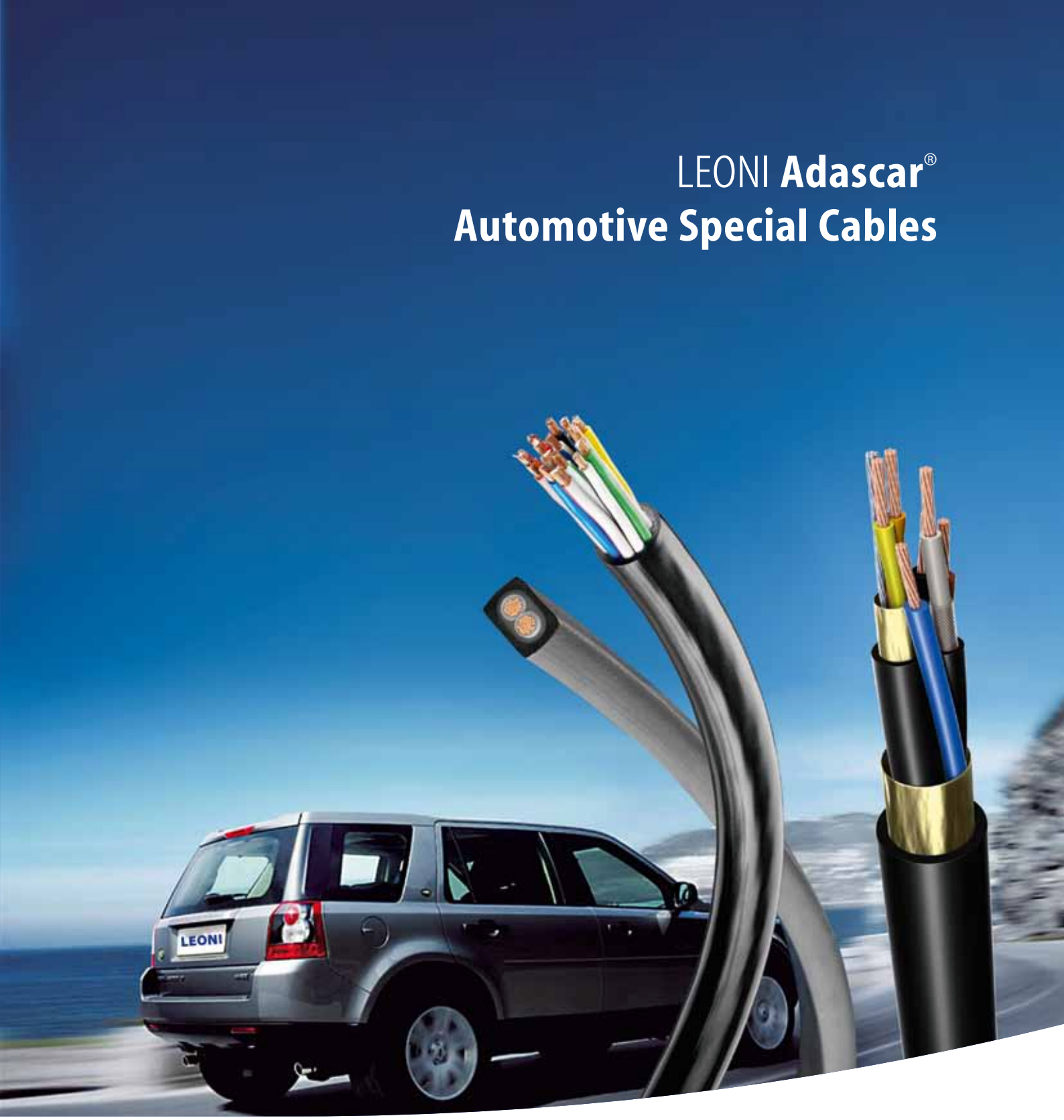
LEONI **Adascar**®
Automotive Special Cables



The Quality Connection

LEONI

Content

Edition: March 2010
Subject to technical changes.

Our competences LEONI **Adascar**®

- Comfort Applications / Control Applications / Power Applications

  Multi-core automotive cables with sheath; shielded and unshielded.

- Safety Applications

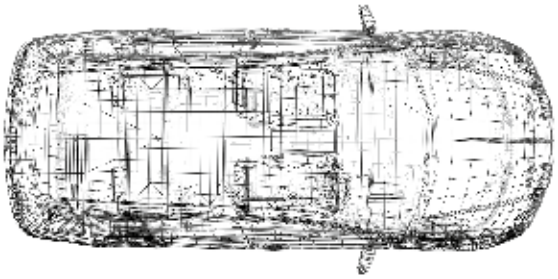
  Multi-core automotive cables for safety applications.

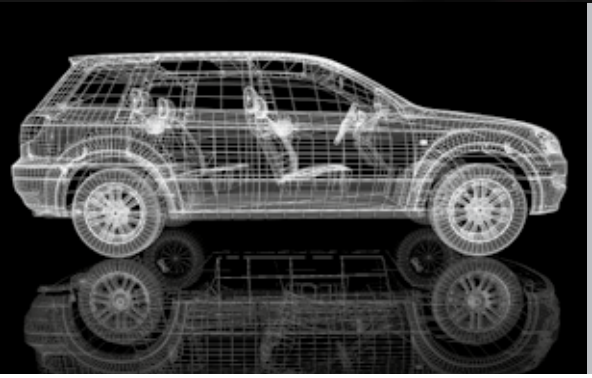
- Truck Applications

  Multi-core automotive cables with ADR certificates for commercial vehicles.

- Wheel Sensor Applications

  Sensor cables for driver assistance and active safety systems in the axel wiring.





LEONI

Cable expertise for the most various industrial markets.

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

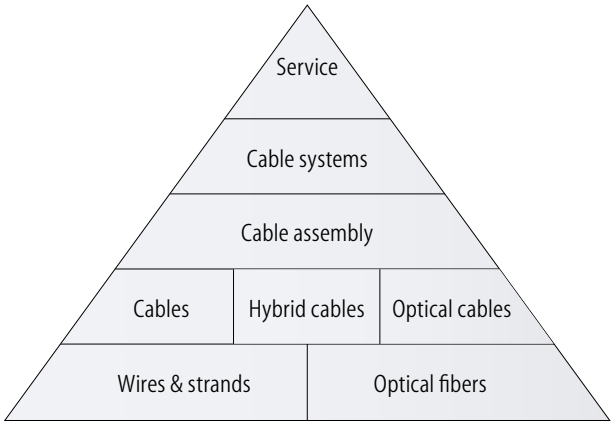
Our group of companies employs more than 45,000 people in 34 countries. Corporate vision, highest quality and innovative power have made us one of the leading cable manufacturers in Europe. LEONI develops and produces technically sophisticated products ranging from wire and optical fibers to cables through to complete cable systems and also offers the related services. Moreover, the product portfolio comprises strands, standardised cables, hybrid cables, fiber optic cables as well as special cables, cable harnesses, wiring systems components and fully assembled systems for applications in various industrial markets.

Your markets – our strength.

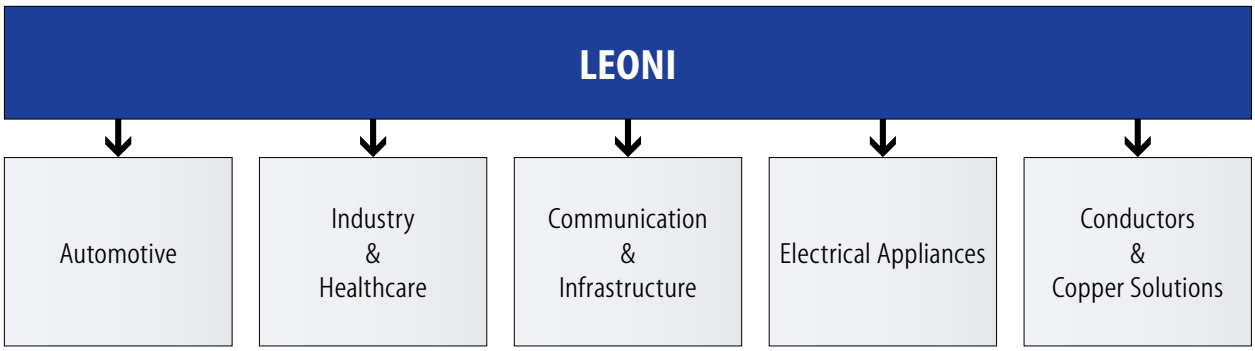
As diverse as our product and service range are the markets and sectors LEONI is supplying. We focus our activities on customers in the markets Automotive, Industry & Healthcare, Communication & Infrastructure, Electrical Appliances and Conductors & Copper Solutions.

In the Automotive market we are in some product areas among the global market leaders. The customers of our Automotive Cables business unit benefit worldwide just as much from innovative as reliable and durable quality products. With the LEONI Adascar brand family we offer products for safety, convenience, energy, control and commercial vehicle applications as well as applications for wheel sensors.
LEONI – The Quality Connection

Products and services portfolio at a glance

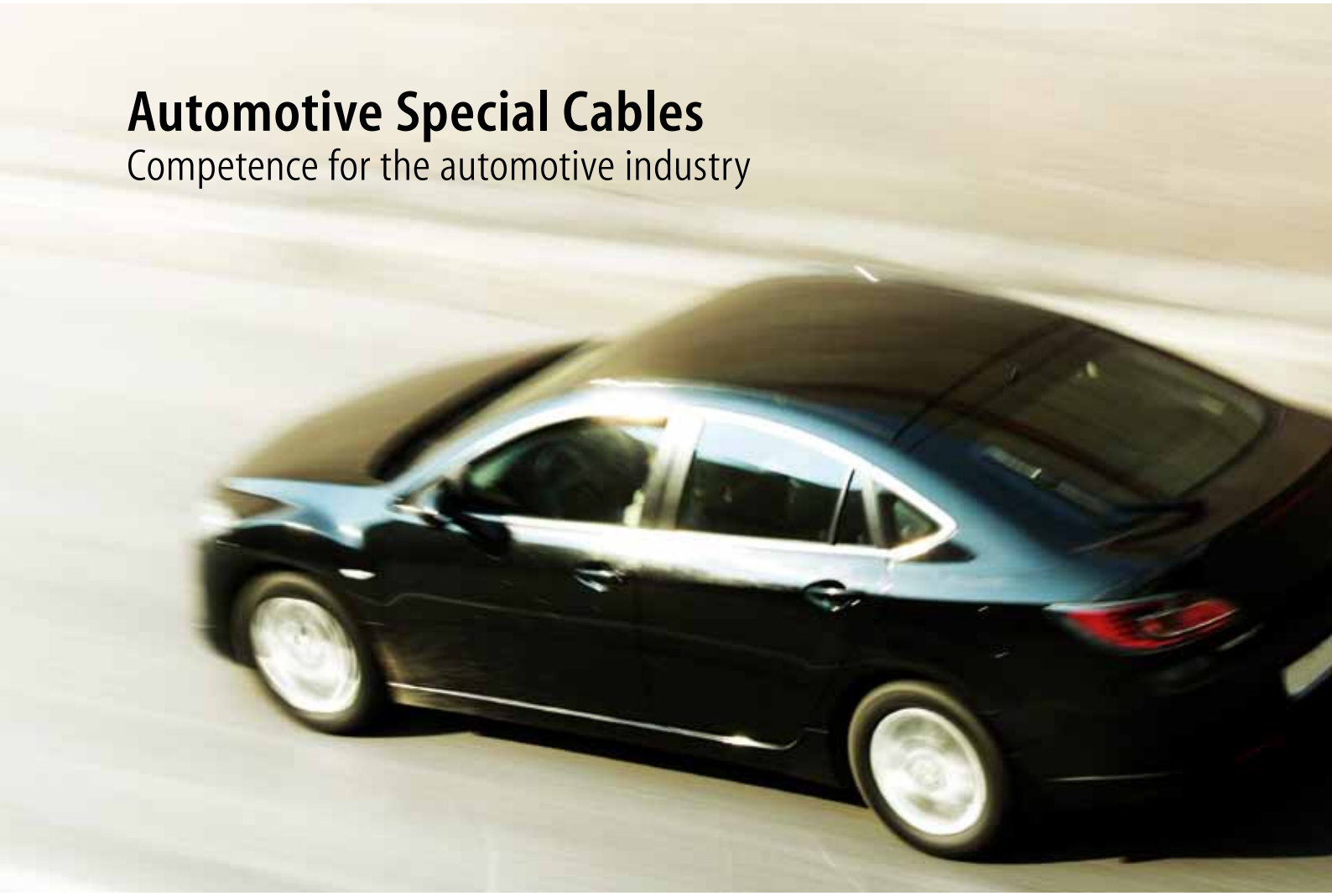


LEONI's core markets



Automotive Special Cables

Competence for the automotive industry



The Automotive Special Cables business unit meets your challenge to bring innovative products into the market within the shortest possible time.

LEONI is covering the whole value creation chain from development up to production.

Development: Our skilled product specialists are in constant touch to the automotive OEM, first tier suppliers and connector manufacturers. They play a significant part in circles of experts of international cable committees.

Range of insulation materials: Within the LEONI group we are developing and producing our own recipes of materials which are especially tailored to the needs of the automotive industry.
In addition to the standard materials we are processing insulation materials for high temperature applications up to + 1,250 °C.
Actually, our product range comprises appr. 50 different materials.

Production: Besides the standard processes for wire and cable production, LEONI employs state-of-the-art technology in the area of rammextrusion and silicone processing. We are covering different kinds of crosslinking such as chemical or radiation, as well as various techniques of foaming.

The product specialists draw on abundant resources in all areas when finding solutions. A large production network with sites in Mexico, China and Europe rounds off LEONI's product range.

The Automotive Special Cables business unit early identifies next generation technologies and offers the best preconditions for their customers to jointly manage the challenges of the automotive industry.

Insulation material properties

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 in the table.

Symbol	Name	Code e.g.	Density	Halogen content	Hardness Shore A/D	Tensile strength	Elongation at break
	z.B. DIN ISO 1629 und 7728	DIN 76722	DIN 53479		DIN 53505	DIN 53504	DIN 53504
			g/cm³	approx. %		MPa	%
PVC-P	Polyvinyl chloride (plasticized)✖	Y	1.30–1.45	35	85A–95A	>10	>150
PVC-P	cold-resistant✖	YK	1.24–1.34	30	80A–95A	>10	>150
PVC-P	hot-pressure resistant✖ heat-resistant✖	YW	1.24–1.34	35	92A–97A	>15	>150
PE	Polyethylene	2Y	0.92–0.95	0	50D–62D	>15	>300
PA	Polyamide	4Y	1.01	0	–/72D	>40	>300
FEP	Tetrafluoroethylene hexafluoropropylene	6Y	2.14	75	–/55D	>15	>200
ETFE	Ethylen tetrafluoroethylene	7Y	1.70	60	–/75D	>30	>200
PP	Polypropylene	9Y	0.91	0	–/70D	>15	>200
PP-FR	Polypropylene, flame-retardant	9Y	1.05–1.3	10	–/70D	>15	>200
PFA	Perfluoroalkoxy copolymer	51Y	2.15	75	–/55D	>20	>200
PVDF	Polyvinylidenfluorid	10Y	1.8	35	–/78D	>25	>100
			g/cm³	approx. %		MPa	%
TPE-U	Thermoplastic polyether polyurethane	11Y	1.12	0	85A–54D	>30	>400
TPE-E	Thermoplastic polyether ester elastomer	12Y	1.16–1.25	0	40D–72D	>25	>400
TPE-E	Thermoplastic polyester elastomer	13Y	1.25–1.28	0	–/55D	>30	>300
TPE-S	Thermoplastic polystyrene block copolymer	31Y	1.10–1.30	0–10	55D–65D	>15	>200
TPE-A	Thermoplastic polyamide elastomer	41Y	1.01–1.06	0	75A–70D	>25	>400
TPE-O	Thermoplastic polyolefin elastomer	91Y	0.95–1.25	0–10	87A/–	>10	>300
			g/cm³	approx. %		MPa	%
E/VA	Ethylene vinyl acetate	4G	1.30–1.40	0	80A–85A	>7	>150
PVC-X	Polyvinyl chloride, crosslinked	X	1.35	30	95A/–	>10	>150
PE-X	Polyethylene, crosslinked (XLPE)	2X	1.1	10	95A/–	>10	>200
PE-X	Polyethylene, crosslinked, halogen-free (XLPE)	2X	1.4	0	–/42D	>10	>200
SIR	Silicone-Rubber	2G	1.20 – 1.30	0	A40 – A90	6-20	> 250
PTFE	Polytetrafluorethylen	5Y	2.12 – 2.17	–	D55 – D65	>20	> 200

All compounds used are lead free.

Service temperatures							Resistance to				
Tempera-ture index✖✖	Thermal overload capacity	Cold winding test	Specific volume resistance	Dielectric strength	Abrasion	Flame retardation	Oil	Fuels	Brake fluid	Acids/ Alkalines	Organic agents
DIN ISO 2578	ISO 6722	ISO 6722	DIN 53482	DIN 53481	ISO 6722		ISO 6722				
°C/3000h	°C/48h	°C	Ω · cm	kV/mm							
105✖	110/125✖	–25/–40✖	$>10^{12}$	>10	+	+	+	+	–	+	–
105	110	–50	$>10^{12}$	>10	+	+	+	+	–	+	–
125	140	–25/–40✖	$>10^{12}$	>10	+	+	+	+	–	+	–
90	100	–40	$>10^{16}$	>30	+	– –	–	+/–✖	– –	+	–
105	140	–50	$>10^{12}$	>10	++	–	++	++	+	+	+
210	260	–65	$>10^{15}$	>30	++	++	++	++	++	++	++
180	230	–65	$>10^{15}$	>30	++	++	++	++	++	++	++
125	150	–40	$>10^{16}$	>30	+	– –	+	+	–	+	+
125	150	–40	$>10^{14}$	>20	+	+	+	+	–	+	+
260	290	–80	$>10^{15}$	>30	++	++	++	++	++	++	++
150	160	–30	$>10^{14}$	>30	++	++	++	++	++	+	+
°C/3000h	°C/48h	°C	Ω · cm	kV/mm							
125	150	–40	$>10^{9}$	>10	++	–	++	++	+	+	+
90	150	–40	$>10^{9}$	>10	++	–	++	++	+	–	+
150	180	–40	$>10^{9}$	>10	++	+/–✖	++	++	+	+	+
125	150	–40	$>10^{10}$	>10	–	+/–	+	+	–	+	–
90	120	–50	$>10^{10}$	>10	++	–	++	++	+	–	+
125	150	–40	$>10^{14}$	>20	–	+/–✖	–	–	–	+	–
°C/3000h	°C/48h	°C	Ω · cm	kV/mm							
140	180	–40	$>10^{10}$	>10	–	–	–	–	–	–	–
105	140	–40	$>10^{12}$	>10	++	+	+	+	–	+	+
125	150	–40	$>10^{14}$	>20	+	+	+	+	–	+	+
125	150	–40	$>10^{14}$	>10	+	+	+	+	–	+	+
23	>300✖✖✖	– 80	$>10^{15}$	18-36	++	++	+/–	++	++	+/–	++
300	310✖✖✖	– 90	$>10^{18}$	>20	+	++	++	–	–	++	++

++ excellent
+ good
– fair
– – poor

✖ depends on recipe, as required
✖✖ criterion: residual elongation at break > 50 %
✖✖✖ thermal overload capability

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.

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 wire (German abbreviations)

FL	= Automotive wire
FZL	= Automotive ignition wire

2. Special conductor materials (excluding electrolytic copper)

M	Materials other than E-Cu or resistance conductors (e. g. aluminium, steel, steel copper, etc.)
W	Resistance conductors (usually copper alloys with Ni, Cr, Mn, etc.)

3. Geometric construction of insulation

Normal thickness of insulation (equivalent to ISO 6722 "Thick wall") is not coded.

U	Greatly reduced thickness of insulation equivalent to ISO 6722
R	Reduced thickness of insulation equivalent to ISO 6722*
S	Reinforced insulation (thickness bigger than specified in ISO 6722)

4. Codes for the dielectrics

Code for the dielectrics used for the insulation and sheath.

Y	Soft-PVC (polyvinyl chloride)
YW	Soft-PVC, heat-resistant, hot-pressure resistant
YK	Soft-PVC, cold-resistant
2Y	PE (polyethylene)
4Y	PA (polyamide)
5Y	PTFE (polytetrafluoroethylene)
6Y	FEP (tetrafluoroethylene/hexafluoropropylene)
7Y	ETFE (ethylene/tetrafluoroethylene)
9Y	PP (polypropylene)
10Y	PVDF (polyvinylidenfluoride)
11Y	TPE-U (thermoplastic elastomer on polyurethane basis)
12Y	TPE-E (thermopl. polyester elastomer on polyether ester basis)
13Y	TPE-E (thermopl. polyester elastomer on polyester ester basis)
31Y	TPE-S (thermopl. polyester elastomer on polystyrene basis)
41Y	TPE-A (thermopl. polyester elastomer on polyamide basis)
51Y	PFA (perfluoroalkoxy copolymer)
91Y	TPE-O (thermopl. polyester elastomer on polyolefin basis)
X	PVC-X (polyvinyl chloride crosslinked)
2X	XLPE (polyethylene crosslinked)
4G	EVA (ethylene/vinyl acetate)

In foamed materials the code is preceded by a "zero":
e. g. **02Y** = foamed or cellular PE.

5. Codes for constructional elements

Codes for further constructional elements and non-extruded coverings (where applicable).

B	Foil shield
C	Copper wire braiding
D	Copper wire spiral shield
G	Glass fiber braiding
P	Insulation foil
T	Textile braiding

6. Special design features

F	Flat wire
Z	Multi-core wire with separable cores

7. Finally…

… the number of cores (except in the case of single core wires) and the nominal cross-section in mm^2 are specified. Especially flexible or highly flexible stranded conductors are identified by additional specification of the nominal cross-section of the single wire.

In some cases the type of metal plating is specified for metal-plated copper wires as follows:

SN	tin-plated
NI	nickel-plated
AG	silver-plated

Bare copper has no special code.

Various components joined by specific structural elements (e.g. inner sheaths or inner shields) are grouped in parentheses in the type code (see examples of coding).

* The code can also be used for other thicknesses. The relevant standard or thickness is then also named.

Example

The nomenclature of LEONI Adascar® Comfort, Control, Power, Safety, Truck and Wheel Sensor cables is defined as follows:

LEONI Adascar®-Power 5020-B 2x0.35 + DW

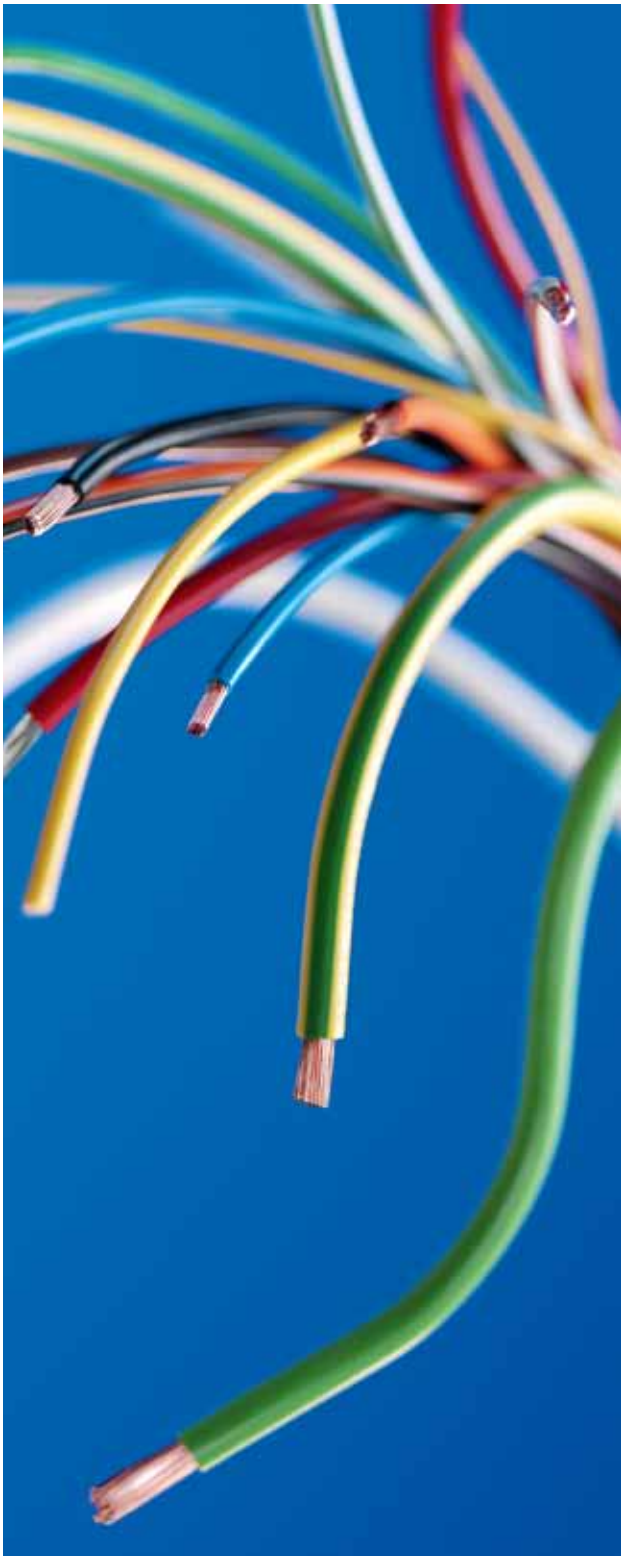
Special design/shielding:

– **F** flat cable
– **B** foil shield (B shield)
– **D** spiral shield (D shield)
– **C** wire braid (C shield)

No of cores x cross-section

Additional information:

DW drainwire
CC conductive core
SN tinned conductor
Flex high flexible cable
Twin twin cable



LEONI **Adascar**® Product range

Advanced Automotive Special Cables.

The LEONI Adascar® family is divided in the following applications:

SAFETY APPLICATIONS: airbag, belt, pre-crash, collision avoidance and closing systems, clamping protections, chassis safety, distance controllers etc.

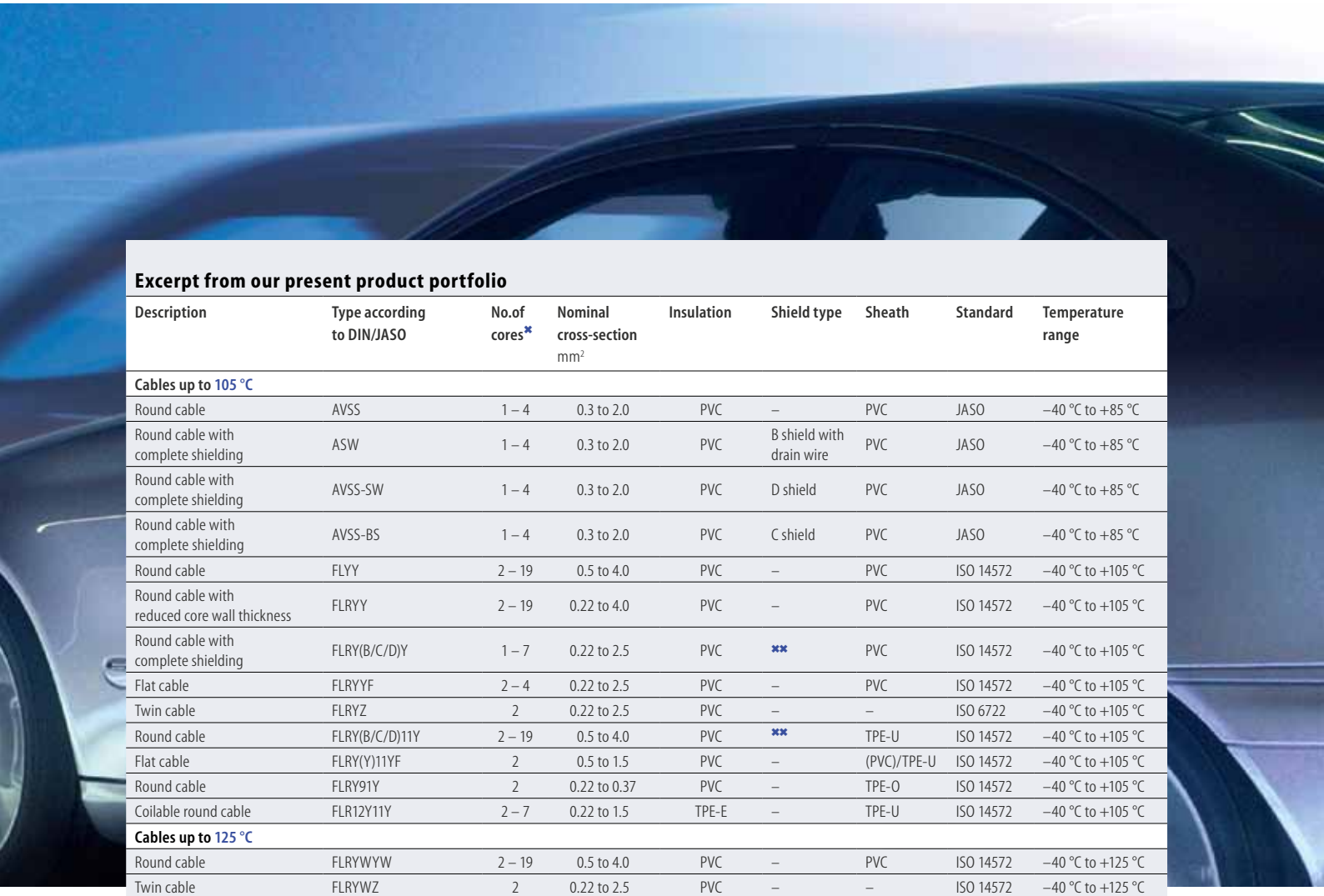
COMFORT APPLICATIONS: roof, seat, heating, ventilation and climate control systems, park assistance, consumer electronics etc.

POWER APPLICATIONS: lighting and wiring systems, electrical installation wiring, engine compartment etc.

CONTROL APPLICATIONS: sensors for rain, weight and occupant recognition, fill level, lambda probe, applications with capacity and inductivity requirements etc.

TRUCK APPLICATIONS: connection cable between tractor and trailer or semi-trailer, lighting and wiring systems with ADR approval etc.

WHEEL SENSOR APPLICATIONS: ABS, ESP, brake wear indicator and electrical parking brake



Excerpt from our present product portfolio

Description	Type according to DIN/JASO	No.of cores✖	Nominal cross-section mm²	Insulation	Shield type	Sheath	Standard	Temperature range
Cables up to 105 °C								
Round cable	AVSS	1 – 4	0.3 to 2.0	PVC	–	PVC	JASO	–40 °C to +85 °C
Round cable with complete shielding	ASW	1 – 4	0.3 to 2.0	PVC	B shield with drain wire	PVC	JASO	–40 °C to +85 °C
Round cable with complete shielding	AVSS-SW	1 – 4	0.3 to 2.0	PVC	D shield	PVC	JASO	–40 °C to +85 °C
Round cable with complete shielding	AVSS-BS	1 – 4	0.3 to 2.0	PVC	C shield	PVC	JASO	–40 °C to +85 °C
Round cable	FLYY	2 – 19	0.5 to 4.0	PVC	–	PVC	ISO 14572	–40 °C to +105 °C
Round cable with reduced core wall thickness	FLRYY	2 – 19	0.22 to 4.0	PVC	–	PVC	ISO 14572	–40 °C to +105 °C
Round cable with complete shielding	FLRY(B/C/D)Y	1 – 7	0.22 to 2.5	PVC	✖✖	PVC	ISO 14572	–40 °C to +105 °C
Flat cable	FLRYYF	2 – 4	0.22 to 2.5	PVC	–	PVC	ISO 14572	–40 °C to +105 °C
Twin cable	FLRYZ	2	0.22 to 2.5	PVC	–	–	ISO 6722	–40 °C to +105 °C
Round cable	FLRY(B/C/D)11Y	2 – 19	0.5 to 4.0	PVC	✖✖	TPE-U	ISO 14572	–40 °C to +105 °C
Flat cable	FLRY(Y)11YF	2	0.5 to 1.5	PVC	–	(PVC)/TPE-U	ISO 14572	–40 °C to +105 °C
Round cable	FLRY91Y	2	0.22 to 0.37	PVC	–	TPE-O	ISO 14572	–40 °C to +105 °C
Coilable round cable	FLR12Y11Y	2 – 7	0.22 to 1.5	TPE-E	–	TPE-U	ISO 14572	–40 °C to +105 °C
Cables up to 125 °C								
Round cable	FLRYWYW	2 – 19	0.5 to 4.0	PVC	–	PVC	ISO 14572	–40 °C to +125 °C
Twin cable	FLRYWZ	2	0.22 to 2.5	PVC	–	–	ISO 14572	–40 °C to +125 °C
Flat cable	FLRYWYWF	2 – 4	0.22 to 2.5	PVC	–	PVC	ISO 14572	–40 °C to +125 °C
Round cable with and without complete shielding	FLRYW(B/C/D)YW	1 – 7	0.22 to 2.5	PVC	✖✖	PVC	ISO 14572	–40 °C to +125 °C
Round cable with and without complete shielding	FLR91Y(B/C/D)11Y	1 – 7	0.22 to 2.5	TPE-O	✖✖	TPE-U	ISO 14572	–40 °C to +125 °C
Round cable with and without complete shielding	FLR12Y(B/C/D)11Y	1 – 7	0.22 to 2.5	TPE-E	✖✖	TPE-U	ISO 14572	–40 °C to +125 °C
Round cable with and without complete shielding	FLR2X(B/C/D)11Y	1 – 7	0.22 to 2.5	PE-X	✖✖	TPE-U	ISO 14572	–40 °C to +125 °C
Cable with EVA insulation	FLRY4G11Y		≥ 0.35	EVA	–	TPE-U		–40 °C to +125 °C
Cable with PE-X insulation	FLR2X11Y	≥ 2	≥ 0.35	PE-X	–	TPE-U		–40 °C to +125 °C
Cable with TPE-S insulation	FLR31Y11Y	≥ 2	≥ 0.35	TPE-S	–	TPE-U		–40 °C to +125 °C
Cold-resistant special cable	FLR5Y(B/C/D)11Y	≥ 2	≥ 0.14	PTFE	✖✖	TPE-U	ISO 14572	–60 °C to +125 °C
Cables up to 150 °C								
Round cable with and without complete shielding	FLU7Y(B/C/D)11Y	1 – 7	0.14 to 1.0	ETFE	✖✖	TPE-U	ISO 14572	–40 °C to +150 °C
Round cable with and without complete shielding	FLU6Y(B/C/D)11Y	1 – 7	0.14 to 1.0	FEP	✖✖	TPE-U	ISO 14572	–40 °C to +150 °C
Cables above 150 °C								
Round cable with and without complete shielding	FLU7Y(B/C/D)7Y	1 – 7	0.14 to 1.0	ETFE	✖✖	ETFE	ISO 14572	–65 °C to +180 °C
Round cable with and without complete shielding	FlU6Y(B/C/D)6Y	1 – 7	0.14 to 1.0	FEP	✖✖	FEP	ISO 14572	–65 °C to +230 °C
Sensor cable for high temperature applications	FLR7Y(B/C/D)11Y	≥ 2	≥ 0.35	ETFE	✖✖	TPE-U		–40 °C to +150 °C
Sensor cable for high temperature applications	FLR7Y(B/C/D)2G	≥ 2	≥ 0.14	ETFE	✖✖	SIR	ISO 14572	–40 °C to +180 °C
Sensor cable for high temperature applications	FLR6Y(B/C/D)2G	≥ 2	≥ 0.14	FEP	✖✖	SIR	ISO 14572	–50 °C to +180 °C
Sensor cable for high temperature applications	FLU5Y(B/C/D)2G	≥ 2	≥ 0.14	PTFE	✖✖	SIR	ISO 14572	–40 °C to +200 °C

✖ Further types upon request.

✖✖ The cables are available with B, C or D shield or in combination.

LEONI **Adascar**®
Comfort Applications

Multi-core automotive cables with sheath; shielded and unshielded.

BENEFITS/PROPERTIES

- customer-specific cables available
- shielded versions
- certified according to international standards
- extensive OEM approvals

APPLICATIONS

- seat systems, power windows, mirror wiring
- heating, ventilation and climate control systems
- consumer electronics
- car phone
- convertible roof, tailgate and sun roof systems
- park assistance
- driver authentification system

COMFORT APPLICATIONS

LEONI has an extensive portfolio of products for comfort applications. Depending on the layout and thus possible mechanical strain, especially resilient materials are used to permit fitting in the bodywork (power windows) and also to allow recoiling of the cable (entertainment).

For fitting in vehicle interiors, flame retardance pursuant to the international standards (ISO, LV, JASO…) is also assured with these special materials. There is also a choice of low halogen and halogen free materials.

STANDARDS

Compliant with ISO 6722, LV 112, ISO 14572, LV 212, JASO and customer specifications.

LEONI

Comfort Applications

Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC round cables					
LEONI Adascar® Comfort 6010	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Comfort 6020	4x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 6030	3x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 6040	5x0.35 Flex	45	0.11	0.80	BL
LEONI Adascar® – PVC special cables					
LEONI Adascar® Comfort 6410	3x0.5	16	0.21	1.00	BL
LEONI Adascar® – PVC 125 °C round/flat					
LEONI Adascar® Comfort 6610	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Comfort 6620-F	4x0.22	7	0.21	0.60	BL
LEONI Adascar® – Special cables unshielded					
LEONI Adascar® Comfort 6710	4x0.35 Flex	45	0.11	0.80	BL
LEONI Adascar® – PVC shielded					
LEONI Adascar® Comfort 7010-C	3x0.35+DW	19	0.16	0.90	BL
LEONI Adascar® Comfort 7020-B	2x0.35+DW	7	0.26	0.75	SN
LEONI Adascar® Comfort 7025-B	4x0.5+DW	16	0.21	1.00	BL
LEONI Adascar® Comfort 7030-B	6x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Comfort 7040-C	2x3+DW	98	0.21	2.20	BL
LEONI Adascar® Comfort 7050-B	4x0.22	7	0.21	0.60	BL
LEONI Adascar® Comfort 7060-B	2x2x0.75+DW	24	0.21	1.10	BL
LEONI Adascar® Comfort 7110-D	2x0.35	12	0.21	0.80	BL
LEONI Adascar® Comfort 7120-D	4x0.35	7	0.26	0.75	BL
LEONI Adascar® Comfort 7130-D	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 7140-D	3x0.75	24	0.21	1.15	BL
LEONI Adascar® Comfort 7150-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Comfort 7160-B	4x0.35+DW	7	0.26	0.80	BL
LEONI Adascar® Comfort 7170-B	3x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® – Special cables shielded					
LEONI Adascar® Comfort 7710-D	2x0.25 Flex	32	0.11	0.60	BL
LEONI Adascar® Comfort 7720-B	2x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Comfort 7730-D	3x0.35 Flex	45	0.11	0.80	BL

Advanced Automotive Special Cables.

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation Material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.80	4.60	–	PVC	PVC	24.7	–40 to +105
1.50	5.30	–	PVC	PVC	37.1	–40 to +105
1.55	4.70	–	PVC	PVC	37.1	–40 to +105
1.30	4.70	–	PVC	PVC	54.4	–40 to +105
1.95	5.40	–	PVC	PVC	36.7	–50 to +90
1.80	4.80	–	PVC	PVC	24.7	–40 to +125
1.10	5.60 x 2.15	–	TPE-E	PVC	84.8	–40 to +125
1.30	5.80	–	TPE-E	TPE-U	54.4	–40 to +105
1.30	4.20	C	PVC	PVC	54.4	–40 to +105
1.25	3.70	B	PVC	PVC	55.5	–40 to +105
1.55	5.60	B	PVC	PVC	37.1	–40 to +105
1.55	6.40	B	PVC	PVC	37.1	–40 to +105
3.10	6.80	C	PVC	PVC	6.15	–40 to +105
1.05	3.50	B	PVC	PVC	84.8	–40 to +105
1.75	6.90	B	PVC	PVC	24.7	–40 to +105
1.35	4.40	D	PVC	PVC	54.4	–40 to +105
1.25	5.30	D	PVC	PVC	54.4	–40 to +105
1.55	4.80	B + D	PVC	PVC	37.1	–40 to +105
1.75	5.30	D	PVC	PVC	24.7	–40 to +105
1.55	4.50	B	PVC	PVC	37.1	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.20	4.20	D	TPE-E	TPE-U	70.3	–40 to +105
1.35	4.90	B	PP	PVC	54.4	–40 to +90
1.25	3.50	D	PVC	TPE-U	54.4	–40 to +105

LEONI **Adascar**®
Control Applications

Multi-core automotive cables with sheath; shielded and unshielded.

BENEFITS/PROPERTIES

- customer- specific cables available
- shielded versions
- certified according to international standards
- extensive OEM approvals

APPLICATIONS

- sensor applications
- knock sensor
- weight sensor
- rain sensor
- engine management sensor
- fill level sensor
- occupant recognition

CONTROL APPLICATIONS

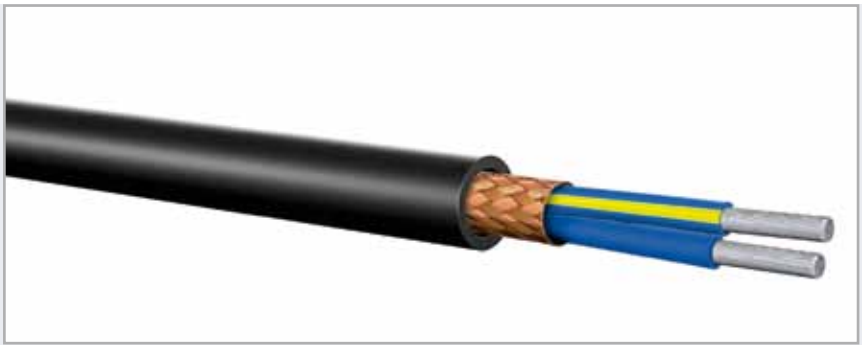
LEONI has a wide range of products with properties tailored individually to the respective customer requirements for the broadest possible variety of control and management functions. Depending on the area of use, the cables are also available in shielded form as foil shields (B shield) with drain wire or conductive core for contacting, as coiled shield (D shield) or as braided shields (C shield) made of copper wires, either bare or tinned.

STANDARDS

Compliant with ISO 6722, LV 112, ISO 14572, LV 212, JASO and customer specifications.


ABS
AIR BAG
OFF
LEVEL
OK

Control Applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC round cables					
LEONI Adascar® Control 8010	5x0.5	16	0.21	1.00	BL
LEONI Adascar® – PVC 125 °C round/flat					
LEONI Adascar® Control 8610	2x0.75	24	0.21	1.10	BL
LEONI Adascar® – Special cables unshielded					
LEONI Adascar® Control 8710	7x0.35sn	7	0.26	0.75	SN
LEONI Adascar® Control 8720	6x0.5sn	19	0.19	0.90	SN
LEONI Adascar® Control 8730	4x0.75sn	24	0.21	1.10	SN
LEONI Adascar® Control 8740	2x0.35	7	0.26	0.75	BL
LEONI Adascar® Control 8750	5x0.5	16	0.21	1.00	BL
LEONI Adascar® Control 8760	16x0.22sn Flex	28	0.11	0.95	SN
LEONI Adascar® Control 8770	2x0.22sn	7	0.21	0.60	SN
LEONI Adascar® Control 8780	6x0.22 FR	11	0.16	0.60	SN
LEONI Adascar® Control 8790	4x0.25 Flex	32	0.11	0.60	BL
LEONI Adascar® – PVC shielded					
LEONI Adascar® Control 9010-C	2x2.5+DW	140	0.16	2.10	BL
LEONI Adascar® Control 9020-B	6x1+DW	32	0.21	1.30	BL
LEONI Adascar® Control 9030-B	2x1.5+DW	30	0.26	1.60	BL
LEONI Adascar® Control 9040-B	2x0.5+CC	19	0.19	0.90	BL
LEONI Adascar® Control 9060-B	3x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Control 9070-B	3x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Control 9110-C	4x0.16+DW	19	0.11	0.50	BL
LEONI Adascar® Control 9120-B	1x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® – Special cables shielded					
LEONI Adascar® Control 9710-B	2x0.35+DW	7	0.26	0.75	SN
LEONI Adascar® Control 9715-B	2x1+CC	32	0.21	1.30	BL
LEONI Adascar® Control 9730-C	12x0.22 Flex	28	0.11	0.60	SN

Advanced Automotive Special Cables.

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation Material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
2.10	7.30	–	PVC	PVC	37.1	–40 to +105
1.80	4.80	–	PVC	PVC	24.7	–40 to +125
1.25	6.30	–	PVC	TPE-U	55.5	–40 to +105
1.50	6.30	–	ETFE	TPE-U	38.2	–40 to +125
2.20	6.20	–	TPE-U	TPE-U	25.4	–40 to +125
1.40	4.20	–	TPE-S	TPE-O	54.4	–40 to +90
1.55	5.50	–	TPE-O	TPE-U	37.1	–40 to +125
1.05	6.30	–	ETFE	TPE-U	86.5	–40 to +125
1.00	3.70	–	TPE-E	TPE-U	86.5	–40 to +125
1.10	4.50	–	TPE-E	TPE-U	86.5	–30 to +85
1.14	3.80	–	TPE-E	TPE-U	72.9	–40 to +105
2.80	7.00	C	PVC	PVC	7.6	–40 to +105
2.00	8.00	B	PVC	PVC	18.5	–40 to +105
2.30	6.40	B	PVC	PVC	12.7	–40 to +105
1.55	5.00	B	PVC	PVC	37.1	–40 to +105
1.25	3.90	B	PVC	PVC	54.4	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.05	4.60	C	PVC	PVC	132.0	–40 to +105
1.30	3.10	B	PVC	PVC	54.4	–40 to +105
1.30	4.00	B	TPE-E	TPE-U	54.4	–40 to +125
2.00	5.60	B	PVC	TPE-U	18.5	–40 to +105
1.00	6.70	C	ETFE	TPE-U	86.5	–40 to +125

LEONI **Adascar**®
Power Applications

Multi-core automotive cables with sheath; shielded and unshielded.

BENEFITS/PROPERTIES

- customer-specific cables available
- shielded versions
- certified according to international standards
- extensive OEM approvals

APPLICATIONS

- lighting and cabling systems
- wiring of electrical equipment (in board and out board, bodywork)
- engine compartment, catalytic converter
- power distributors

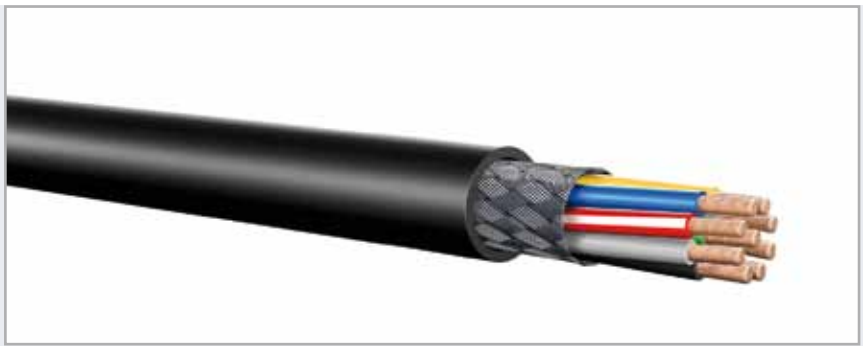
POWER APPLICATIONS

LEONI provides with the brand LEONI Adascar® Power a wide selection of multi-core shielded and unshielded wiring cables. There is, depending on the area of installation, i.e. interior, engine compartment or cable harness, a very wide variety of materials to meet the respective mechanical, thermal or chemical requirements. Shielding with a high level of coverage (up to nearly 100 percent) is essential when carrying currents to reducing the radiation and thus the inference to data cables fitted in the vicinity.

STANDARDS

Compliant with ISO 6722, LV 112, ISO 14572, LV 212, JASO and customer specifications.

Power Applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC round cables					
LEONI Adascar® Power 4010	2x0.5	16	0.21	1.00	BL
LEONI Adascar® Power 4020	2x0.75	24	0.21	1.10	BL
LEONI Adascar® – PVC flat cables					
LEONI Adascar® Power 4505	2x0.35 Twin	7	0.26	0.80	BL
LEONI Adascar® Power 4510	2x0.5 Twin	16	0.21	1.00	BL
LEONI Adascar® Power 4520	2x0.75 Twin	24	0.21	1.10	BL
LEONI Adascar® Power 4530	2x1 Twin	19	0.26	1.30	BL
LEONI Adascar® Power 4540	2x1.5 Twin	30	0.26	1.60	BL
LEONI Adascar® Power 4550	2x2.5 Twin	19	0.41	2.00	BL
LEONI Adascar® – Special cables unshielded					
LEONI Adascar® Power 4710	4x0.75	24	0.21	1.10	BL
LEONI Adascar® – PVC shielded					
LEONI Adascar® Power 5010-C	2x2x0.5sn	16	0.21	1.00	SN
LEONI Adascar® Power 5001-C	1x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5002-C	1x0.5	7	0.31	0.90	BL
LEONI Adascar® Power 5005-C	1x1.5sn	30	0.26	1.60	SN
LEONI Adascar® Power 5020-B	4x0.22	7	0.21	0.60	BL
LEONI Adascar® Power 5030-D	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Power 5040-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5050-B	2x1+DW	19	0.26	1.30	BL
LEONI Adascar® Power 5060-B	1x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5070-B	2x2.5+DW	50	0.26	2.00	BL
LEONI Adascar® Power 5080-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5110-C	10x0.22+DW	7	0.21	0.60	BL
LEONI Adascar® Power 5120-C	2x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5130-C	3x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5140-C	4x0.35+DW	19	0.26	0.75	BL

Advanced Automotive Special Cables.

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.55	4.45	–	PVC	PVC	37.1	–40 to +105
1.80	4.90	–	PVC	PVC	24.7	–40 to +105
–	3.80 x 1.80✖	–	–	PVC	54.4	–40 to +105
–	4.40 x 2.10✖	–	–	PVC	37.1	–40 to +105
–	4.40 x 2.10✖	–	–	PVC	24.7	–40 to +105
–	3.80 x 1.90✖	–	–	PVC	18.5	–40 to +105
–	5.60 x 2.80✖	–	–	PVC	12.7	–40 to +105
–	5.20 x 2.60✖	–	–	PVC	7.6	–40 to +105
1.95	6.70	–	PVC	TPE-U	24.7	–40 to +105
1.80	8.60	C	PVC	PVC	38.2	–40 to +105
1.45	2.95	C	PVC	PVC	54.4	–40 to +105
1.70	3.50	C	PVC	PVC	37.1	–40 to +105
2.60	4.10	C	PVC	PVC	13.0	–40 to +105
1.10	3.50	B	PVC	PVC	84.8	–40 to +105
1.55	4.80	D	PVC	PVC	37.1	–40 to +105
1.55	4.20	B	PVC	PVC	37.1	–40 to +105
1.95	5.10	B	PVC	PVC	18.5	–40 to +105
1.55	3.80	B	PVC	PVC	37.1	–40 to +105
2.80	7.50	B	PVC	PVC	7.6	–40 to +105
1.55	4.50	B	PVC	PVC	37.1	–40 to +105
1.10	6.00	C	PVC	PVC	84.8	–40 to +105
1.45	4.40	C	PVC	PVC	54.4	–40 to +105
1.45	5.00	C	PVC	PVC	54.4	–40 to +105
1.25	5.30	C	PVC	PVC	54.4	–40 to +105

✖ Dimensions nom. width x height [mm x mm]

Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® Power 5150-C	5x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5160-C	6x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5170-C	8x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5180-C	10x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5210-C	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Power 5220-C	3x0.50+DW Flex	64	0.11	0.90	BL
LEONI Adascar® Power 5230-C	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Power 5240-D	2x2.5	50	0.26	2.00	BL
LEONI Adascar® Power 5250-D	3x1	32	0.21	1.30	BL
LEONI Adascar® – Special cables shielded					
LEONI Adascar® Power 5710-C	2x0.22+DW	7	0.21	0.60	SN
LEONI Adascar® Power 5720-D	1x0.75	24	0.21	1.10	BL
LEONI Adascar® Power 5820-B	3x0.35sn+DW	19	0.16	0.75	SN
LEONI Adascar® Power 5810-C	3x0.35sn	19	0.16	0.75	SN
LEONI Adascar® Power 5830-C	3x0.5sn+DW	19	0.16	0.75	SN

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.30	4.90	C	PVC	PVC	58.5	−40 to +105
1.45	6.40	C	PVC	PVC	54.4	−40 to +105
1.25	6.00	C	PVC	PVC	58.5	−40 to +105
1.25	6.70	C	PVC	PVC	58.5	−40 to +105
1.70	5.20	C	PVC	PVC	38.2	−40 to +105
1.55	5.00	C	PVC	PVC	37.1	−40 to +105
1.75	5.00	C	PVC	PVC	24.7	−40 to +105
2.85	7.80	D	PVC	PVC	7.6	−40 to +105
1.95	5.70	D	PVC	PVC	18.5	−40 to +105
1.15	3.70	C	ETFE	TPE-O	86.5	−40 to +180
2.00	3.20	D	TPE-E	TPE-U	24.7	−40 to +105
1.32	5.00	B	FEP	SIR	58.8	−40 to +180
1.32	5.45	C	FEP	SIR	58.8	−40 to +180
1.34	5.55	C	FEP	SIR	50.0	−40 to +180

LEONI **Adascar®** Safety Applications

Multi-core automotive cables for safety applications.

BENEFITS/PROPERTIES

- excellent processability
- extensive OEM approvals
- customised solutions
- worldwide production facilities

APPLICATIONS

- impact protection (airbag)
- restraint systems (belt)
- active headrest, seats, engine cover (pre/in crash)
- locking systems, clamping protection
- chassis safety
- pre-impact warning sensors, distance controller (collision avoidance)

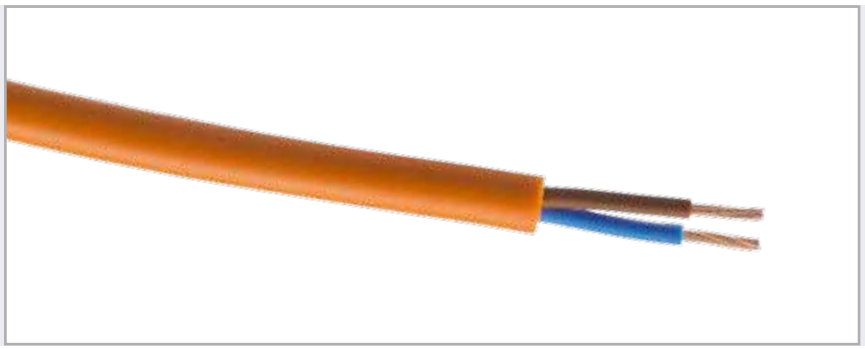
SAFETY APPLICATIONS

The LEONI Adascar® Safety product range is used in all safety-related applications in vehicles. By being easy to strip and extrude, the cables are ideally suited to a wide variety of fully automated further processing. The materials used are exclusively of high quality and approved to international standards.

STANDARDS

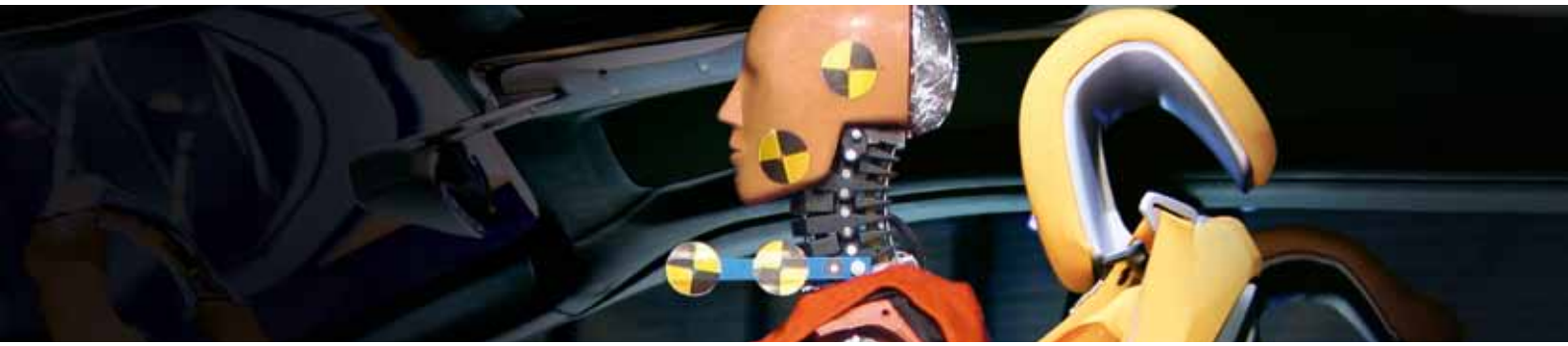
Compliant with ISO 6722, LV 112, ISO 14572, LV 212, JASO and customer specifications.

Safety Applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC round cables					
LEONI Adascar® Safety 2010	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2011	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2012	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2013	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2015	3x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2020	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2021	2x0.5-B	16	0.21	0.90	BL
LEONI Adascar® Safety 2022	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2023	2x0.5/7	7	0.31	0.90	BL
LEONI Adascar® Safety 2024	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2025	2x0.5sn-A	19	0.19	0.90	SN
LEONI Adascar® Safety 2026	2x0.5sn-A	19	0.19	0.90	SN
LEONI Adascar® Safety 2030	3x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2035	2x0.5sn+0.5	19	0.19	0.90	SN
LEONI Adascar® Safety 2040	4x0.5-A	19	0.19	0.90	BL
LEONI Adascar® – PVC special cables					
LEONI Adascar® Safety 2410	4x0.35+2x2.5	12 / 50	0.21 / 0.26	0.75 / 2.00	BL / BL
LEONI Adascar® – PVC flat cables					
LEONI Adascar® Safety 2510-F	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2511-F	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2512-F	2x0.35sn-A	7	0.26	0.75	SN
LEONI Adascar® Safety 2520-F	2x0.5-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2521-F	2x0.5-B	16	0.21	0.90	BL
LEONI Adascar® Safety 2522-F	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® – PVC 125 °C					
LEONI Adascar® Safety 2610	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® – Special cables unshielded					
LEONI Adascar® Safety 2710	2x0.22-A	7	0.21	0.60	BL
LEONI Adascar® Safety 2720	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2721	2x0.37-A AVSS	7	0.27	0.80	BL
LEONI Adascar® – PVC shielded					
LEONI Adascar® Safety 3010-B	2x0.35+DW	7	0.26	0.75	BL

Advanced Automotive Special Cables.



Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.25	5.45	–	PVC	PVC	54.4	–40 to +105
1.30	3.75	–	PVC	PVC	54.4	–40 to +105
1.25	3.50	–	PVC	PVC	54.4	–40 to +105
1.25	4.00	–	PVC	PVC	54.4	–40 to +105
1.25	3.90	–	PVC	PVC	54.4	–40 to +105
1.55	4.40	–	PVC	PVC	37.1	–40 to +105
1.55	4.50	–	PVC	PVC	37.1	–40 to +105
1.70	4.45	–	PVC	PVC	37.1	–40 to +105
1.55	4.45	–	PVC	PVC	37.1	–40 to +105
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
1.55	4.45	–	PVC	PVC	38.2	–40 to +105
1.55	4.25	–	PVC	PVC	38.2	–40 to +105
1.55	4.50	–	PVC	PVC	37.1	–40 to +105
1.55	4.50	–	PVC	PVC	38.2	–40 to +105
1.50	4.80	–	PVC	PVC	37.1	–40 to +105
1.30 / 2.70	6.85	–	PVC	PVC	54.4	–40 to +105
1.25	3.90 x 2.60✖	–	PVC	PVC	54.4	–40 to +105
1.25	4.10 x 2.80✖	–	PVC	PVC	54.4	–40 to +105
1.25	4.10 x 2.80✖	–	PVC	PVC	55.5	–40 to +105
1.55	4.40 x 2.80✖	–	PVC	PVC	37.1	–40 to +105
1.55	3.80 x 2.25✖	–	PVC	PVC	37.1	–40 to +105
1.55	4.40 x 2.80✖	–	PVC	PVC	37.1	–40 to +105
1.55	4.40	–	PVC	PVC	37.1	–40 to +125
1.15	3.40	–	PVC	TPE-O	84.8	–30 to +90
1.60	4.10	–	PVC	TPE-O	54.4	–30 to +90
1.40	4.00	–	PVC	TPE-O	50.2	–30 to +90
1.25	3.70	B	PVC	PVC	54.4	–40 to +105

✖ Dimensions nom. width x height [mm x mm]

LEONI **Adascar**®
Truck Applications

Multi-core automotive cables with ADR certificates for commercial vehicles.

BENEFITS/PROPERTIES

- with ADR/GGVS certificates
- with integrated data pair
- coilable versions
- with double jacket

APPLICATIONS

- cable to connect the tractor and trailer or semi trailer
- wiring of the electrical equipment
- front, rear and side illumination as well as cabling systems

TRUCK APPLICATIONS

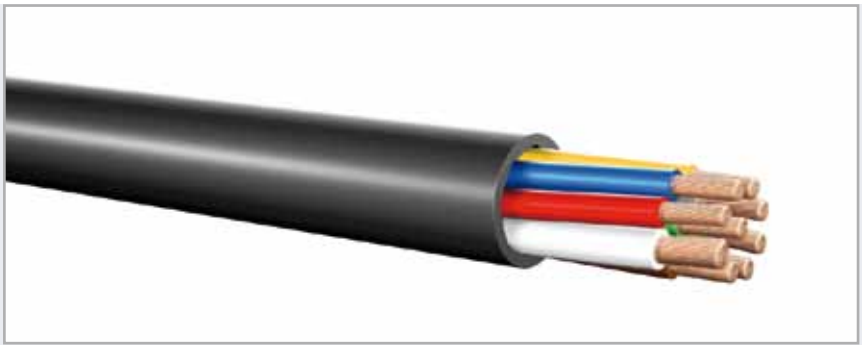
The LEONI Adascar® Truck cables meet the high mechanical, chemical and also electric requirements in the commercial vehicle industry. These PVC cables are resistant to oil, weather, chemicals and UV as well as to cold. The versions with PU jackets also boast increased resistance to wear and abrasion as well as excellent durability under exposure to microbes and hydrolysis.

STANDARDS

Compliant with ISO 6722, LV 112, ISO 14572, LV 212, ISO 4141 and customer specifications.

LEONI

Truck Applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC round cables					
LEONI Adascar® Truck 10201	2x0.5	16	0.21	0.90	BL
LEONI Adascar® Truck 10202	2x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10203	2x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 10204	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Truck 10206	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 10207	2x2.5	50	0.26	2.00	BL
LEONI Adascar® Truck 10300	3x0.5	19	0.19	0.90	BL
LEONI Adascar® Truck 10301	3x0.75	19	0.23	1.10	BL
LEONI Adascar® Truck 10302	3x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 10303	3x2.5	19	0.41	2.00	BL
LEONI Adascar® Truck 10304	3x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10401	4x0.75	19	0.23	1.10	BL
LEONI Adascar® Truck 10402	4x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10403	2x1.5+2x0.5	19 / 19	0.32 / 0.19	1.55 / 0.90	BL
LEONI Adascar® Truck 10501	5x0.5	16	0.21	0.95	BL
LEONI Adascar® Truck 10502	5x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 10503	2x4+3x1.5	56 / 19	0.31 / 0.32	2.55 / 1.55	BL
LEONI Adascar® Truck 10504	2x6+3x1.5	84 / 19	0.31 / 0.32	3.10 / 1.60	BL
LEONI Adascar® Truck 10505	3x1.5+2x0.5	19 / 19	0.32 / 0.19	1.60 / 0.90	BL
LEONI Adascar® Truck 10506	5x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 10601	1x1+5x0.75	32 / 24	0.21 / 0.21	1.30 / 1.10	BL
LEONI Adascar® Truck 10602	6x0.5	16	0.21	0.90	BL
LEONI Adascar® Truck 10603	2x1.5+4x0.5	30 / 16	0.26 / 0.21	1.70 / 1.00	BL
LEONI Adascar® Truck 10701	1x1.5+6x1	30 / 32	0.26 / 0.21	1.60 / 1.30	BL
LEONI Adascar® Truck 10702	7x1	19	0.26	1.30	BL
LEONI Adascar® Truck 10703	7x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 10706	3x2.5+4x1.5	50 / 30	0.26 / 0.26	2.00 / 1.60	BL
LEONI Adascar® Truck 10707	4x2+3x0.75	24 / 30	0.21 / 0.31	1.80 / 1.10	BL
LEONI Adascar® Truck 10801	1x2.5+7x1	50 / 32	0.26 / 0.26	2.00 / 1.30	BL

Advanced Automotive Special Cables.

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
2.00	6.00	–	PVC	PVC	18.5	–40 to +105
2.30	6.60	–	PVC	PVC	12.7	–40 to +105
1.55	5.00	–	PVC	PVC	37.1	–40 to +105
2.30	5.60	–	PVC	PVC	24.7	–40 to +105
2.85	7.70	–	PVC	PVC	12.7	–40 to +105
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
1.80	5.90	–	PVC	PVC	24.7	–40 to +105
2.30	7.15	–	PVC	PVC	12.7	–40 to +85
2.90	8.65	–	PVC	PVC	7.6	–40 to +85
2.50	6.80	–	PVC	PVC	18.5	–40 to +105
1.85	6.60	–	PVC	PVC	24.7	–40 to +105
2.00	6.70	–	PVC	PVC	18.5	–40 to +105
2.30 / 1.55	6.50	–	PVC	PVC	12.5 / 37.1	–40 to +85
1.55	5.80	–	PVC	PVC	37.1	–40 to +105
2.30	8.40	–	PVC	PVC	12.7	–40 to +105
3.65 / 2.30	10.60	–	PVC	PVC	4.7 / 12.7	–40 to +105
4.20 / 2.30	11.60	–	PVC	PVC	3.2 / 12.7	–40 to +105
2.30 / 1.55	8.50	–	PVC	PVC	12.7 / 37.1	–40 to +105
1.75	6.50	–	PVC	PVC	24.7	–40 to +105
2.00 / 1.75	7.30	–	PVC	PVC	18.5 / 24.7	– 40 to +105
1.55	6.50	–	PVC	PVC	37.1	–40 to +105
2.30 / 1.55	7.50	–	PVC	PVC	12.7 / 37.1	–40 to +105
2.30 / 2.30	9.30	–	PVC	PVC	12.7 / 18.5	–40 to +105
2.00	8.00	–	PVC	PVC	18.5	–40 to +105
2.30	10.30	–	PVC	PVC	12.7	–40 to +105
2.85 / 2.30	10.30	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.50 / 1.80	9.30	–	PVC	PVC	9.4 / 24.7	–40 to +105
2.60 / 1.90	8.40	–	PVC	PVC	7.6 / 18.5	–40 to +105

Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® Truck 10101	2x2.5+8x1	32 / 50	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10111	4x2.5+7x1	32 / 50	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10131	4x2.5+9x1.5	50 / 30	0.26 / 0.26	2.20 / 1.70	BL
LEONI Adascar® Truck 10151	3x2.5+12x1	50 / 32	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10153	5x2.5+8x1.5	50 / 30	0.26 / 0.26	2.00 / 1.60	BL
LEONI Adascar® – PVC flat cables					
LEONI Adascar® Truck 11201	2x1.5sn	30	0.26	1.50	SN
LEONI Adascar® Truck 11202	2x1.5	30	0.26	1.55	BL
LEONI Adascar® Truck 11204	2x2.5	50	0.26	2.10	BL
LEONI Adascar® Truck 11301	3x1.5	30	0.26	1.70	BL
LEONI Adascar® – PVC/PU round cables					
LEONI Adascar® Truck 12201	2x0.75	24	0.26	1.10	BL
LEONI Adascar® Truck 12301	3x1.5	30	0.26	1.55	BL
LEONI Adascar® Truck 12501	2x6+3x1.5	84 / 30	0.31 / 0.26	3.15 / 1.60	BL
LEONI Adascar® Truck 12502	5x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 12701	1x2+6x1	28 / 32	0.31 / 0.21	1.80 / 1.30	BL
LEONI Adascar® – PVC/PU flat cables					
LEONI Adascar® Truck 13201	2x1sn	32	0.21	1.30	SN
LEONI Adascar® Truck 13202	2x1.5sn	30	0.26	1.50	SN
LEONI Adascar® – PU round cables					
LEONI Adascar® Truck 14301	3x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 14302	3x2.5	19	0.41	2.00	BL
LEONI Adascar® Truck 14303	2x2.5+1x0.5	19 / 19	0.41 / 0.19	2.20 / 1.00	BL
LEONI Adascar® Truck 14401	4x0.25	14	0.16	0.65	BL
LEONI Adascar® Truck 14501	2x4+3x1.5	56 / 30	0.31 / 0.26	2.70 / 1.70	BL
LEONI Adascar® Truck 14601	6x0.25	14	0.16	0.70	BL
LEONI Adascar® Truck 14701	7x0.25	14	0.16	0.70	BL
LEONI Adascar® – Cables with PP data pair					
LEONI Adascar® Truck 15151	3x2.5+12x1.5	50 / 32	0.26 / 0.21	2.00 / 1.50	BL
LEONI Adascar® Truck 15401	2x0.75+2x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 15701	2x4+5x1.5	56 / 30	0.31 / 0.26	2.75 / 1.70	BL
LEONI Adascar® Truck 15702	4+3x1.5+3x0.75	56 / 30 / 24	0.31 / 0.26 / 0.21	2.75 / 1.70 / 1.20	BL
LEONI Adascar® – Spiral cable hytrel/special cables					
LEONI Adascar® Truck 16701	2x4+5x1.5	56 / 30	0.31 / 0.26	2.75 / 1.70	BL
LEONI Adascar® – Shielded cables					
LEONI Adascar® Truck 18171	13x1+(4x1)-C	32 / 32	0.21 / 0.21	1.30 / 1.30	BL
LEONI Adascar® Truck 18201-D	2x0.75	24	0.21	1.15	BL

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
2.85 / 2.00	10.50	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.60 / 2.00	11.00	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.80 / 2.25	13.40	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.80 / 2.00	12.60	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.80 / 2.30	13.60	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.70	6.80 x 4.50	–	PVC	PVC	13.0	–40 to +105
2.75	3.80 x 6.60	–	PVC	PVC	12.7	–40 to +105
3.40	4.60 x 8.10	–	PVC	PVC	7.6	–40 to +105
2.65	3.80 x 9.20	–	PVC	PVC	12.7	–40 to +105
1.85	6.10	–	PVC	PVC / TPE-U	24.7	–40 to +105
2.30	7.50	–	PVC	PVC / TPE-U	12.7	–40 to +105
4.20 / 2.25	12.00	–	PVC	PVC / TPE-U	3.4 / 12.7	–40 to +90
2.30	10.40	–	PVC	PVC / TPE-U	12.7	–40 to +125
2.50 / 2.10	9.10	–	PVC	PVC / TPE-U	9.42 / 18.5	–40 to +105
2.00	6.20 x 4.10	–	PVC	PVC / TPE-U	19.1	–40 to +105
2.35	6.80 x 4.50	–	PVC	PVC / TPE-U	13	–40 to +105
2.30	7.50	–	PVC	TPE-U	12.7	–40 to +105
2.90	9.20	–	PVC	TPE-U	7.6	–40 to +105
2.80 / 1.55	7.60	–	TPE-O	TPE-U	7.6 / 37.1	–40 to +125
1.30	5.20	–	PVC	TPE-U	80.0	–40 to +80
3.65 / 2.55	10.60	–	PVC	TPE-U	4.7 / 12.7	–40 to +90
1.30	5.90	–	PVC	TPE-U	80.0	–40 to +105
1.30	5.90	–	PVC	TPE-U	80.0	–40 to +105
2.60 / 2.50	14.50	–	PVC / PP	PVC / TPE-U	7.6 / 12.7	–40 to +85
1.95 / 1.85	8.00	–	PVC / PP	PVC	24.7 / 24.7	–40 to +85
3.40 / 2.30	11.50	–	PVC / PP	PVC	4.7 / 12.7	–40 to +85
3.40 / 2.30 / 1.85	11.80	–	PVC / PP	PVC	4.7 / 12.7 / 24.7	–40 to +85
3.40 / 2.60 / 2.30	12.00	–	TPE-O / TPE-O / PP	TPE-E	4.7 / 12.7 / 12.7	–40 to +90
2.40 / 2.30	8.40 / 15.50	C	PVC	PVC / PVC	18.5 / 18.5	–40 to +105
1.75	5.10	D	PVC	PVC	24.7	–40 to +105

LEONI **Adascar**®
Wheel Sensor Applications

Sensor cables for driver assistance and active safety systems in the axel wiring.

BENEFITS/PROPERTIES

- highly flexible
- available in halogen-free version
- extremely high abrasion resistance
- very good media resistance
- long-term temperature resistance to +150 °C
- resistant to charring
- resistant to hydrolysis
- bending strength
- recyclability

APPLICATIONS

- ABS/ESP sensor cables
- ABC (active body control)
- brake wear indicator
- sensor cables for automatic regulation of head lamp leveling
- extension cables for ABS systems on trucks and trailers
- electrical parking brake

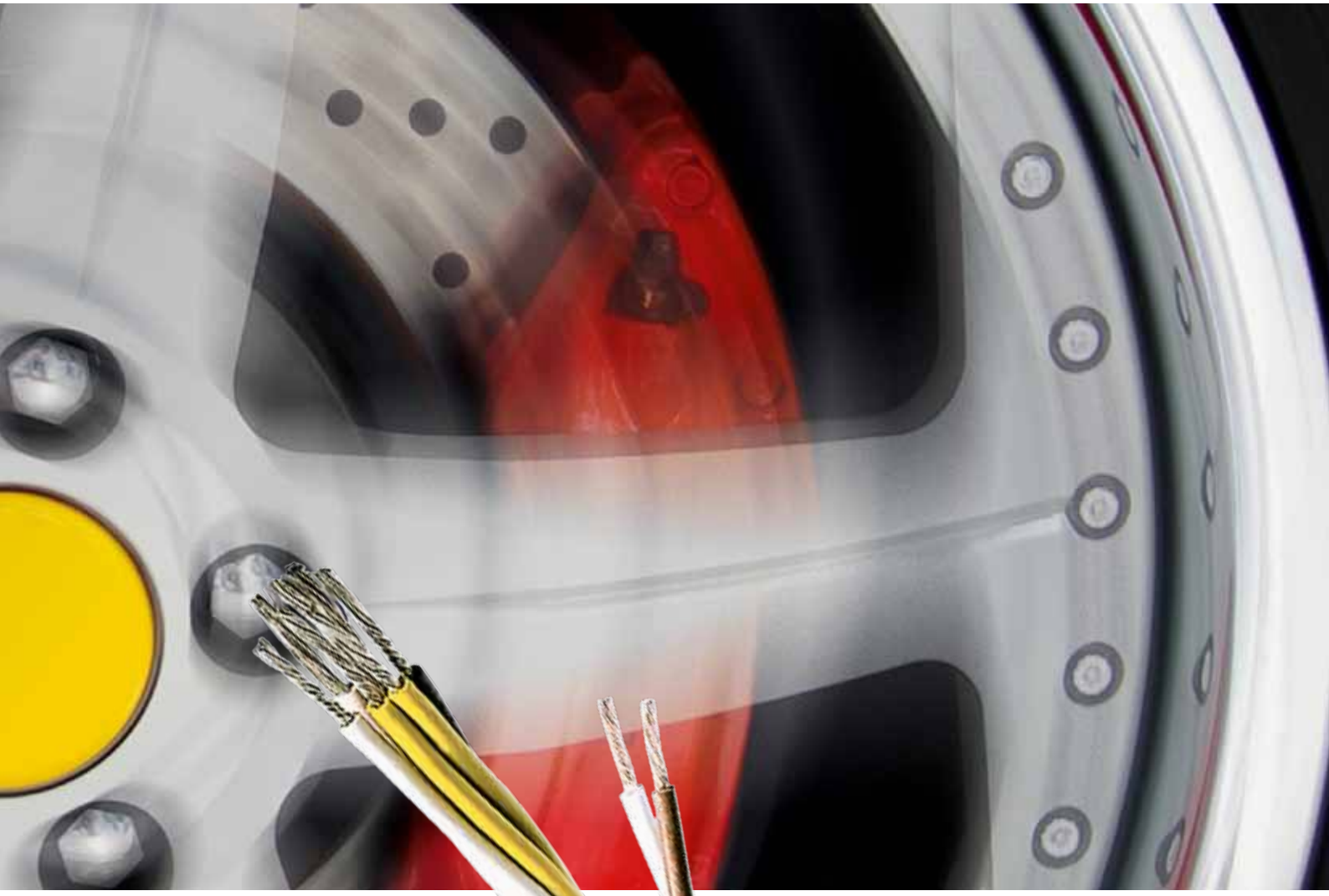
WHEEL SENSOR APPLICATIONS

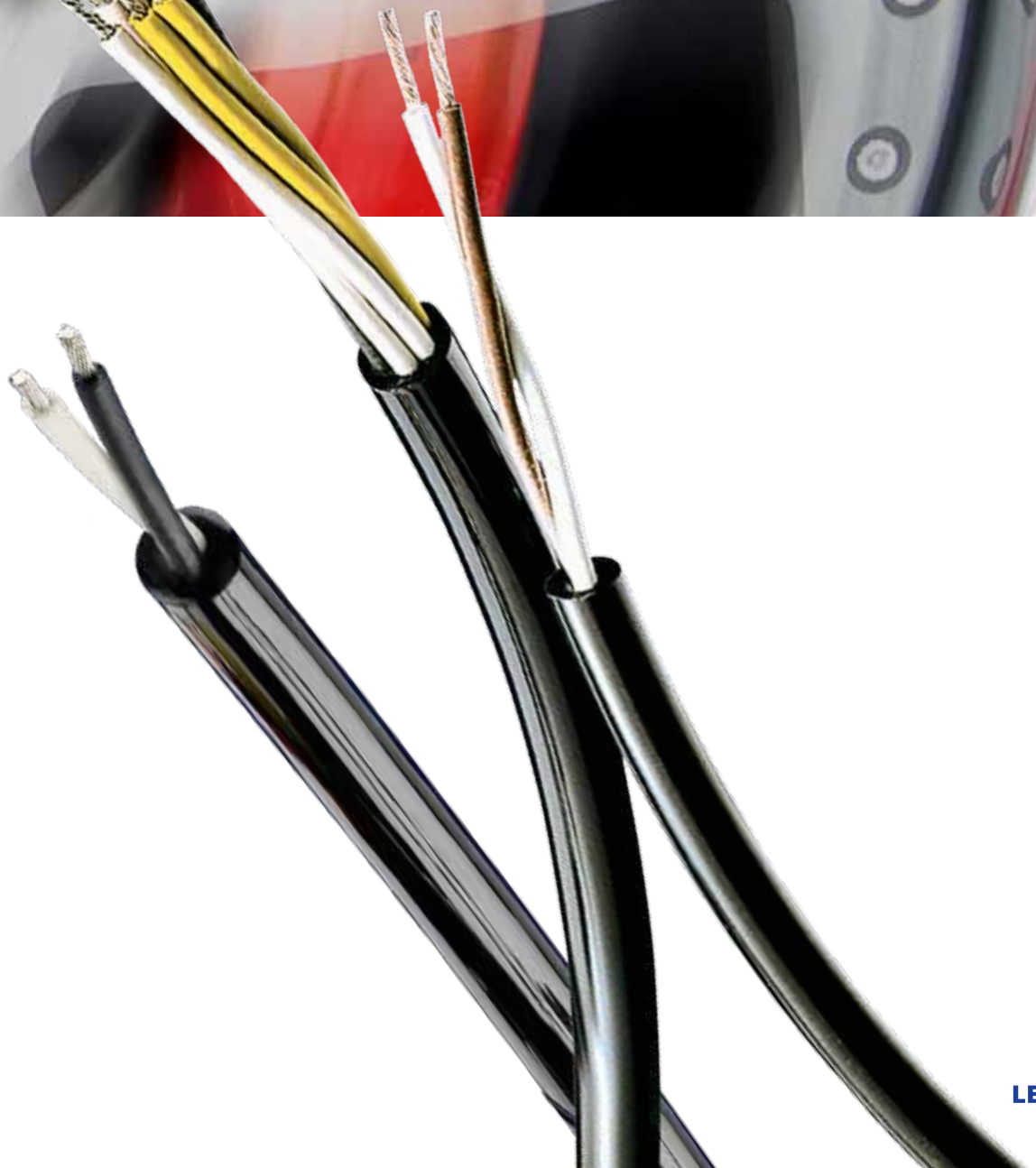
The LEONI Adascar® Wheel Sensor brand stands for cables used in many different areas of axel wiring in both cars and trucks.

The cables meet particularly high reliability requirements. This means they must be oil and fuel resistant, have very high resistance to abrasion and a long flex life.

STANDARDS

Compliant with customer specifications.





LEONI

Wheel Sensor Applications

Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® – PVC insulation					
LEONI Adascar® Sensor 1620	2x0.75	42	0.16	1.20	BL
LEONI Adascar® Sensor 1650	3x1.5	30	0.26	1.70	BL
LEONI Adascar® Sensor 1630	2x1.5	30	0.26	1.60	BL
LEONI Adascar® – EVA insulation					
LEONI Adascar® Sensor 210	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 220	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 310	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 110	2x0.35	37	0.11	0.80	SN
LEONI Adascar® Sensor 120	4x0.35	19	0.16	0.85	SN
LEONI Adascar® Sensor 211	2x0.5	64	0.11	1.00	SN
LEONI Adascar® – TPE insulation					
LEONI Adascar® Sensor 1100	2x0.5	19	0.19	1.00	BL
LEONI Adascar® Sensor 1400	2x0.75	42	0.16	1.20	BL
LEONI Adascar® Sensor 1301	4x0.5	64	0.11	1.00	BL
LEONI Adascar® Sensor 1300	4x0.5	28	0.16	1.00	BL
LEONI Adascar® Sensor 1401	2x0.75	96	0.11	1.20	BL
LEONI Adascar® – PE-X insulation					
LEONI Adascar® Sensor 810	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 820	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 811	2x0.5	19	0.19	0.95	BL
LEONI Adascar® – Special cables					
LEONI Adascar® Sensor 1840	3x0.5	19	0.19	1.00	BL
LEONI Adascar® Sensor 1820	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 1810	2x0.35	19	0.16	0.85	BL
LEONI Adascar® Sensor 1310	2x0.25	19	0.13	0.25	NI

Advanced Automotive Special Cables.

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.90	5.40	–	PVC	TPE-U	24.7	–40 to +105
2.40	6.70	–	PVC	TPE-U	13.3	–40 to +105
1.90	6.80	–	PVC	TPE-U	13.3	–40 to +105
1.65	4.30	–	EVA	TPE-U	40.1	–40 to +125
1.65	5.15	–	EVA	TPE-U	40.1	–40 to +125
2.20	6.20	–	EVA	TPE-U	27.1	–40 to +125
1.42	4.00	–	EVA	TPE-U	54.5	–40 to +125
1.45	4.70	–	EVA	TPE-U	54.5	–40 to +125
1.65	4.30	–	EVA	TPE-U	40.1	–40 to +125
1.60	5.00	–	TPE-S	TPE-U	37.1	–40 to +125
1.90	6.20	–	TPE-S	TPE-U	24.7	–40 to +125
1.50	6.20	–	TPE-S	TPE-U	37.1	–40 to +125
1.50	6.20	–	TPE-S	TPE-U	37.1	–40 to +125
1.80	6.20	–	TPE-S	TPE-U	24.7	–40 to +125
1.65	4.30	–	XLPE	TPE-U	40.1	–40 to +125
2.20	6.20	–	XLPE	TPE-U	27.1	–40 to +125
1.70	5.00	–	XLPE	TPE-U	37.4	–40 to +125
1.65	5.10	–	ETFE	TPE-U	37.1	–40 to +150
1.80	5.00	–	ETFE	TPE-U	27.1	–40 to +150
1.35	4.00	–	ETFE	TPE-U	56.0	–40 to +150
0.95	5.15	–	PFA	TPE-U	84.8	–60 to +125

LEONI
Environmental management

For us, business success with ecological responsibility is not a contradiction in terms. As a globally active producer we acknowledge our co-responsibility in protecting the world's natural resources and basis of life. It is our objective to strike a harmony between nature's needs and our company's interests. As such, environmental protection is an intrinsic element of our corporate activities. We motivate our contractual partners to follow environmental guidelines that are equivalent to our own and advise our customers on how to use and dispose our products in an environmentally responsible manner.

Our environmental management system is certified as complying with DIN EN ISO 14001, confirming that our environmental policy is effectively implemented.

CERTIFICATE

DQS GmbH

LEONI Kabel Holding GmbH

Environmental Management System.

EN ISO 14001 : 2004

LEONI
Quality management

We are able to satisfy the exceptionally high standards of our customers from the automobile industry. The quality management at all the LEONI Wire and Cable locations throughout the world is certified as complying with ISO 9001:2002; locations producing automotive cables are also certified according to ISO/TS 16949:2002. Our efforts are concentrated on preventive quality assurance involving faultinhibiting instruments such as FMEA or machine and process capability analysis.

We use state-of-the-art systems to continuously measure, monitor and control the diameter and dielectric strength of our cables and wires during the production process. Regular testing of random samples guarantees product compliance with the required limit values. With these tests conducted directly alongside the production line it is possible to respond quickly to any faults.

Product properties are tested in accordance with our customers' own specifications and/or German and international standards. They include:

- **cable and wire behaviour under extreme temperature conditions**
- **functionality after artificial ageing**
- **resistance to fuels, lubricants and environmental influences**
- **resistance of the insulated covering to stretching, abrasion and tearing**
- **mechanical and electrical properties of the conductor**
- **alternate bending strength and resistance to torsion**

Through the combined efforts of these quality assurance activities we are able to continuously optimise our ambitious quality goals.

LEONI news

LEONI worldwide

Our regularly updated information services such as the customer publication "LEONI inTEAM" keep you abreast of recent developments at LEONI and on the market, either by mail or by e-mail. So that we can tailor our choice of topics even more closely to your requirements and interests, we would be delighted to receive your suggestions and comments.

Visit our website
www.leoni-automotive-cables.com

Cable 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.

Here an overview of our production plants of the Automotive Special Cables business unit:

Germany
LEONI Kabel GmbH, Roth

LEONI HighTemp Solutions GmbH, Halver

China
LEONI Cable (Changzhou) Co. Ltd., Changzhou

Poland
LEONI Kabel Polska S.p.z.o.o., Kobierzyce

Mexico
LEONI Cable Mexico S.A. de C.V., Cuauhtémoc

Turkey
LEONI Kablo ve Teknolojileri San. ve Tic. Ltd. Sti., Gemlik

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

LEONI Kabel GmbH
Automotive Special Cables
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