NavalLine®
Cables for naval shipbuilding

The Quality Connection

LEONI

Find out more:

Applications as multifaceted as the ocean.

LEONI solutions for Marine applications

With the market Marine, LEONI provides the customers with all the expertise of a global enterprise, focused on the needs of the shipbuilding industry. With an extensive portfolio of products and services, LEONI will assist you across the entire lifecycle of your projects – worldwide.

As a strong partner, LEONI offers application-specific cables and cable system solutions meeting national and international standards. You can trust in the well-founded sector and product knowledge as well as many years of experience. Innovative quality products, prove and project-related system solutions, as well as highest availability and sustainable service management are matter of course for LEONI.

The LEONI group

LEONI is a global provider of products, solutions and services for energy and data management in the automotive sector and other industries. The value chain encompasses wires, optical fibers, standardised cables, special cables and assembled systems as well as intelligent products and smart services. As an innovation partner and solutions provider, LEONI supports its customers with pronounced development and systems expertise. The market-listed group of companies employs more than 95,000 people in 32 countries and generated consolidated sales of EUR 4.8 billion in 2019.

Further informations www.leoni.com

Cable solutions

for marine / shipbuilding

The new cable generation can also be installed onboard of submarines as they conform to the inside installation regulations.

The outboard cables are available with the previous and the new design. The minimum order quantity is 100 m.

With our NavalLine® products we have specialised in the demands of naval shipbuilding. For instance, along with inboard cables for all naval vessels, we supply laterally and longitudinally waterproof cables for outboard applications on submarines.

Neutral buoyancy and floating trailing and underwater cables or tensile cables with either steel or aramide strain relief elements for rated loads up to several tons as well as coiled cables round off our range for naval shipbuilding. With our NavalLine® products we have specialised in the demands of naval shipbuilding.

We have also available a wide range of cables for land based applications like military vehicles or military safty systems including building installations.

NavalLine®

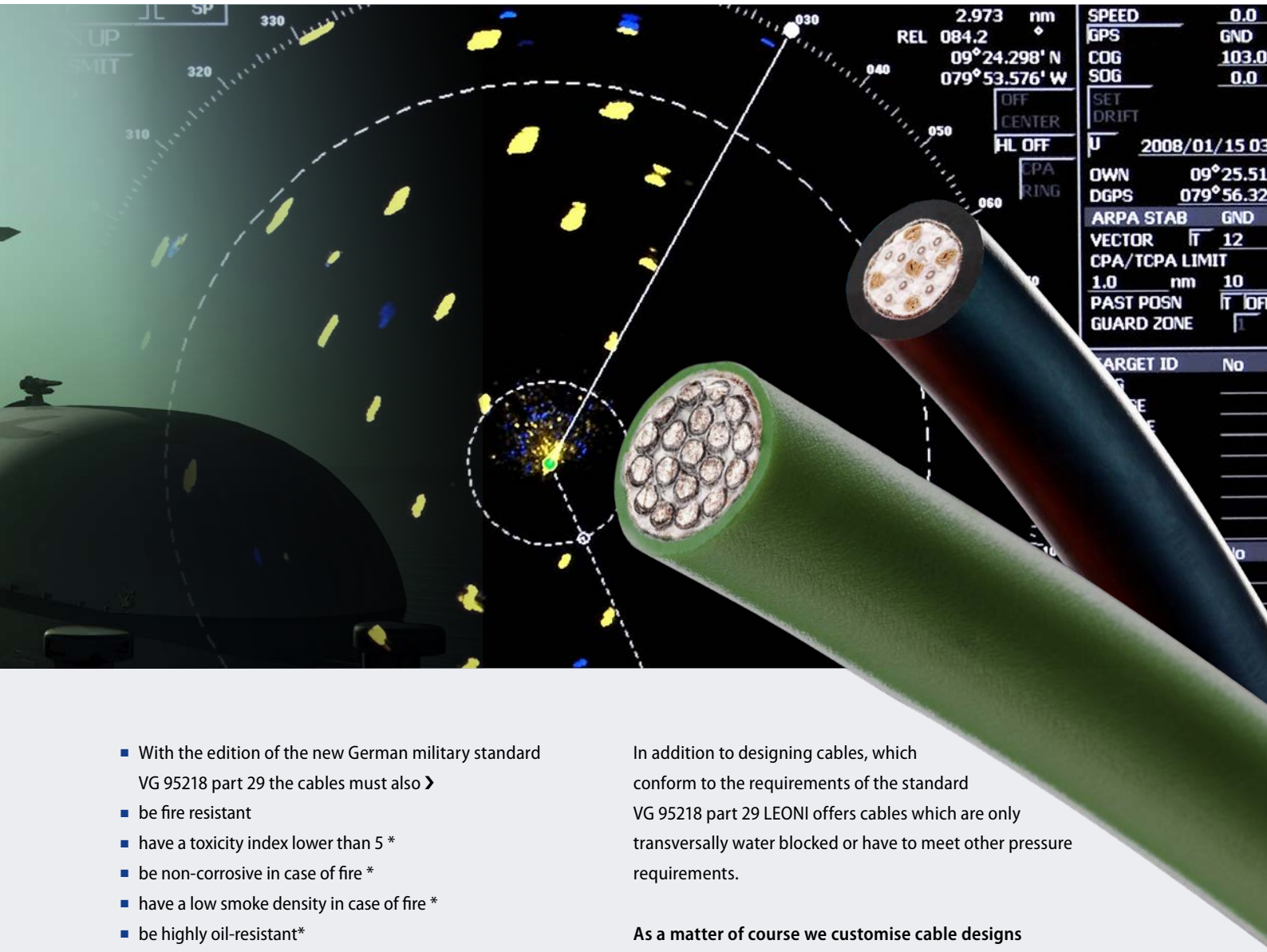
- longitudinally and transversally water blocked cables
- inboard and outboard applicable
- compliant with VG standards everything is done in our own production plants.

As a manufacturer of customised outboard installation cables for naval vessels, LEONI offers, for more than ten years now, a wide range of cables with the following characteristics:

- seawater resistance
- operating lifetime of 20.000 hours
- transversal and/or longitudinal water blocking up to a pressure of 63 bars

The cables are for example installed in submarines operating in

- Germany
- South Africa
- Turkey
- Israel
- Greece
- Korea



- With the edition of the new German military standard VG 95218 part 29 the cables must also ❯
- be fire resistant
- have a toxicity index lower than 5 *
- be non-corrosive in case of fire *
- have a low smoke density in case of fire *
- be highly oil-resistant*

* not valid for cables VG 95218T029 G-M

VG 95218 part 29 defines two different types of outboard cables

- **LWDC**

These cables are transversally water blocked up to a pressure of 100 bars and longitudinally completely water blocked up to a pressure of 63 bars.

- **PLWDC**

These cables are transversally water blocked up to a pressure of 100 bars and longitudinally partially water blocked (all wires are not water blocked) up to a pressure of 63 bars.

longitudinally water blocked

transversally water blocked

In addition to designing cables, which conform to the requirements of the standard VG 95218 part 29 LEONI offers cables which are only transversally water blocked or have to meet other pressure requirements.

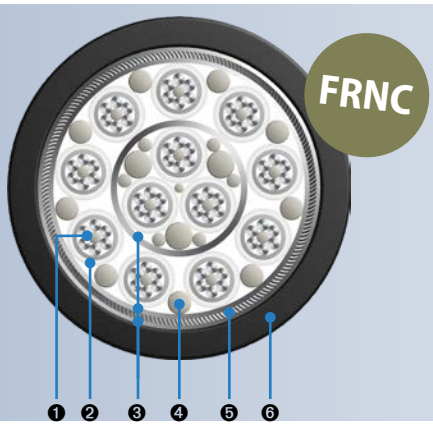
As a matter of course we customise cable designs with various types of wires, conductor number and design, colours and strength members to meet your requirements.

Explanation of cable type description for water blocked cables

P	Partiell	partial
LWD	LängsWasserDicht	longitudinal water blocked
C	Gesamtschirm	overall screen
CC	Paarschirm und Gesamtschirm, elektrisch nicht getrennt	pairscreen and overall screen, electrically not separated
C-C	Paarschirm und Gesamtschirm, elektrisch getrennt	pairscreen and overall screen, electrically separated

Special cable, longitudinally water blocked

acc. to VG 95218 part 29D



HALOGEN FREE

Application & characteristics

Suitable for outside and inside installation on submarines.

Operating temperature › –40 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded wires, water-blocking central element, fine stranded tin-plated copper, water blocking tape

❷ Insulation › special elastomer, white with black printed numbers

❸ Water-blocking tapes

❹ Water-blocking fillers

❺ Outer shielding › copper braid with tin-plated wires

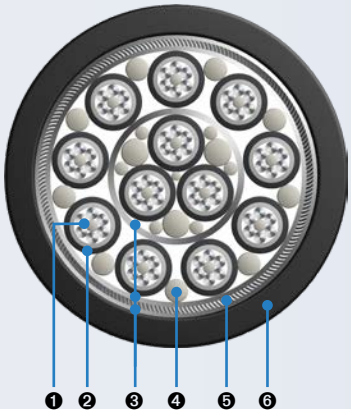
❻ Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29D									
LWDC 2 x 1.5	3.4	2.0	12.6	13.2	200	30	500	VG95218T029D001	**ERK 14036**
LWDC 3 x 1.5	3.4	1.8	13.4	13.8	250	30	500	VG95218T029D002	**ERK 12313**
LWDC 3 G 1.5*	3.4	1.8	13.4	13.8	250	30	500	VG95218T029D003	**ERK 14042**
LWDC 7 x 1.5	3.4	1.5	15.7	16.2	430	30	500	VG95218T029D004	**ERK 14044**
LWDC 4 x 2 x 0.75	2.5	2.0	20.6	21.2	560	30	500	VG95218T029D005	**ERK 12907**
LWDC 12 x 0.75	2.5	2.0	18.5	19.1	540	30	500	VG95218T029D006	**ERK 14051**
LWDC 12 x 1.5	3.4	2.0	20.9	21.5	700	30	500	VG95218T029D007	**ERK 14046**
LWDC 24 x 1.5	3.4	2.0	28.1	28.7	1,230	30	500	VG95218T029D008	**ERK 14049**
LWDC 3 x 2 x 0.75	2.5	2.4	17.2	17.8	370	30	500	VG95218T029D009	**ERK 023271**
LWDC 3 x 0.75	2.5	2.1	10.7	11.3	170	30	500	VG95218T029D010	**ERK 023270**
LWDC 7 x 2 x 0.75	2.5	2.5	20.7	21.3	600	30	500	VG95218T029D011	**ERK 023272**
LWDC 9 x 2 x 0.75	2.5	2.8	24.7	25.3	790	30	500	VG95218T029D012	**ERK 023273**
LWDC 19 x 2 x 0.75	2.5	3.1	32.2	32.8	1300	30	500	VG95218T029D013	**ERK 023636**
LWDC 4 x 1.5	3.4	2.2	13.7	14.4	270	30	500	VG95218T029D014	**ERK 023275**
LWDC 4 x 4	4.7	2.2	16.7	17.3	450	30	500	VG95218T029D015	**ERK 023276**
LWDC 4 x 0.5	2.2	1.5	9.7	10.3	150	30	500	VG95218T029D016	**ERK 015084**

* G: one green/yellow core

Special cable, longitudinally water blocked

acc. to VG 95218 part 29J



HALOGEN FREE

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature › –50 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded wires, water-blocking central element, fine stranded tin-plated copper, water blocking tape

❷ Insulation › special elastomer, black with white printed numbers

❸ Water-blocking tapes

❹ Water-blocking fillers

❺ Outer shielding › copper braid with tin-plated wires

❻ Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	**Order no.**
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29J									
LWDC 2 x 1.5	3.4	2.0	12.6	13.2	200	30	500	VG95218T029J001	**ERK 8136**
LWDC 3 x 1.5	3.4	1.8	13.4	13.8	250	30	500	VG95218T029J002	**ERK 022708**
LWDC 3 G 1.5*	3.4	1.8	13.4	13.8	250	30	500	VG95218T029J003	**ERK 8172**
LWDC 7 x 1.5	3.4	2.0	17.0	17.6	430	30	500	VG95218T029J004	**ERK 021538**
LWDC 4 x 2 x 0.75	2.5	2.0	18.7	19.3	390	30	500	VG95218T029J005	**ERK 8219**
LWDC 12 x 0.75	2.5	2.0	18.5	19.1	540	30	500	VG95218T029J006	**ERK 8256**
LWDC 12 x 1.5	3.4	2.0	21.2	21.8	700	30	500	VG95218T029J007	**ERK 6078**
LWDC 24 x 1.5	3.4	2.0	28.7	29.3	1,230	30	500	VG95218T029J008	**ERK 6339**

Special cable, longitudinally water blocked

acc. to VG 95218 part 29M

acc. to VG 95218 part 29N

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature › –50 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded wires, water-blocking central element, fine stranded tin-plated copper, water blocking tape

❷ Insulation › special elastomer, black/blue

❸ Water-blocking fillers

❹ Water-blocking tape

❺ Sheath › polyurethane, flame retardant, black

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature › –50 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded wires, water-blocking central element, fine stranded tin-plated copper, water blocking tape

❷ Insulation › special elastomer, black/blue

❸ Water-blocking fillers

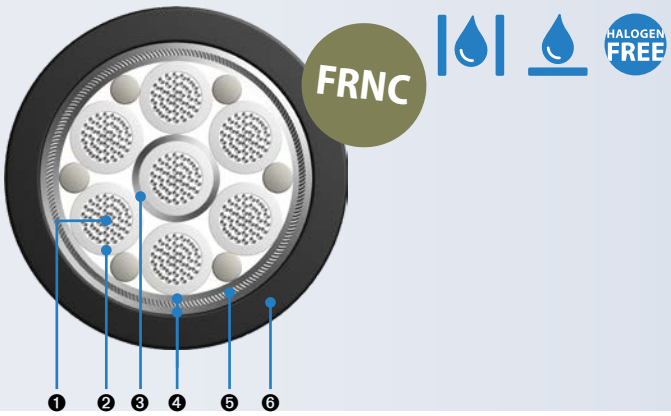
❹ Water-blocking tape

❺ Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	**Order no.**
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29M									
LWD 2 x 1.5	3.4	1.4	9.8	10.2	120	–	500	VG95218T029M001	**ERK 023487**
acc. to VG 95218 part 29N									
LWD 2 x 1.5	3.4	1.4	9.8	10.2	120	–	500	VG95218T029N001	**ERK 020133**
LWD 2 x 1.5	3.4	1.7	10.5	11.1	???	–	500	VG95218T029N002	**ERK 028712**

Special cable, partially longitudinally water blocked

acc. to VG 95218 part 29B and C



Application & characteristics

Suitable for outside and inside installation on submarines.

Operating temperature › –40 °C up to +90 °C

Construction

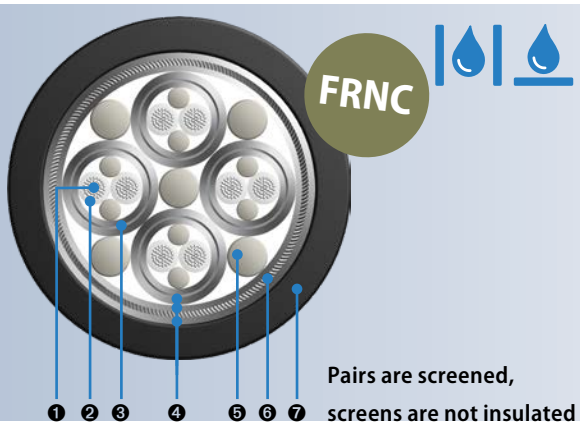
1. Core › conductor with fine stranded tin-plated copper
2. Insulation › special elastomer, white with black printed numbers
3. Water-blocking tapes
4. Water-blocking tapes
5. Outer shielding › copper braid with tin-plated wires
6. Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29B and C									
PLWDC 1 x 35	11.3	2.0	17.0	17.5	680	30	600	VG95218T029B001	**ERK 14090**
PLWDC 1 x 120	21.6	2.0	28.7	29.3	2,000	30	600	VG95218T029B002	**ERK 14091**
PLWDC 1 x 185	25.3	2.0	31.9	32.5	2,900	30	600	VG95218T029B003	**ERK 14093**
PLWDC 1 x 240	29.8	2.0	35.3	35.9	4,050	30	600	VG95218T029B004	**ERK 14097**
PLWDC 2 x 1.5	2.4	1.5	9.4	10.0	150	30	500	VG95218T029C001	**ERK 14055**
PLWDC 3 x 1.5	2.4	1.5	9.7	10.3	160	30	500	VG95218T029C002	**ERK 14056**
PLWDC 3 G 1.5*	2.4	1.5	9.7	10.3	160	30	500	VG95218T029C003	**ERK 14057**
PLWDC 4 x 0.5	1.5	1.5	9.5	9.7	140	30	500	VG95218T029C004	**ERK 14602**
PLWDC 4 x 1.0	2.2	1.8	10.0	10.6	175	30	500	VG95218T029C005	**ERK 12261**
PLWDC 4 x 6 + 2 x 1.0	5.2/2.2	2.0	18.7	19.3	785	30	500	VG95218T029C006	**ERK 14071**
PLWDC 7x 1.5	2.4	1.5	11.6	12.2	250	30	500	VG95218T029C007	**ERK 14060**
PLWDC 4 x 2 x 0.75	1.9	1.8	14.3	14.9	275	30	500	VG95218T029C008	**ERK 12265**
PLWDC 12 x 1.5	2.4	1.8	15.1	15.7	425	30	500	VG95218T029C009	**ERK 14061**
PLWDC 8 x 2 x 0.75	1.9	1.8	16.9	17.5	420	30	500	VG95218T029C010	**ERK 14069**
PLWDC 24 x 1.5	2.4	2.5	21.5	22.1	835	30	500	VG95218T029C011	**ERK 14065**
PLWDC 37 x 0.75	1.9	2.0	18.3	18.9	650	30	500	VG95218T029C012	**ERK 14066**
PLWDC 27 x 2 x 0.38	1.35	2.0	22.0	22.6	630	30	500	VG95218T029C013	**ERK 14081**
PLWDC 19 x 6	5.2	2.5	32.5	33.0	1,800	30	500	VG95218T029C014	**ERK 14324**
PLWDC 4 x 0.5	1.5	0.5	6.0	6.2	65	30	500	VG95218T029C015	**ERK 14173**
PLWDC 2 x 0.75	1.9	1.3	7.8	8.2	96	30	500	VG95218T029C016	**ERK 014605**
PLWDC 2 x 6.0	5.2	2.0	16.8	17.4	410	30	500	VG95218T029C017	**ERK 014648**
PLWDC 5 x 1.5	2.4	1.5	11.3	11.8	230	30	500	VG95218T029C018	**ERK 014949**
PLWDC 5G 1.5*	2.4	1.5	11.3	11.8	230	30	500	VG95218T029C019	**ERK 015259**
PLWDC 10 x 2 x 0.75	1.9	2.0	21.2	21.8	600	30	500	VG95218T029C020	**ERK 014741**
PLWDC 3 x 0.75	1.9	1.3	8.0	8.4	110	30	500	VG95218T029C021	**ERK 014808**

* G: one green/yellow core

Special cable, longitudinally water blocked

acc. to VG 95218 part 29E



Pairs are screened, screens are not insulated

Application & characteristics

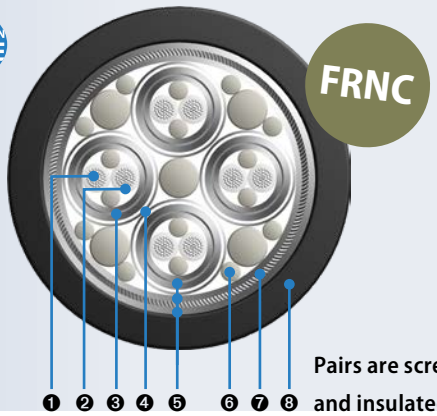
Suitable for outside and inside installation on submarines.

Operating temperature › –40 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded tin-plated copper
❷ Insulation › special elastomer, white with black printed numbers
❸ Pair shielding › copper braid with tin-plated wires
❹ Water-blocking tapes
❺ Water-blocking fillers
❻ Outer shielding › copper braid with tin-plated wires
❼ Sheath › cross-linked, flame retardant, black

acc. to VG 95218 part 29F



Pairs are screened and insulated

Application & characteristics

Suitable for outside and inside installation on submarines.

Operating temperature › –40 °C up to +90 °C

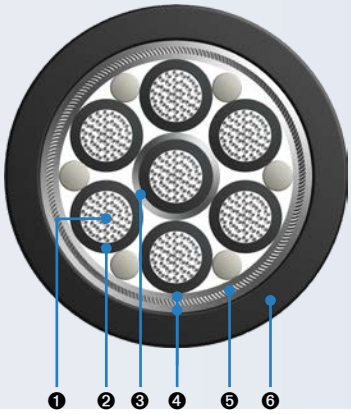
Construction

❶ Core › conductor with fine stranded tin-plated copper
❷ Insulation › special elastomer, white with black printed numbers
❸ Pair shielding › copper braid with tin-plated wires
❹ Inner covering › special elastomer
❺ Water-blocking tapes
❻ Water-blocking fillers
❼ Outer shielding › copper braid with tin-plated wires
❽ Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29E									
PLWDCC 4 x 2 x 0.75	1.9	1.7	17.8	18.4	430	15	500	VG95218T029E001	**ERK 014647**
PLWDCC 8 x 2 x 0.75	1.9	2.0	22.1	22.7	720	15	500	VG95218T029E002	**ERK 015249**
PLWDCC 10 x 2 x 0.75	1.9	2.0	26.3	26.9	900	15	500	VG95218T029E003	**ERK 015252**
PLWDCC 27 x 2 x 0.38	1.3	2.5	34.1	34.7	1,500	15	500	VG95218T029E004	**ERK 015267**
PLWDCC 7 x 2 x 0.75	1.9	2.0	19.8	20.4	650	15	500	VG95218T029E005	**ERK 015025**
acc. to VG 95218 part 29F									
PLWDC-C 4 x 2 x 0.75	1.9	2.0	20.5	20.9	530	15	500	VG95218T029F001	**ERK 015253**
PLWDC-C 8 x 2 x 0.75	1.9	2.0	26.1	26.5	880	15	500	VG95218T029F002	**ERK 015254**
PLWDC-C 10 x 2 x 0.75	1.9	2.0	32.3	32.9	1,350	15	500	VG952180T29F003	**ERK 015257**
PLWDC-C 27 x 2 x 0.38	1.3	3.0	42.1	42.7	1,800	15	500	VG952180T29F004	**ERK 015266**
PLWDC-C 12 x 2 x 0.38	1.9	2.0	30.6	31.2	1,190	15	500	VG952180T29F005	**ERK 014950**
PLWDC-C 2 x 2 x 0.75	1.9	2.0	17.7	18.3	540	15	500	VG95218T029F006	**ERK 023637**

Special cable, partially longitudinally water blocked

acc. to VG 95218 part 29G and H



HALOGEN FREE

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature ❯ –50 °C up to +90 °C

Construction

❶ Core ❯ conductor with fine stranded tin-plated copper

❷ Insulation ❯ special elastomer, black with white printed numbers

❸ Water-blocking tapes

❹ Water-blocking fillers

❺ Outer shielding ❯ copper braid with tin-plated wires

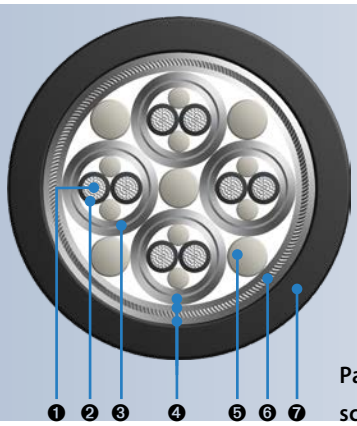
❻ Sheath ❯ polyurethane, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29G and H									
PLWDC 1 x 35	11.3	2.0	17.0	17.5	680	30	600/900	VG95218T029G001	**ERK 019361**
PLWDC 1 x 120	21.6	2.0	28.7	29.3	2,000	30	600/900	VG95218T029G002	**ERK 019358**
PLWDC 1 x 185	25.3	2.0	31.9	32.5	2,900	30	600/900	VG95218T029G003	**ERK 023045**
PLWDC 1 x 240	29.8	2.0	35.0	36.5	4,050	30	600/900	VG95218T029G004	**ERK 019360**
PLWDC 2 x 1.5	2.4	2.2	10.4	11.0	150	30	500	VG95218T029H001	**ERK 019367**
PLWDC 3 x 1.5	2.4	2.0	10.8	11.2	170	30	500	VG95218T029H002	**ERK 019370**
PLWDC 3 G 1.5*	2.4	2.0	10.8	11.2	170	30	500	VG95218T029H003	**ERK 015666**
PLWDC 4 x 0.5	1.5	2.0	9.3	9.7	140	30	500	VG95218T029H004	**ERK 019388**
PLWDC 4 x 1.0	2.2	1.8	10.0	10.6	175	30	500	VG95218T029H005	**ERK 6422**
PLWDC 4 x 6 + 2 x 1.0	5.2/2.2	2.0	18.7	19.3	785	30	500	VG95218T029H006	**EHRK 6424**
PLWDC 7x 1.5	2.4	2.0	13.3	13.7	280	30	500	VG95218T029H007	**ERK 019387**
PLWDC 4 x 2 x 0.75	1.9	1.8	14.8	15.2	275	30	500	VG95218T029H008	**ERK 019371**
PLWDC 12 x 1.5	2.4	1.8	16.2	16.6	425	30	500	VG95218T029H009	**ERK 019363**
PLWDC 8 x 2 x 0.75	1.9	1.8	16.9	17.5	415	30	500	VG95218T029H010	**ERK 019374**
PLWDC 24 x 1.5	2.4	2.0	20.8	21.4	835	30	500	VG95218T029H011	**ERK 019385**
PLWDC 37 x 0.75	1.9	1.5	18.3	18.9	650	30	500	VG95218T029H012	**ERK 019386**
PLWDC 27 x 2 x 0.38	1.35	1.5	22.0	22.6	630	30	500	VG95218T029H013	**ERK 6499**
PLWDC 19 x 6	5.2	2.5	33.0	33.5	1,800	30	500	VG95218T029H014	**ERK 5870**
PLWDC 4 x 0.5	1.5	0.5	6.0	6.4	70	30	500	VG95218T029H015	**ERK 019372**
PLWDC 2 x 0.75	1.9	1.3	7.8	8.2	96	30	500	VG 95218T29H016	**ERK 020197**
PLWDC 2 x 6.0	5.2	2.0	16.8	17.4	410	30	500	VG 95218T29H017	**ERK 014089**
PLWDC 5 x 1.5	2.4	1.8	11.6	12.0	230	30	500	VG 95218T29H018	**ERK 019373**
PLWDC 5G 1.5*	2.4	1.8	11.6	12.0	230	30	500	VG 95218T29H019	**ERK 022700**
PLWDC 10 x 2 x 0.75	1.9	2.0	21.9	22.5	600	30	500	VG 95218T29H020	**ERK 020607**
PLWDC 3 x 0.75	1.9	1.3	8.0	8.4	110	30	500	VG 95218T29H021	**ERK 022702**
PLWDC 4 x 6	5.2	2.0	18.7	19.3	785	30	500	VG95218T029H022	**ERK 022704**
PLWDC 14 x 2 x 0.75	1.9	2.0	24.3	24.9	820	30	500	VG95218Z029H023	**ERK 22706**

* G: one green/yellow core

Special cable, partially longitudinally water blocked

acc. to VG 95218 part 29K



Pairs are screened, screens are not insulated

acc. to VG 95218 part 29L

Pairs are screened and insulated

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature › –50 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded tin-plated copper

❷ Insulation › special elastomer, black with white printed numbers

❸ Pair shielding › copper braid with tin-plated wires

❹ **Water-blocking tapes**

❺ **Water-blocking fillers**

❻ Outer shielding › copper braid with tin-plated wires

❼ Sheath › polyurethane, flame retardant, black

Application & characteristics

Suitable for outside installation on submarines.

Suitable for fixed installation and installation in flexible chains.

Operating temperature › –50 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded tin-plated copper

❷ Insulation › special elastomer, black with white printed numbers

❸ Pair shielding › copper braid with tin-plated wires

❹ Inner covering › special elastomer

❺ **Water-blocking tapes**

❻ **Water-blocking fillers**

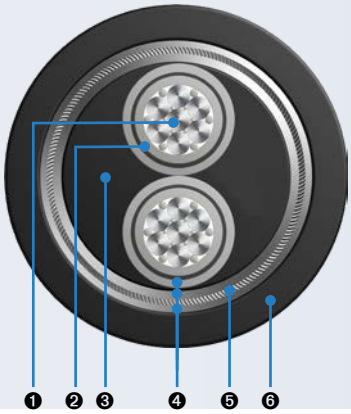
❼ Outer shielding › copper braid with tin-plated wires

❽ Sheath › polyurethane, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 29K									
PLWDCC 4 x 2 x 0.75	1.9	1.7	17.2	17.8	430	15	500	VG95218T029K001	**ERK 7778**
PLWDCC 8 x 2 x 0.75	1.9	2.0	22.1	22.7	720	15	500	VG95218T029K002	**ERK 6607**
PLWDCC 10 x 2 x 0.75	1.9	2.0	26.3	26.9	900	15	500	VG95218T029K003	**ERK 6657**
PLWDCC 27 x 2 x 0.38	1.3	2.5	34.1	34.7	1,500	15	500	VG95218T029K004	**ERK 6770**
PLWDCC 7 x 2 x 0.75	1.9	2.0	19.8	20.4	650	15	500	VG95218T029K005	**ERK 022197**
PLWDCC 14 x 2 x 0.75	1.9	3.0	30.7	31.3	1,200	15	500	VG95218T029K006	**ERK 023573**
acc. to VG 95218 part 29L									
PLWDC-C 4 x 2 x 0.75	1.9	2.0	20.5	21.1	530	15	500	VG95218T029L001	**ERK 019382**
PLWDC-C 8 x 2 x 0.75	1.9	2.0	22.7	23.3	680	15	500	VG95218T029L002	**ERK 021062**
PLWDC-C 10 x 2 x 0.75	1.9	2.0	32.3	32.9	1,350	15	500	VG95218T029L003	**ERK 021299**
PLWDC-C 27 x 2 x 0.38	1.3	3.0	42.1	42.7	1,800	15	500	VG95218T029L004	**ERK 021563**
PLWDC-C 12 x 2 x 0.38	1.9	2.0	30.6	31.2	1,190	15	500	VG95218T029L005	**ERK 11402**
PLWDC-C 2 x 2 x 0.75	1.9	1.8	17.5	18.1	330	15	500	VG95218T029L006	**ERK 021580**
PLWDC-C 14 x 2 x 0.75	1.9	3.0	36.5	37.5	1,600	15	500	VG95218T029L007	**ERK 023533**

Special cable, water blocked

acc. to further requirements



Application & characteristics

Suitable for outside and inside installation on submarines.

Operating temperature › –40 °C up to +90 °C

Construction

❶ Core › conductor with fine stranded wires, water-blocking central element, stranded copper

❷ Insulation › **water blocking tape,** special elastomer, black with white print 1–2

❸ **Water-blocking filling compound**

❹ **Water-blocking tapes**

❺ Outer shielding › copper braid with tin-plated wires

❻ Sheath › cross-linked, flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	**Order no.**
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to further requirements									
LWDC 2 x 10 fix	5.9	2.0	20.3	21.5	650	100	500	–	**ERK 013218**

Comparison list

for LEONI's water blocked cables

Type description	Existing LEONI elocab design numbers (not VG approval)	New LEONI elocab design numbers	VG Order no.	New LEONI elocab design numbers	VG Order no.
	Polyurethane sheath orange	VG approved polyurethane sheath black		VG approved cross–linked sheath halogen free	
PLWDC 1 x 35	ERK 8314	ERK 019361	VG95218T029G001	ERK 14090	VG95218T029B001
PLWDC 1 x 120	ERK 5129	ERK 019358	VG95218T029G002	ERK 14091	VG95218T029B002
PLWDC 1 x 185	ERK 5300	ERK 023045	VG95218T029G003	ERK 14093	VG95218T029B003
PLWDC 1 x 240	ERK 8315	ERK 019360	VG95218T029G004	ERK 14097	VG95218T029B004
PLWDC 2 x 1.5	ERK 5131	ERK 019367	VG95218T029H001	ERK 14055	VG95218T029C001
PLWDC 3 x 1.5	ERK 5000	ERK 019370	VG95218T029H002	ERK 14056	VG95218T029C002
PLWDC 3 G 1.5	–	ERK 015666	VG95218T029H003	ERK 14057	VG95218T029C003
PLWDC 4 x 0.5	ERK 5512	ERK 019388	VG95218T029H004	ERK 14602	VG95218T029C004
PLWDC 4 x 1.0	ERK 6353	ERK 6422	VG95218T029H005	ERK 12261	VG95218T029C005
PLWDC 4 x 6 + 2 x 1	ERK 5149	EHRK 6424	VG95218T029H006	ERK 14071	VG95218T029C006
PLWDC 7 x 1.5	ERK 5044	ERK 019387	VG95218T029H007	ERK 14060	VG95218T029C007
PLWDC 4 x 2 x 0.75	ERK 6054	ERK 019371	VG95218T029H008	ERK 12265	VG95218T029C008
PLWDC 12 x 1.5	ERK 5045	ERK 019363	VG95218T029H009	ERK 14061	VG95218T029C009
PLWDC 8 x 2 x 0.75	ERK 6242	ERK 019374	VG95218T029H010	ERK 14069	VG95218T029C010
PLWDC 24 x 1.5	ERK 5046	ERK 019385	VG95218T029H011	ERK 14065	VG95218T029C011
PLWDC 37 x 0.75	ERK 5004	ERK 019386	VG95218T029H012	ERK 14066	VG95218T029C012
PLWDC 27 x 2 x 0.38	ERK 5299	ERK 6499	VG95218T029H013	ERK 14081	VG95218T029C013
PLWDC 19 x 6.0	ERK 5882	ERK 5870	VG95218T029H014	ERK 14324	VG95218T029C014
PLWDC 4 x 0.5	ERK 5163	ERK 019372	VG95218T029H015	ERK 14173	VG95218T029C015
PLWDC 2 x 0.75	ERK 8978	ERK 020197	VG95218T029H016	ERK 014605	VG95218T029C016
PLWDC 2 x 6.0	ERK13778	ERK 014089	VG95218T029H017	ERK 014648	VG95218T029C017
PLWDC 5 x 1.5	ERK 8313	ERK 019373	VG95218T029H018	ERK 014949	VG95218T029C018
PLWDC 5 G 1.5	ERK 022701	ERK 022700	VG95218T029H019	ERK 015259	VG95218T029C019
PLWDC 10 x 2 x 0.75	ERK 11704	ERK 020607	VG95218T029H020	ERK 014741	VG95218T029C020
PLWDC 3 x 0.75	ERK 022703	ERK 022702	VG95218T029H021	ERK 014808	VG95218T029C021
PLWDC 4 x 6	ERK 022705	ERK 022704	VG95218T029H022	–	–
PLWDC 14 x 2 x 0.75	ERK 022707	ERK 22706	VG95218T029H023	–	–
LWDC 2 x 1.5	ERK 8143	ERK 8136	VG95218T029J001	ERK 14036	VG95218T029D001
LWDC 3 x 1.5	ERK 6093	ERK 022708	VG95218T029J002	ERK 12313	VG95218T029D002
LWDC 3 G 1.5	ERK 8175	ERK 8172	VG95218T029J003	ERK 14042	VG95218T029D003
LWDC 7 x 1.5	ERK 6048	ERK 021538	VG95218T029J004	ERK 14044	VG95218T029D004
LWDC 4 x 2 x 0.75	ERK 8219	ERK 8219	VG95218T029J005	ERK 012907	VG95218T029D005
LWDC 12 x 0.75	ERK 8297	ERK 8256	VG95218T029J006	ERK 014051	VG95218T029D006
LWDC 12 x 1.5	ERK 6214	ERK 6078	VG95218T029J007	ERK 14046	VG95218T029D007
LWDC 24 x 1.5	ERK 6298	ERK 6339	VG95218T029J008	ERK 14049	VG95218T029D008
LWDC 3 x 2 x 0.75	–	–	–	ERK 023271	VG95218T029D009
LWDC 3 x 0.75	–	–	–	ERK 023270	VG95218T029D010
LWDC 7 x 2 x 0.75	–	–	–	ERK 023272	VG95218T029D011
LWDC 9 x 2 x 0.75	–	–	–	ERK 023273	VG95218T029D012
LWDC 19 x 2 x 0.75	–	–	–	ERK 023636	VG95218T029D013
LWDC 4 x 1.5	–	–	–	ERK 023275	VG95218T029D014
LWDC 4 x 4	–	–	–	ERK 023276	VG95218T029D015
LWDC 4 x 0.5	–	–	–	ERK 015084	VG95218T029D016
PLWDCC 4 x 2 x 0.75	ERK 7800	ERK 7778	VG95218T029K001	ERK 014647	VG95218T029E001
PLWDCC 8 x 2 x 0.75	ERK 6610	ERK 6607	VG95218T029K002	ERK 015249	VG95218T029E002
PLWDCC 10 x 2 x 0.75	ERK 6761	ERK 6657	VG95218T029K003	ERK 015252	VG95218T029E003
PLWDCC 27 x 2 x 0.38	ERK 6771	ERK 6770	VG95218T029K004	ERK 015267	VG95218T029E004
PLWDCC 7 x 2 x 0.75	ERK 7799	ERK 022197	VG95218T029K005	ERK 015025	VG95218T029E005
PLWDCC 14 x 2 x 0.75	–	ERK 023573	VG95218T029K006	–	–
PLWDC-C 4 x 2 x 0.75	ERK 019583	ERK 019258	VG95218T029L001	ERK 015253	VG95218T029F001
PLWDC-C 8 x 2 x 0.75	ERK 021064	ERK 021062	VG95218T029L002	ERK 015254	VG95218T029F002
PLWDC-C 10 x 2 x 0.75	ERK 021545	ERK 021299	VG95218T029L003	ERK 015257	VG95218T029F003
PLWDC-C 27 x 2 x 0.38	ERK 021564	ERK 021563	VG95218T029L004	ERK 015266	VG95218T029F004
PLWDC-C 12 x 2 x 0.38	ERK 011401	ERK 11402	VG95218T029L005	ERK 014950	VG95218T029F005
PLWDC-C 2 x 2 x 0.75	ERK 021739	ERK 021580	VG95218T029L006	ERK 023637	VG95218T029F006
PLWDC-C 14 x 2 x 0.75	–	ERK 023533	VG95218T029L007	–	–
LWD 2 x 1.5	ERK 023488	ERK 023487	VG95218T029M001	–	–
LWD 2 x 1.5	–	–	–	ERK 020133	VG95218T029N001
LWD 2 x 1.5	–	–	–	ERK 028712	VG95218T029N002

Data cable Cat. 7

acc. to VG 95218 part 31D

Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Operating temperature › –33 °C up to +85 °C

Construction

❶ Core › conductor with fine stranded wires,

❷ Insulation › special elastomer,
WH/BU, WH/BN, WH/GN, WH/OR

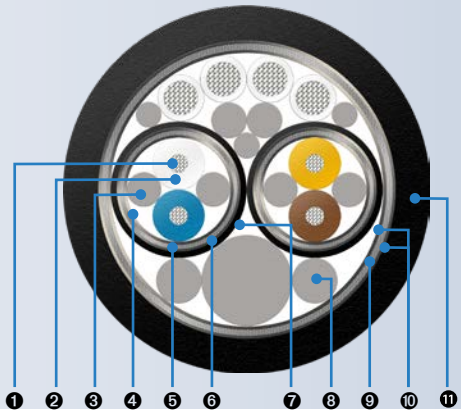
❸ Pair shielding › aluminated foil

❹ Outer shielding › copper braid with tin-plated wires

❺ Sheath › flame retardant, black

Data cable

acc. to VG 95218 part 31X



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Operating temperature › –33 °C up to +85 °C

Construction

❶ Core › conductor with fine stranded wires,

❷ Insulation › special elastomer,

❸ Filler

❹ Screening foil

❺ Shielding › copper braid with tin-plated wires

❻ Inner covering

❼ Binder

❽ Filler

❾ Screening braid

❿ Binder

⓫ Sheath › flame retardant, black

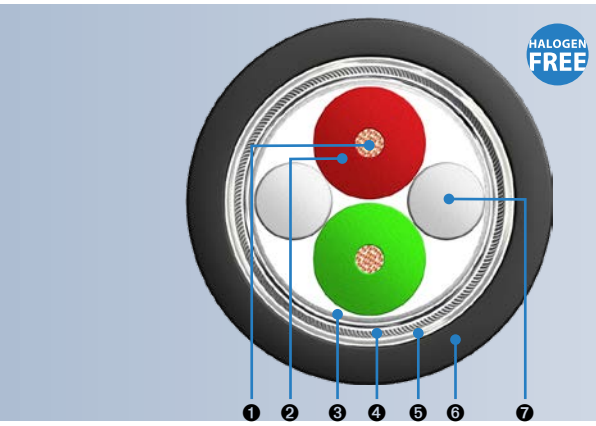
Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 31D									
Cat 7 4 x 2 x 0.27	0.7	0.8	8.3	8.8	120	15	125	VG 95218 T031D001	**ERK 020654**
Cat 7 4 x 2 x 0.355	0.8	1.3	10.6	11.0	150	30	125	VG 95218 T031D002	**ERK 017466**
acc. to VG 95218 part 31X									
Hybrid cable	2.25 2.15	1.5	15.4	16.2	396	30	125 * 600/900 **	VG 95218T031X001	**ERK 025309**

*data pairs

** power cores

Data cable PROFIBUS DP

acc. to VG 95218 part 31F



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

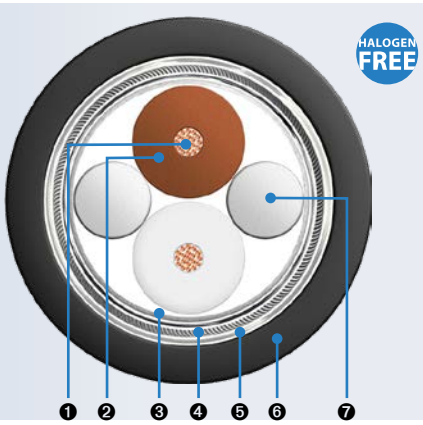
Operating temperature › –33 °C up to +85 °C

Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer, RD, GN
❸ Tape › plastic foil
❹ Outer shielding › copper braid with tin-plated wires
❺ Tape › plastic foil
❻ Sheath ›flame retardant, black
❼ Filler

Data cable CAN-Bus

acc. to VG 95218 part 31H



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Operating temperature › –33 °C up to +85 °C

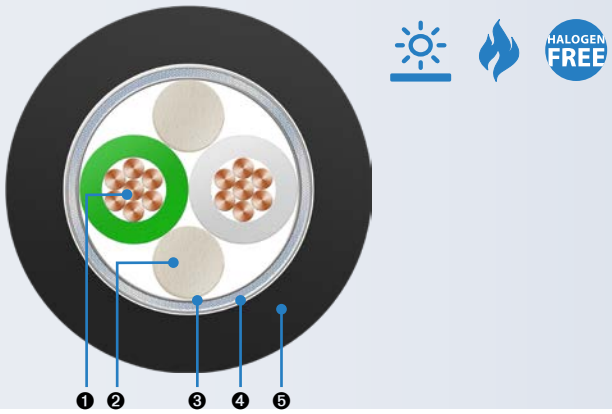
Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer, WH, BN
❸ Tape › plastic foil
❹ Outer shielding › copper braid with tin-plated wires
❺ Tape › plastic foil
❻ Sheath ›flame retardant, black
❼ Filler

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 31F									
PROFIBUS 2x0.35	3.1	1.3	9.6	10.0	110	15	125	VG 95218 T031F001	**ERK 017460**
PROFIBUS 2x0.35	2.8	1.3	9.0	9.4	110	20	125	VG 95218 T031F002	**ERK 20657**
acc. to VG 95218 part 31H									
CAN-Bus 2 x 0.34	2.18	1.3	7.6	8.0	90	15	125	VG 95218 T031H001	**ERK 017461**
CAN-Bus 2 x 0.34	2.15	1.3	7.6	8.0	90	15	125	VG 95218 T031H002	**ERK 020658**
CAN-Bus 2 x 0.5	2.35	1.08	7.6	8.2	83	25	125	VG 95218 T031H003	**ERK 020659**

Thermo-compensaiting cable

acc. to VG 95218-7 type D



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Operating temperature (Type D) › –40 °C up to +90 °C

Operating temperature (Type F) › –46 °C up to +85 °C

Construction

❶ Core › conductor with stranded wires

❷ Filler

❸ Wrapping

❹ Screening braid

❺ Sheat › flame retardant, black

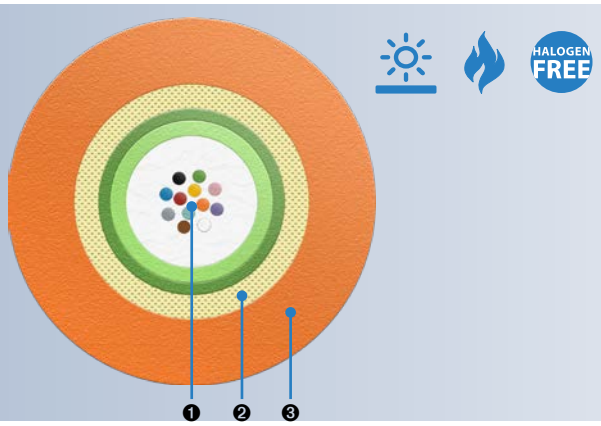
Fire performance

Flame retardancy	IEC 60332-1-2 and IEC 60332-3-22
Smoke density	Cat. C
Absence of halogen	IEC 61034
Acidity of combustion	IEC 60754-1
gases	IEC 60754-2

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 31D									
2 x 0.34	0.8	0.8	4.9	5.3	42	30	450	VG95218T007D001	**ERK 025343**
2 x 0.5	1.0	0.9	5.5	5.9	52	30	450	VG95218T007D002	**ERK 025344**
2 x 0.75	1.2	1.0	5.9	6.3	62	30	450	VG95218T007D003	**ERK 025345**
2 x 1.0	1.4	1.0	6.6	7.0	77	30	450	VG95218T007D004	**ERK 025346**
2 x 1.5	1.7	1.1	7.2	7.6	93	30	450	VG95218T007D005	**ERK 025347**

FiberConnect® Central loose tube cable

acc. to VG 95218-30 type A



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Construction

❶ Central loose tube with 24 fibers

❷ Strain relief elements (Aramid) stranded around the loose tube

❸ Sheath, flame-retardant material

Thermal properties

Transport/storage	– 33 °C to + 85 °C
Installation	– 15 °C to + 50 °C
Operating temperature	– 33 °C to + 85 °C

Mechanical properties

Min. bending radius	static	20 × outer diameter
	dynamic	25 × outer diameter
Max. crush resistance		2000 N/dm
Max. tensile force		2000 N

Fire performance

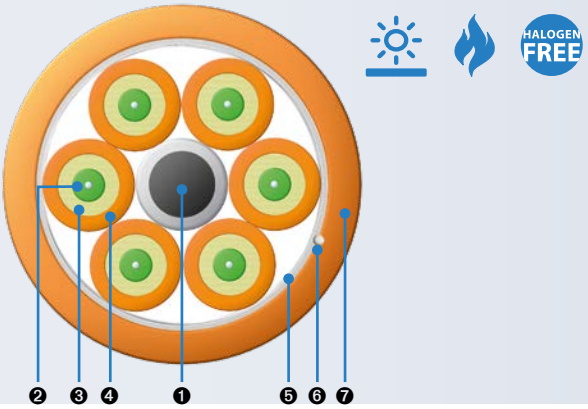
Flame retardancy	IEC 60332-1-2
Smoke density	IEC 61034
Absence of halogen	IEC 60754-1
Acidity of combustion gases	IEC 60754-2

No. of optical fibers	No. of loose tubes	Ø of the loose tube d1 max.	Outer sheath wall thickness min.	Cable Ø d2 min.	Cable Ø d2 max.	Mass max.	VG part no.	Order no.
		mm	mm	mm	mm	kg/km		
acc. to VG 95218-30 type A								
24	1	4.5	2.0	9.5	12.5	200	VG 95218 T030A01*	**8406512F#222**

The dash no. is to be completed with the fiber type acc. to the table on page 21

FiberConnect® **Breakout cable** with central strength member

acc. to VG 95218-30 type B



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Construction

❶ FRP central strength member in the core

❷ Over that stranding of certain number of single cable elements each consisting of a tight buffered fiber (TB900L)

❸ Non-metallic strain relief elements (Aramid)

❹ Halogen free, flame retardant subcable sheath (Ø 2.2 mm), stranded in layers (4–16)

❺ Nonwoven

❻ Rip cord

❼ Sheath, flame-retardant material

Thermal properties

Transport/storage	– 33 °C to + 85 °C
Installation	– 15 °C to + 50 °C
Operating temperature	– 33 °C to + 85 °C

Mechanical properties

Min. bending radius	static	20 × outer diameter
	dynamic	25 × outer diameter
Max. crush resistance		2000 N/dm

Fire performance

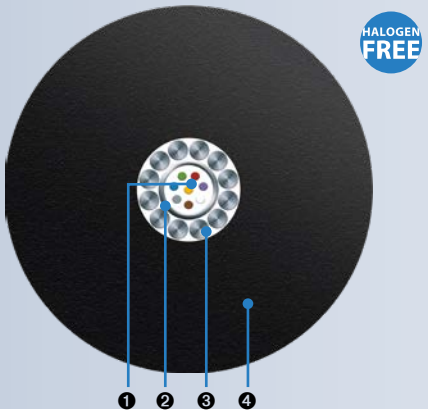
Flame retardancy	IEC 60332-1-2 and IEC 60332-3-24 Cat. C
Smoke density	IEC 61034
Absence of halogen	IEC 60754-1
Acidity of combustion gases	IEC 60754-2

No. of optical fibers	Ø tight buffered core d1	Ø single fiber element d2 max.	Outer sheath wall thickness min.	Cable Ø d3 min.	Cable Ø d3 max.	Mass max.	Tensile force max.	VG part no.	**Order no.**
	mm	mm	mm	mm	mm	kg/km	N		
acc. to VG 95218-30 type A									
4	0.90 ± 0.05	2.2 ± 0.2	1.4	7.7	9.6	90	1200	VG 95218 T030B08*	**8406602L#222**
8	0.90 ± 0.05	2.2 ± 0.2	1.4	10.1	12.5	155	2400	VG 95218 T030B09*	**8406604L#222**
12	0.90 ± 0.05	2.2 ± 0.2	2.0	13.8	16.9	280	2400	VG 95218 T030B10*	**8406606L#222**
16	0.90 ± 0.05	2.2 ± 0.2	2.0	13.2	16.3	260	2400	VG 95218 T030B11*	**8406608L#222**

The dash no. is to be completed with the fiber type acc. to the table on page 21

Fiber Optics cable for underwater applications

acc. to VG 95218-7 Type F



Application & characteristics

Suitable for portable use inside and outside military vessels.

Suitable for fixed installation in harsh environment areas.

Operating temperature (Type F) –46 °C up to +85 °C

Construction

❶ Optical fiber

❷ Jelly filled stainless steel tube

❸ Stainless steel wires stranded around the tube

❹ Outer sheat, Type F according to VG 95218-8

Mechanical properties

Min. bending radius	dynamic	10 × outer diameter

Fire performance

Flame retardancy

No. of optical fibers	No. of loose tubes	Ø of the loose tube d1 max.	Outer sheath wall thickness min.	Cable Ø d2 min.	Cable Ø d2 max.	Mass max.	VG part no.	Order no.
		mm	mm	mm	mm	kg/km		
acc. to VG 95218-7 Type F								
8	1	1.9	3.0	9.5	10.5	160	VG 95218 T007F01*	**84951322#000**

The dash no. is to be completed with the fiber type acc. to the table on page 21

FiberConnect® Breakout cable with central strength member

Fiber specifications						
VG fiber type (Dash no.)	A	B	C	D	E	F
IEC	G62.5/125 OM1	G50/125 OM2	G50/125 OM3	E9/125 OS1	G50/125 OM4	G50/125 OM5
IEC 60793-10 or -50 type	A1b	A1a.1	A1a.2	B6a	A1a.3	A1a.4
Order no.	84######L	84######X	84######V	84######A	84######W	84######J

Geometry/mechanical properties						
Transmission properties	LEONI fiber type L (OM1)	LEONI fiber type X (OM2)	LEONI fiber type V (OM3)	LEONI fiber type A (OS1)	LEONI fiber type W (OM4)	LEONI fiber type J (OM5)
Core diameter (µm)	62.5 ± 3	50 ± 2.5	50 ± 2.5	–	50 ± 2.5	50 ± 2.5
Mode field diameter (at 1310 nm) (µm)	–	–	–	9.2 ± 0.4	–	–
Cladding diameter (µm)	125 ± 2	125 ± 1	125 ± 1	125 ± 0.7	125 ± 1	125 ± 1
Coating diameter (µm)	245 ± 10	245 ± 10	245 ± 10	245 ± 10	245 ± 10	245 ± 10
Core non-circularity (%)	< 5	< 5	< 5	–	< 5	< 5
Cladding non-circularity (%)	< 1	< 1	< 1	< 0.7	< 1	< 1
Core/Clad concentricity error (µm)	< 1.5	< 1.5	< 1.5	< 0.5	< 1.5	< 1.5
Eccentricity of coating (µm)	< 10	< 10	< 10	< 10	< 10	< 10
Screen test	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi	≥ 100 kpsi

Transmission properties													
Wavelength (nm)	850	1300	850	1300	850	1300	1310	1550	850	1300	850	953	1300
Attenuation max. (dB/km)	3.5	1.5	3.5	1.5	3.5	1.5	0.4	0.4	3.5	1.5	3.0	3.0	1.5
Bandwidth min. (MHz · km)	200	500	500	500	1500	500	–	–	3500	500	3500	1850	500
Effective group of refraction	1.497	1.493	1.483	1.478	1.483	1.478	1.4695	1.4701	1.483	1.478	1.483	1.478	
Numerical apperture	0.275 ± 0.015		0.200 ± 0.015		0.200 ± 0.015		–	–	0.200 ± 0.015		0.200 ± 0.015		
Dispersion coefficient max. (ps/nm · km)	–		–		–		3.5	18	–		–		
Zero dispersion wavelength (nm)	–		–		–		1304 –1324		–		–		
Dispersion slope (ps/nm² · km)	–		–		–		≤ 0.092		–		–		
Cutoff wavelength (cabled) (nm)	–		–		–		≤ 1260		–		–		
Polarization mode dispersion (ps/√km)	–		–		–		≤ 0.1		–		–		

Installation wire, hook-up

acc. to VG 95218 part 20P

Application & characteristics

The wiring lines distinguish by their halogen free features and an improved behavior in case of fire. In this case the generating of corrosive and toxic fission products is down to a minimum and the light transparency is at least 75 %.

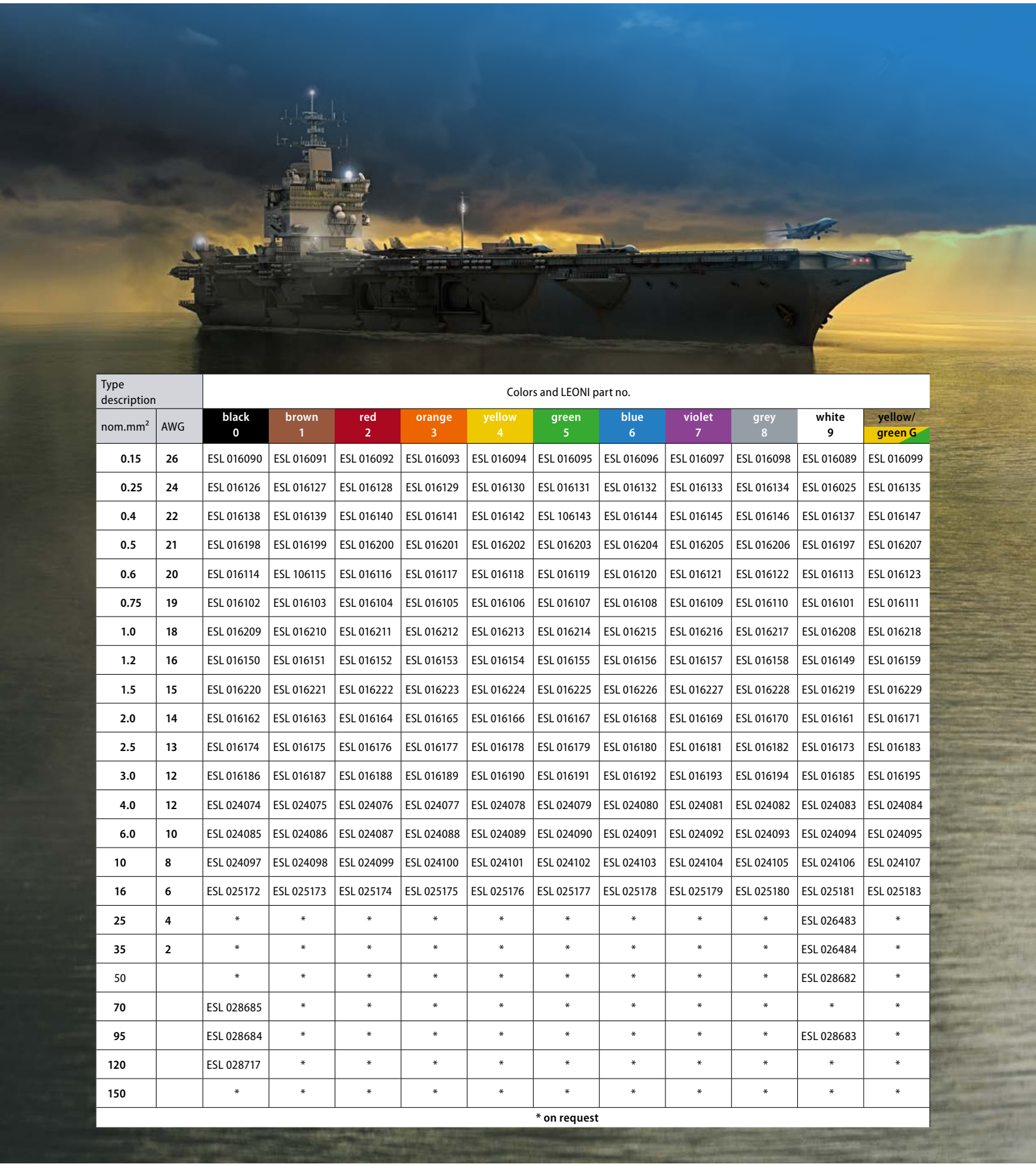
Operating temperature ❯ –55 °C up to +105 °C

Max. voltage ❯ AC 600 V / DC 900 V

Construction

❶ Core ❯ conductor with fine stranded wires

❷ Insulation ❯ the insulation material has a high resistance against many types of oil, grease, lubricants and other chemical materials.

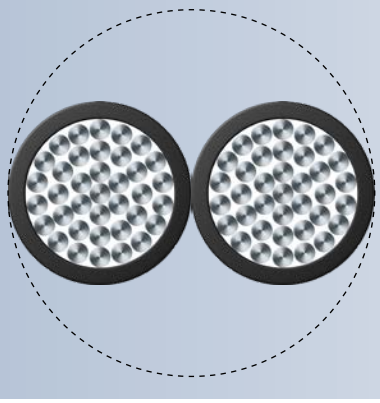


Type description		Colors and LEONI part no.										
nom.mm²	AWG	black 0	brown 1	red 2	orange 3	yellow 4	green 5	blue 6	violet 7	grey 8	white 9	yellow/ green G
0.15	26	ESL 016090	ESL 016091	ESL 016092	ESL 016093	ESL 016094	ESL 016095	ESL 016096	ESL 016097	ESL 016098	ESL 016089	ESL 016099
0.25	24	ESL 016126	ESL 016127	ESL 016128	ESL 016129	ESL 016130	ESL 016131	ESL 016132	ESL 016133	ESL 016134	ESL 016025	ESL 016135
0.4	22	ESL 016138	ESL 016139	ESL 016140	ESL 016141	ESL 016142	ESL 106143	ESL 016144	ESL 016145	ESL 016146	ESL 016137	ESL 016147
0.5	21	ESL 016198	ESL 016199	ESL 016200	ESL 016201	ESL 016202	ESL 016203	ESL 016204	ESL 016205	ESL 016206	ESL 016197	ESL 016207
0.6	20	ESL 016114	ESL 106115	ESL 016116	ESL 016117	ESL 016118	ESL 016119	ESL 016120	ESL 016121	ESL 016122	ESL 016113	ESL 016123
0.75	19	ESL 016102	ESL 016103	ESL 016104	ESL 016105	ESL 016106	ESL 016107	ESL 016108	ESL 016109	ESL 016110	ESL 016101	ESL 016111
1.0	18	ESL 016209	ESL 016210	ESL 016211	ESL 016212	ESL 016213	ESL 016214	ESL 016215	ESL 016216	ESL 016217	ESL 016208	ESL 016218
1.2	16	ESL 016150	ESL 016151	ESL 016152	ESL 016153	ESL 016154	ESL 016155	ESL 016156	ESL 016157	ESL 016158	ESL 016149	ESL 016159
1.5	15	ESL 016220	ESL 016221	ESL 016222	ESL 016223	ESL 016224	ESL 016225	ESL 016226	ESL 016227	ESL 016228	ESL 016219	ESL 016229
2.0	14	ESL 016162	ESL 016163	ESL 016164	ESL 016165	ESL 016166	ESL 016167	ESL 016168	ESL 016169	ESL 016170	ESL 016161	ESL 016171
2.5	13	ESL 016174	ESL 016175	ESL 016176	ESL 016177	ESL 016178	ESL 016179	ESL 016180	ESL 016181	ESL 016182	ESL 016173	ESL 016183
3.0	12	ESL 016186	ESL 016187	ESL 016188	ESL 016189	ESL 016190	ESL 016191	ESL 016192	ESL 016193	ESL 016194	ESL 016185	ESL 016195
4.0	12	ESL 024074	ESL 024075	ESL 024076	ESL 024077	ESL 024078	ESL 024079	ESL 024080	ESL 024081	ESL 024082	ESL 024083	ESL 024084
6.0	10	ESL 024085	ESL 024086	ESL 024087	ESL 024088	ESL 024089	ESL 024090	ESL 024091	ESL 024092	ESL 024093	ESL 024094	ESL 024095
10	8	ESL 024097	ESL 024098	ESL 024099	ESL 024100	ESL 024101	ESL 024102	ESL 024103	ESL 024104	ESL 024105	ESL 024106	ESL 024107
16	6	ESL 025172	ESL 025173	ESL 025174	ESL 025175	ESL 025176	ESL 025177	ESL 025178	ESL 025179	ESL 025180	ESL 025181	ESL 025183
25	4	*	*	*	*	*	*	*	*	*	ESL 026483	*
35	2	*	*	*	*	*	*	*	*	*	ESL 026484	*
50		*	*	*	*	*	*	*	*	*	ESL 028682	*
70		ESL 028685	*	*	*	*	*	*	*	*	*	*
95		ESL 028684	*	*	*	*	*	*	*	*	ESL 028683	*
120		ESL 028717	*	*	*	*	*	*	*	*	*	*
150		*	*	*	*	*	*	*	*	*	*	*

*** on request**

Open twisted installation wire

acc. to V95218-21 part 21F



Application & characteristics

The wiring lines distinguish by their halogen free features and an improved behavior in case of fire. In this case the generating of corrosive and toxic fission products is down to a minimum and the light transparency is at least 75 %.

Operating temperature › –55 °C up to +105 °C

Max. voltage › AC 600 V / DC 900 VV

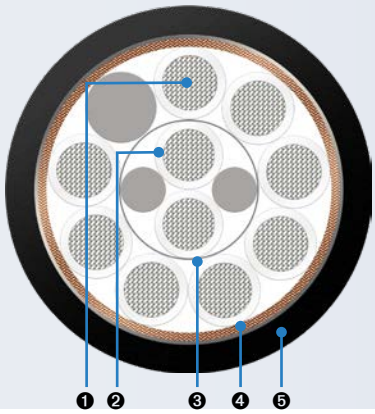
Construction

❶ Core › conductor with fine stranded wires

❷ Insulation › the insulation material has a high resistance against many types of oil, grease, lubricants and other chemical materials. 3 open twisted element

Lightweight power cables with overall electrical screen LMGSGO

acc. to VG 95218 part 28C



HALOGEN FREE

Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas.

Suitable for fixed installation in military vehicles.

Construction

❶ Core › conductor with fine stranded wires

❷ Insulation › special elastomer

❸ Wires acc. to VG 95218 part 28P

❹ Outer shielding › copper braid with tin-plated wires

❺ Sheath › flame retardant, black

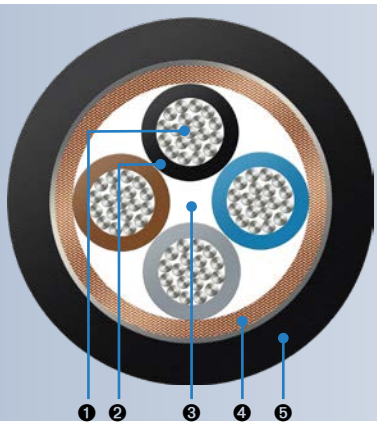
Thermal properties

Operating temperature –40 °C up to +105 °C

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 28C									
LMGSGO 2x1.5	2.34	0.7	6.2	7.0	94	100	600/900	VG95218T028C083	**ERK 016866**
LMGSGO 3x1.5	2.34	0.7	6.5	7.3	105	100	600/900	VG95218T028C122	**ERK 016867**
LMGSGO 4x1.5	2.34	0.7	7.1	7.9	135	100	600/900	VG95218T028C088	**ERK 016885**
LMGSGO 5x1.5	2.34	0.7	7.6	8.4	156	100	600/900	VG95218T028C090	**ERK 016887**
LMGSGO 7x1.5	2.34	0.7	8.2	9.0	196	70	600/900	VG95218T028C046	**ERK 016894**
LMGSGO 10x1.5	2.34	0.8	10.5	11.7	275	45	600/900	VG95218T028C052	**ERK 016478**
LMGSGO 12x1.5	2.34	0.8	10.8	12.8	309	45	600/900	VG95218T028C055	**ERK 016847**
LMGSGO 14x1.5	2.34	0.8	11.3	12.5	358	45	600/900	VG95218T028C058	**ERK 016903**
LMGSGO 16x1.5	2.34	0.8	11.9	13.1	402	45	600/900	VG95218T028C060	**ERK 016906**
LMGSGO 19x1.5	2.34	0.8	12.5	13.7	456	45	600/900	VG95218T028C061	**ERK 016908**
LMGSGO 24x1.5	2.34	0.7	15.3	16.1	585	30	600/900	VG95218T028C065	**ERK 016917**
LMGSGO 27x1.5	2.34	0.8	15.0	16.6	640	30	600/900	VG95218T028C066	**ERK 016919**
LMGSGO 33x1.5	2.34	0.9	15.8	17.6	760	30	600/900	VG95218T028C070	**ERK 016926**
LMGSGO 37x1.5	2.34	1.0	18.2	19.2	868	30	600/900	VG95218T028C005	**ERK 016928**
LMGSGO 2x2.5	2.79	0.7	7.1	7.9	126	100	600/900	VG95218T028C084	**ERK 016865**
LMGSGO 3x2.5	2.79	0.7	7.5	8.3	151	100	600/900	VG95218T028C086	**ERK 016864**
LMGSGO 4x2.5	2.79	0.7	8.2	9.0	186	70	600/900	VG95218T028C089	**ERK 016862**
LMGSGO 7x2.5	2.79	0.7	9.6	10.8	278	45	600/900	VG95218T028C048	**ERK 016896**
LMGSGO 3G1.5	2.34	0.7	6.5	7.3	105	100	600/900	VG95218T028C085	**ERK 016879**
LMGSGO 5G1.5	2.34	0.7	7.6	8.4	156	100	600/900	VG95218T028C091	**ERK 016888**
LMGSGO 7G1.5	2.34	0.7	8.0	8.8	196	70	600/900	VG95218T028C047	**ERK 016895**
LMGSGO 10G1.5	2.34	0.8	10.5	11.5	281	45	600/900	VG95218T028C053	**ERK 016845**
LMGSGO 3G2.5	2.79	0.7	7.5	8.3	151	100	600/900	VG95218T028C087	**ERK 016881**
LMGSGO 5G2.5	2.79	0.8	9.3	10.1	230	100	600/900	VG95218T028C128	**ERK 028493**
LMGSGO 7G2.5	2.79	0.7	9.6	10.8	278	45	600/900	VG95218T028C129	**ERK 028494**

Communication cables with overall electrical screen FMGSGO

acc. to VG 95218 part 28C



Application & characteristics

Suitable for fixed installation inside military vessels.

Suitable for fixed installation in harsh environment areas

Suitable for fixed installation in military vehicles

Operating temperature › –40 °C up to +105 °C

Construction

❶ Core › conductor with fine stranded wires

❷ Insulation › special elastomer

❸ Twisted elements acc. to VG 95218 part 21F

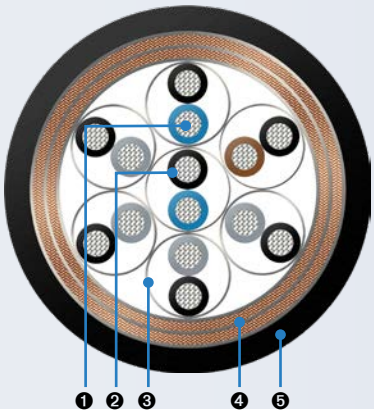
❹ Outer shielding › copper braid with tin-plated wires

❺ Sheath › flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	**Order no.**
	mm	mm	mm	mm	kg/km	mΩ/m	V		
acc. to VG 95218 part 28C									
FMGSGO 1x2x0.75	1.77	0.7	5.2	5.6	57	100	600/900	VG95218T028C082	**ERK 016877**
FMGSGO 2x2x0.75	1.77	0.7	5.7	6.3	79	100	600/900	VG95218T028C040	**ERK 016472**
FMGSGO 4x2x0.75	1.77	0.7	8.7	9.7	162	70	600/900	VG95218T028C050	**ERK 016898**
FMGSGO 6x2x0.75	1.77	0.8	10.1	11.3	225	45	600/900	VG95218T028C054	**ERK 016846**
FMGSGO 8x2x0.75	1.77	0.8	11.0	12.0	269	45	600/900	VG95218T028C059	**ERK 016904**
FMGSGO 10x2x0.75	1.77	0.8	12.2	13.4	341	30	600/900	VG95218T028C062	**ERK 016911**
FMGSGO 14x2x0.75	1.77	0.8	13.0	14.4	402	45	600/900	VG95218T028C067	**ERK 016921**
FMGSGO 16x2x0.75	1.77	0.8	14.4	15.8	479	30	600/900	VG95218T028C069	**ERK 016924**

Lightweight power cables

with overall electrical screen LFMGSSGO
acc. to VG 95218 part 28E



HALOGEN FREE

Application & characteristics

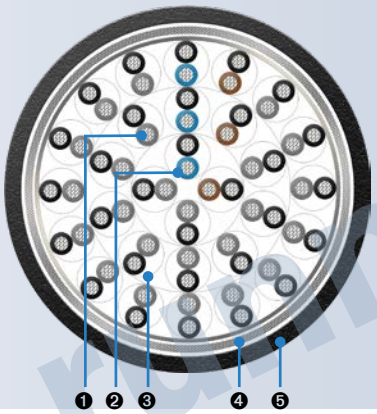
Suitable for fixed installation inside military vessels.
Suitable for fixed installation in harsh environment areas.
Suitable for fixed installation in military vehicles.
Operating temperature › –40 °C up to +105 °C

Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer
❸ Twisted pairs acc. to VG 95218 part 21F
❹ Double outer shielding › copper braid with tin-plated wires
❺ Sheath › flame retardant, black

Lightweight communication cables

with overall electrical screen LFMGSGO
acc. VG 95218 part 28C



Application & characteristics

Suitable for fixed installation inside military vessels.
Suitable for fixed installation in harsh environment areas.
Suitable for fixed installation in military vehicles.
Operating temperature › –40 °C up to +105 °C

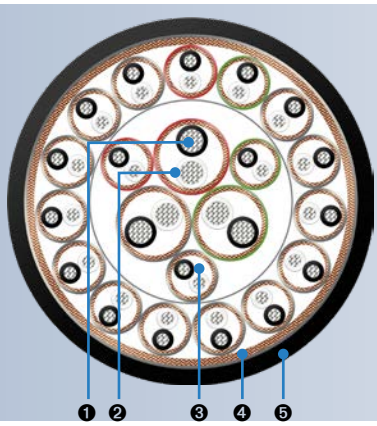
Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer
❸ Twisted pairs acc. to VG 95218 part 21F
❹ Outer shielding › copper braid with tin-plated wires
❺ Sheath › flame retardant, black

Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
power cables – LMGSGO									
LFMGSSGO 2x2x0.4	1.46	0.7	5.8	6.4	78	10	600/900	VG95218T028E004	**ERK 019203**
LFMGSSGO 4x2x0.4	1.46	0.7	8.0	9.0	139	10	600/900	VG95218T028E005	**ERK 019196**
LFMGSSGO 7x2x0.4	1.46	0.7	9.5	10.5	184	5	600/900	VG95218T028E006	**ERK 016480**
LFMGSSGO 12x2x0.4	1.46	0.8	11.5	12.7	285	5	600/900	VG95218T028E008	**ERK 019202**
LFMGSSGO 19x2x0.4	1.46	0.8	13.6	15.0	396	5	600/900	VG95218T028E010	**ERK 017348**
LFMGSSGO 27x2x0.4	1.46	0.9	16.1	17.9	569	5	600/900	VG95218T028E011	**ERK 017362**
communication cables – LFMGSGO									
LFMGSGO 30x2x0.4	1.46	0.9	15.5	17.1	493	30	600/900	VG95218T028C076	**ERK 016937**
LFMGSGO 45x2x0.4	1.46	0.9	18.1	20.0	699	30	600/900	VG95218T028C077	**ERK 016940**
LFMGSGO 60x2x0.15	1.13	1.7	19.5	21.5	643	50	600/900	VG95218T028C030	**ERK 016944**

Lightweight communication cables

with pair and overall electrical screen LFMSGSGO
acc. to VG 95218 part 28C



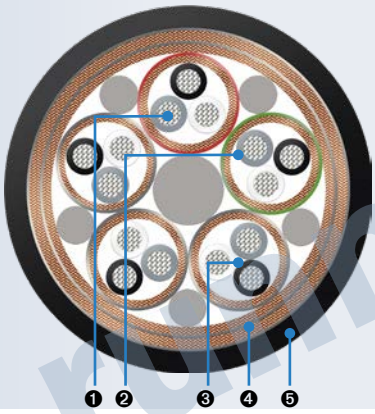
Application & characteristics

Suitable for fixed installation inside military vessels.
Suitable for fixed installation in harsh environment areas.
Suitable for fixed installation in military vehicles.
Operating temperature › –40 °C up to +105 °C

Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer
❸ Twisted pairs acc. to VG 95218 part 21F
❹ Double outer shielding › copper braid with tin-plated wires
❺ Sheath › flame retardant, black

with pair and twin-overall electrical screen LFMSGSSGO
acc. to VG 95218 part 28E



Application & characteristics

Suitable for fixed installation inside military vessels.
Suitable for fixed installation in harsh environment areas.
Suitable for fixed installation in military vehicles.
Operating temperature › –40 °C up to +105 °C

Construction

❶ Core › conductor with fine stranded wires
❷ Insulation › special elastomer
❸ Twisted pairs acc. to VG 95218 part 21F
❹ Double outer shielding › copper braid with tin-plated wires
❺ Sheath › flame retardant, black

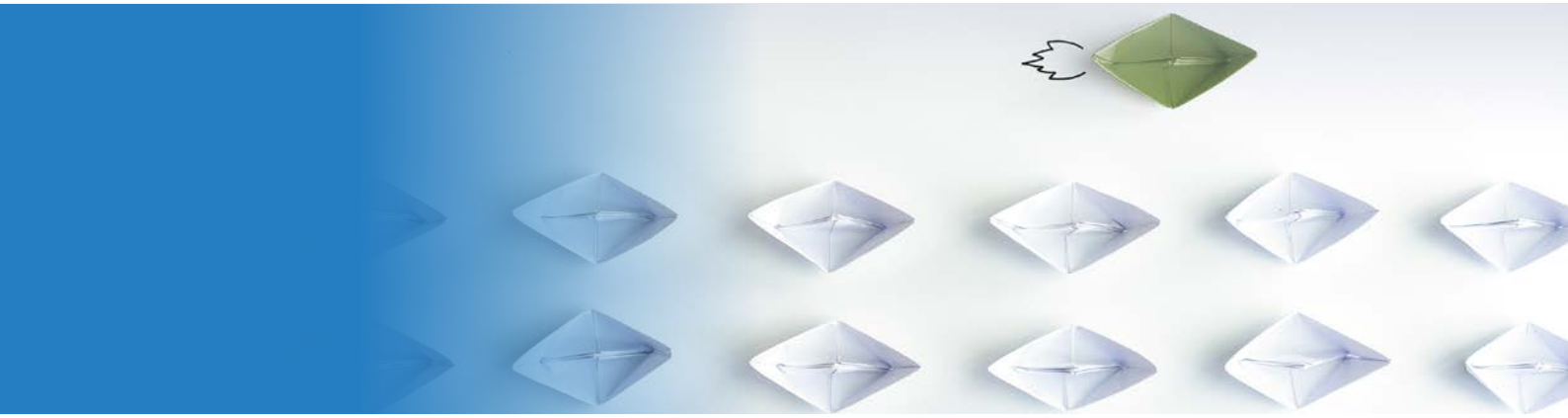
Type description	Ø single core max.	Sheath wall thickness min.	Cable Ø min.	Cable Ø max.	Weight max.	Transfer impedance max.	Operating voltage AC/DC	VG part no.	Order no.
	mm	mm	mm	mm	kg/km	mΩ/m	V		
communication cables – LFMSGSGO									
LFMSGSGO 2x2x0.4	1.46	0.7	8.3	9.1	125	70	600/900	VG95218T028C039	**ERK 016882**
LFMSGSGO 4x2x0.4	1.46	0.7	9.3	10.3	178	45	600/900	VG95218T028C049	**ERK 016897**
LFMSGSGO 7x2x0.4	1.46	0.8	11.3	12.3	263	45	600/900	VG95218T028C056	**ERK 016851**
LFMSGSGO 12x2x0.4	1.46	0.8	13.7	15.1	407	30	600/900	VG95218T028C064	**ERK 016916**
LFMSGSGO 19x2x0.4	1.46	0.8	16.8	18.6	603	30	600/900	VG95218T028C071	**ERK 016931**
LFMSGSGO 27x2x0.4	1.46	0.9	19.4	21.4	806	30	600/900	VG95218T028C075	**ERK 016935**
LFMSGSGO 3x2x1.2+18x2x0.25	1.75 / 1.29	0.9	17.8	19.6	624	30	600/900	VG95218T028C073	**EHRK 016645**
LFMSGSGO 27x4x0.25	1.29	1.0	21.6	23.8	1008	30	600/900	VG95218T028C078	**ERK 016943**
communication cables – LFMSGSSGO									
LFMSGSSGO 5x3x0.4	1.46	0.8	11.6	12.8	328	5	600/900	VG95218T028E007	**ERK 016733**
LFMSGSSGO 12x3x0.4	1.46	0.9	16.5	18.3	624	5	600/900	VG95218T028E009	**ERK 016868**

Cross reference list for cables acc. to VG 95218 part 28 and 61-66

No. of cores x nom. cross section	Dash-No. VG 95218 part 28	Dash-No. VG 95218 part 61-66	Order no.
mm²			
LMGSGO	**T28**	**T61**	
2x1.5	C083	A019	**ERK 016866**
3x1.5	C122	A021	**ERK 016867**
4x1.5	C088	A025	**ERK 016885**
5x1.5	C090	A027	**ERK 016887**
7x1.5	C046	A116	**ERK 016894**
10x1.5	C052	A120	**ERK 016478**
12x1.5	C055	A122	**ERK 016847**
14x1.5	C058	A123	**ERK 016903**
16x1.5	C060	A124	**ERK 016906**
19x1.5	C061	A125	**ERK 016908**
24x1.5	C065	A126	**ERK 016917**
27x1.5	C066	A127	**ERK 016919**
33x1.5	C070	A128	**ERK 016926**
37x1.5	C005	A129	**ERK 016928**
2x2.5	C084	A020	**ERK 016865**
3x2.5	C086	A023	**ERK 016864**
4x2.5	C089	A026	**ERK 016862**
7x2.5	C048	A118	**ERK 016896**
3G1.5	C085	A022	**ERK 016879**
5G1.5	C091	A028	**ERK 016888**
7G1.5	C047	A117	**ERK 016895**
10G1.5	C053	A121	**ERK 016845**
3G2.5	C087	A115	**ERK 016881**
5G2.5	C128	A107	**ERK 028493**
7G2.5	C129	A119	**ERK 028494**
FMGSGO	**T28**	**T62**	
1x2x0.75	C082	A008	**ERK 016877**
2x2x0.75	C040	A001	**ERK 016472**
4x2x0.75	C050	A002	**ERK 016898**
6x2x0.75	C054	A003	**ERK 016846**
8x2x0.75	C059	A004	**ERK 016904**
10x2x0.75	C062	A005	**ERK 016911**
14x2x0.75	C067	A006	**ERK 016921**
16x2x0.75	C069	A007	**ERK 016924**

No. of cores x nom. cross section	Dash-No. VG 95218 part 28	Dash-No. VG 95218 part 61-66	Order no.
mm²			
FMSGSGO	**T28**	**T63**	
2x2x0.75	C041	A001	**ERK 016884**
4x2x0.75	C051	A002	**ERK 016550**
7x2x0.75	C057	A003	**ERK 026836**
11x2x0.75	C063	A004	**ERK 016899**
14x2x0.75	C068	A005	**ERK 016922**
19x2x0.75	C072	A006	**ERK 016932**
24x2x0.75	C074	A007	**ERK 016933**
LFMGSSGO	**T28**	**T64**	
2x2x0.4	E004	A001	**ERK 019203**
4x2x0.4	E005	A002	**ERK 019196**
7x2x0.4	E006	A003	**ERK 016480**
12x2x0.4	E008	A004	**ERK 019202**
19x2x0.4	E010	A005	**ERK 017348**
27x2x0.4	E011	A006	**ERK 017362**
LFMGSGO	**T28**	**T65**	
2x2x0.4	C039	A001	**ERK 016882**
4x2x0.4	C049	A002	**ERK 016897**
7x2x0.4	C056	A003	**ERK 016851**
12x2x0.4	C064	A004	**ERK 016916**
19x2x0.4	C071	A005	**ERK 016931**
27x2x0.4	C075	A006	**ERK 016935**
3x2x1.2+18x2x0.25	C073	B001	**EHRK 016645**
27x4x0.25	C078	C001	**ERK 016943**
LFMSGSSGO	**T28**	**T66**	
5x3x0.4	E007	A001	**ERK 016733**
12x3x0.4	E009	A002	**ERK 016868**

Individually designed installation cable



Without any relation to VG standards LEONI is able to design and produce outboard and inboard cables with following elements:

- Single wires up to a voltage of 1.5 kV AC
- Twisted pairs up to a voltage of 1.0 kV AC
- Ethernet data (LAN) elements up to Cat 7
- Bus elements
- Fiber optic elements
- Coaxial elements
- Electrical screens
- Water-blocking tapes and fillers (up to a pressure of 100 bars for the complete cable)

Individually designed installation cable acc. to VG 95218-8

The standard VG 95218-8 describes different types of sheathing material which can be used for individually designed VG cables ❯

Place of cable installation	Material type	Acc. to standard	Main characteristics	Type of sheath acc. to VG 95218-8
All military applications, but not under water	Cross-linked	VG 95218-28, type C and E	Halogen-free Non-toxic Non corrosive Flame retardant	B
Inboard vessels	Cross-linked	VG 95218-29 type B to F		E
		VG 95218-31 type D, F and H		D
Outboard vessels	Cross-linked	VG 95218-29 type B to F		E
	Polyurethane	VG 95218-29 type G to M	Halogen-free Flame retardant	F
All military applications, but not under water	Cross-linked	VG 95218-30 type A and B	Halogen-free Non-toxic Non corrosive Flame retardant	G
Fixed and portable installation	Cross-linked	VG 95218-31 type L		H

Individually designed installation cable acc. to VG 95218-9

For the design of the individually designed cables are allowed to use the following elements to cover the cable by the standard VG 95218-9 (all elements available from LEONI) ›

Type of sheath acc. to VG 95218-8	Approved constructions elements	Type of element
B	VG95218T020P…	Single core
	VG95218T021F…	Twisted pair
	VG95218T022G…	Single core with screen and protective cover
	VG95218T023C…	Cables with screen and protective cover
	VG95218T023G…	Cables with screen and protective cover
	VG95218T030B…*	Fiber optic cables, bundle design
	VG95218T031D…*	Ethernet Cat. 7
	VG95218T031F…*	Profibus DP
	VG95218T031H…*	CAN-Bus
D	VG95218T020P…	Single core
	VG95218T021F…	Twisted pair
	VG95218T022G…	Single core with screen and protective cover
	VG95218T023C…	Cables with screen and protective cover
	VG95218T023G…	Cables with screen and protective cover
	VG95218T030B…*	Fiber optic cables, bundle design
	VG95218T031D…*	Ethernet Cat. 7
	VG95218T031F…*	Profibus DP
	VG95218T031H…*	CAN-Bus
E	VG95218T020L…	Single core
	VG95218T020M…	Single core water-blocked
	VG95218T020P…	Single core
	VG95218T021F…	Twisted pair
	VG95218T022G…	Single core with screen and protective cover
	VG95218T023C…	Cables with screen and protective cover
	VG95218T023G…	Cables with screen and protective cover
	VG95218T030B…*	Fiber optic cables, bundle design
	VG95218T031D…*	Ethernet Cat. 7
	VG95218T031F…*	Profibus DP
	VG95218T031H…*	CAN-Bus
F	VG95218T020L…	Single core
	VG95218T020M…	Single core water-blocked
G	VG 95218T030A…	Fiber optic cables, breakout design
	VG95218T030B…	Fiber optic cables, bundle design
H	VG95218T030L…	CAN-Bus

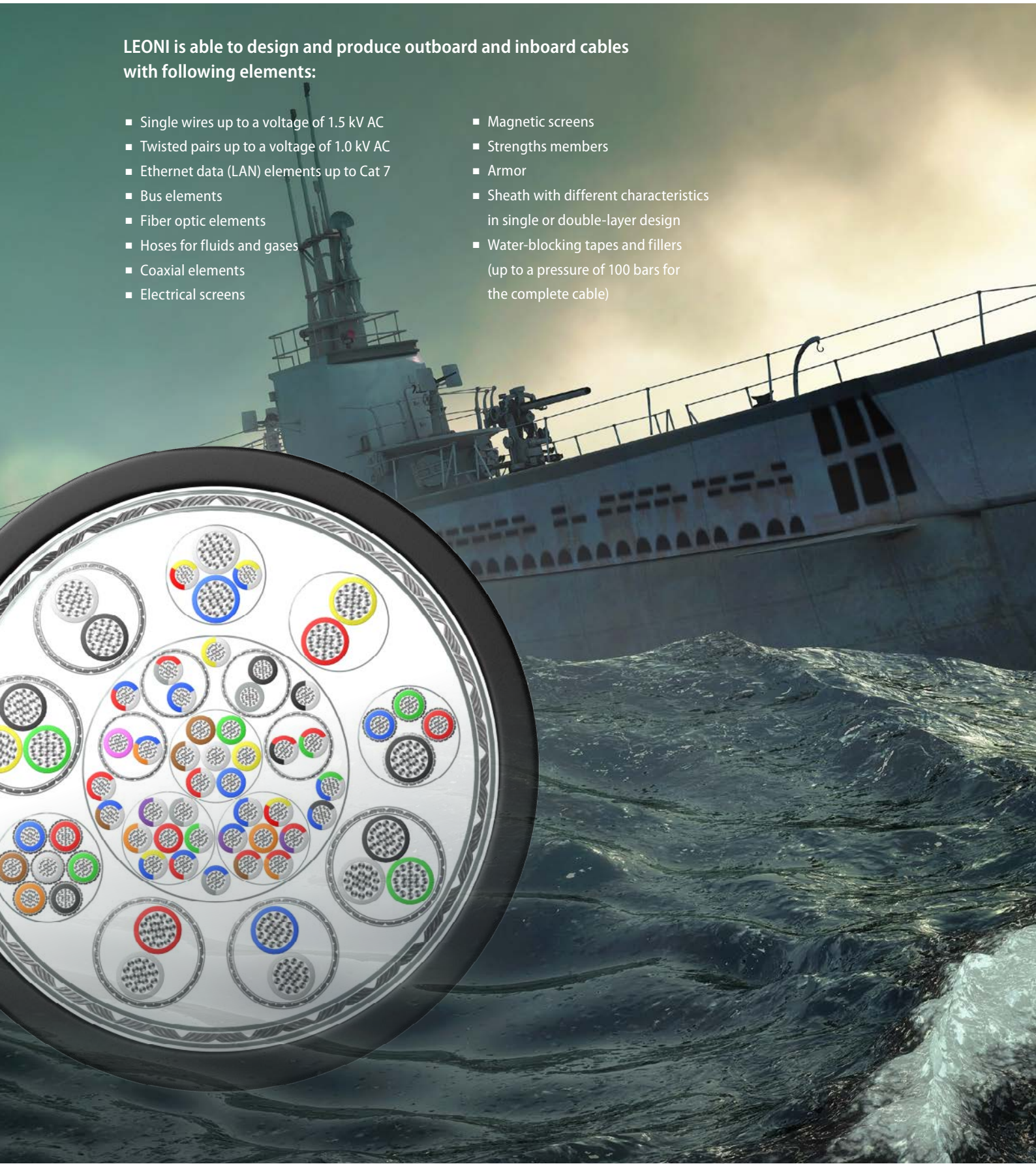
* with or without outer sheath

The electrical screens are defined with a maximum transfer impedance of

- 30 mΩ/m for one overall screen
- 15 mΩ/m for a double screen.

Customized installation cables

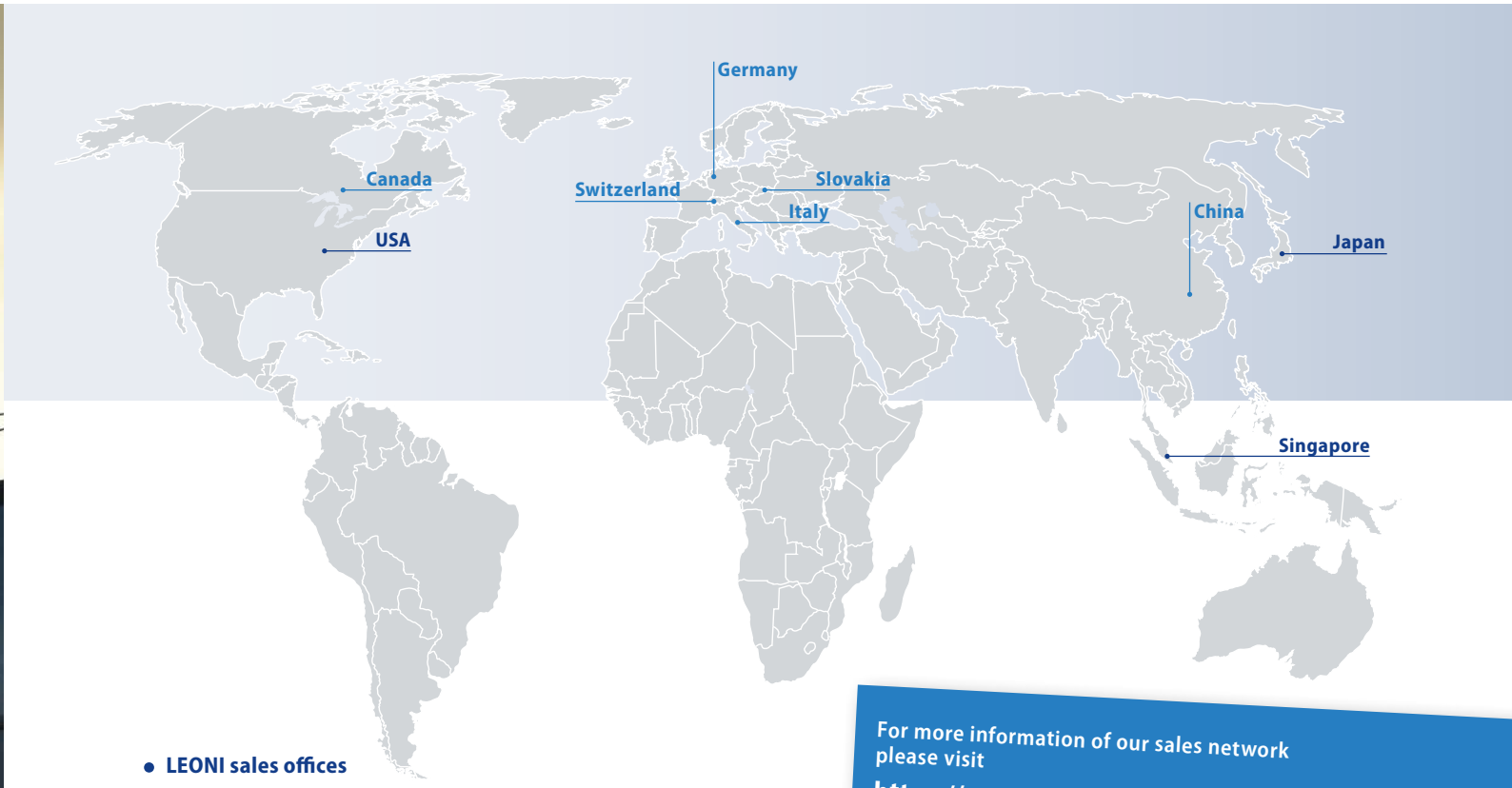
without any relation to VG standards



LEONI is able to design and produce outboard and inboard cables with following elements:

- Single wires up to a voltage of 1.5 kV AC
- Twisted pairs up to a voltage of 1.0 kV AC
- Ethernet data (LAN) elements up to Cat 7
- Bus elements
- Fiber optic elements
- Hoses for fluids and gases
- Coaxial elements
- Electrical screens
- Magnetic screens
- Strengths members
- Armor
- Sheath with different characteristics in single or double-layer design
- Water-blocking tapes and fillers (up to a pressure of 100 bars for the complete cable)

Sales network Marine – worldwide



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