g/cm ³			
EAl 99.7	1370	Al 99.7	2.7	659 °C	62	Aluminium with electrical conductivity of ≥ 35.5 m/ Ω mm ² at 20 °C in a soft condition.

Alternative conductor materials



Application

Low-current and signal cables for use in the automotive industry or for industrial applications.

Material		Material Standard
CuAg	Copper Silver → low alloyed copper	DIN CEN/TS 13388
CCS	Copper Clad Steel	ASTM B 227, ASTM B 228, ASTM B 452
CuMg	Copper Magnesium → low alloyed copper	DIN CEN/TS 13388
CuSn	Copper Tin → low alloyed copper	DIN CEN/TS 13388

Characteristics

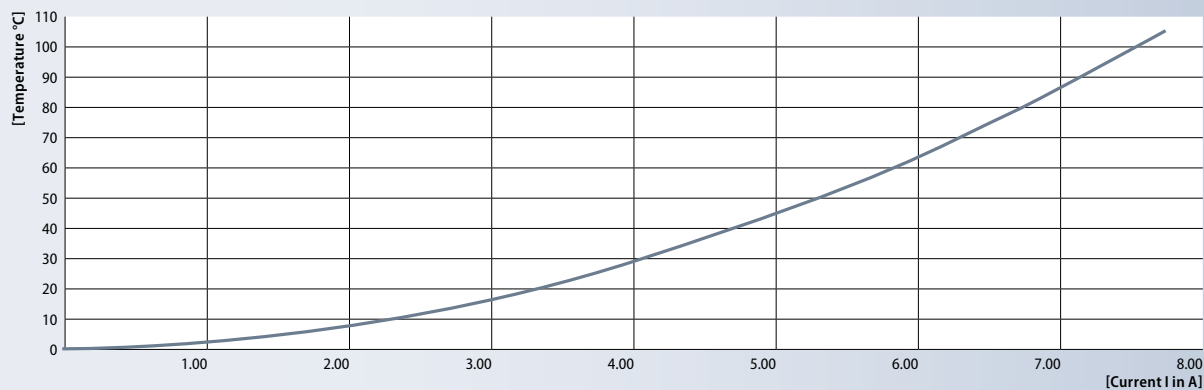
	CuAg	CCS	CuMg	CuSn	Cu-ETP																		
Electrical conductivity	95 %, IACS	40 %, IACS	75 %, IACS	72 %, IACS	100 %, IACS																		
Tensile strength*	> 540 N/mm ²	> 770 N/mm ²	> 670 N/mm ²	> 620 N/mm ²	> 220 N/mm ²																		
Elongation at break	> 1 %	> 1 %	> 1 %	> 1 %	> 16 %																		
Bending test performance	<p>number of cycles</p> <table border="1"> <caption>Bending Test Performance (Number of Cycles)</caption> <thead> <tr> <th>Material</th> <th>Cross-section</th> <th>Number of Cycles</th> </tr> </thead> <tbody> <tr> <td>CuAg</td> <td>0.13 mm²</td> <td>~2000</td> </tr> <tr> <td>CCS</td> <td>0.13 mm²</td> <td>~7000</td> </tr> <tr> <td>CuMg</td> <td>0.13 mm²</td> <td>~2500</td> </tr> <tr> <td>CuSn</td> <td>0.13 mm²</td> <td>~2000</td> </tr> <tr> <td>CU-ETP1 soft-annealed</td> <td>0.35 mm²</td> <td>~1000</td> </tr> </tbody> </table>					Material	Cross-section	Number of Cycles	CuAg	0.13 mm ²	~2000	CCS	0.13 mm ²	~7000	CuMg	0.13 mm ²	~2500	CuSn	0.13 mm ²	~2000	CU-ETP1 soft-annealed	0.35 mm ²	~1000
Material	Cross-section	Number of Cycles																					
CuAg	0.13 mm ²	~2000																					
CCS	0.13 mm ²	~7000																					
CuMg	0.13 mm ²	~2500																					
CuSn	0.13 mm ²	~2000																					
CU-ETP1 soft-annealed	0.35 mm ²	~1000																					

* Values based on soft-annealed ETP-copper and hard-drawn CuAg, CCS, CuMg and CuSn

Comparison table – cable types

Materials	FLCUAGRY	FLCUAGRY	FLCCSRY	FLCUMGRY	FLCUSNRY	FLRY	Ratio
Cross-section	0.13 mm ²	0.17 mm ²	0.13 mm ²	0.13 mm ²	0.13 mm ²	0.35 mm ²	63–65 % reduction
Tensile strength	> 95 N	> 100 N	> 130 N	> 100 N	> 100 N	> 75 N	20–33 % increase
Weight approx.	2.0 kg/km	2.5 kg/km	2.0 kg/km	2.0 kg/km	2.0 kg/km	4.5 kg/km	45–55 % reduction

Current rating diagram – FLCUMG02RY 0.13-A



Insulation: Depending on the application and requirement, there are various insulation materials available to choose from.

FLR – symmetric conductor construction type A with reduced wall thickness

	Conductor construction					Insulation	Cable	
	Nominal cross-section	No. of strands	Diameter of single wire	Diameter of conductor	Electrical resistance at 20 °C	Wall thickness	Outer diameter	Weight
	mm ²		max. mm	max. mm	max. mΩ/m	min. mm	max. mm	approx. kg/km
CuAg01	0.13	7	0.16	0.49	145	0.2	1.05	2.0
	0.17	7	0.18	0.56	105	0.2	1.1	2.5
	0.22	7	0.21	0.7	86	0.2	1.2	3.1
	0.35	19	0.16	0.9	58	0.2	1.4	4.7
CuSn03	0.13	7	0.16	0.49	170	0.2	1.05	2.0
	0.22	7	0.21	0.7	115	0.2	1.2	3.1
	0.35	19	0.16	0.9	81	0.2	1.4	4.7
CuMg02	0.13	7	0.16	0.49	170	0.2	1.05	2.0
CCS	0.13	7	0.16	0.49	317	0.2	1.05	2.1
	0.22	7	0.21	0.7	210	0.2	1.2	2.9

FLR – symmetric conductor construction type A with ultra-thin wall thickness

	Conductor construction					Insulation	Cable	
	Nominal cross-section	No. of strands	Diameter of single wire	Diameter of conductor	Electrical resistance at 20 °C	Wall thickness	Outer diameter	Weight
	mm ²		max. mm	max. mm	max. mΩ/m	min. mm	max. mm	approx. kg/km
CuAg01	0.17	7	0.18	0.56	105	0.16	1.0	2.3

Coding key

The type designation provides information on the type of wire, the insulation and sheath materials used and the principle design features in abbreviated and simplified form. Further details are listed in DIN 76722.

A type designation is made up of several groups. The type of wire is specified first and then its construction from inside to outside:

1.	Type of cable	Automotive cable	FL
		Automotive ignition cable	FZL
2.	Conductor materials Copper is not named additionally * The composition of the alloys is fully specified. Examples: CuMg02, CuSn03, CuAg01	Aluminium	AL
		Resistance conductors	W
		Other conductor materials	M
		Copper alloys*	CU "xx"
		Aluminium alloys*	AL "xx"
		Copper Clad Steel	CCS
3.	Geometric construction of insulation	Ultrathin thickness of insulation acc. to ISO 6722-1	U
		Reduced thickness of insulation acc. to ISO 6722-1	R
		Thick wall acc. to ISO 6722-1 (is not identified)	
		Ultrathick insulation (thickness bigger than specified in ISO 6722-1)	S
4.	Codes for conductor materials Designations used as abbreviations for insulation materials	Soft-PVC (Polyvinyl chloride plasticized)	Y
		Soft-PVC (Polyvinyl chloride, heat-resistant)	YW
		Soft-PVC (Polyvinyl chloride, cold-resistant)	YK
		PE (Polyethylene)	2Y
		PA (Polyamide)	4Y
		PTFE (Polytetrafluoroethylene)	5Y
		FEP (Fluorinated ethylene propylene)	6Y
		ETFE (Ethylene tetrafluoroethylene)	7Y
		PP (Polypropylene)	9Y
		PVDF (Polyvinylidene fluoride)	10Y
		TPE-U (Thermoplastic elastomer on polyurethane basis, PUR)	11Y
		TPE-E (Thermoplastic polyester elastomer on polyether ester basis)	12Y
		TPE-E (Thermoplastic polyester elastomer on polyester ester basis)	13Y
		TPE-S (Thermoplastic polyester elastomer on polystyrene basis)	31Y
		TPE-A (Thermoplastic polyester elastomer on polyamide basis)	41Y
		PFA (Perfluoroalkoxy copolymer)	51Y
		PVC-X (Polyvinyl chloride crosslinked)	X
		PE-X (Polyethylene crosslinked)	2X
SIR (Silicone rubber)	2G		
EVA (Ethylene/vinyl acetate)	4G		
5.	Codes for constructional elements Codes for further constructional elements and non-extruded coverings	Foil shield	B
		Copper wire braiding	C
		Copper wire spiral shield	D
		Glass fiber braiding	G
		Insulation foil	P
		Textile braiding	T
6.	Conductor cross-section and construction These are at the end of the respective designation block. The following different constructions are used for the conductor →	Symmetric conductor structure acc. to ISO 6722-1	A
		Asymmetric conductor structure in accordance with ISO 6722-1	B
		Multi-strand conductor structure in accordance with ISO 6722-1**	C
7.	Surface conductor coating In some cases the type of metal plating is specified as follows →	Tin-plated	SN
		Nickel-plated	NI
		Silver-plated	AG

** Especially flexible or highly flexible stranded conductors are identified by additional specification of the nominal diameter of the single wire.

Example

Single-core cables

FLY 0.5

automotive cable	FL
PVC insulation	Y
nominal cross-section 0.5 mm ²	0.5

FLRY 0.75

automotive cable	FL
reduced wall thickness of insulation	R
PVC insulation	Y
nominal cross-section 0.75 mm ²	0.75

FLYK 25.0/0.1

automotive cable	FL
insulation (cold-resistant PVC)	YK
nominal cross-section 25 mm ²	25.0
max. individual wire-diameter 0.1 mm	0.1

FLR5Y 0.5NI-A

automotive cable	FL
reduced wall thickness of insulation	R
PTFE insulation	5Y
nominal cross-section 0.5 mm ²	0.5
nickel-plated single conductors	NI
symmetric conductor structure	-A

FLALRY 10.0

automotive cable	FL
aluminium conductor material	AL
reduced wall thickness of insulation	R
PVC insulation	Y
nominal cross-section 10.0 mm ²	10.0

Twisted cables (without sheath)

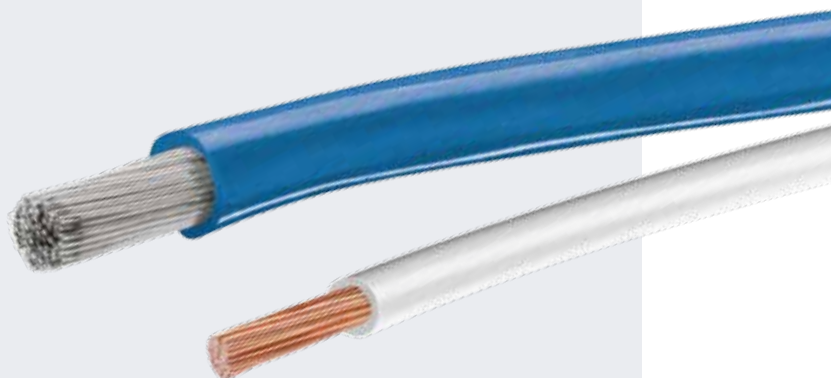
FLRY 2x1.5SN-B

automotive cable	FL
reduced wall thickness of insulation	R
PVC insulation	Y
two cores	2x
nominal cross-section 1.5 mm ²	1.5
tinned conductor	SN
asymmetrical conductor structure	-B

Cables with alternative conductor materials

FLCUAG01RY 0.13-A

automotive cable	FL
copper alloys with silver (Ag) share of 0.1 %	CuAg01
reduced wall thickness of insulation	R
PVC insulation	Y
nominal cross-section 0.13 mm ²	0.13
symmetric conductor structure	-A



International standards – Automotive cables

International standards

SAE J 1128 Engineering Society
for advancing mobility Land, Sea, Air and Space

International standards

ISO 6722 -1	Road vehicles, 60 V and 600 V single-core cables
ISO 6722 -2	Road vehicles, 60 V and 600 V single-core aluminium cables
ISO 14 572	Road vehicles – round, screened and unshielded, 60 V and 600 V multi-core sheathed cables
LV 112-1	Electrical cables for motor vehicles (copper, single-core, unshielded)
LV 112-2	Electrical cables for motor vehicles (aluminium, single-core, unshielded)
LV 112-3	Specification of the current rating of vehicle cables
LV 112-4	Electrical cables for motor vehicles (copper alloy cables, single-core, unshielded)
LV 122	Twisted cables
LV 212	Sheathed cables for motor vehicles (requirements and testing)
LV 213-1 & LV 213-2	High-frequency cables for motor vehicles
LV 216-1 & LV 216-2	Shielded high-voltage sheathed cables for motor vehicles and their electrical drives

SAE J 1128 Engineering Society for advancing mobility Land, Sea, Air and Space

TWP	Thin wall, Thermoplastic Insulated
GPT	General Purpose, Thermoplastic Insulated
HDT	Heavy Duty, Thermoplastic Insulated
TXL	Thin wall, Cross (X) Linked Polyolefin Insulated
GXL	General Purpose, Cross (X) Linked Polyolefin Insulated
SXL	Special Purpose, Cross (X) Linked Polyolefin Insulated
TWE	Thin wall, Thermoplastic Elastomer Insulated
GTE	General Purpose, Thermoplastic Elastomer Insulated
HTE	Heavy Duty, Thermoplastic Elastomer Insulated



Customer standards

JASO D 611: 2009 Japanese Automobile Standard

JASO D 611:2009 Japanese Automobile Standard

AV	Vinyl insulated low tension electric cable for automobiles
AVS	Low tension cable with reduced outside diameter for automobiles, general wall thickness
AVSS	Low tension cable with reduced outside diameter for automobiles, thin wall thickness
AVSSf	Low tension cable with reduced outside diameter for automobiles, thin wall thickness, high flexibility
CAVS	Construction of conductors pressed in circular shape, low tension cable with reduced outside diameter for automobiles, general wall thickness
AVX	Crosslinked vinyl heat-resistant low-tension cable for automobiles
AEX	Crosslinked polyethylene heat-resistant low-tension cable for automobiles

Customer standards

In addition, we produce according to various customer standards (see excerpt):

Customer	Customer standard
BMW	GS 95007-1-1, GS 95007-1-2, GS 95007-2
Bosch	5 998 340 ..., 5 998 342 ..., 5 998 350..., N34A AE011B S003, N34A AE011D S006
Daimler	DBL 6312, MBN 22 014
FIAT	FIAT 91107/17, 91107/18, 91107/19
FORD	ES-AU5T-1A348, ES-5M5T-14401
GM/OPEL	GMW 15 626, GME 14 022
Jaguar / Landrover	TPJLR.18.007, JPS D02-17
MAN	MAN 3135-1, MAN 3135-2
PSA	B25 1110, STE 96 461 475 99
Renault	36 - 05 - 009/--N
Rover	RES.62.21.759
Volvo	7611 131 R2, 7611 131 R3, 7611 131 R2B, 31834866
VW	VW 60306-1

Automotive cables with
alternative conductor materials
starting on page 12

Automotive cables · single-core

LEONI product range

		page			page
Heating cables					
LEONI Mocar® W... / LEONI SHC... heating cable	high temperature resistant for applications in the engine compartment / interior	19	LEONI Mocar® 150 A	with TPE-E insulation Type A / Type B, heat-resistant	31
Aluminium cables					
FLALRY	Aluminium cable with thin wall PVC insulation	20	LEONI Mocar® 150 C	with TPE-E insulation Type A / Type B, heat-resistant	31
FLALRYW	Aluminium cable with thin wall PVC insulation hot-pressure resistant	21	LEONI Mocar® 180 E	with ETFE insulation Type A / Type B, high temperature resistant	32
Standard cables					
FLY	with PVC insulation	22	LEONI Mocar® 200 G	with silicone insulation high temperature resistant	33
FLYW	with PVC insulation hot-pressure resistant	23	LEONI Mocar® 200 G AL	with silicone insulation Aluminium conductors, high temperature resistant	33
FLYK	with PVC insulation cold-resistant with increased flexibility	24	LEONI Mocar® 210 F	with FEP insulation Type A / Type B, high temperature resistant	34
FLRYK	with thin wall PVC insulation cold-resistant	24	LEONI Mocar® 260 T	with PFA insulation high temperature resistant	35
FLRY	with thin wall PVC insulation Type A / Type B	25	LEONI Mocar® 260 R	with PTFE insulation Type A / Type B, high temperature resistant	35
FLRYW	with thin wall PVC insulation Type A / Type B, hot-pressure resistant	26	Cables according to American standards		
FLR4Y	with thin wall PA insulation Type A / Type B	27	TWP	with thin wall PVC insulation	36
FLRYH	with thin wall PVC insulation fine wire, highly flexible	27	TXL	with thin wall, crosslinked PE insulation	36
LEONI Mocar® cables			WTA	with ultra-thin wall PVC insulation	37
LEONI Mocar® 125 S	with TPE-S insulation for flexible and standard applications	28	WXC	with ultra-thin wall XLPE insulation	37
LEONI Mocar® 125 P	with PP insulation Type A / Type B, heat-resistant	29	Cables according to Japanese standards		
LEONI Mocar® 125 XS	with crosslinked PE insulation Type A / Type B, heat-resistant	30	AV	with PVC insulation	38
LEONI Mocar® 125 XE	with crosslinked PE insulation Type A / Type B, heat-resistant	30	AVS	with PVC insulation	38
			AVSS	with thin wall PVC insulation	39
			Special cables		
			FL11Y	with TPE-U insulation battery cables	40
			FLYY	with core insulation and PVC sheath	40
			Twisted cables		
			FLRY n x...	Twisted cables unshielded (without sheath)	41

LEONI Mocar® W... / LEONI SHC... heating cable

high temperature resistant, for applications in the engine compartment / interior



Temperature range (3,000 hrs)

variable **-90 °C to +260 °C**

Construction / materials

depending on requirements → see table

Special properties

- Over a defined electrical resistance, the heating cables can be used for a wide range of applications.

Examples for applications

- Seat heating
- Hose heating

Description	Insulation material	Electrical resistance at 20 °C	Temperature range (3,000 hrs)
		Ω/km	°C
Heating cables for applications in the engine compartment			
LEONI Mocar® 150 C W...	TPE	60 ... 100k	-40 °C to +150 °C
LEONI Mocar® 180 E W...	ETFE		-65 °C to +180 °C
LEONI Mocar® 210 F W...	FEP		-65 °C to +210 °C
LEONI Mocar® 260 T W...	PFA		-80 °C to +260 °C
LEONI Mocar® 260 R W...	PTFE		-90 °C to +260 °C

Heating cables for applications in the interior

LEONI SHC Y...	PVC	60 ... 100k	-40 °C to +105 °C
LEONI SHC 12Y...	TPE		-40 °C to +105 °C
LEONI SHC 7Y...	ETFE		-65 °C to +180 °C
LEONI SHC 6Y...	FEP		-65 °C to +210 °C

Conductor construction (LEONI SHC)

C	Soft-annealed electrolytic copper Cu-ETP1
T	Tinsel → Core thread braided with laminated copper wires
E	Enamelled copper wire conductors → Single wires with laquer coating
H	Hybrid conductors → Strand with individual wires made of various materials
R	Special conductor with incorporated strain-relief element
A	Alloy

Examples

Example LEONI Mocar® 180 E W550

Description	Max. continuous use temperature (insulation material)	Electrical resistance
LEONI Mocar®	180 E	W550

Example LEONI SHC 7Y A 2000

Description	Insulation material	Conductor construction	Electrical resistance
LEONI SHC	7Y	A	2000



FLALRY with thin wall PVC insulation



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Aluminium 99.7%, $\geq 1.25 \text{ mm}^2$
Aluminium alloy $< 1.25 \text{ mm}^2$
Insulation Soft-PVC with properties according to ISO 6722-2, Class B

Special properties

- Cables with cross-sections $> 10 \text{ mm}^2$ can be used as battery cables
- Considerable weight savings compared to copper

Standards / specifications

ISO 6722-2

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.75	11	0.3	1.3	43.6	0.24	1.9	-0.2	5
1	16	0.29	1.5	32.7	0.24	2.1	-0.2	6
1.25	16	0.32	1.7	24.8	0.24	2.3	-0.2	7
1.5	16	0.35	1.8	21.2	0.24	2.4	-0.2	8
2	15	0.42	2.0	15.7	0.28	2.8	-0.3	10
2.5	19	0.43	2.2	12.7	0.28	3.0	-0.3	12
3	23	0.42	2.4	10.2	0.32	3.4	-0.3	15
4	30	0.42	2.8	7.85	0.32	3.7	-0.3	18
5	36	0.42	3.1	6.57	0.32	4.2	-0.3	23
6	45	0.42	3.4	5.23	0.32	4.3	-0.3	25
8	59	0.42	4.3	3.97	0.32	5.0	-0.4	29
10	50	0.52	4.5	3.03	0.48	6.0	-0.7	44
12	60	0.52	5.4	2.53	0.48	6.5	-0.7	50
16	78	0.52	5.8	1.93	0.52	7.2	-0.8	65
20	95	0.52	6.9	1.59	0.52	7.8	-0.8	75
25	122	0.52	7.2	1.24	0.52	8.7	-0.8	91
30	141	0.52	8.3	1.08	0.64	9.6	-0.9	110
35	172	0.52	8.5	0.878	0.64	10.4	-1.0	132
40	193	0.52	9.6	0.788	0.71	11.1	-1.1	148
50	247	0.52	10.5	0.613	0.71	12.2	-1.2	183
60	289	0.52	11.6	0.525	0.80	13.3	-1.3	217
70	351	0.52	12.5	0.432	0.80	14.4	-1.4	253
85	420	0.52	13.6	0.365	0.90	15.8	-1.4	305
95	463	0.52	14.8	0.327	0.90	16.7	-1.4	334
120 ^{***}	305	0.72	16.5	0.255	1.28	19.7	-2.0	456
160 ^{***}	398	0.72	19.0	0.195	1.28	22.5	-2.0	570

* Nominal value, tolerance of number of strands $\geq 6.0 \text{ mm}^2$ are permitted ($\pm 5\%$).

** Also available with increased wall thickness of the insulation.

*** With increased wall thickness.



FLALRYW with thin wall PVC insulation

hot-pressure resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Aluminium 99.7 %, $\geq 1.25 \text{ mm}^2$

Aluminium alloy $< 1.25 \text{ mm}^2$

Insulation Soft-PVC with properties according to ISO 6722-2, Class C

Special properties

- Suitable for applications inside the engine compartment
- Considerable weight savings compared to copper

Standards / specifications

ISO 6722-2

Nominal cross-section	Conductor construction				Insulation Wall thickness** min.	Cable		Weight approx. kg/km
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm		
0.75	11	0.3	1.3	43.6	0.24	1.9	-0.2	5
1	16	0.29	1.5	32.7	0.24	2.1	-0.2	6
1.25	16	0.32	1.7	24.8	0.24	2.3	-0.2	7
1.5	16	0.35	1.8	21.2	0.24	2.4	-0.2	8
2	15	0.42	2.0	15.7	0.28	2.8	-0.3	10
2.5	19	0.43	2.2	12.7	0.28	3.0	-0.3	12
3	23	0.42	2.4	10.2	0.32	3.4	-0.3	15
4	30	0.42	2.8	7.85	0.32	3.7	-0.3	18
5	36	0.42	3.1	6.57	0.32	4.2	-0.3	23
6	45	0.42	3.4	5.23	0.32	4.3	-0.3	25
8	59	0.42	4.3	3.97	0.32	5.0	-0.4	29
10	50	0.52	4.5	3.03	0.48	6.0	-0.7	44
12	60	0.52	5.4	2.53	0.48	6.5	-0.7	50
16	78	0.52	5.8	1.93	0.52	7.2	-0.8	65
20	95	0.52	6.9	1.59	0.52	7.8	-0.8	75
25	122	0.52	7.2	1.24	0.52	8.7	-0.8	91
30	141	0.52	8.3	1.08	0.64	9.6	-0.9	110
35	172	0.52	8.5	0.878	0.64	10.4	-1.0	132
40	193	0.52	9.6	0.788	0.71	11.1	-1.1	148
50	247	0.52	10.5	0.613	0.71	12.2	-1.2	183
60	289	0.52	11.6	0.525	0.80	13.3	-1.3	217
70	351	0.52	12.5	0.432	0.80	14.4	-1.4	253
85	420	0.52	13.6	0.365	0.90	15.8	-1.4	305
95	463	0.52	14.8	0.327	0.90	16.7	-1.4	334
120***	305	0.72	16.5	0.255	1.28	19.7	-2.0	456
160***	398	0.72	19.0	0.195	1.28	22.5	-2.0	570

* Nominal value, tolerance of number of strands $\geq 6.0 \text{ mm}^2$ are permitted ($\pm 5\%$).

** Also available with increased wall thickness of the insulation.

*** With increased wall thickness.

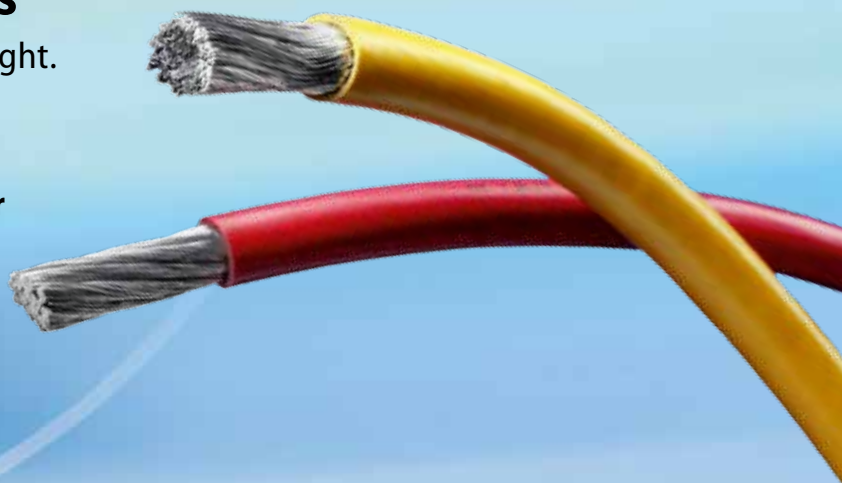
Aluminium (battery) cables

Maximum performance – minimum weight.

Alternative conductor material to copper

Aluminium and copper in comparison

	Cu	Al
density (at 20 °C)	8.92 kg/dm ³	2.7 kg/dm ³
electrical conductivity	100 %	60 % IACS
tensile strength	>200 N/mm ²	>70 – 100 N/mm ²
elongation at break	>16 %	>16 %



FLY with PVC insulation



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor constr. acc. to ISO 6722-1

Insulation Soft-PVC with properties
according to ISO 6722-1, Class B

Special properties

- Conductors with cross-sections > 6 mm² are also suitable as battery cables

Standards / specifications

LV 112-1 · BMW GS 95007-1-1 · VW 60306-1
ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness nom.	Outer diameter	
					max.		Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.3	9
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.3	12
1	32	0.21	1.35	18.5	0.60	2.7	-0.3	15
1.25	16	0.33	1.7	14.9	0.60	2.95	-0.55	15
1.5	30	0.26	1.7	12.7	0.60	3.0	-0.3	20
2	28	0.31	2.0	9.42	0.60	3.3	-0.3	26
2.5	50	0.26	2.2	7.6	0.70	3.6	-0.3	32
3	60	0.26	2.4	6.15	0.70	4.1	-0.3	38
4	56	0.31	2.75	4.71	0.80	4.4	-0.4	49
5	65	0.33	3.1	3.94	0.80	4.9	-0.4	60
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	69
8	50	0.46	4.3	2.38	0.80	5.9	-0.9	90
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	113
12	96	0.41	5.4	1.52	1.00	7.4	-0.8	144
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	181
20	152	0.41	6.9	0.955	1.10	9.1	-1.0	221
25	196	0.41	7.8	0.743	1.30	10.4	-0.7	288
30	224	0.41	8.3	0.647	1.30	10.9	-1.2	325
35	276	0.41	9.0	0.527	1.30	11.6	-0.6	361
40	308	0.41	9.6	0.473	1.40	12.4	-1.2	438
50	396	0.41	10.5	0.368	1.50	13.5	-2.0	521
60	296	0.51	11.6	0.315	1.50	14.6	-1.2	644
70	360	0.51	12.5	0.259	1.50	15.5	-2.0	716
95	475	0.51	14.8	0.196	1.60	18.0	-2.0	918
120	608	0.51	16.5	0.153	1.60	19.7	-2.0	1220

* Nominal value, tolerance of number of strands ≥ 6.0 mm² are permitted ($\pm 5\%$).



FLYW with PVC insulation

hot-pressure resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor constr. acc. to ISO 6722

Insulation Soft-PVC with properties according
to ISO 6722-1, Class C

Special properties

- Hot-pressure resistant test at 120 °C
- Suitable for applications inside the engine compartment.

Standards / specifications

Bosch 5 998 341... · DBL 6312

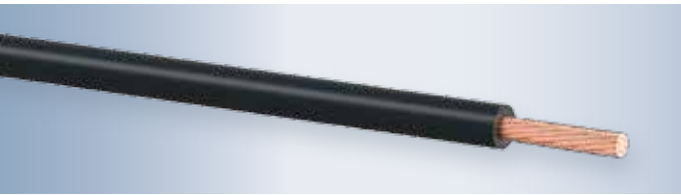
Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness nom.	Outer diameter	
					max.		Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.3	8
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.3	11
1	32	0.21	1.35	18.5	0.60	2.7	-0.3	14
1.25	16	0.33	1.7	14.9	0.60	2.95	-0.55	14
1.5	30	0.26	1.7	12.7	0.60	3.0	-0.3	19
2	28	0.31	2.0	9.42	0.60	3.3	-0.3	25
2.5	50	0.26	2.2	7.6	0.70	3.6	-0.3	31
3	60	0.26	2.4	6	0.70	4.1	-0.3	37
4	56	0.31	2.75	4.71	0.80	4.4	-0.4	47
5	65	0.33	3.1	3.94	0.80	4.9	-0.4	58
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	68
8	50	0.46	4.3	2.38	0.80	5.9	-0.9	88
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	111
12	96	0.41	5.4	1.52	1.00	7.4	-0.8	142
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	179
20	152	0.41	6.9	0.955	1.10	9.1	-1.0	218
25	196	0.41	7.8	0.743	1.30	10.4	-1.0	278

* Nominal value, tolerance of number of strands $\geq 6.0 \text{ mm}^2$ are permitted ($\pm 5\%$).



FLYK with PVC insulation

cold-resistant with increased flexibility



Temperature range (3,000 hrs)

-50 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare

Insulation Soft-PVC, cold-resistant

Special properties

- Cold bending test acc. to ISO 6722-1 at -50 °C
- Short-term and long-term ageing according to ISO 6722-1, Class B

Nominal cross-section*	Conductor construction				Insulation Wall thickness nom.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	28	0.16	1.1	37.7	0.60	2.3	-0.3	9
0.75	42	0.16	1.3	25.1	0.60	2.5	-0.3	12
1	57	0.16	1.5	18.8	0.60	2.7	-0.3	15
1.5	84	0.16	1.8	12.7	0.60	3.0	-0.3	20
2.5	140	0.16	2.3	7.54	0.70	3.9	-0.4	32
4	1015	0.08	3.3	4.71	0.80	4.9	-0.4	53
6	1548	0.08	4.2	3.14	0.80	5.9	-0.4	76
10	2510	0.08	5.2	1.85	1.00	7.3	-0.6	124
16	4033	0.08	6.7	1.16	1.00	8.8	-0.6	198
25	3169	0.11	8.0	0.743	1.20	10.5	-0.6	298

* Additional cross-sections and strands constructions on request.

FLRYK with thin wall PVC insulation

cold-resistant



Temperature range (3,000 hrs)

-50 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor constr. acc. to ISO 6722-1

Insulation Soft-PVC, cold-resistant

Special properties

- Cold bending test acc. to ISO 6722-1 at -50 °C
- Short-term and long-term ageing according to ISO 6722-1, Class B

Standards / specifications

Bosch 5 998 342...

Nominal cross-section*	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6
1	32	0.21	1.4	18.5	0.30	2.1	-0.2	12
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.3	16
2.5	50	0.26	2.1	7.6	0.70	3.7	-0.4	30

* Additional cross-sections and strands constructions on request.

FLRY with thin wall PVC insulation

Type A / Type B



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation Soft-PVC with properties
according to ISO 6722-1, Class B

Standards / specifications

BMW GS 95007-1-1 · VW 60306-1 · DBL 6312
Ford ES-AU5T-1A348 · LV 112-1 · MAN 3135
BOSCH 5 998 340 · FIAT 91107/18

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
FLRY – Type A								
0.22	7	0.21	0.7	84.8 / 86.5	0.20	1.2	-0.1	3
0.35**	7	0.26	0.8	54.4 / 55.5***	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.25	19	0.3	1.7	14.9 / 15.9	0.24	2.3	-0.2	15
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	16
2	19	0.38	2.0	9.42 / 9.69	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	26
FLRY – Type B								
0.35	12	0.21	0.9	54.4 / 55.5***	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.25	16	0.33	1.7	14.9 / 15.9	0.24	2.3	-0.2	14
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	16
2	28	0.31	2.0	9.42 / 9.69	0.28	2.8	-0.3	23
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15 / 6.36	0.32	3.4	-0.3	34
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42
5	65	0.33	3.1	3.94 / 4.02	0.32	4.2	-0.3	52
6	84	0.31	3.3	3.14 / 3.23	0.32	4.3	-0.3	61
8	50	0.46	4.3	2.38 / 2.52	0.32	5.0	-0.4	87
10	80	0.41	4.5	1.82 / 1.85	0.48	5.8	-0.4	108
12	96	0.41	5.4	1.52 / 1.6	0.48	6.5	-0.7	122
16	126	0.41	5.5	1.16 / 1.18	0.52	7.0	-0.5	170
20	152	0.41	6.9	0.955 / 0.999	0.52	7.8	-0.8	194
25	196	0.41	7.0	0.743 / 0.757	0.52	8.7	-0.8	265

* Nominal value, tolerance of number of strands ≥ 6.0 mm² are permitted ($\pm 5\%$).

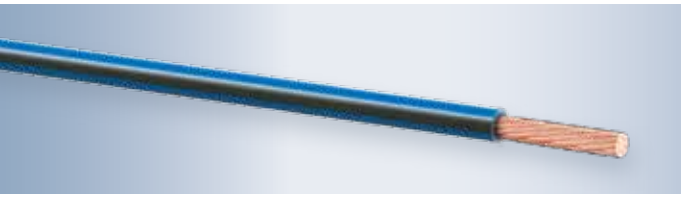
** This cross-section with tinned stranded conductor is suitable for use with insulation displacement connectors.

*** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.



FLRYW with thin wall PVC insulation

Type A / Type B, hot-pressure resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation Soft-PVC with properties according
to ISO 6722-1, Class C

Special properties

- Heat resistant cable
- Suitable for applications inside the engine compartment

Standards / specifications

DBL 6312 · Ford ES-AU5T-1A348

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx. kg/km
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Outer diameter max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
FLRYW – Type A								
0.35	7	0.26	0.8	54.4 / 55.5**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.25	19	0.30	1.7	14.9 / 15.9	0.24	2.3	-0.2	12
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	16
2	19	0.38	2.0	9.42 / 9.69	0.28	2.8	-0.3	22
FLRYW – Type B								
0.35	12	0.21	0.9	54.4 / 55.5**	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.25	16	0.33	1.7	14.9 / 15.9	0.24	2.3	-0.2	12
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	16
2	28	0.31	2.0	9.42 / 9.69	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15 / 6.36	0.32	3.4	-0.3	33
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42
5	65	0.33	3.1	3.94 / 4.02	0.32	4.2	-0.3	50
6	84	0.31	3.3	3.14 / 3.23	0.32	4.3	-0.3	61
8	50	0.46	4.3	2.38 / 2.52	0.32	5.0	-0.4	82
10	80	0.41	4.5	1.82 / 1.85	0.48	5.8	-0.4	108
12	96	0.41	5.4	1.52 / 1.6	0.48	6.5	-0.7	120
16	126	0.41	5.5	1.16 / 1.18	0.52	7.0	-0.5	170
20	152	0.41	6.9	0.955 / 0.999	0.52	7.8	-0.8	192
25	196	0.41	7.0	0.743 / 0.757	0.52	8.7	-0.8	265

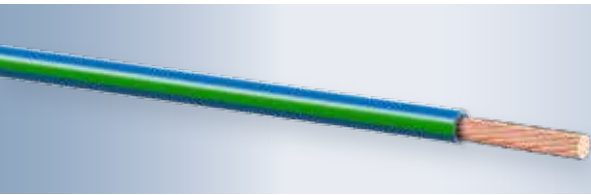
* Nominal value, tolerance of number of strands $\geq 6.0 \text{ mm}^2$ are permitted ($\pm 5\%$).

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.



FLR4Y with thin wall PA insulation

Type A / Type B



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 according to DIN EN 13602,
bare or tinned conductor constr.
acc. to ISO 6722-1

Insulation PA (Polyamide)

Special properties

- Outstanding fuel resistance
- Especially suitable as fuel gauge wire

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Outer diameter		Weight approx.
						Wall thickness min.	max.	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
FLR4Y – Type A								
0.35	7	0.26	0.8	54.4 / 55.5*	0.20	1.3	-0.1	4
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	6
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	8
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	15
2.5	19	0.41	2.2	7.6 / 7.8	0.28	3.0	-0.3	24
FLR4Y – Type B								
0.35	12	0.21	0.9	54.4 / 55.5*	0.20	1.4	-0.2	4
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	6
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	8
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	15
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	24
4	56	0.31	2.75	4.71 / 4.8	0.32	3.7	-0.3	40

* Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

FLRYH with thin wall PVC insulation

fine wire, highly flexible



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
fine wire, bare

Insulation Soft-PVC, with properties according
to ISO 6722-1, Class B

Special properties

Flexible strand structure

Standards / specifications

LV 112-1

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands*	Diam. of single wire***	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		Weight approx.
						Wall thickness min.	max.	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.35	45	0.11	0.9	54.4**	0.20	1.4	-0.2	5
0.5	64	0.11	1.0	37.1	0.22	1.6	-0.2	6
0.75	96	0.11	1.2	24.7	0.24	1.9	-0.2	9
1	126	0.11	1.35	18.5	0.24	2.1	-0.2	12
1.5	196	0.11	1.7	12.7	0.24	2.4	-0.2	16
2.5	315	0.11	2.2	7.6	0.28	3.0	-0.3	27
4	126	0.21	2.75	4.71	0.32	3.7	-0.3	42
6	189	0.21	3.4	3.1	0.32	4.3	-0.3	68
10	324	0.21	4.5	1.82	0.48	5.8	-0.4	118
16	518	0.21	5.5	1.16	0.52	7.0	-0.5	174
25	798	0.21	7.0	0.743	0.64	8.8	-0.6	263
35	1107	0.21	8.3	0.527	0.8	10.5	-0.7	377

* Slight deviations in the number of strands are permissible ($\pm 5\%$) with adherence to the electrical resistance and the max. single wire diameter.

** Also available with a resistance of 52.0 mΩ/m.

*** Also available in highly flexible version.

LEONI Mocar® 125 S with TPE-S insulation

for flexible and standard applications



Temperature range (3,000 hrs)

-50 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation TPE-S insulation with properties
according to LV112-2, ISO 6722-1,
Class C

Special properties

- Cables for flexible applications
- Very good bending resistance
- Use: Door, convertible top, rear hatch, sliding door

Standards / specifications

LV 112-1 · FORD ES 5M5T-14401

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Outer diameter		Weight approx.
					max.	Limit tolerance		
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
LEONI Mocar® 125 S – Flexible conductor construction								
0.35	45	0.11	0.9	54.4/55.5**	0.20	1.4	-0.2	5
0.5	64	0.11	1.0	37.1/38.6	0.22	1.7	-0.2	7
0.75	96	0.11	1.2	24.7/25.2	0.24	1.9	-0.2	9
1	126	0.11	1.35	18.5/19.1	0.24	2.1	-0.2	11
1.5	192	0.11	1.7	12.7/13.0	0.24	2.4	-0.2	16
2.5	320	0.11	2.2	7.6/7.82	0.28	3.0	-0.3	26
4	120	0.20	2.75	4.71/4.85	0.32	3.7	-0.3	42

LEONI Mocar® 125 S – Standard conductor construction								
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
0.35	7	0.26	0.8	54.4/55.5**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1/38.6	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7/25.2	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5/19.1	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7/13.0	0.24	2.4	-0.2	16
2.5	80	0.21	2.2	7.6/7.82	0.28	3.7	-0.3	26

* Minor deviations are permissible:

With max. 40 single wires ±1 %, with more than 40 single wires ±5 %.

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.



LEONI Mocar® 125 P with PP insulation

Type A / Type B, heat-resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor constr. acc. to ISO 6722-1

Insulation PP-FR (Polypropylene, flame
retardant), low halogen

Special properties

- Marking according to customer requirement
- Use in the engine compartment

Standards / specifications

Ford ES-AU5T-1A348 · FIAT 91107/17

Renault 36-05-009/--N · VW 60306-1

Nominal cross-section	Conductor construction				Insulation Wall thickness* min.	Cable Outer diameter		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
LEONI Mocar® 125 P – Type A								
0.35	7	0.26	0.8	54.4**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6	0.28	3.0	-0.3	26
LEONI Mocar® 125 P – Type B								
0.35	12	0.21	0.9	54.4**	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16
2	28	0.31	2.0	9.42	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61
10	80	0.41	4.5	1.82	0.48	5.8	-0.4	104
16	126	0.41	5.5	1.16	0.52	7.0	-0.5	158
25	196	0.41	7.8	0.743	0.52	8.7	-0.5	243
35	276	0.41	9.0	0.527	1.04	11.6	-0.6	351
50	396	0.41	10.5	0.368	1.20	13.5	-0.6	490
70	360	0.51	11.6	0.259	1.20	14.6	-0.8	692

* Also available with increased wall thickness of the insulation.

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

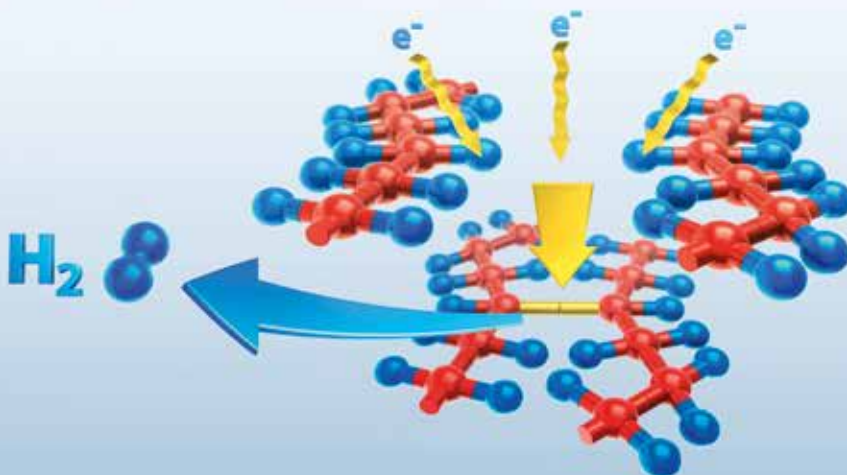
Irradiation crosslinking

As a world leader in technology, LEONI expands and optimises the plastics it develops and uses with irradiation crosslinking.

Polyethylene macro molecules can be crosslinked three-dimensionally into PE-X or XLPE.

Irradiation crosslinked plastics are distinguished by improved thermal pressure deforming as well as very good

- temperature resistance
- chemical resistance
- solvent resistant (increased swell resistance)
- bending resistance
- abrasion resistance.



LEONI Mocar® 125 XS with crosslinked PE insulation

Type A / Type B, heat-resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor construction
according to ISO 6722-1

Insulation PE-X (Silane crosslinked polyethylene)
with properties according to
ISO 6722-1, Class C

Special properties

Use in the engine compartment

Standards / specifications

ISO 6722-1

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
LEONI Mocar® 125 XS – Type A								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3
0.35	7	0.26	0.8	54.4*	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6	0.28	3.0	-0.3	26
LEONI Mocar® 125 XS – Type B								
0.35	12	0.21	0.9	54.4*	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61

* Also available with a resistance of 52.0 mΩ/m.

LEONI Mocar® 125 XE with crosslinked PE insulation

Type A / Type B, heat-resistant



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
conductor constr. acc. to ISO 6722-1

Insulation PE-X (Irradiated crosslinked polyethylene)
with properties according to
ISO 6722-1, Class C

Special properties

Use in the engine compartment

Standards / specifications

ISO 6722-1 · LV 112-1 · VW 60306-1

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
LEONI Mocar® 125 XE – Type A								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3
0.35	7	0.26	0.8	54.4*	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6	0.28	3.0	-0.3	26
LEONI Mocar® 125 XE – Type B								
0.35	12	0.21	0.9	54.4*	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16
2	28	0.31	2.0	9.42	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61

* Also available with a resistance of 52.0 mΩ/m.

LEONI Mocar® 150 A with TPE-E insulation

Type A / Type B, heat-resistant



Temperature range (3,000 hrs)

-40 °C to +150 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation TPE-E (Thermoplastic polyester
elastomer) with properties similar to
ISO 6722-1, Class D

Special properties

- Limited resistance to hydrolysis

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm		
LEONI Mocar® 150 A – Type A								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3
0.35	7	0.26	0.8	54.4*	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	6
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16
2	19	0.37	2.0	9.42	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6	0.28	3.0	-0.3	26
LEONI Mocar® 150 A – Type B								
0.35	12	0.21	0.9	54.4*	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61

* Also available with a resistance of 52.0 mΩ/m.

LEONI Mocar® 150 C with TPE-E insulation

Type A / Type B, heat-resistant



Temperature range (3,000 hrs)

-40 °C to +150 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation TPE-E (Thermoplastic polyester
elastomer) with properties similar to
ISO 6722-1, Class D

Special properties

- Resistance to hydrolysis
- Limited resistance to battery acid
- Use in headlight application

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm		
LEONI Mocar® 150 C – Type A								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3
0.35	7	0.26	0.8	54.4*	0.20	1.3	-0.1	4
0.5	19	0.19	1.1	37.1	0.22	1.6	-0.2	6
0.75	19	0.24	1.2	24.7	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	12
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16
2	19	0.37	2.0	9.42	0.28	2.8	-0.3	22
2.5	19	0.41	2.2	7.6	0.28	3.0	-0.3	26
LEONI Mocar® 150 C – Type B								
0.35	12	0.21	0.9	54.4*	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	32
4	56	0.31	2.8	4.71	0.32	3.7	-0.3	41
6	84	0.31	3.4	3.14	0.32	4.3	-0.3	61

* Also available with a resistance of 52.0 mΩ/m.

LEONI Mocar® 180 E with ETFE insulation

Type A / Type B, high temperature resistant



Nom. cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		Weight approx.
					Wall thickness* min.	max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
LEONI Mocar® 180 E – Type A								
0.35	7	0.26	0.8	54.4 / 55.5**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	6
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	12
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	17
2.5	19	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	28
LEONI Mocar® 180 E – Type B								
0.35	12	0.21	0.9	54.4 / 55.5**	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	6
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	12
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	17
2.5	50	0.26	2.2	7.6 / 7.82	0.28	3.0	-0.3	28
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61

Temperature range (3,000 hrs)

-65 °C to +180 °C

Construction / materials

Conductor	Soft-annealed electrolytic copper Cu-ETP1 acc. to DIN EN 13602, bare, tinned or silver-plated fine-wire stranded conductor according to ISO 6722-1
Insulation	ETFE (Ethylene tetrafluoroethylene) with properties acc. to ISO 6722-1, Class E

Special properties

- Good mechanical and thermal properties with excellent chemical resistance
- Particularly suitable for wiring within the engine compartment and as a fuel level indicator wire

* Ultra-thin wall thickness on request (ISO 6722-1).

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

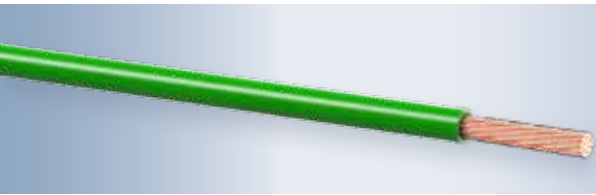
Standards / specifications

DBL 6312 · VW 60306-1 · LV 112-1



LEONI Mocar® 200 G with silicone insulation

high temperature resistant



Temperature range (3,000 hrs)

-80 °C to +200 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare
(also available in multi-strand version)

Insulation SIR, Silicone rubber with properties
according to ISO 6722-1, Class F

Special properties

- Good thermal properties and high flexibility at low temperatures

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.35	12	0.21	0.9	54.4*	0.50	2.0	-0.2	7
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.2	9
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.2	12
1	32	0.21	1.35	18.5	0.60	2.7	-0.2	14
1.5	30	0.26	1.7	12.7	0.60	3.1	-0.3	20
2.5	50	0.26	2.2	7.6	0.70	3.8	-0.3	31
4	56	0.31	2.8	4.71	0.80	4.8	-0.4	50
6	84	0.31	3.4	3.1	0.80	5.4	-0.4	71
10	80	0.41	4.5	1.82	1.00	7	-0.5	118
16	126	0.41	5.8	1.16	1.00	8.4	-0.6	180
25	196	0.41	7.2	0.743	1.30	10.4	-0.6	276
35	276	0.41	8.5	0.527	1.30	11.9	-0.8	379
50	396	0.41	10.5	0.368	1.50	14.3	-0.8	546
70	360	0.51	12.5	0.259	1.50	16.7	-1.2	753
95	457	0.51	14.8	0.196	1.60	19.2	-1.2	999

* Also available with a resistance of 52.0 mΩ/m.

LEONI Mocar® 200 G AL with silicone insulation

Aluminium conductors, high temperature resistant



Temperature range (3,000 hrs)

-80 °C to +200 °C

Construction / materials

Conductor Aluminium 99,7%, conductor construction according to ISO 6722-2

Insulation SIR, Silicone rubber with properties according to ISO 6722-2, Class F

Special properties

- Good thermal properties
- Considerable weight savings over copper

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
10	50	0.52	4.5	3.03	0.80	6.5	-0.6	51
16	78	0.52	5.8	1.93	0.80	8.3	-0.6	85
25	122	0.52	7.2	1.24	1.04	10.4	-1.0	131
35	172	0.52	8.5	0.878	1.04	11.6	-2.0	150
50	247	0.52	10.5	0.613	1.20	13.5	-2.0	209
70	351	0.52	12.5	0.432	1.20	15.5	-2.0	265
95	463	0.52	14.8	0.327	1.28	18.0	-2.0	370
120	305	0.72	16.5	0.255	1.28	19.7	-2.0	452

LEONI Mocar® 210 F with FEP insulation

Type A / Type B, high temperature resistant



Temperature range (3,000 hrs)

-65 °C to +210 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare, tinned, silver-plated or nickel-plated fine-wire stranded conductor according to ISO 6722-1

Insulation FEP (Tetrafluoroethylene hexafluoropropylene) with properties according to ISO 6722-1, Class F

Special properties

- Good mechanical and thermal properties with excellent chemical resistance
- Suitable for applications inside the engine compartment

Standards / specifications

LV 112-1 · VW 60306-1 · PSA B25 1110

Nom. cross-section	Conductor construction				Insulation Wall thickness* min.	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		Weight approx.
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
LEONI Mocar® 210 F – Type A								
0.35	7	0.26	0.8	54.4 / 55.5**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	10
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	13
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	18
2.5	19	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	29
LEONI Mocar® 210 F – Type B								
0.35	12	0.21	0.9	54.4 / 55.5**	0.20	1.4	-0.2	5
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	10
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	13
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	18
2.5	50	0.26	2.2	7.6 / 7.82	0.28	3.0	-0.3	29
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	44
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61

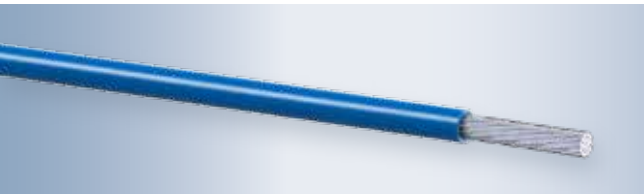
* Ultra-thin wall thickness on request (ISO 6722-1).

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.



LEONI Mocar® 260 T with PFA insulation

high temperature resistant



Temperature range (3,000 hrs)

-80 °C to +260 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602, bare,
tinned, silver-plated or nickel-plated
conductor construction acc. to
ISO 6722-1

Insulation PFA (Perfluoroalkoxy copolymer) with
properties acc. to ISO 6722-1, Class H

Special properties

- Excellent resistance to chemicals
- Very good mechanical stability
- Due to its high temperature resistance,
an equivalent alternative to PTFE

Standards / specifications

ISO 6722-1

Nom. cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.35	7	0.26	0.8	54.4 / 55.5**	0.20	1.3	-0.1	5
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	10
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	13
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	18
2.5	19	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	29
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	44

* Ultra-thin wall thickness on request (ISO 6722-1).

** Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

LEONI Mocar® 260 R with PTFE insulation

Type A / Type B, high temperature resistant



Temperature range (3,000 hrs)

-90 °C to +260 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
copper nickel-plated
conductor constr. acc. to ISO 6722-1

Insulation PTFE (Polytetrafluoroethylene) with
properties acc. to ISO 6722-1, Class H

Special properties

- Excellent resistance to chemicals
- Very good mechanical stability
- Excellent temperature resistance

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
LEONI Mocar® 260 R – Type A								
0.22	7	0.21	0.7	87.9	0.20	1.2	-0.1	4
0.35	7	0.27	0.8	56.8	0.20	1.35	-0.1	5
0.5	19	0.19	1.0	38.6	0.22	1.6	-0.2	7
0.75	19	0.24	1.2	25.7	0.24	1.9	-0.2	10
1	19	0.27	1.35	19.3	0.24	1.95	-0.2	13
1.5	19	0.33	1.7	13.2	0.24	2.3	-0.2	19
2.5	19	0.41	2.2	7.92	0.28	2.8	-0.3	29
LEONI Mocar® 260 R – Type B								
0.35	12	0.21	0.9	87.9	0.20	1.35	-0.1	5
0.5	16	0.21	1.0	56.8	0.22	1.6	-0.2	7
0.75	24	0.21	1.2	38.6	0.24	1.9	-0.2	10
1	32	0.21	1.4	25.7	0.24	1.95	-0.2	13
1.5	30	0.26	1.7	19.3	0.24	2.3	-0.2	19
2.5	50	0.26	2.2	13.2	0.28	2.8	-0.3	29
4	56	0.31	2.75	4.91	0.32	3.35	-0.3	45
6	84	0.31	3.4	3.27	0.32	4.15	-0.3	69

TWP with thin wall PVC insulation



Temperature range

-40 °C to +85 °C (3,000 hrs)
+105 °C (48 hrs)

Construction / materials

Conductor Soft-annealed electrolytic copper acc. to ASTM B3, conductor construction acc. to customer specification

Insulation PVC, insulation material according to SAE J 1128 / ESB-M1 L 120-A / MS-7889 / UTMS 12501

Special properties

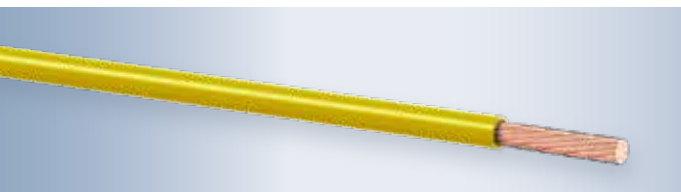
- Also available as GPT, HDT type and tinned version

Standards / specifications

American standards: SAE J1128

Size	Conductor construction				Insulation		Cable	
	Nominal cross-section	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Wall thickness		Outer diameter max.	Weight approx.
					nom.	min.		
AWG	mm ²		mm	mm	mm	mm	mm	kg/km
22	0.35	7	0.25	0.76	0.40	0.33	1.7	5
20	0.5	7	0.32	0.97	0.40	0.33	1.9	8
18	0.8	16	0.25	1.17	0.40	0.33	2.2	11
18	0.8	19	0.23	1.17	0.40	0.33	2.2	11
16	1.3	19	0.28	1.45	0.40	0.33	2.4	15
14	2	19	0.36	1.8	0.40	0.33	2.7	22
12	3	19	0.45	2.29	0.46	0.38	3.3	34
10	5	19	0.57	2.87	0.50	0.43	4.0	53

TXL with thin wall, crosslinked PE insulation



Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper according to ASTM B3, conductor construction acc. to customer specification

Insulation XLPE (Polyethylene, crosslinked), flame-retardant, halogen-free insulation material acc. to SAE J 1128 / ESB-M1 L 123-A / MS-8288 / UTMS 12501

Special properties

- Also available as SXL, GXL type and tinned

Standards / specifications

American standards: SAE J1128

Size	Conductor construction				Insulation		Cable	
	Nominal cross-section	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Wall thickness		Outer diameter max.	Weight approx.
					nom.	min.		
AWG	mm ²		mm	mm	mm	mm	mm	kg/km
22	0.35	7	0.25	0.76	0.40	0.33	1.7	5
20	0.5	7	0.32	0.97	0.40	0.33	1.9	8
18	0.8	16	0.25	1.17	0.40	0.33	2.2	11
18	0.8	19	0.23	1.17	0.40	0.33	2.2	11
16	1.3	19	0.28	1.45	0.40	0.33	2.4	15
14	2	19	0.36	1.8	0.40	0.33	2.7	22
12	3	19	0.45	2.29	0.46	0.38	3.3	34
10	5	19	0.57	2.87	0.50	0.43	4.0	53

WTA with ultra-thin wall PVC insulation



Size	Conductor construction					Insulation Wall thickness min.	Cable		Weight approx.
	Nom. cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electr.resistance at 20 °C bare/tinned max.		Outer diameter		
							max.	Limit toler- ance	
AWG	mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
22	0.35	7	0.25	0.76	53.9 / 57.8	0.20	1.35	-0.15	5
20	0.5	7	0.32	0.97	34.3 / 36.4	0.20	1.55	-0.15	7
18	0.8	19	0.23	1.17	23.0 / 24.7	0.20	1.75	-0.15	9
16	1.3	19	0.28	1.45	15.5 / 16.6	0.20	2.03	-0.15	13
14	2	19	0.36	1.8	9.44 / 10.0	0.20	2.39	-0.15	21
12	3	19	0.45	2.3	6.0 / 6.37	0.24	3.00	-0.15	31

Temperature range (3,000 hrs)

-40 °C to +85 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
acc. to ASTM B3, conductor construction
acc. to customer specifications

Insulation PVC, ultra-thin wall
insulation material acc. to SAE J 1678 /
Ford WSB M1L134-A / Chrysler MS
9532 / Lear UTMS 12501 / SAE J1678

Special properties

Also available in UTA version

Standards / specifications

American standards: SAE J1678

WXC with ultra-thin wall XLPE insulation



Size	Conductor construction					Insulation Wall thickness min.	Cable		Weight approx.
	Nom. cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		
							max.	Limit toler- ance	
AWG	mm ²		mm	mm	mΩ/m	mm	mm	kg/km	
22	0.35	7	0.25	0.76	53.9 / 57.8	0.20	1.35	-0.15	5
20	0.5	7	0.32	0.97	34.3 / 36.4	0.20	1.55	-0.15	7
18	0.8	19	0.23	1.17	23.0 / 24.7	0.20	1.75	-0.15	9
16	1.3	19	0.28	1.45	15.5 / 16.6	0.20	2.03	-0.15	13
14	2	19	0.36	1.8	9.44 / 10.0	0.20	2.39	-0.15	21
12	3	19	0.45	2.3	6.0 / 6.37	0.24	3.00	-0.15	32

Temperature range (3,000 hrs)

-40 °C to +125 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
acc. to ASTM B3, conductor construc-
tion acc. to customer specification

Isolierung XLPE, ultra-thin wall, flame-retardant,
halogen-free
insulation material acc. to SAE J 1678 /
Ford WSS M1L-135-A / Lear UTMS 12501

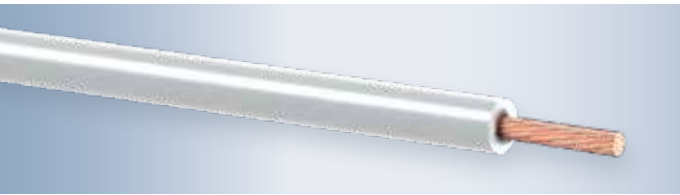
Special properties

Also available in UXC version

Standards / specifications

American standards: SAE J1678

AV with PVC insulation



Temperature range

-40 °C to +80 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 nach D 609-90, bare
conductor construction according to
JASO D 611:2009

Insulation PVC, insulation material according to
JASO D 611:2009

Standards / specifications

Japanese standards:

JASO D 611:2009 · JASO D 618:2008 · JIS C 3406

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						min.	max.	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	7	0.32	1.0	32.7	0.60	2.4	-0.2	10
0.85	11	0.32	1.2	20.8	0.60	2.6	-0.2	13
1.25	16	0.32	1.5	14.3	0.60	2.9	-0.2	17
2	26	0.32	1.9	8.81	0.60	3.4	-0.3	26
3	41	0.32	2.4	5.59	0.70	4.1	-0.3	40
5	65	0.32	3.0	3.52	0.80	4.9	-0.3	62
8	50	0.45	3.7	2.32	0.90	5.8	-0.3	92
10	63	0.45	4.5	1.84	1.00	6.9	-0.4	120
15	84	0.45	4.8	1.38	1.10	7.4	-0.4	160
0.5 f *	20	0.18	1.0	36.7	0.60	2.4	-0.2	9
0.75 f *	30	0.18	1.2	24.4	0.60	2.6	-0.2	12
1.25 f *	50	0.18	1.5	14.7	0.60	2.9	-0.2	18
2 f *	37	0.26	1.8	9.5	0.60	3.4	-0.4	25
3 f *	61	0.26	2.4	5.76	0.70	4.1	-0.3	40

* The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

AVS with PVC insulation



Temperature range

-40 °C to +80 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 nach D 609-90, bare
conductor construction according to
JASO D 611:2009

Insulation PVC, insulation material according to
JASO D 611:2009

Standards / specifications

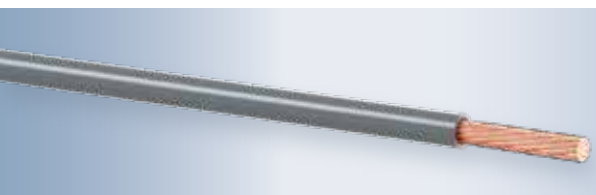
Japanese standards:

JASO D 611:2009 · JASO D 618:2008

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						min.	max.	
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.3	7	0.26	0.8	50.2	0.50	1.9	-0.1	6
0.5	7	0.32	1.0	32.7	0.50	2.1	-0.1	8
0.85	11	0.32	1.2	20.8	0.50	2.3	-0.1	12
1.25	16	0.32	1.5	14.3	0.50	2.6	-0.1	16
2	26	0.32	1.9	8.81	0.50	3.1	-0.2	25
3	41	0.32	2.4	5.59	0.60	3.8	-0.2	39
5	65	0.32	3.0	3.52	0.70	4.6	-0.2	60
0.3 f *	15	0.18	0.8	48.9	0.50	1.9	-0.1	6
0.5 f *	20	0.18	1.0	36.7	0.50	2.1	-0.1	8
0.75 f *	30	0.18	1.2	24.4	0.50	2.3	-0.1	11
1.25 f *	50	0.18	1.5	14.7	0.50	2.6	-0.1	17
2 f *	37	0.26	1.8	9.5	0.50	3.1	-0.2	24

* The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

AVSS with thin wall PVC insulation



Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm ²		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.3	7	0.26	0.8	50.2	0.30	1.5	-0.1	5
0.5	7	0.32	1.0	32.7	0.30	1.7	-0.1	7
0.85	19	0.24	1.2	21.7	0.30	1.9	-0.1	10
1.25	19	0.29	1.5	14.9	0.30	2.2	-0.1	14
2 (f)*	37	0.26	1.8	9.5	0.40	2.7	-0.1	22
0.3 f*	19	0.16	0.8	48.8	0.30	1.5	-0.1	5
0.5 f*	19	0.19	1.0	34.6	0.30	1.7	-0.1	7
0.75 f*	19	0.23	1.2	23.6	0.30	1.9	-0.1	10
1.25 f*	37	0.21	1.5	14.6	0.30	2.2	-0.1	14

* The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

Temperature range

-40 °C to +80 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 nach JIS C 3102, bare
conductor construction according to
JASO D 611:2009

Insulation PVC, insulation material according to
JASO D 611:2009

Standards / specifications

Japanese standards:

JASO D 611:2009 · JASO D618:2008



FL11Y with TPE-U insulation

battery cables



Temperature range (3,000 hrs)

-40 °C to +110 °C

Construction / materials

Conductor	Soft-annealed electrolytic copper Cu-ETP1 acc. to DIN EN 13602, bare
Insulation	TPE-U (Thermoplastic polyurethane elastomer) according to ISO 6722-1, Class B

Special properties

- Also available as aluminium battery cables

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands*	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	kg/km
mm ²		mm	mm	mΩ/m	mm	mm	mm	
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	66
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	109
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	176
25	196	0.41	7.8	0.743	1.30	10.4	-0.7	273
35	276	0.41	9.0	0.527	1.30	11.6	-0.6	355
50	396	0.41	10.5	0.368	1.50	13.5	-2.0	511
70	360	0.51	12.5	0.259	1.50	15.5	-2.0	705
95	475	0.51	14.8	0.196	1.60	18.0	-2.0	905
120	608	0.51	16.5	0.153	1.60	19.7	-2.0	1170

* Nominal value, tolerance of number of strands (±5 %).

FLYY with core insulation and PVC sheath



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor	Soft-annealed electrolytic copper Cu-ETP1 acc. to DIN EN 13602, bare conductor construction acc. to ISO 6722-1
Insulation/ sheath	Plasticized PVC with properties according to ISO 6722-1, Class B

Special properties

- Sheath options: adherent or separable from inner core

Nom. cross-section	Conductor construction				Insulation*			Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.	Wall thickness min.	Core diam.	Sheath wall thickness min.	Outer diameter		Weight approx.
								max.	Limit tolerance	
mm ²		mm	mm	mΩ/m	mm	mm	mm	mm		
0.5	16	0.21	1.0	37.1	0.60	2.1	0.4	3.1	-0.4	14
0.75	24	0.21	1.2	24.7	0.60	2.3	0.4	3.3	-0.3	17
1	32	0.21	1.35	18.5	0.60	2.5	0.4	3.6	-0.4	20
1.5	30	0.26	1.7	12.7	0.60	2.8	0.5	4.1	-0.4	28
2	40	0.26	2.0	9.42	0.60	3.0	0.5	4.3	-0.4	33
2.5	50	0.26	2.2	7.61	0.70	3.5	0.5	4.8	-0.5	41

* All cross-sections can also be supplied with reduced insulation thickness (FLRY).

FLRY n x... Twisted cables

unshielded (without sheath)



Temperature range (3,000 hrs)

-40 °C to +105 °C

Construction / materials

Conductor Soft-annealed electrolytic copper
Cu-ETP1 acc. to DIN EN 13602,
bare or tinned
conductor constr. acc. to ISO 6722-1

Insulation Plasticized PVC with properties
according to ISO 6722-1, Class B

Special properties

Additional versions with
→ higher heat resistance
→ tinned conductor
→ other lay lengths
available on request

Example of designation

FLRY 2 x 0.5-A BN / YE S30MM

→ twisted cable
2 cores x nominal cross-section 0.5 mm²
conductor construction type A
Colour of core BN, YE
Lay length S 30 MM

Standards / specifications

LV 122 · Daimler B47 · VW 75205

Con- struction	Conductor construction core				Insulation core		Cable			
	No. of cores x nominal cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electrical resistance at 20 °C max.	Wall thick- ness min.	Core diam. max.	Lay length nom.	Outer diam. max.	Weight approx.
	mm ²		mm	mm	mΩ/m	mm	mm	mm	mm	kg/km
2 x 0.35	7	0.26	0.8	52.0	0.20	1.3	16	2.6	9	
2 x 0.35	7	0.26	0.8	52.0	0.20	1.3	20	2.6	9	
2 x 0.35	7	0.26	0.8	52.0	0.20	1.3	30	2.6	9	
2 x 0.5	19	0.19	1.0	37.1	0.22	1.6	15	3.2	13	
2 x 0.5	19	0.19	1.0	37.1	0.22	1.6	30	3.2	13	
2 x 0.5	16	0.21	1.0	37.1	0.22	1.6	20	3.2	13	
2 x 0.5	16	0.21	1.0	37.1	0.22	1.6	30	3.2	13	
2 x 0.5	19	0.19	1.0	37.1	0.22	1.6	30	3.5	20	
2 x 0.5	16	0.21	1.0	37.1	0.22	1.6	40	3.5	20	
2 x 0.75	19	0.23	1.2	24.7	0.24	1.9	30	3.8	18	
2 x 0.75	24	0.21	1.2	24.7	0.24	1.9	30	3.8	18	
3 x 0.75	19	0.23	1.2	24.7	0.24	1.9	30	4.1	27	
2 x 1.0	19	0.26	1.35	18.5	0.24	2.1	30	4.2	22	
2 x 1.0	32	0.21	1.35	18.5	0.24	2.1	30	4.2	22	
3 x 1.0	32	0.21	1.35	18.5	0.24	2.1	25	4.5	33	
4 x 1.0	19	0.26	1.35	18.5	0.24	2.1	30	5.1	44	
2 x 1.5	19	0.32	1.7	12.7	0.24	2.4	30	4.8	32	
2 x 2.5	50	0.26	2.2	7.8	0.28	3.0	30	6.0	52	
5 x 2.5	50	0.26	2.2	7.8	0.28	3.0	50	8.1	130	
6 x 2.5	50	0.26	2.2	7.8	0.28	3.0	55	9.0	156	

Quality and environmental management

LEONI – The Quality Connection

LEONI quality management

With our quality management, we meet the extraordinarily high demands of our customers from the automobile industry. The wire and cable production locations of LEONI are certified worldwide in accordance with ISO 9001:2008; all locations in which automotive cables are produced are certified in accordance with ISO/TS 16949:2009. We place extreme importance on preventative quality assurance, whereby error prevention instrumentation, such as FMEA or machine and process capability analyses are firmly rooted.

During the production process, we continuously measure, monitor and regulate the diameter and properties of the insulation of our cables and lines with the latest systems. Through regular random testing, the production testing assures adherence to the requisite thresholds. These tests in the immediate production area guarantee a quick reaction to disturbances.

In accordance with customer specifications and/or domestic and international rules and regulations, we test the following, among other things:

- the behaviour of the cables and lines under extreme temperature conditions
- functionality after artificial ageing
- resistance to fuels, lubricants and environmental influences
- expansion, abrasion and tear-resistance of the insulating sleeve
- mechanical and electrical properties of the conductor
- bending and torsional resistance

The interplay of these quality assurance measures enables continuous optimisation of our ambitious quality goals.



LEONI environmental management

Environmentally-conscious thinking and action are future-oriented factors for LEONI.

As a successful, globally-producing company, LEONI assures active and effective implementation of its environmental policy:

- Environmentally-friendly production
- Preservation of natural resources in the product and process development
- Prevention of emissions
- Waste reduction

We are happy to advise our customers about the environmentally-friendly handling and disposal of our products.

Our organisation is certified in accordance with DIN EN ISO 14001:2004.

LEONI worldwide

Automotive Cables facilities of the LEONI Group



Proximity to our customers is a core element of our corporate policy. LEONI is a dependable partner to its customers – all over the world. We also regard maintaining, as well as raising quality and service at the same high level everywhere in the world as a sign of proximity.

We support efficient operating as well as our customers' power of innovation and market position on the basis of our own international positioning, standardised methods and clearly defined processes.

No matter where we apply and realise our know-how, commitment and ideas: we want confident customers around the world.

An overview of all entities

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LEONI Kabel GmbH, Roth
LEONI HighTemp Solutions GmbH,
Halver

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LEONI Cable (Changzhou) Co. Ltd.,
Changzhou

Japan

LEONI Wire & Cable Solutions Japan K.K.,
Aichiken

India

LEONI Cable Solutions (India) Pvt. Ltd.,
Pune

Morocco

LEONI Cable Maroc SARL.,
Casablanca

Mexico

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Poland

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Slovakia

LEONI Slovakia spol. s.r.o.,
Nová Dubnica

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San. ve Tic. Ltd. Sti., Gemlik

Hungary

LEONI Kábelgyár Hungaria Kft.,
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