POWERING THE SURFACE

Advanced Cable Solutions for Opencast Mining

prysmian

The planet's pathways

Connecting the world.

Today and in the future.

25
R&D CENTRES AROUND THE WORLD

Prysmian – the world leader in the energy and telecom cables and systems industry.

150
YEARS OF EXPERIENCE

With 150 years' experience, Prysmian is strongly positioned in high-tech markets and offers the widest possible range of products, services, technologies and know-how.

We specialise in underground and submarine cables and systems for power transmission and distribution, special cables for applications in many different industries, and medium and low voltage cables for the construction and infrastructure sectors.

For the telecommunications industry, Prysmian is the world's largest provider of cutting-edge cables and accessories for voice, video and data transmission, offering a comprehensive range of optical fibres, optical and copper cables and connectivity systems.

We are committed to environmental responsibility in our production processes, the protection of the global environment, and the responsible management of relations with the local communities in which we work.

For us, innovation means meeting the needs of our customers and communities by understanding their business drivers as quickly as they do. To do that, our team of over 900 Research & Development professionals is constantly looking to the future, predicting and identifying emerging trends in each of our industries and sectors. Acting on this intelligence from 25 R&D centres around the world, we're constantly close to our customers in their own local markets.

DOWN TO THE CORE

Powering the Future of Mining

The mining industry demands power, control, and reliability in the harshest conditions. Prysmian delivers cutting-edge cable solutions engineered for durability, safety, and superior performance – whether in opencast, underground mining, or tunneling. Our advanced technology ensures seamless operation in the most extreme environments, meeting the needs of OEMs, contractors, installers, and mining companies worldwide.

COMPREHENSIVE CABLE SOLUTIONS FOR MINING & TUNNELING

Prysmian provides a full range of cables for both fixed installations and movable equipment, ensuring efficient power transmission and operational safety. With decades of expertise and close collaboration with leading mining companies, we continuously innovate to meet the evolving demands of the industry.

Why Choose Prysmian Mining Cables?

Our mining and tunneling cables are designed to excel in demanding applications, offering numerous benefits:

EXTENDED LIFE SPAN
Engineered for longevity, reducing down-time and maintenance costs.

SUPERIOR CLIMATE & CHEMICAL RESISTANCE
Withstanding extreme temperatures, oil, fuel, moisture, acids, and bases, as well as UV irradiation and ozone.

UNMATCHED MECHANICAL STRENGTH & FLEXIBILITY
Designed for high-speed reeling, acceler-ation, extreme bending, torsional loads, and misalignment.

COMPACT & LIGHTWEIGHT DESIGN
Up to 30% reduction in cable size and 40% weight reduction without com-promising performance.

TAILORED ENGINEERING
Customized solutions for specific mining requirements, including LV/MV, instrumentation, and optical fibre cables.

ENHANCED SAFETY STANDARDS
High-grade rubber sheathing ensur-ing optimal mechanical resistance and protection against harsh mining conditions.

ENGINEERED FOR THE TOUGHEST MINING APPLICATIONS

1. Opencast & Underground Mining
Large-scale mining operations rely on highly mobile, heavy-duty machinery that requires flexible and durable power cables. Prysmian provides Medium Voltage (MV) reeling and trailing cables, specially designed to perform under extreme stress, ensuring efficient power distribution for excavators, drills, and conveyor systems.

2. Tunneling: Beyond Mining
Tunneling technology is essential not only in mining but also in critical infrastructure projects worldwide, including subway systems and high-speed rail networks. From the Channel Tunnel to San Gottardo, Prysmian cables power the world's most challenging tunneling projects.

PROVEN RELIABILITY, WORLDWIDE

With manufacturing facilities strategically located near major mining regions across all continents, Prysmian ensures local availability, rapid delivery, and expert support. Our cables have been field-tested and proven in global mining and tunneling applications, reinforcing Prysmian's position as the trusted partner for the industry's most demanding projects.

PRYSMIAN: DRIVING MINING INNOVATION

As the mining industry evolves, efficiency, safety, and sustainability are paramount. With our state-of-the-art cable solutions, we power the future of mining and tunneling, ensuring operational excellence in even the most challenging environments.
Explore Prysmian's mining and tunneling cable solutions and experience unmatched durability, reliability, safety, and performance down to the core.

MINING & SUSTAINABILITY

Powering the Future Responsibly

The world's need for minerals is expected to ten-fold during the next decade. The production of minerals such as graphite, lithium, and cobalt could increase by nearly 500% by 2050. To mine all these minerals while at the same time achieving zero-carbon emissions in the mining operations, calls for a transition towards clean energy and greater energy efficiency.

In fact, from lithium-ion batteries to photovoltaic cells, most green technologies require metals and minerals in their construction, thus essential for a low-carbon future. Consequently, the mining industry is driving the change, aiming for fully electrified, data-driven fleets.

In parallel, innovations and increased efficiency requirements within mines are leading to an increasingly extensive use of equipment operating at higher and higher voltages. The safety of personnel working in proximity to energised equipment, especially in underground mines, has become an increasingly crucial theme, too.

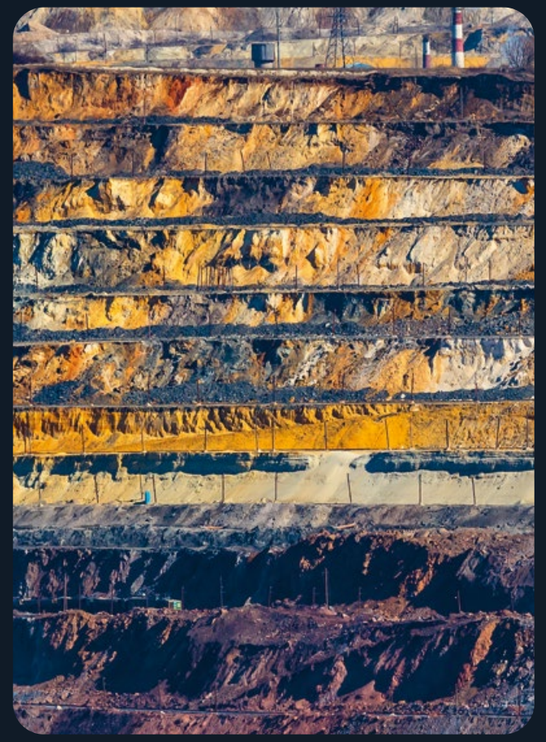
This is What We Do

INNOVATION MEETS SUSTAINABILITY

To meet these challenges, Prysmian has, besides extremely resistant and flexible mining cables and technological breakthroughs, developed complete cable solutions for the mining industry. Solutions that will make the production flow flawless, enhance the safety of the workforce, and bring sustainable energy to power it all up.

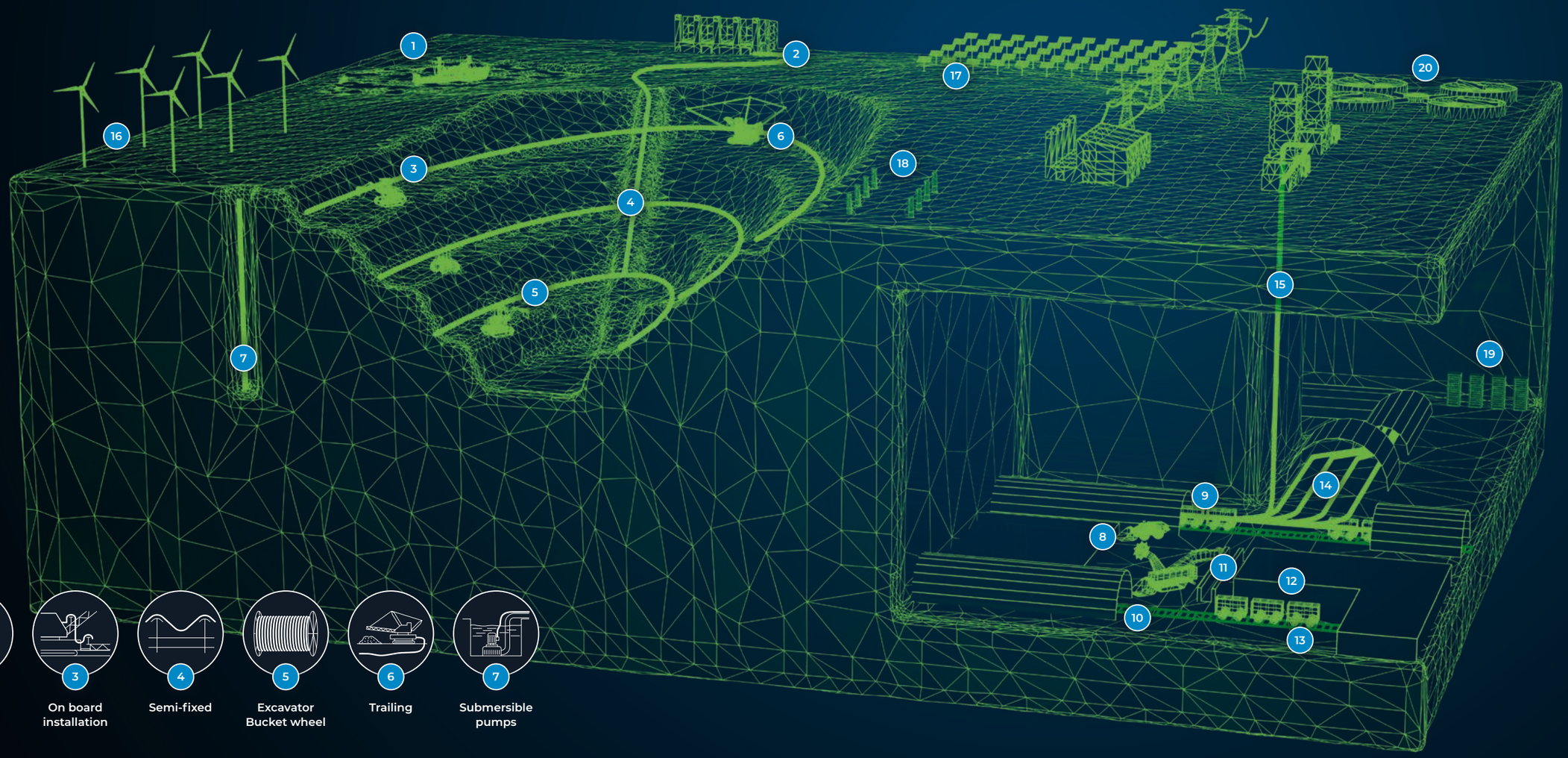
Our complete cable offer makes mining more sustainable – in many different ways. Safe and sturdy cables saving you on cost, and the environment on CO_2 emissions? Sounds too good to be true, doesn't it? But it is the truth! Our complete offer of top-notch mining cables will cost you less in the long run.

Being tough enough to endure the most uncompromising environments, in terms of everything from mechanical strains to chemical liquids and climate conditions, these cables will run flawlessly for years to come. Add to that a complete range of cables ready to provide every equipment on site with sustainable energy, and your business will have saved a lot more than just money.



SUSTAINABLE MINING ACTIVITIES

Our electrification solutions



OPENCAST MINING

1 Dredger
2 Stacker/ Reclaimer
3 On board installation
4 Semi-fixed
5 Excavator Bucket wheel
6 Trailing
7 Submersible pumps

UNDERGROUND MINING & TUNNELING

8 LHD, Scoop, Loader
9 Drill
10 Coal cutter – free trailing
11 Coal cutter – chain application
12 Festoon
13 Shuttle car
14 Fixed installation
15 Shaft cable

SUPPLEMENTARY SOLUTIONS

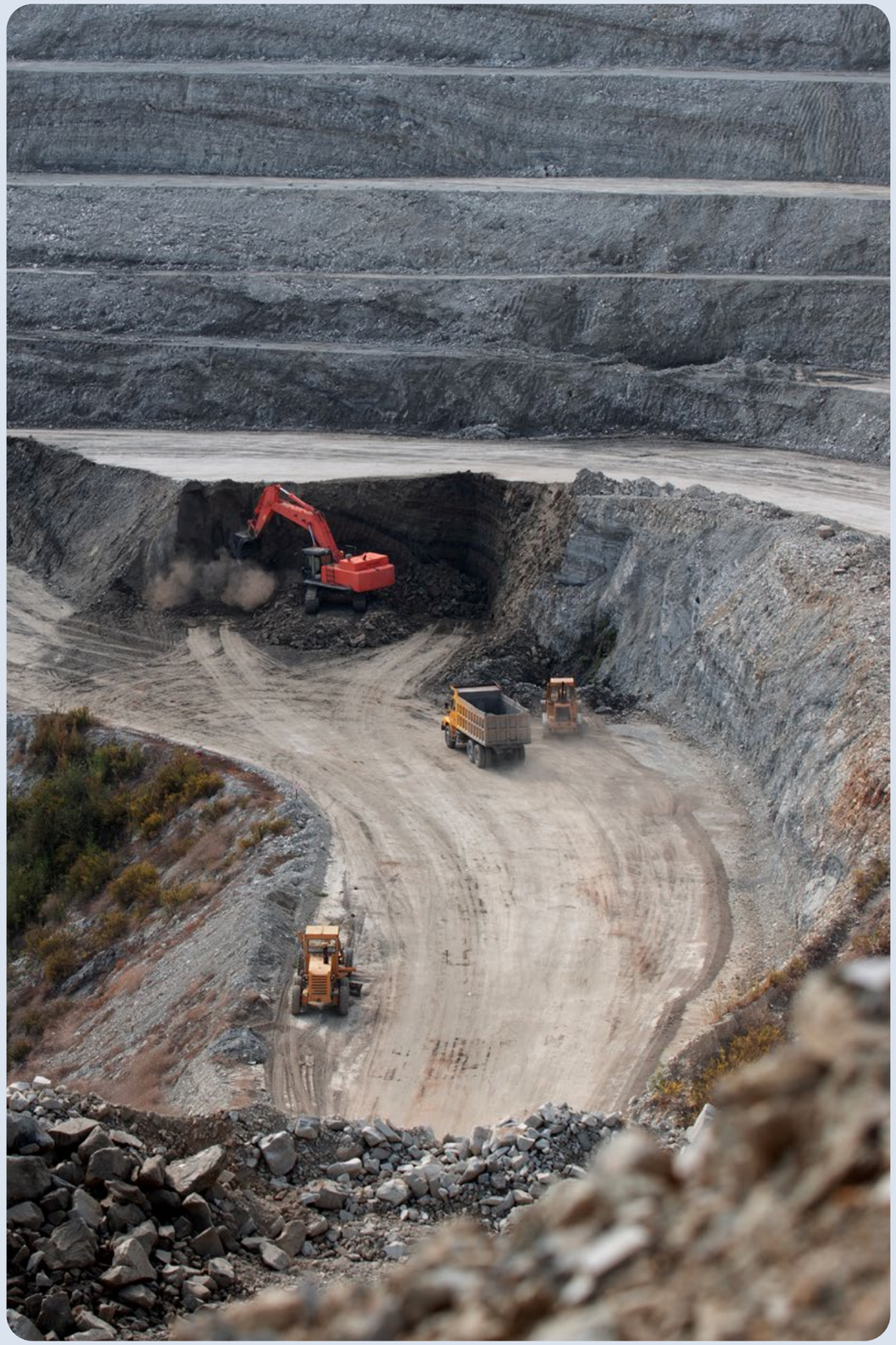
16 Wind turbines
17 PV plants
18 EV Charging
19 Server
20 Water treatment

APPLICATION OVERVIEW

Opencast

● Main Application
● Suitable

Application groups	Stacker/ Reclaimer	Bunker Drill	Trailing	Dredge	Submersible pump	Semi-fixed	Semi-fixed
MEDIUM VOLTAGE REELING CABLES							
PROTOLON (M) R-(N)TSCGEWOEU	●	●				●	●
PROTOLON (M) R-(N)TSCGEWOEU LWL	●	●				●	●
TROMMELFLEX-M-PUR D2X11Y	●	●				●	●
TROMMELFLEX-M-PUR BRAIDED D2X11Y	●	●				●	●
TUNNELFLEX-PUR-HF WITHOUT ANTITWISTING PROTECTION	●	●				●	●
TUNNELFLEX-R-PUR-HF WITH ANTITWISTING PROTECTION	●	●				●	●
MEDIUM VOLTAGE TRAILING CABLES							
PROTOLON(SB) NTSCGEWOEU			●			●	●
PROTOLON(SB-SAM) (N)TSCGEWOEU			●			●	●
PROTOLON(SB-SAM) SHD-GC			●			●	●
TENAX-SAS (N)TSCGEWOEU			●			●	●
TENAX-PUR (N)TSCGEH3S			●			●	●
TENAX-LUMEN (N)TSCGH3S			●			●	●
TENAX PUR SHD GC			●			●	●
MEDIUM VOLTAGE DREDGING CABLES							
PROTOLON (ST) NTSCGEWOEU				●	●	●	●
PROTOLON (ST) 3E NTSCGEWOEU				●	●	●	●
CABLES FOR SEMI-FLEXIBLE INSTALLATION							
PROTOLON (M) F-(N)TSWOEU					●	●	●
PROTOLON (M) F-(N)TSCGEWOEU					●	●	●
PROTOMONT NSSHOEU					●	●	●
(N)SSHOEU PUR					●	●	●



PROTOLON (M)

R-(N)TSCGEWOEU | 6 - 35 KV

For connection of large material handling machines such as excavators, dumpers, mobile crusher in open-cast mines. Flexible MV reeling cable suitable for high mechanical stresses in conjunction with mono spiral reels and cylindrical reels.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
EN 50525-2-21	Electrical parameters
DIN VDE 0207-21	Compound
DIN VDE 0298-3	Mechanical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

1 Very finely stranded copper, bare, class FS
PE: Very finely stranded copper, bare, class FS
2 Semi-conductive EPR
3 EPR rubber
PROTOLON Special compound 3GI3
4 Three core design, with split earth conductor in three interstices
5 Semi-conductive NBR easy-strip
7 Rubber - Special compound 5GM3
8 Braiding
Material - Polyester
9 Rubber - polychloroprene (PCP), Special compound 5GM5

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	20 N/mm² static
	25 N/mm² dynamic
Travel speed	On rewinding: up to 100 m/min
	Reeling operation: up to 120 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation
	20 x D min distance with S-type directional changes

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)	20/35 (42)
Test voltage	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV	50 kV
Nominal voltage U	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V	35,000 V

MEDIUM VOLTAGE REELING CABLE

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) R-(N)TSCGEWOEU 3.6/6KV									
3x25+3x25/3	7.1	35.5	38.5	2,300	1,500	370	0.31	0.7839	131
3x25+3x50/3	7.1	39.9	42.9	2,760	1,500	370	0.35	0.7839	131
3x35+3x25/3	8.4	39.3	42.3	2,870	2,100	430	0.3	0.554	162
3x35+3x50/3	8.4	42.2	45.2	3,190	2,100	430	0.32	0.554	162
3x50+3x25/3	10.1	42.8	45.8	3,550	3,000	490	0.28	0.386	202
3x50+3x50/3	10.1	42.8	45.8	3,620	3,000	490	0.3	0.386	202
3x70+3x35/3	11.8	46.4	49.4	4,340	4,200	550	0.27	0.272	250
3x70+3x50/3	11.8	46.6	49.6	4,450	4,200	550	0.27	0.272	250
3x95+3x50/3	13.8	51.5	55.5	5,790	5,700	630	0.26	0.206	301
3x120+3x70/3	15.5	55.2	59.2	6,950	7,200	700	0.25	0.161	352
3x150+3x70/3	17.4	59.2	63.2	8,200	9,000	760	0.25	0.129	404
3x150+3x95/3	17.4	59.2	63.2	7,983	9,000	760	0.25	0.129	404
3x185+3x95/3	19.2	64.4	68.4	9,800	11,100	820	0.24	0.106	461
3x185+3x120/3	19.2	64.4	68.4	9,591	11,100	820	0.24	0.106	461
3x240+3x120/3	22.1	70.6	74.6	12,490	14,400	930	0.24	0.0801	540
3x300+3x150/3	24.7	77.5	81.5	15,270	18,000	1,030	0.23	0.0641	620
3x50+2x25/2+1x10ST	10.1	42.8	45.8	3,660	3,000	490	0.28	0.386	202
3x70+2x35/2+1x10ST	11.8	46.6	49.6	4,550	4,200	550	0.27	0.272	250
3x95+2x50/2+1x10ST	13.8	51.5	55.5	5,650	5,700	630	0.26	0.206	301
3x120+2x70/2+1x10ST	15.5	58.1	62.1	7,300	7,200	700	0.25	0.161	352
3x185+2x95/2+1x10ST	19.2	64.4	68.4	9,697	11,100	820	0.24	0.106	461
PROTOLON (M) R-(N)TSCGEWOEU 6/10KV									
3x25+3x25/3	7.1	36.8	39.8	2,360	1,500	330	0.32	0.7839	131
3x25+3x50/3	7.1	41.3	44.3	2,880	1,500	330	0.32	0.7839	131
3x35+3x25/3	8.4	40.5	43.5	2,960	2,100	380	0.31	0.554	162
3x35+3x50/3	8.4	42.9	45.9	3,350	2,100	380	0.31	0.554	162
3x50+3x25/3	10.1	44.1	47.1	3,610	3,000	430	0.29	0.386	202
3x50+3x50/3	10.1	44.1	47.1	3,820	3,000	430	0.29	0.386	202
3x70+3x35/3	11.8	47.9	50.9	4,510	4,200	490	0.28	0.272	250
3x70+3x50/3	11.8	47.9	50.9	4,730	4,200	490	0.28	0.272	250
3x95+3x50/3	13.8	52.8	56.8	5,810	5,700	560	0.27	0.206	301
3x120+3x70/3	15.5	56.4	60.4	7,110	7,200	620	0.26	0.161	352
3x150+3x70/3	17.4	61.9	65.9	8,380	9,000	670	0.25	0.129	404
3x185+3x95/3	19.2	65.7	69.7	10,030	11,100	730	0.25	0.106	461
3x240+3x120/3	22.1	73.3	77.3	12,570	14,400	820	0.24	0.0801	540
3x300+3x150/3	24.7	78.7	82.7	15,060	18,000	910	0.24	0.0641	620

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3X50+2X25/2+1X10ST	10.1	44.8	47.8	3,740	3,000	400	0.29	0.386	202
3X25+2X25/2+1X10ST	7.1	41.2	44.2	2,860	1,500	330	0.32	0.7839	131
3X95+2X50/2+1x10ST	13.8	56.1	60.1	6,500	5,700	560	0.27	0.206	301
3x120+2x70/2+1x10ST	15.5	56.4	60.4	7,190	7,200	620	0.26	0.161	352
3x185+2x95/2+1x10ST	19.2	65.7	69.7	9,859	11,100	730	0.25	0.106	461
PROTOLON (M) R-(N)TSCGEWOEU 8.7/15KV									
3x25+3x25/3	7.1	41.4	44.4	2,700	1,500	340	0.26	0.7839	139
3x25+3x50/3	7.1	43.6	46.6	3,080	1,500	340	0.26	0.7839	139
3x35+3x25/3	8.4	43.9	46.9	3,190	2,100	290	0.33	0.554	172
3x35+3x50/3	8.4	43.9	46.9	3,380	2,100	290	0.33	0.554	172
3x50+3x25/3	10.1	44.1	47.1	3,890	3,000	330	0.31	0.386	215
3x50+3x50/3	10.1	57	60	5,790	3,000	330	0.31	0.386	215
3x70+3x35/3	11.8	52	56	5,010	4,200	380	0.3	0.272	265
3x70+3x50/3	11.8	52	56	5,130	4,200	380	0.3	0.272	265
3x95+3x50/3	13.8	56.2	60.2	6,300	5,700	410	0.29	0.206	319
3x120+3x70/3	15.5	61.3	65.3	7,580	7,200	450	0.28	0.161	371
3x150+3x70/3	17.4	65.3	69.3	8,980	9,000	500	0.27	0.129	428
3x185+3x95/3	19.2	69.1	73.1	10,280	11,100	540	0.26	0.106	488
3x240+3x120/3	22.1	76.6	80.6	13,110	14,400	600	0.26	0.0801	574
3x300+3x150/3	24.7	83.5	88.5	16,010	18,000	660	0.25	0.0641	660
3x240+2x120/2+1x10ST	22.1	77.9	81.9	13,500	14,400	600	0.26	0.0801	574
PROTOLON (M) R-(N)TSCGEWOEU 12/20KV									
3x25+3x25/3	7.1	44.1	47.1	3,110	1,500	230	0.36	0.7839	139
3x25+3x50/3	7.1	44.1	47.1	3,160	1,500	230	0.36	0.7839	139
3x35+3x25/3	8.4	46.8	49.8	3,620	2,100	260	0.34	0.554	172
3x35+3x50/3	8.4	46.8	49.8	3,660	2,100	260	0.34	0.554	172
3x50+3x25/3	10.1	51.3	55.3	4,490	3,000	290	0.32	0.386	215
3x50+3x50/3	10.1	51.3	55.3	4,720	3,000	290	0.32	0.386	215
3x70+3x35/3	11.8	55	59	5,360	4,200	330	0.31	0.272	265
3x70+3x50/3	11.8	55	59	5,480	4,200	330	0.31	0.272	265
3x95+3x50/3	13.8	61.8	65.8	6,800	5,700	370	0.3	0.206	319
3x95+3x70/3	13.8	59.2	63.2	7,090	5,700	370	0.3	0.206	319
3x120+3x70/3	15.5	64.2	68.2	7,980	7,200	400	0.29	0.161	371
3x150+3x70/3	17.4	68.2	72.2	9,380	9,000	440	0.28	0.129	428
3x185+3x95/3	19.2	73.4	77.4	10,990	11,100	480	0.27	0.106	488
3x240+3x120/3	22.1	78.3	82.3	14,200	14,400	540	0.26	0.0801	574
3x300+3x150/3	24.7	86.4	91.4	16,560	18,000	590	0.26	0.0641	660
3x120+2x70/2+1x10ST	15.5	64.2	68.2	8,000	7,200	400	0.29	0.161	371

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) R-(N)TSCGEWOEU 14/25KV									
3x25+3x25/3	7.1	47.9	50.9	3,360	1,500	200	0.38	0.7839	139
3x25+3x50/3	7.1	47.9	50.9	3,540	1,500	200	0.38	0.7839	139
3x35+3x25/3	8.4	51.5	55.5	4,050	2,100	220	0.36	0.554	172
3x35+3x50/3	8.4	51.5	55.5	4,240	2,100	220	0.36	0.554	172
3x50+3x25/3	10.1	55.2	59.2	4,820	3,000	250	0.34	0.386	215
3x50+3x50/3	10.1	51.2	55.2	5,010	3,000	250	0.34	0.386	215
3x70+3x35/3	11.8	58.8	62.8	6,030	4,200	280	0.33	0.272	265
3x70+3x50/3	11.8	58.8	62.8	6,180	4,200	280	0.33	0.272	265
3x95+3x50/3	13.8	64.4	68.4	7,280	5,700	310	0.31	0.206	319
3x120+3x70/3	15.8	68	72	8,850	7,200	340	0.3	0.161	371
3x150+3x70/3	17.4	73.4	77.4	10,230	9,000	370	0.29	0.129	428
3x185+3x95/3	19.2	77.3	81.3	11,610	11,100	400	0.28	0.106	488
3x240+3x120/3	22.1	84.7	89.7	14,660	14,400	450	0.27	0.0801	574
3x300+3x150/3	24.7	91.8	96.8	17,330	18,000	490	0.27	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU 18/30KV									
3x25+3x25/3	7.1	52.2	56.2	3,900	1,500	180	0.4	0.7839	139
3x25+3x50/3	7.1	52.2	56.2	4,090	1,500	180	0.4	0.7839	139
3x35+3x25/3	8.4	55	59	4,450	2,100	190	0.38	0.554	172
3x35+3x50/3	8.4	55	59	4,640	2,100	190	0.38	0.554	172
3x50+3x25/3	10.1	58.6	62.6	5,250	3,000	220	0.36	0.386	215
3x50+3x50/3	10.1	58.6	62.6	5,430	3,000	220	0.36	0.386	215
3x70+3x35/3	11.8	62.5	66.5	6,500	4,200	240	0.34	0.272	265
3x70+3x50/3	11.8	63.6	67.6	6,840	4,200	240	0.34	0.272	265
3x95+3x50/3	13.8	67.9	71.9	8,160	5,700	270	0.33	0.206	319
3x120+3x70/3	15.5	72.8	76.8	9,630	7,200	290	0.31	0.161	371
3x150+3x70/3	17.4	76.9	80.9	10,780	9,000	320	0.3	0.129	428
3x185+3x95/3	19.2	80.6	84.6	12,170	11,100	340	0.3	0.106	488
3x240+3x120/3	22.1	88.1	93.1	15,280	14,400	380	0.28	0.0801	574
3x300+3x150/3	24.7	94.6	99.6	18,200	18,000	420	0.28	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU 20/35KV									
3x25+3x25/3	7.1	56.8	60.8	4,450	1,500	160	0.42	0.7839	139
3x35+3x25/3	8.4	61.1	65.1	5,260	2,100	180	0.4	0.554	172
3x50+3x25/3	10.1	64.6	68.6	6,080	3,000	200	0.37	0.386	215
3x50+3x50/3	10.1	63.2	67.2	6,500	3,000	200	0.37	0.386	215
3x70+3x35/3	11.8	68.2	72.2	7,160	4,200	230	0.36	0.272	265
3x70+3x50/3	11.8	68.2	72.2	7,590	4,200	250	0.36	0.272	265
3x120+3x70/3	15.5	76.4	81.4	9,850	7,200	280	0.34	0.161	371

PROTOLON (M)

R-(N)TSCGEWOEU LWL | 6 - 35 KV

For connection of large material handling machines such as excavators, dumpers, mobile crushers in open-cast mines. Flexible MV reeling cable suitable for high mechanical stresses in conjunction with mono-spiral reels and cylindrical reels.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
EN 50525-2-21	Electrical parameters
DIN VDE 0207-21	Compound
DIN VDE 0298-3	Mechanical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

1 Very finely stranded copper, bare (class FS) PE: Very finely stranded copper, bare, class FS
2 Semi-conductive EPR
3 Three core design, with split earth conductor in three interstices; Optical element: six tubes, laid up around a central support element, each with one, two, three or four optical fibers
4 EPR rubber, PROTOLON Special compound 3GI3
5 Semi-conductive NBR easy-strip
8 Rubber - Special compound 5GM3
9 Polyester Mesh tape
10 Polychloroprene (PCP) Special compound 5GM5

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	20 N/mm² static
	25 N/mm² dynamic
Travel speed	On rewinding: up to 100 m/min
	Reeling operation: up to 120 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation
	20 x D min distance with S-type directional changes

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)	20/35 (42)
Test voltage	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV	50 kV
Nominal voltage U	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V	35,000 V

MEDIUM VOLTAGE REELING CABLE WITH INTEGRATED FIBER-OPTICS

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) R-(N)TSCGEWOEU LWL 3.6/6KV									
3x25+2x25/2+LWL	7.1	40	43	2,590	1,500	370	0.35	0.7839	131
3x25+2x50/2+LWL	7.1	42.6	45.6	2,900	1,500	370	0.38	0.7839	131
3x35+2x25/2+LWL	8.4	41.6	44.6	2,960	2,100	430	0.32	0.554	162
3x35+2x50/2+LWL	8.4	44.5	47.5	3,300	2,100	430	0.32	0.554	162
3x50+2x25/2+LWL	10.1	42.8	45.8	3,430	3,000	490	0.28	0.386	202
3x50+2x50/2+LWL	10.1	46.4	49.4	3,950	3,000	490	0.28	0.386	202
3x70+2x35/2+LWL	11.8	46.4	49.4	4,350	4,200	550	0.27	0.272	250
3x70+2x50/2+LWL	11.8	49.8	53.8	4,700	4,200	550	0.29	0.272	250
3x95+2x50/2+LWL	13.8	51.5	55.5	5,630	5,700	630	0.26	0.206	301
3x120+2x70/2+LWL	15.5	55.2	59.2	6,800	7,200	700	0.25	0.161	352
3x150+2x70/2+LWL	17.4	59.2	63.2	7,970	9,000	760	0.25	0.129	404
3x185+2x95/2+LWL	19.2	64.4	68.4 9	,630	11,100	820	0.24	0.106	461
3x240+2x120/2+LWL	22.1	70.6	74.6	12,160	14,400	930	0.24	0.0801	540
3x300+2x150/2+LWL	24.7	77.5	81.5	14,880	18,000	1,030	0.23	0.0641	620
PROTOLON (M) R-(N)TSCGEWOEU LWL 6/10KV									
3x25+2x25/2+LWL	7.1	41.3	44.3	2,660	1,500	330	0.35	0.7839	131
3x25+2x50/2+LWL	7.1	43.6	46.6	2,900	1,500	330	0.38	0.7839	131
3x35+2x25/2+LWL	8.4	42.9	45.9	3,070	2,100	380	0.33	0.554	162
3x35+2x50/2+LWL	8.4	45.2	48.2	3,500	2,100	380	0.35	0.554	162
3x50+2x25/2+FO	10.1	44.1	47.1	3,560	3,000	430	0.29	0.386	202
3x50+2x50/2+LWL	10.1	47.8	50.8	3,900	3,000	430	0.32	0.386	202
3x70+2x35/2+LWL	11.8	47.7	50.7	4,480	4,200	490	0.28	0.272	250
3x70+2x50/2+LWL	11.8	51.2	55.2	5,010	4,200	490	0.3	0.272	250
3x95+2x50/2+LWL	13.8	52.8	56.8	5,770	5,700	560	0.27	0.206	301
3x120+2x70/2+LWL	15.5	56.4	60.4	6,950	7,200	620	0.25	0.161	352
3x150+2x70/2+LWL	17.4	61.9	65.9	8,350	9,000	670	0.25	0.129	404
3x185+2x95/2+LWL	19.2	65.7	69.7	9,810	11,100	730	0.24	0.106	461
3x240+2x120/2+LWL	22.1	73.3	77.3	12,600	14,400	820	0.24	0.0801	540
3x300+2x150/2+LWL	24.7	78.7	82.7	15,090	18,000	910	0.23	0.0641	620
3x50+1x25+1x(4x2,5ST)+LWL	10.1	47.8	50.8	3,990	3,000	430	0.32	0.386	202
3x70+1x35+1x(4x2,5ST)+LWL	11.8	52.2	55.2	5,100	4,200	490	0.28	0.272	250
3x95+1x50+1x(4x2,5ST)+LWL	13.8	60.1	64.1	7,350	5,700	560	0.27	0.206	301
3x120+1x70+1x(4x2,5ST)+LWL	15.5	66	70	8,800	7,200	620	0.25	0.161	352
PROTOLON (M) R-(N)TSCGEWOEU LWL 8.7/15KV									
3x25+2x25/2+FO	7.1	43.6	46.6	2,910	1,500	260	0.36	0.7839	139
3x25+2x50/2+FO	7.1	45.9	48.9	3,250	1,500	260	0.38	0.7839	139

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x35+2x25/2+LWL	8.4	43.9	46.9	3,180	2,100	290	0.33	0.554	172
3x35+2x50/2+FO	8.4	47.5	50.5	3,600	2,100	290	0.35	0.554	172
3x50+2x25/2+LWL	10.1	47.5	50.5	3,900	3,000	330	0.31	0.386	215
3x50+2x50/2+LWL	10.1	51	55	4,500	3,000	330	0.32	0.386	215
3x70+2x35/2+LWL	11.8	52	56	5,020	4,200	370	0.3	0.272	265
3x70+2x50/2+LWL	11.8	52	56	5,130	4,200	370	0.3	0.272	265
3x95+2x50/2+LWL	13.8	56.2	60.2	6,180	5,700	410	0.28	0.206	319
3x120+2x70/2+LWL	15.5	61.3	65.3	7,600	7,200	450	0.27	0.161	371
3x150+2x70/2+LWL	17.4	65.3	69.3	8,820	9,000	500	0.27	0.129	428
3x185+2x95/2+LWL	19.2	69.1	73.1	10,300	11,100	540	0.26	0.106	488
3x240+2x120/2+LWL	22.1	76.6	80.6	13,140	14,400	600	0.25	0.0801	574
3x300+2x150/2+LWL	24.7	83.5	88.5	16,040	18,000	660	0.25	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU LWL 12/20KV									
3x25+2x25/2+LWL	7.1	44.1	47.1	2,980	1,500	230	0.36	0.7839	139
3x25+2x50/2+LWL	7.1	47	50	3,300	1,500	230	0.39	0.7839	139
3x35+2x25/2+LWL	8.4	46.8	49.8	3,480	2,100	260	0.34	0.554	172
3x35+2x50/2+LWL	8.4	50.3	54.3	4,000	2,100	260	0.36	0.554	172
3x50+2x25/2+FO	10.1	51.3	55.3	4,700	3,000	300	0.32	0.386	215
3x50+2x50/2+LWL	10.1	51.3	55.3	4,800	3,000	300	0.32	0.386	215
3x70+2x35/2+FO	11.8	55	59	5,370	4,200	330	0.31	0.272	265
3x70+2x50/2+LWL	11.8	55	59	5,480	4,200	330	0.31	0.272	265
3x95+2x50/2+LWL	13.8	59.2	63.2	6,550	5,700	370	0.3	0.206	319
3x120+2x70/2+LWL	15.5	64.2	68.2	8,000	7,200	410	0.29	0.161	371
3x150+2x70/2+LWL	17.4	68.2	72.2	9,240	9,000	440	0.28	0.129	428
3x185+2x95/2+LWL	19.2	73.4 7	7.4	11,010	11,100	480	0.27	0.106	488
3x240+2x120/2+LWL	22.1	79.6	83.6	13,650	14,400	540	0.26	0.0801	574
3x300+2x150/2+LWL	24.7	86.4	91.4	16,590	18,000	590	0.26	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU LWL 14/25KV									
3x25+2x25/2+LWL	7.1	47.9	50.9	3,360	1,500	200	0.38	0.7839	139
3x25+2x50/2+LWL	7.1	47.9	50.9	3,440	1,500	200	0.4	0.7839	139
3x35+2x25/2+FO	8.4	51.5	55.5	4,050	2,100	220	0.36	0.554	172
3x35+2x50/2+LWL	8.4	51.5	55.5	4,130	2,100	220	0.36	0.554	172
3x50+2x25/2+LWL	10.1	55.2	59.2	4,830	3,000	260	0.34	0.386	215
3x50+2x50/2+LWL	10.1	55.2	59.2	4,900	3,000	260	0.34	0.386	215
3x70+2x35/2+LWL	11.8	58.8	62.8	5,840	4,200	280	0.32	0.272	265
3x70+2x50/2+LWL	11.8	58.8	62.8	5,950	4,200	280	0.32	0.272	265
3x95+2x50/2+LWL	13.8	64.4	68.4	7,280	5,700	310	0.31	0.206	319
3x120+2x70/2+LWL	15.5	68	72	8,530	7,200	350	0.3	0.161	371
3x150+2x70/2+LWL	17.4	73.4	77.4	10,080	9,000	370	0.29	0.129	428

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x185+2x95/2+LWL	19.2	77.3	81.3	11,630	11,100	400	0.28	0.106	488
3x240+2x120/2+LWL	22.1	84.7	89.7	14,690	14,400	450	0.27	0.0801	574
3x300+2x150/2+LWL	24.7	90.2	95.2	17,310	18,000	500	0.26	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU LWL 18/30KV									
3x25+2x25/2+LWL	7.1	52.2	56.2	3,900	1,500	180	0.4	0.7839	139
3x25+2x50/2+LWL	7.1	52.2	56.2	3,980	1,500	180	0.4	0.7839	139
3x35+2x25/2+LWL	8.4	55	59	4,450	2,100	200	0.38	0.554	172
3x35+2x50/2+LWL	8.4	55	59	4,530	2,100	200	0.38	0.554	172
3x50+2x25/2+LWL	10.1	58.6	62.6	5,250	3,000	220	0.35	0.386	215
3x50+2x50/2+LWL	10.1	58.6	62.6	5,320	3,000	220	0.35	0.386	215
3x70+2x35/2+LWL	11.8	63.6	67.6	6,510	4,200	250	0.34	0.272	265
3x70+2x50/2+LWL	11.8	63.6	67.6	6,610	4,200	250	0.34	0.272	265
3x95+2x50/2+LWL	13.8	67.8	71.8	7,770	5,700	270	0.33	0.206	319
3x120+2x70/2+LWL	15.5	72.8	76.8	9,230	7,200	290	0.31	0.161	371
3x150+2x70/2+LWL	17.4	76.9	80.9	10,630	9,000	320	0.3	0.129	428
3x185+2x95/2+LWL	19.2	80.6	84.6	12,190	11,100	340	0.3	0.106	488
3x240+2x120/2+LWL	22.1	88.1	93.1	15,310	14,400	380	0.28	0.0801	574
3x300+2x150/2+LWL	24.7	94.6	99.6	18,220	18,000	420	0.28	0.0641	660
PROTOLON (M) R-(N)TSCGEWOEU LWL 20/35KV									
3x25+2x25/2+LWL	7.1	56.8	60.8	4,450	1,500	160	0.42	0.7839	139
3x35+2x25/2+LWL	8.4	61.1	65.1	5,250	2,100	180	0.4	0.554	172
3x50+2x25/2+LWL	10.1	64.6	68.6	6,180	3,000	200	0.37	0.386	215
3x50+2x35/2+LWL	10.1	64.6	68.6	6,390	3,000	200	0.37	0.386	215
3x70+2x35/2+LWL	11.8	68.2	72.2	7,320	4,200	230	0.36	0.272	265
3x70+2x50/2+1x(24E9LWL)	11.8	68.2	72.2	7,600	4,200	230	0.36	0.272	265

TROMMELFLEX-M-PUR

D2X11Y | 1 KV

TROMMELFLEX-M-PUR is a flexible low voltage reeling cable with optimized dimensions and flame retardant, halogen-free polyurethane outer sheath. The cable is used as power supply for underground mining and tunnelling equipment and designed for frequently changing dynamic loads, such as reeling operation on drilling machines, scoops and LHD's. Suitable to withstand the high mechanical stresses caused by reeling application and the abrasion to be expected in trailing operation.

STANDARDS / APPROVALS

DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0298-300	Core identification
IEC 60502-1	Compound
DIN VDE 0298-4	Electrical parameters
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Halogen free	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Max. water depth	10 m

MECHANICAL PARAMETERS

Torsional stress +/-	50 °/m
Permanent tensile strength (rule)	20 N/mm²
Travel speed	Reeling operation underground: 60 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	4 x D fixed installation
	8 x D reeling operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Test voltage	2.5 kV
AC test voltage (control cores)	2 kV
Nominal voltage U	1,000 V

1 Finely stranded copper, bare, class 5
2 XLPE
5 Three main conductors laid-up together with split earth conductor and control cores in the inter-stices. Cores twisted with very short length of lay
Main cores: brown, black, grey
Control cores: blue, white
6 Halogenfree polymer
7 Polyurethane (PUR)

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Bending radius moving (min)	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	mm	Ω/km	A
TROMMELFLEX-M-PUR D2X11Y 0.6/1KV								
3x25 + 3G6 + 2x1	6.2	22.5	24	1,130	1,500	192	0.78	131
3x35 + 3G6 + 2x1,5	7.8	26.5	28	1,530	2,100	224	0. 554	162
3x50 + 3G10 + 2x1,5	9.6	30	32	2,160	3,000	256	0.386	202
3x70 + 3G16 + 2x1,5	11.1	35	37	3,050	4,200	296	0.272	250
3x95 + 3G16 + 2x1,5	12.6	39.5	42	3,690	5,700	336	0.206	302
3x120 + 3G25 + 2x1,5	14.8	44	46.5	4,810	7,200	372	0.161	352
3x150 + 3G25 + 2x1,5	16	49	52	5,780	9,000	416	0.129	404
3x185 + 3G35 + 2x1,5	17.7	53.5	56	7,300	11,100	448	0.106	461
3x240 + 3G50 + 2x1,5	20.2	61.5	64.5	9,600	14,400	516	0.0801	540
4x50	9.6	33	35	2,450	4,000	280	0.386	202
4x70	11.1	38.1	40.6	3,300	5,600	325	0.272	250
4G70 + 2x (10x2,5) + 1x (8x1,5)C	11.1	62	66	5,300	5,600	528	0.272	250

TROMMELFLEX-M-PUR BRAIDED

D2X11Y | 1 KV

TROMMELFLEX-M-PUR is a flexible low voltage reeling cable with optimized dimensions and flame retardant, halogen-free polyurethane outer sheath. The cable is used as power supply for underground mining and tunnelling equipment and designed for frequently changing dynamic loads, such as reeling operation on drilling machines, scoops and LHD's. Suitable to withstand the high mechanical stresses caused by reeling application and the abrasion to be expected in trailing operation.

STANDARDS / APPROVALS

DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0298-300	Core identification
IEC 60502-1	Compound
DIN VDE 0298-4	Electrical parameters
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Halogen free	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Max. water depth	10 m

MECHANICAL PARAMETERS

Torsional stress +/-	50 °/m
Permanent tensile strength (rule)	25 N/mm²
Travel speed	Reeling operation underground: 100 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	4 x D fixed installation
	8 x D reeling operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Test voltage	2.5 kV
AC test voltage (control cores)	2 kV
Nominal voltage U	1,000 V

2 Finely stranded copper, bare, class 5
3 XLPE
4 Central Aramid carrier element; Three main conductors laid-up together with split earth conductor in the inter-stices. Cores twisted with very short length of lay Main cores: brown, black, grey
6 Halogenfree polymer
7 Braiding
8 Polyurethane (PUR)

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Bending radius moving (min)	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	mm	Ω/km	A
TROMMELFLEX-M-PUR D2X11Y 0.6/1KV								
3x25+3G6	6.2	23	25	1,215	1,875	200	0.78	131
3x50+3G10	9.6	30.5	32.5	2,250	3,750	260	0.386	202
3x70+3G16	11.1	35.5	37.5	3,210	5,250	300	0.272	250
3x95+3G16	12.6	39.5	42.5	3,925	7,125	340	0.206	301
3x25+3G6+2X1	6.2	23	24.5	1,243	1,875	196	0.78	131
3x35+3G6+2X1,5	7.8	26.5	28	1,570	2,100	224	0.554	162
3x50+3G10+2X1,5	9.6	30.5	32.5	2,376	3,750	260	0.386	202
3x70+3G16+2X1,5	11.1	35.5	37.5	3,355	5,250	300	0.272	250
3x95+3G16+2X1,5	12.6	40	42.5	4,059	7,125	340	0.206	301
3x120+3G25+2X1,5	14.8	44.5	47	5,291	9,000	376	0.161	352
3x150+3G25+2X1,5	16	49.5	52.5	6,358	11,250	420	0.129	404
3x185+3G35+2X1,5	17.7	54	56.5	8,030	13,875	452	0.106	461
3x240+3G50+2X1,5	20.2	62	65	10,560	18,000	520	0.0801	540
4x16	5.1	22	23.5	900	1,600	188	1.21	99

TUNNELFLEX-PUR HF

WITHOUT ANTITWISTING PROTECTION | 1 KV

Power supply to mobile equipment with high risk of mechanical damage in mining and tunneling. TUNNELFLEX/PUR HF cable, due to without anti-twisting protection, is suitable for application where it is deflected in one plane only. Maximum speed 60 m/min.

STANDARDS / APPROVALS

DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0298-300	Core identification
IEC 60754-1	Halogen-free
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Fire behaviour	Yes
Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes

MECHANICAL PARAMETERS

Travel speed	60 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D on drums

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Max. operating voltage Um	1.2 kV
Test voltage	3.5 kV

1 Plain copper, flexible, class 5
2 XLPE special compound Brown - Black - Grey
3 Phase cores laid up with earth cores in the interstices
4 Conductor: Plain copper, flexible, class 5
5 optional without control cores
6 HFFR* thermoplastic polyurethane compound
7 HFFR* thermoplastic polyurethane compound, abrasion, tear, oil & chemical resistant

* halogen free and flame retardant

HALOGEN-FREE LOW VOLTAGE POWER CABLES FOR MOBILE APPLICATIONS

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Bending radius fixed (min)	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	mm	A
TUNNELFLEX-PUR HF-0.6/1KV							
4G10	4.0	18.0	20.0	580	800	120	74
4G16	5.1	20.0	22.0	870	1280	132	99
3x25+3G6	6.5	22.5	24.0	1120	1500	144	131
3x35+3G6	7.5	25.5	28.0	1490	2100	168	162
3x50+3G10	9.1	29.5	32.0	2100	3000	192	202
3x70+3G16	10.8	34.0	37.0	2960	4200	222	250
3x95+3G16	12.1	37,5	40,5	3640	5700	243	301
3x120+3G25	14.3	42.0	45.0	4750	7200	270	352
3x150+3G25	16.1	47.5	50.5	5740	9000	303	404
3x185+3G35	17.5	52.0	55.0	6960	11100	330	461
3x240+3G50	19.9	58.0	61.0	9130	14400	366	540
TUNNELFLEX-R-PUR HF-0.6/1KV WITH CONTROL CORES							
3x25+3G6+2x1	6.5	22.5	24.0	1150	1500	144	131
3x35+3G6+2x1,5	7.5	26.0	28.0	1530	2100	168	162
3x50+3G10+2x1,5	9.1	29.5	32.0	2130	3000	192	202
3X70+3G16+2x1,5	10.8	34.0	37.0	2990	4200	222	250
3x95+3G16+2x1,5	12.1	37.5	40.5	3670	5700	243	301
3X120+3G25+2x1,5	14.3	42.0	45.0	4780	7200	270	352
3x150+3G25+2x1,5	16.1	47.5	50.5	5780	9000	303	404
3X185+3G35+2x1,5	17.5	52.0	55.0	7000	11100	330	461
3X240+3G50+2x1,5	19.9	58.0	61.0	9170	14400	366	540

TUNNELFLEX-R-PUR HF

WITH ANTITWISTING PROTECTION | 1 KV

Power supply to mobile equipment with high risk of mechanical damage in mining and tunneling.
Maximum speed 120 m/min.

STANDARDS / APPROVALS

DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0298-300	Core identification
IEC 60754-1	Halogen-free
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Fire behaviour	Yes
Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes

MECHANICAL PARAMETERS

Travel speed	120 m/min
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation 10 x D on drums

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Max. operating voltage Um	1.2 kV
Test voltage	3.5 kV

1 Plain copper, flexible, class 5
2 XLPE special compound Brown - Black - Grey
3 Phase cores laid up with earth cores in the interstices
4 Conductor: Plain copper, flexible, class 5
5 optional with control cores
6 HFFR* thermoplastic polyurethane compound
7 Synthetic mesh
8 HFFR* thermoplastic polyurethane compound, abrasion, tear, oil & chemical resistant

* halogen free and flame retardant

HALOGEN-FREE LOW VOLTAGE POWER CABLES FOR MOBILE APPLICATIONS

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Bending radius fixed (min)	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	mm	A
TUNNELFLEX-R-PUR HF-0.6/1KV							
4G10	4.0	18.5	20.5	630	800	123	74
4G16	5.1	21.5	23.5	930	1280	141	99
3x25+3G6	6.5	24.5	26.5	1240	1500	159	131
3x35+3G6	7.5	26.0	28.5	1520	2100	171	162
3x50+3G10	9.1	30.0	32.5	2130	3000	195	202
3x70+3G16	10.8	34.0	37.0	3000	4200	222	250
3x95+3G16	12.1	37,5	40,5	3710	5700	243	301
3x120+3G25	14.3	42.5	45.5	4830	7200	273	352
3x150+3G25	16.1	47.5	50.5	5830	9000	303	404
3x185+3G35	17.5	52.0	55.0	7050	11100	330	461
3x240+3G50	19.9	58.0	61.0	9240	14400	366	540
TUNNELFLEX-R-PUR HF-0.6/1KV WITH CONTROL CORES							
3x25+3G6+2x1	6.5	25,5	28.0	1260	1500	168	131
3x35+3G6+2x1,5	7.5	26.5	29.0	1560	2100	174	162
3x50+3G10+2x1,5	9.1	30.0	32.5	2160	3000	195	202
3X70+3G16+2x1,5	10.8	34.0	37.0	3030	4200	222	250
3x95+3G16+2x1,5	12.1	37.5	40.5	3740	5700	243	301
3X120+3G25+2x1,5	14.3	42.5	45.5	4860	7200	273	352
3x150+3G25+2x1,5	16.1	47.5	50.5	5860	9000	303	404
3X185+3G35+2x1,5	17.5	52.0	55.0	7080	11100	330	461
3X240+3G50+2x1,5	19.9	58.0	61.0	9270	14400	366	540

PROTOLON (SB)

NTSCGEWOEU | 3 - 30 KV

As power supply or connection cables for large material handling machines, e.g. excavators in opencast mines subject to extremely high mechanical stresses in which abrasion and chaffing stresses are to be expected in trailing operation.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
EN 50525-2-21	Electrical parameters
DIN VDE 0298-3	Mechanical parameters
MSHA P-189-4	Certifications / Approvals
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-20 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	15 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation 10 x D flexible operation

1 Conductor
2 Inner semi-conducting layer
3 Core insulation
4 Core arrangement
5 Outer semi-conducting layer
6 Split Earth Conductor
7 Armoring / reinforcement
8 Inner sheath
9 Outer sheath

1 Finely stranded copper, tinned, class 5
PE: Very finely stranded copper, tinned, class FS with semi conductive special rubber compound
2 Semi-conductive EPR
3 EPR rubber
PROTOLON
Special compound 3GI3
4 Three-core design, with split earth conductor in the interstices.
Tear-resistant reinforcing tape over assembly
5 Semi-conductive NBR easy strip
7 Braiding
Material - Polyester
8 Rubber - polychloroprene (PCP)
Special compound 5GM5
9 Rubber polychloroprene (PCP),
Special compound 5GM5

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	1.8/3 (3,6)	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)
Test voltage	6 kV	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV
Nominal voltage U	3,000 V	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V

MEDIUM VOLTAGE FLEXIBLE TRAILING CABLES

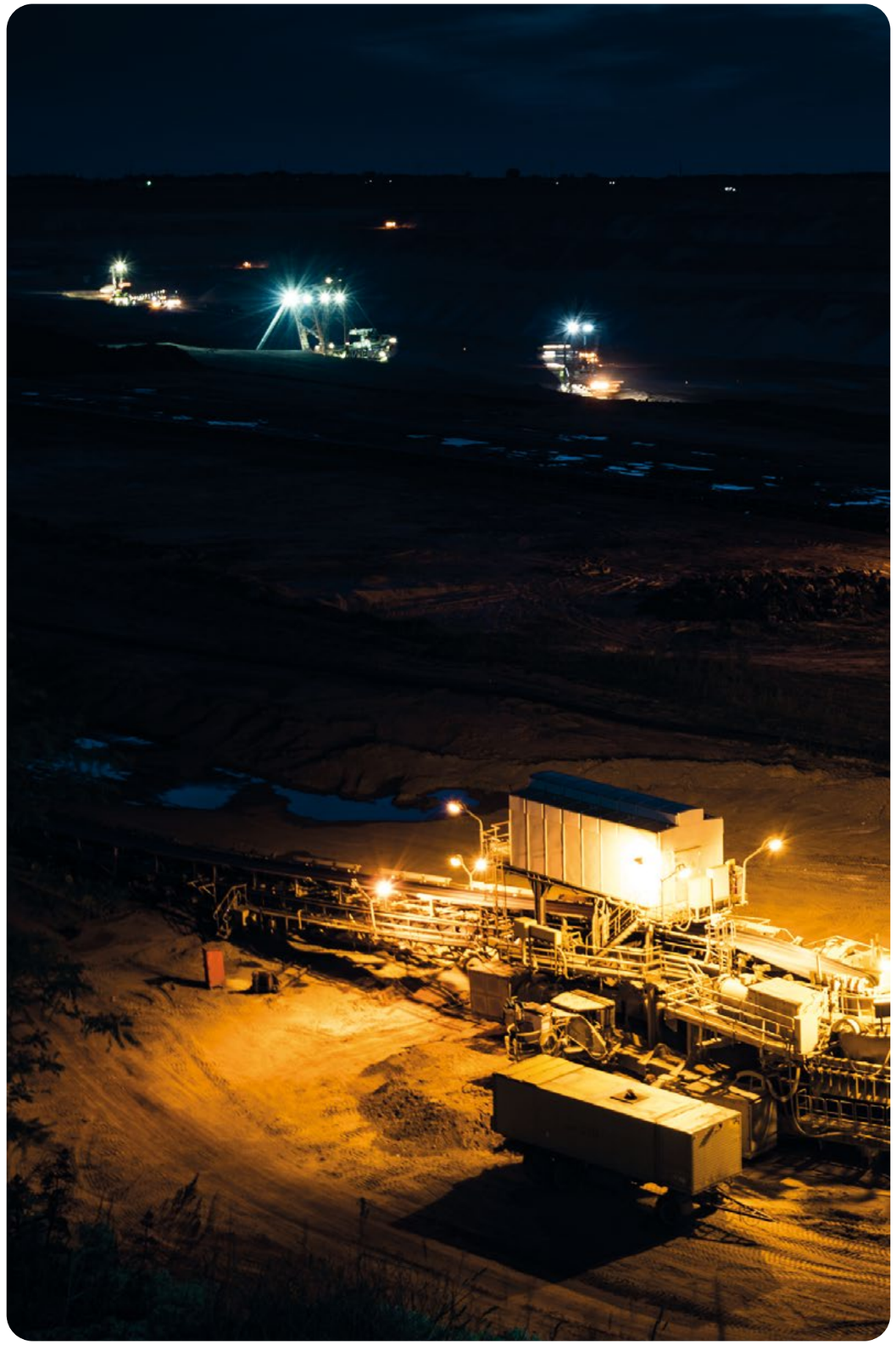
ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (SB) NTSCGEWOEU 1.8/3KV									
3x25+3x25/3	6.4	35.5	38.5	2,470	1,125	410	0.33	0.795	131
3x35+3x25/3	7.6	39.5	42.5	3,080	1,575	470	0.31	0.565	162
3x50+3x25/3	9.1	43.1	46.1	3,750	2,250	540	0.29	0.393	202
3x70+3x35/3	10.9	46.7	50.7	4,690	3,150	610	0.28	0.277	250
3x95+3x50/3	12.6	54.4	58.4	6,210	4,275	660	0.28	0.21	301
3x120+3x70/3	14.2	58.2	62.2	7,430	5,400	720	0.27	0.164	352
3x150+3x70/3	5.9	63.7	67.7	8,900	6,750	790	0.26	0.132	404
3x185+3x95/3	17.7	67.6	71.6	10,330	8,325	860	0.26	0.108	461
PROTOLON (SB) NTSCGEWOEU 3.6/6KV									
3x25+3x25/3	6.4	43.1	46.1	2,910	1,125	340	0.36	0.795	131
3x35+3x25/3	7.6	42.5	45.5	3,180	1,575	390	0.34	0.565	162
3x50+3x25/3	9.1	45.7	48.7	3,860	2,250	430	0.32	0.393	202
3x70+3x35/3	10.9	51.7	55.7	5,080	3,150	490	0.3	0.277	250
3x95+3x50/3	12.6	59.9	63.9	6,580	4,275	540	0.29	0.21	301
3x120+3x70/3	14.2	59	63	8,110	5,400	600	0.28	0.164	352
3x150+3x70/3	15.9	64.4	68.4	8,610	6,750	650	0.27	0.132	404
3x185+3x95/3	17.7	68.3	72.3	10,020	8,325	700	0.27	0.108	461
PROTOLON (SB) NTSCGEWOEU 6/10KV									
3x25+3x25/3	6.4	41.6	44.6	2,880	1,125	310	0.37	0.795	131
3x35+3x25/3	7.6	44.2	47.2	3,340	1,575	350	0.34	0.565	162
3x50+3x25/3	9.1	47.3	50.3	4,020	2,250	390	0.33	0.393	202
3x70+3x35/3	10.9	53.4	57.4	5,610	3,150	440	0.31	0.277	250
3x95+3x50/3	12.6	57.4	61.4	6,140	4,275	490	0.3	0.21	301
3x120+3x70/3	14.2	62.6	66.6	8,010	5,400	540	0.29	0.164	352
3x150+3x70/3	15.9	66.1	70.1	9,170	6,750	580	0.28	0.132	404
3x185+3x95/3	17.7	69.6	73.6	10,280	8,325	630	0.27	0.108	461
PROTOLON (SB) NTSCGEWOEU 8.7/15KV									
3x25+3x25/3	6.4	46.3	49.3	3,230	1,125	250	0.39	0.795	139
3x35+3x25/3	7.6	50.2	54.2	3,920	1,575	280	0.37	0.565	172
3x50+3x25/3	9.1	53.3	57.3	4,610	2,250	310	0.35	0.393	215
3x70+3x35/3	10.9	58	62	6,000	3,150	350	0.33	0.277	265
3x95+3x50/3	12.6	68.2	72.2	7,850	4,275	390	0.32	0.21	319
3x120+3x70/3	14.2	67.2	71.2	8,440	5,400	420	0.31	0.164	371
3x150+3x70/3	15.9	70.8	74.8	9,640	6,750	460	0.3	0.132	428
3x185+3x95/3	17.7	76.4	80.4	11,440	8,325	500	0.29	0.108	488

MEDIUM VOLTAGE FLEXIBLE TRAILING CABLES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (SB) NTSCGEWOEU 12/20KV									
3x25+3x25/3	6.4	51.9	55.9	3,920	1,125	220	0.41	0.795	139
3x35+3x25/3	7.6	54.4	58.4	4,450	1,575	250	0.39	0.565	172
3x50+3x25/3	9.1	65	69	6,300	2,250	270	0.37	0.393	215
3x70+3x35/3	10.9	68.9	72.9	7,410	3,150	300	0.35	0.277	265
3x95+3x50/3	12.6	68.1	72.1	7,950	4,275	330	0.33	0.21	319
3x120+3x70/3	14.2	71.4	75.4	9,160	5,400	360	0.32	0.164	371
3x150+3x70/3	15.9	76.8	80.8	10,720	6,750	390	0.31	0.132	428
3x185+3x95/3	17.7	88.4	92.4	13,530	8,325	420	0.3	0.108	488
PROTOLON (SB) NTSCGEWOEU 14/25KV									
3x25+3x25/3	6.4	58.7	62.2	5,310	1,125	190	0.43	0.795	139
3x35+3x25/3	7.6	64.8	68.8	6,150	1,575	220	0.41	0.565	172
PROTOLON (SB) NTSCGEWOEU 18/30KV									
3x25+3x25/3	6.4	65.5	68.5	6,680	1,125	170	0.45	0.795	139
3x35+3x25/3	7.6	71.5	74.5	7,380	1,575	190	0.43	0.565	172
3x50+3x25/3	9.1	72.5	75.5	8,460	2,250	210	0.4	0.393	215
3x70+3x35/3	10.9	86.5	90.5	9,690	3,150	230	0.38	0.277	265
3x95+3x50/3	2.6	79.9	83.9	10,960	4,275	250	0.37	0.21	319
3x120+3x70/3	14.2	85.6	89.6	12,830	5,400	270	0.35	0.164	371
3x150+3x70/3	15.9	89.3	93.3	14,250	6,750	290	0.34	0.132	428
3x185+3x95/3	17.7	95	99	16,390	8,325	310	0.33	0.108	488



PROTOLON (SB-SAM)

(N)TSCGEWOEU | 6 - 20 KV

As power supply or connection cables for large material handling machines, e.g. excavators in opencast mines subject to extremely high mechanical stresses in which abrasion and chaffing stresses are to be expected in trailing operation.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
EN 50525-2-21	Electrical parameters
DIN VDE 0298-3	Mechanical parameters
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	20 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	3.6/6 (7.2) kV	6/10 (12)kV	12/20 (24)kV
Test voltage	11 kV	17 kV	29 kV
Nominal voltage U	6,000 V	10,000 V	20,000 V

1 Finely stranded copper, tinned, class 5
PE: Very finely stranded copper, tinned, class FS with semi conductive special rubber compound

2 Semi-conductive EPR

3 EPR rubber
PROTOLON
Special compound 3GI3

4 Three-core design, with split earth conductor in the interstices.
Tear-resistant reinforcing tape over assembly

5 Semi-conductive NBR easy strip

7 Braiding
Material - Polyester

8 Rubber - polychloroprene (PCP)
Special compound 5GM5

9 Rubber polychloroprene (PCP), Special compound > 5GM5

MEDIUM VOLTAGE FLEXIBLE TRAILING CABLES WITH OPTIMIZED WALL THICKNESS

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON(SB-SAM) (N)TSCGEWOEU 3.6/6 KV									
3x25+2x25/2 + 1x10ST	6.5	35.5	42.5	2670	1500	0.35	0.32	0.78	131
3x35+2x25/2 + 1x10ST	7.6	41.9	44.9	3020	2100	0.39	0.31	0.554	162
3x50+2x25/2 + 1x10ST	9.1	42.8	45.8	3510	3000	0.45	0.29	0.386	202
3x70+2x35/2 + 1x10ST	10.9	46.5	49.5	4300	4200	0.52	0.28	0.272	250
3x95+2x50/2 + 1x10ST	12.7	52.9	56.9	5600	5700	0.58	0.27	0.206	301
3x120+2x70/2 + 1x10ST	14.4	56.5	60.5	6750	7200	0.65	0.26	0.161	352
3x150+2x70/2 + 1x10ST	16.2	63	67	8100	9000	0.71	0.25	0.129	404
3x185+2x95/2 + 1x10ST	17.8	66.4	70.4	9400	11100	0.77	0.25	0.106	461
3x240+2x120/2 + 1x10ST	20.6	72.3	76.3	11700	14400	0.88	0.24	0.08	540
PROTOLON(SB-SAM) (N)TSCGEWOEU 6/10 KV									
3x25+2x25/2 + 1x10ST	6.5	40.8	43.8	2700	1500	0.3	0.34	0.78	131
3x35+2x25/2 + 1x10ST	7.6	41.1	44.1	3030	2100	0.33	0.32	0.554	162
3x50+2x25/2 + 1x10ST	9.1	45.3	48.3	3600	3000	0.38	0.31	0.386	202
3x70+2x35/2 + 1x10ST	10.9	47.7	50.7	4540	4200	0.43	0.29	0.272	250
3x95+2x50/2 + 1x10ST	12.7	54.2	58.2	5700	5700	0.48	0.28	0.206	301
3x120+2x70/2 + 1x10ST	14.4	57.7	61.7	7130	7200	0.54	0.27	0.161	352
3x150+2x70/2 + 1x10ST	16.2	64.2	68.2	8300	9000	0.59	0.26	0.129	404
3x185+2x95/2 + 1x10ST	17.8	67.6	71.6	9600	11100	0.64	0.26	0.106	461
3x240+2x120/2 + 1x10ST	20.6	72.3	76.3	12060	14400	0.72	0.25	0.08	540
PROTOLON(SB-SAM) (N)TSCGEWOEU 8.7/15 KV									
3x25+2x25/2 + 1x10ST	6.5	41.9	44.9	2600	1500	0.22	0.37	0.78	139
3x35+2x25/2 + 1x10ST	7.6	45.5	48.5	3440	2100	0.25	0.35	0.554	172
3x50+2x25/2 + 1x10ST	9.1	47.4	50.4	3700	3000	0.28	0.33	0.386	215
3x70+2x35/2 + 1x10ST	10.9	53.7	57.7	5380	4200	0.32	0.31	0.272	265
3x95+2x50/2 + 1x10ST	12.7	57.6	61.6	6150	5700	0.35	0.3	0.206	319
3x120+2x70/2 + 1x10ST	14.4	63	67	7840	7200	0.39	0.29	0.161	371
3x150+2x70/2 + 1x10ST	16.2	66.8	70.8	8990	9000	0.43	0.28	0.129	428
3x185+2x95/2 + 1x10ST	17.8	71 75	10100	11100	0.106	0.27	488	0.46	26.46
3x240+2x120/2 + 1x10ST	20.6	78.3	83.3	12800	14400	0.52	0.27	0.08	574

MEDIUM VOLTAGE FLEXIBLE TRAILING CABLES WITH OPTIMIZED WALL THICKNESS

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON(SB-SAM) (N)TSCGEWOEU 12/20 KV									
3x25+2x25/2 + 1x10ST	6.5	44.9	47.9	3000	1500	0.78	0.22	0.37	139
3x35+2x25/2 + 1x10ST	7.6	47.2	50.2	3500	2100	0.554	0.24	0.35	172
3x50+2x25/2 + 1x10ST	9.1	51.7	55.7	4350	3000	0.386	0.27	0.33	215
3x70+2x35/2 + 1x10ST	10.9	55.5	59.5	5400	4200	0.272	0.31	0.32	265
3x95+2x50/2 + 1x10ST	12.7	60.5	64.5	6500	5700	0.206	0.35	0.3	319
3x120+2x70/2 + 1x10ST	14.4	65.9	69.9	8000	7200	0.161	0.38	0.29	371
3x150+2x70/2 + 1x10ST	16.2	70.6	74.6	9200	9000	0.129	0.42	0.28	428
3x185+2x95/2 + 1x10ST	17.8	75.8	79.8	10850	11100	0.106	0.45	0.28	488
3x240+2x120/2 + 1x10ST	20.6	81.2	86.2	13300	14400	0.08	0.51	0.27	574

FLEXIBLE TRAILING CABLE WITH COPPER CORE SHIELD

PROTOLON(SB)

NEW

SHD-GC | 5 - 15 KV

Shielded heavy-duty ground check cables (SHD-GC) are used as power supply or connection cables for large material handling machines, e.g. excavators in opencast mines subject to extremely high mechanical stresses. Particularly suitable for applications in which abrasion and chaffing stresses are to be expected in trailing operation.

STANDARDS / APPROVALS

ANSI/NEMA WC 58 ICEA S-75-381	General
DIN VDE 0298-3	Mechanical parameters
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour
EN 50525-2-21	Electrical parameters

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	25 °/m
Permanent tensile strength (rule)	20 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	5 kV	8 kV	15 kV
Test voltage	14 kV	23 kV	43 kV
Nominal voltage U	5,000 V	8,000 V	15,000 V

1 Finely stranded copper, tinned
Ground-Check: Finely stranded copper, tinned, with yellow rubber insulation
Ground: Finely stranded copper, tinned

2 Semi-conductive EPR

3 Three main conductors with individual concentric mix screen of tinned copper and colored polyester yarn laid up with 2 ground conductors and one GC in the outer interstices.
Tear-resistant reinforcing tape over assembly

4 EPR rubber PROTOLON

5 Semi-conductive NBR easy strip

8 Rubber - polychloroprene (PCP)

9 Polyester Mesh tape

10 Rubber - polychloroprene (PCP)

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

TENAX-SAS

(N)TSCGEWOEU | 6 - 35 KV

As power supply cable to large mobile equipment in mines. Trailing cable for use with shovels and draglines in trailing and reeling applications. The outer sheath is extremly robust and tough against abrasion and tearing, fully flexible operation down to -50°C,

STANDARDS / APPROVALS

DIN VDE 0250-813	General
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0207-21	Compound
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
DIN VDE 0298-4	Electrical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-50 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-50 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	20 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 X D fixed installation
	10 X D flexible operation
	20 X D min distance with S-type directional changes

1 Finely stranded copper, tinned, class 5
PE: Finely stranded copper, tinned, class 5 with semi conductive special rubber compound
3 Semi-conductive EPR
4 Cores laid up around conductive central support element with aramid rope in the centre
5 EPR rubber
Special compound 3GI3
6 Semi-conductive NBR easy strip
7 Copper, tinned, class 5; EPR-insulation
8 EPR rubber
Special compound 5GM3
9 Rubber Special compound 5GM3

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)	20/35 (42)
Test voltage	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV	50 kV
Nominal voltage U	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V	35,000 V

MEDIUM VOLTAGE CABLE FOR TRAILING APPLICATIONS COLD FLEXIBLE TO -50°C

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
TENAX-SAS (N)TSCGEWOEU 3.6/6KV									
3x16+2x10+1x10	5	41	45	2,270	1,200	200	0.39	1.24	99
3x16+2x16+1x16	5	40.5	44.5	2,469	1,200	200	0.39	1.24	99
3x25+2x16+1x16	6.2	43.5	47.5	2,790	1,875	230	0.36	0.795	131
3x35+2x16+1x16	7.5	46.5	50	3,280	2,625	260	0.34	0.565	162
3x50+2x16+1x16	9	49.5	54	3,900	3,750	290	0.32	0.393	202
3x70+2x25+1x16	10.6	55	59.5	5,020	5,250	340	0.3	0.277	250
3x95+2x25+1x16	12.6	58.5	63	5,860	7,125	370	0.29	0.21	301
3X95+3X50/3	12.6	58.5	63	5,800	7,125	370	0.29	0.21	301
3x120+2x35+1x16	14.8	65.5	70	7,410	9,000	410	0.28	0.164	352
3x150+2x35+1x16	16	69.8	73.4	8,456	11,250	440	0.27	0.132	404
3x185+2x50+1x16	17.7	72.7	77.2	9,955	13,875	480	0.27	0.108	461
3x240+2x70+1x16	20.3	80.1	84.6	12,618	18,000	540	0.26	0.0817	540
3x300+2x95+1x16	31.3	84	89	15,075	22,500	780	0.24	0.0654	620
TENAX-SAS (N)TSCGEWOEU 6/10KV									
3x16+2x16+1x16	5	42.5	46.5	2,613	1,200	190	0.4	1.24	99
3x25+2x16+1x16	6.2	46.1	49.6	3,041	1,875	210	0.37	0.0795	131
3x35+2x16+1x16	7.5	52.5	56.5	3,470	2,625	240	0.35	0.565 1	62
3x50+2x16+1x16	9	52	56.5	4,080	3,750	270	0.33	0.393	202
3x70+2x25+1x16	10.6	57	61.5	5,240	5,250	310	0.31	0.277	250
3x95+2x25+1x16	12.6	61.6	66.1	6,503	7,125	340	0.3	0.21	301
3x120+2x35+1x16	14.8	64.2	68.7	7,630	9,000	380	0.29	0.164	352
3x150+2x35+1x16	16	70.6	75.1	8,694	11,250	410	0.28	0.132	404
3x185+2x50+1x16	17.7	74.4	78.9	10,467	13,875	440	0.27	0.108	461
3x240+2x70+1x16	20.3	81.8	86.3	12,895	18,000	490	0.26	0.0817	540
3x300+2x95+1x16	31.3	87.5	92.5	15,693	22,500	710	0.24	0.0654	620
TENAX-SAS (N)TSCGEWOEU 8.7/15KV									
3x16+2x16+1x16	5	47	51	3,041	1,200	160	0.43	1.24	105
3x25+2x16+1x16	6.2	52	56	3,677	1,875	180	0.4	0.0795	139
3x35+2x16+1x16	7.5	55.4	59.9	4,138	2,625	200	0.37	0.565	172
3x50+2x16+1x16	9	57.5	61.5	4,813	3,750	220	0.35	0.393	215
3x70+2x25+1x16	10.6	64	68	6,159	5,250	260	0.33	0.277	265
3x95+2x25+1x16	12.6	68.2	72.7	7,123	7,125	280	0.32	0.21	319
3x120+2x35+1x16	14.8	72.9	77.4	8,322	9,000	310	0.31	0.164	371
3x150+2x35+1x16	16	75.4	79.9	9,645	11,250	330	0.3	0.132	428
3x185+2x50+1x16	17.7	80.9	85.4	11,208	13,875	360	0.29	0.108	488
3x240+2x70+1x16	20.3	86.5	91	13,991	18,000	400	0.28	0.0817	574

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x300+2x95+1x16	31.3	92	97	16,533	22,500	570	0.25	0.0654	660
3x16+2x16+1x16	5	47	51	3,041	1,200	160	0.43	1.24	105
3x25+2x16+1x16	6.2	52	56	3,677	1,875	180	0.4	0.0795	139
3x35+2x16+1x16	7.5	55.4	59.9	4,138	2,625	200	0.37	0.565	172
3x50+2x16+1x16	9	57.5	61.5	4,813	3,750	220	0.35	0.393	215
3x70+2x25+1x16	10.6	64	68	6,159	5,250	260	0.33	0.277	265
3x95+2x25+1x16	12.6	68.2	72.7	7,123	7,125	280	0.32	0.21	319
3x120+2x35+1x16	14.8	72.9	77.4	8,322	9,000	310	0.31	0.164	371
3x150+2x35+1x16	16	75.4	79.9	9,645	11,250	330	0.3	0.132	428
3x185+2x50+1x16	17.7	80.9	85.4	11,208	13,875	360	0.29	0.108	488
3x240+2x70+1x16	20.3	86.5	91	13,991	18,000	400	0.28	0.0817	574
3x300+2x95+1x16	31.3	92	97	16,533	22,500	570	0.25	0.0654	660
TENAX-SAS (N)TSCGEWOEU 12/20KV									
3x16+2x16+1x16	5	53.5	57.5	3,655	1,200	140	0.45	1.24	105
3x25+2x16+1x16	6.2	56.9	61.4	4,145	1,875	160	0.42	0.0795	139
3x35+2x16+1x16	7.5	59.7	64.2	4,628	2,625	180	0.39	0.565	172
3x50+2x16+1x16	9	62.8	67.3	5,552	3,750	200	0.37	0.393	215
3x95+2x25+1x16	12.6	72.5	77	7,727	7,125	250	0.33	0.21	319
3x120+2x35+1x16	14.8	79	83.5	9,224	9,000	270	0.32	0.164	371
3x150+2x35+1x16	16	81.5	86	10,324	11,250	290	0.31	0.132	428
3x185+2x50+1x16	17.7	85.5	90.5	12,218	13,875	310	0.3	0.108	488
3x240+2x70+1x16	20.3	92.6	97.1	14,768	18,000	350	0.29	0.0817	574
3x300+2x95+1x16	31.3	98.5	103.5	17,694	22,500	490	0.26	0.0654	660
TENAX-SAS (N)TSCGEWOEU 14/25KV									
3x16+2x16+1x16	5	59	63	4,288	1,200	130	0.48	1.24	105
3x25+2x16+1x16	6.2	62.5	67	5,030	1,875	140	0.44	0.795	139
3x35+2x16+1x16	7.5	67.1	71.6	5,631	2,625	160	0.42	0.565	172
3x50+2x16+1x16	9	70.2	74.7	6,301	3,750	170	0.39	0.393	215
3x70+2x25+1x16	10.6	73.8	78.3	7,794	5,250	200	0.37	0.277	265
3x95+2x25+1x16	12.6	79.9	84.4	8,843	7,125	210	0.35	0.21	319
3x120+2x35+1x16	14.8	84.6	89.1	10,125	9,000	230	0.34	0.164	371
3x150+2x35+1x16	16	87.1	91.6	11,568	11,250	250	0.33	0.132	428
3x185+2x70+35	17.7	92.1	97.1	13,220	13,875	270	0.32	0.108	488
3x240+2x70+1x16	20.3	98.5	102.7	16,175	18,000	300	0.3	0.0817	574
3x300+2x95+1x16	31.3	104	109	18,837	22,500	420	0.27	0.0654	660

MEDIUM VOLTAGE CABLE FOR TRAILING APPLICATIONS COLD FLEXIBLE TO -50°C

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
TENAX-SAS (N)TSCGEWOEU 18/30KV									
3x16+2x16+1x16	5	66	70	5,157	1,200	120	0.5	1.24	105
3x25+2x16+1x16	6.2	69.5	74	5,719	1,875	130	0.46	0.0795	139
3x35+2x16+1x16	7.5	72.3	76.8	6,264	2,625	140	0.44	0.565	172
3x70+2x25+1x16	10.6	80.7	85.2	8,607	5,250	180	0.38	0.277	265
3x95+2x25+1x16	12.6	85	89.5	9,992	7,125	190	0.37	0.21	319
3x120+2x35+1x16	14.8	91.6	96.1	11,324	9,000	210	0.35	0.164	371
3x150+2x35+1x16	16	94	98.5	12,509	11,250	220	0.34	0.132	428
3x185+2x50+1x16	17.7	97.8	102.3	14,542	13,875	240	0.33	0.108	488
3x240+2x70+1x16	20.3	103.4	107.9	17,234	18,000	270	0.32	0.0817	574
3x300+2x95+1x16	31.3	108	114	19,949	22,500	370	0.28	0.0654	660
TENAX-SAS (N)TSCGEWOEU 20/35KV									
3x16+2x16+1x16	5	71	77	6,057	1,200	110	0.52	1.24	105
3x25+2x16+1x16	6.2	76	82	6,922	1,875	120	0.48	0.0795	139
3x35+2x16+1x16	7.5	78	84	7,508	2,625	130	0.46	0.565	172
3x50+2x16+1x16	9	82	88	8,346	3,750	140	0.43	0.393	215
3x70+2x25+1x16	10.6	88	94	10,008	5,250	160	0.4	0.277	265
3x95+2x25+1x16	12.6	92	98	11,155	7,125	170	0.39	0.21	319
3x120+2x35+1x16	14.8	96	104	12,872	9,000	190	0.37	0.164	371
3x150+2x35+1x16	16	99	107	14,112	11,250	200	0.36	0.132	428
3x185+2x50+1x16	17.7	103	111	15,331	13,875	210	0.35	0.108	488
3x240+2x70+1x16	20.3	109	117	18,633	18,000	240	0.33	0.0817	574
3x300+2x95+1x16	31.3	114	122	21,416	22,500	320	0.29	0.0654	660

TENAX-PUR

(N)TSCGEH3S | 6 - 10 KV

TENAX-PUR is a medium voltage trailing cable for the power supply to large mobile equipment in mines, such as shovels and draglines. The outer sheath (available in orange, yellow, or other colours on demand) is extremely robust and tough against abraison and tearing, suitable for fully flexible operation down to -50°C.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60754-2	Fire performance
DIN VDE 0298-4	Electrical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-50 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-50 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Permanent tensile strength (rule)	25 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation
	20 X D min distance with S-type directional changes

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	3.6/6 (7.2) kV	6/10 (12)kV
Test voltage	11 kV	17 kV
Nominal voltage U	6,000 V	10,000 V

1 Finely stranded copper, tinned, class 5
PE: Finely stranded copper, tinned, class 5 with semi conductive special rubber compound
2 Semi-conductive EPR
3 Cores laid up around semiconductive central filler with aramid yarns
4 EPR rubber
Special compound 3GI3
5 Semi-conductive NBR easy strip
6 Copper, tinned, class 5; EPR-insulation
7 Polyurethane (PUR)

PUR POWER CABLE FOR TRAILING APPLICATION

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
TENAX-PUR (N)TSCGEH3S 3.6/6KV									
3x35+2x16+1x16	7.5	46	50	3,380	2,625	320	0.35	0.565	162
3x25+2x16+1x16	6.2	43.5	47.5	2,800	1,875	300	0.37	0.795	131
3x16+2x10+1x10	5	42.2	46.2	2,400	1,200	280	0.39	1.24	99
3x35+2x16+1x16	7.5	46	50	3,380	2,625	320	0.35	0.565	162
3x50+2x16+1x16	9	47.4	51.4	3,760	3,750	360	0.32	0.393	202
3x70+2x25+1x16	11	52	56	4,700	5,250	410	0.3	0.277	250
3x95+2x25+1x16	12.6	55.3	59.3	5,420	7,125	460	0.29	0.21	301
3x120+2x35+1x16	14.8	60.5	64.5	6,700	9,000	520	0.28	0.164	352
3x120+2x35+1x16	14.8	60.5	64.5	6,700	9,000	520	0.28	0.164	352
3x150+2x35+1x16	16	62.5	66.5	7,430	11,250	560	0.27	0.132	404
3x150+3x95/3	16	62.5	66.5	8,170	11,250	560	0.27	0.132	404
3x185+2x50+1x16	17.7	68.5	72.5	9,500	13,875	600	0.26	0.108	461
TENAX-PUR (N)TSCGEH3S 6/10KV									
3x35+2x16+1x16	7.5	46	50	3,380	2,625	290	0.35	0.565	162
3x50+2x16+1x16	9	49.2	53.2	3,800	3,750	330	0.33	0.393	202
3x70+2x25+1x16	11	53.5	57.5	4,850	5,250	370	0.31	0.277	250
3x95+2x25+1x16	12.6	57	61	5,700	7,125	420	0.3	0.21	301
3x120+2x35+1x16	14.8	61.7	65.7	6,990	9,000	470	0.29	0.164	352
3x150+2x35+1x16	16	65.5	69.5	7,800	11,250	500	0.28	0.132	404
3x185+2x50+1x16	17.7	72.8	76.8	10,000	13,875	540	0.27	0.108	461
3x240+2x70+1x16	20.3	77.3	81.3	12,500	18,000	600	0.26	0.0817	540

TENAX-LUMEN

(N)TSCGH3S | 6 - 10 KV

TENAX-LUMEN is a self-illuminating medium voltage trailing cable for the power supply to large mobile equipment in mines, such as shovels and draglines. Especially intended for application where, to guarantee the safety of personnel and equipment, the cable must be visible in the dark. The active illuminating element, embedded under a transparent polyurethane outer sheath, allows the cable illumination also when not energized. The outer sheath is extremely robust and tough against abraison and tearing, suitable for fully flexible operation down to -50°C.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60754-2	Fire performance
DIN VDE 0298-4	Electrical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-50 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-50 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

Permanent tensile strength (rule)	25 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation
	10 x D flexible operation
	20 X D min distance with S-type directional changes

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	3.6/6 (7.2) kV	6/10 (12)kV
Test voltage	11 kV	17 kV
Nominal voltage U	6,000 V	10,000 V

1 Finely stranded copper, tinned, class 5
PE: Finely stranded copper, tinned, class 5 with semi conductive special rubber compound
2 Semi-conductive EPR
3 EPR rubber
Special compound 3GI3
4 Cores laid up around semiconductive central filler with aramid yarns; EL-strings in the outer interstices
Special electroluminescent string designed for high visibility and low power consumption
5 Semi-conductive NBR easy strip
6 Copper, tinned, class 5; EPR-insulation
8 Polyurethane (PUR)
Special compound transparent

LUMINESCENT POWER CABLE FOR TRAILING APPLICATION

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
TENAX-LUMEN (N)TSCGH3S 3.6/6KV									
3x35+3x25/3	7.5	45.2	48.5	3,100	2,625	260	0.34	0.565	162
3x35+2x16+1x16	7.5	44.5	48.5	3,150	2,625	260	0.34	0.565	162
3x50+2x16+1x16	9	49.3	53.8	3,800	3,750	290	0.32	0.393	202
3x70+3x35/3	10.6	52	56	4,650	5,250	320	0.3	0.277	250
3x95+2x25+1x16	12.6	58.9	63.4	5,750	7,125	370	0.29	0.21	301
3x70+2x25+1x16	10.6	52	56	4,700	5,250	320	0.3	0.277	250
3x150+2x35+1x16	16	68.8	72.4	8,350	11,250	440	0.27	0.132	404
3x120+2x35+1x16	14.8	60.5	64.5	6,700	9,000	400	0.28	0.164	352
3x185+2x50+1x16	17.7	71.7	76.2	9,850	13,875	480	0.27	0.108	461
3x240+2x70+1x16	20.3	74.3	78.3	12,000	18,000	540	0.26	0.0817	540
TENAX-LUMEN (N)TSCGH3S 6/10KV									
3x35+2x16+1x16	7.5	46	50	3,380	2,625	240	0.35	0.565	162
3x50+2x16+1x16	9	49.2	53.2	3,950	3,750	270	0.33	0.393	202
3x70+2x25+1x16	10.6	53.5	57.5	4,850	5,250	310	0.31	0.277	250
3x95+2x25+1x16	12.6	57	61	5,700	7,125	340	0.3	0.21	301
3x120+2x35+1x16	14.8	61.7	65.7	6,990	9,000	380	0.29	0.164	352
3x150+2x35+1x16	16	65.5	69.5	7,800	11,250	410	0.28	0.132	404
3x185+2x50+1x16	17.7	72.8	76.8	10,000	13,875	440	0.27	0.108	461
3x240+2x70+1x16	20.3	77.3	81.3	12,500	18,000	490	0.26	0.0817	540
3x50+3x25/3	9	49.2	53.2	3,900	3,750	270	0.33	0.393	202
3x70+3x35/3	10.6	53.5	57.5	4,800	5,250	310	0.31	0.277	250

LUMEN

Parameters of electroluminescent strings	
Voltage max.	125 V AC
Frequency max.	2000 Hz
Current absorption	~ 15 A/km
Heat development	none
Light homogeneity	> 95%
Irradiation	360°

FLEXIBLE TRAILING CABLE WITH COPPER CORE SHIELD

TENAX-PUR

SHD GC | 8 KV

NEW

As power supply or connection cables for large material handling machines, e.g. excavators in opencast mines subject to extremely high mechanical stresses. Particularly suitable for applications in which abrasion and chaffing stresses are to be expected in trailing operation. Halogen free.

STANDARDS / APPROVALS

ANSI/NEMA WC 58 ICEA S-75-381	General
DIN VDE 0298-3	Mechanical parameters
EN 50525-2-21	Electrical parameters
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

MECHANICAL PARAMETERS

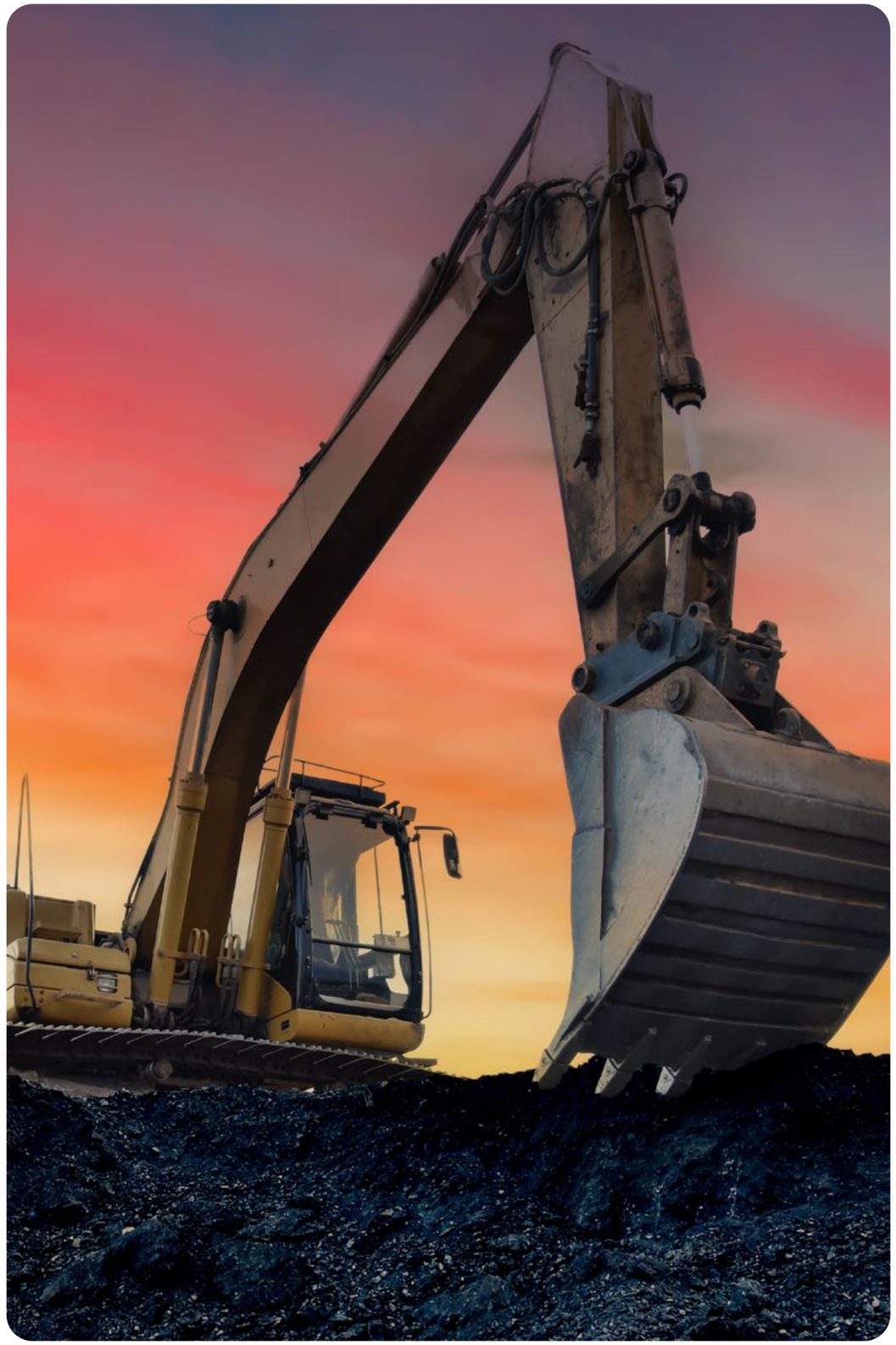
Torsional stress +/-	25 °/m
Permanent tensile strength (rule)	20 N/mm² static
Bending radius (rule)	
Acc. to VDE 0298-3:	6 x D fixed installation 10 x D flexible operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	5 kV	8 kV	15 kV
Test voltage	14 kV	23 kV	43 kV
Nominal voltage U	5,000 V	8,000 V	15,000 V

1 Finely stranded copper, tinned
Ground-Check: Finely stranded copper, tinned, with yellow rubber insulation
Ground: Finely stranded copper, tinned
2 Semi-conductive EPR
3 EPR rubber PROTOLON
4 Three main conductors with individual concentric mix screen of tinned copper and colored polyester yarn laid up with 2 ground conductors and one GC in the outer interstices. Tear-resistant reinforcing tape over assembly
7 Semi-conductive NBR easy strip
8 Polyurethane (PUR)
9 Polyester Braiding
10 Polyurethane (PUR)

ONLINE DATA SHEET
Here you can find the online data sheet of this product.



PROTOLON (ST)

NTSCGEWOEU | 3 - 30 KV

Power supply cable for use in water, e.g. for connection to dredgers, floating docks, pumps, etc., in applications where high mechanical stresses are to be expected. Also suitable for use in sewage, salt water and brackish water at water depths of up to 500 m.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN VDE 0298-4	Electrical parameters
MSHA P-189-4	Certifications / Approvals
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
DIN EN 50525-2-21	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-25 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth	500 m

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3:
	6 x D fixed installation
	10 x D flexible operation

1 Finely stranded copper, tinned, class 5
PE: Split into 3 in the outer interstices.
2 Semi-conductive EPR
3 EPR rubber
Special compound 3GI3
4 Three main conductor laid-up with protective-earth conductor split into 3 in the outer interstices.
6 Semi-conductive EPR
7 Special EPR compound waterproof
8 Chlorinated polyethylene (CM/CPE)
Special compound 5GM3 waterproof

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)	20/35 (42)
Test voltage	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV	50 kV
Nominal voltage U	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V	35,000 V

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (ST) NTSCGEWOEU 1.8/3KV									
3x25+3x25/3	6.4	36.1	39.1	2,370	1,125	330	0.33	0.795	131
3x35+3x25/3	7.6	37.8	40.8	2,600	1,575	380	0.31	0.565	162
3x50+3x25/3	9	42.1	45.1	3,320	2,250	430	0.3	0.393	202
3x70+3x35/3	10.9	47.4	50.4	4,350	3,150	500	0.28	0.277	250
3x95+3x50/3	12.6	53.2	57.2	5,850	4,275	520	0.27	0.21	301
3x120+3x70/3	14.1	56.4	60.4	6,700	5,400	560	0.27	0.164	352
3x150+3x70/3	16	60.4	64.4	8,060	6,750	630	0.26	0.132	404
3x185+3x95/3	17.8	66.9	70.9	9,450	8,325	690	0.25	0.108	461
3x240+3x120/3	20.4	72.4	76.4	11,000	10,800	770	0.25	0.0817	540
PROTOLON (ST) NTSCGEWOEU 3.6/6KV									
3x16+3x16/3E	5.7	37.5	40.5	2,250	720	240	0.35	1.24	99
3x25+3x25/3	6.4	40.1	43.1	2,620	1,125	260	0.35	0.795	131
3x25+3x25/3E	6.4	42.4	45.4	2,800	1,125	260	0.35	0.795	131
3x35+3x25/3	7.6	42.6	45.6	3,200	1,575	290	0.33	0.565	162
3x35+3x16/3E	7.6	43.9	46.9	3,310	1,575	290	0.33	0.565	162
3x50+3x25/3	9	45.6	48.6	3,690	2,250	330	0.32	0.393	202
3x35+3x25/3E	7.6	44.3	47.3	3,420	1,575	290	0.33	0.565	162
3x70+3x35/3	10.9	52.2	56.2	5,180	3,150	380	0.3	0.277	250
3x50+3x25/3E	9	48.1	51.1	4,160	2,250	330	0.32	0.393	202
3x95+3x50/3	12.6	58.4	62.4	6,600	4,275	430	0.29	0.21	301
3x120+3x70/3	14.2	59.1	63.1	7,320	5,400	470	0.28	0.164	352
3x70+3x35/3E	10.9	54.3	58.3	5,440	3,150	380	0.3	0.277	250
3x150+3x70/3	16	65.6	69.6	8,470	6,750	520	0.27	0.132	404
3x95+3x50/3E	12.6	63.8	67.8	6,610	4,275	430	0.29	0.21	301
3x185+3x95/3	17.8	69.4	73.4	9,850	8,325	560	0.26	0.108	461
3x120+3x70/3E	14.1	64	68	8,240	5,400	470	0.28	0.164	352
3x150+3x70/3E	16	69.9	73.9	9,520	6,750	520	0.27	0.132	404
3x240+3x120/3	20.4	76.7	80.7	11,500	10,800	630	0.25	0.0817	540
PROTOLON (ST) NTSCGEWOEU 6/10KV									
3x25+3x25/3	6.4	41.7	44.7	2,910	1,125	240	0.36	0.795	138
3x35+3x25/3	7.6	44.3	47.3	3,380	1,575	270	0.34	0.565	171
3x50+3x25/3	9	48.9	52.9	4,310	2,250	300	0.32	0.393	214
3x70+3x35/3	10.9	53.8	57.8	5,380	3,150	340	0.31	0.277	265
3x95+3x50/3	12.6	57.4	61.4	6,420	4,275	380	0.29	0.21	321
3x120+3x70/3	14.1	60.6	64.6	7,270	5,400	420	0.29	0.164	372
3x150+3x70/3	16	66.4	70.4	9,000	6,750	460	0.28	0.132	428

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x185+3x95/3	17.8	71.1	75.1	10,100	8,325	500	0.27	0.108	488
3x240+3x120/3	20.4	77.9	82.9	12,000	10,800	560	0.26	0.0817	575
PROTOLON (ST) NTSCGEWOEU 8.7/15KV									
3x25+3x25/3	6.4	46.4	49.4	3,440	1,125	200	0.39	0.795	138
3x35+3x25/3	7.6	48.4	52.4	3,730	1,575	220	0.37	0.565	171
3x50+3x25/3	9	53.3	57.3	4,880	2,250	240	0.35	0.393	215
3x70+3x35/3	0.9	57.3	61.3	5,780	3,150	280	0.33	0.277	265
3x95+3x50/3	12.6	63.9	67.9	7,100	4,275	310	0.31	0.21	319
3x120+3x70/3	14.1	67.1	71.1	8,250	5,400	330	0.3	0.164	371
3x150+3x70/3	16	72	76	9,450	6,750	370	0.29	0.132	428
3X150+2X70/2+1x(24E9LWL)	16	74.5	78.5	10,100	6,750	370	0.29	0.132	428
3x185+3x95/3	17.8	76.6	80.6	11,690	8,325	400	0.28	0.108	488
3x240+3x120/3	20.4	82.6	87.6	12,700	10,800	440	0.27	0.0817	574
PROTOLON (ST) NTSCGEWOEU 12/20KV									
3x25+3x25/3	6.4	52	56	4,190	1,125	170	0.41	0.795	139
3x35+3x25/3	7.6	54.5	58.5	4,720	1,575	190	0.39	0.565	172
3x50+3x25/3	9	57.4	61.4	5,460	2,250	210	0.37	0.393	215
3x70+3x35/3	10.9	64.5	68.5	6,660	3,150	240	0.35	0.277	265
3x95+3x50/3	12.6	68.2	72.2	7,760	4,275	260	0.33	0.21	319
3x120+3x70/3	14.1	71.3	75.3	8,930	5,400	280	0.32	0.164	371
3x150+3x70/3	16	77.5	82.5	10,500	6,750	310	0.31	0.132	428
3x185+3x95/3	17.8	81.3	86.3	12,000	8,325	340	0.3	0.108	488
3x240+3x120/3	20.4	88.6	93.6	13,800	10,800	380	0.29	0.0817	574
PROTOLON (ST) NTSCGEWOEU 14/25KV									
3x25+3x25/3	6.4	57.4	61.4	4,670	1,125	150	0.44	0.795	139
3x35+3x25/3	7.6	60	64	5,500	1,575	160	0.41	0.565	172
3x50+3x25/3	9	64.8	68.8	6,220	2,250	180	0.39	0.393	215
3x70+3x35/3	10.9	68.8	72.8	7,500	3,150	200	0.37	0.277	265
3x95+3x50/3	12.6	75.5	79.5	9,000	4,275	220	0.35	0.21	319
3x120+3x70/3	14.1	78.1	83.1	12,250	5,400	240	0.34	0.164	371
3x150+3x70/3	16	83	88	11,600	6,750	270	0.32	0.132	428
3x185+3x95/3	17.8	88.6	93.6	13,500	8,325	290	0.31	0.108	488
3x240+3x120/3	20.4	94.1	99.1	15,500	10,800	320	0.3	0.0817	574
PROTOLON (ST) NTSCGEWOEU 18/30KV									
3x25+3x25/3	6.4	64.3	68.3	5,650	1,125	140	0.46	0.795	139
3x35+3x25/3	7.6	66.9	70.9	6,230	1,575	150	0.43	0.565	172
3x50+3x25/3	9	69.8	73.8	7,000	2,250	160	0.41	0.393	215
3x70+3x35/3	10.9	76.8	80.8	8,710	3,150	180	0.38	0.277	265

MEDIUM VOLTAGE FLEXIBLE CABLES FOR USE IN WATER

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x95+3x50/3	12.6	79.5	84.5	9,910	4,275	200	0.37	0.21	319
3x120+3x70/3	14.1	83.2	88.2	11,280	5,400	220	0.35	0.164	371
3x150+3x70/3	16	89	94	12,910	6,750	230	0.34	0.132	428
3x185+3x95/3	17.8	93.7	98.7	14,500	8,325	250	0.33	0.108	488
3x240+3x120/3	20.4	101	106	16,500	10,800	280	0.32	0.0817	574

PROTOLON (ST) 3E

NTSCGEWOEU | 3 - 30 KV

Power supply cable for use in water, e.g. for connection to dredgers, floating docks, pumps, etc., in applications where high mechanical stresses are to be expected. Also suitable for use in sewage, salt water and brackish water at water depths of up to 500 m. This screened cable design is suitable for the use with dredging equipment acc. VDE 0168.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN VDE 0298-4	Electrical parameters
MSHA P-189-4	Certifications / Approvals
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
DIN EN 50525-2-21	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

1 Finely stranded copper, tinned, class 5
PE: individual concentric conductors distributed over the insulation of the three main cores.
2 Semi-conductive EPR
3 EPR rubber
Special compound 3GI3
4 Semi-conductive EPR
6 Three main conductor laid-up with individual concentric protective-earth conductor.
7 Special EPR compound waterproof
8 Chlorinated polyethylene (CM/CPE)
Special compound 5GM3 waterproof

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-25 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth	500 m

MECHANICAL PARAMETERS

Torsional stress +/-	25 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3:
	6 x D fixed installation
	10 x D flexible operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	1.8/3 (3,6)	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)
Test voltage	6 kV	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV
Nominal voltage U	3,000 V	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V

MEDIUM VOLTAGE FLEXIBLE CABLES FOR USE IN WATER WITH COPPER CORE SHIELD

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (ST) 3E NTSCGEWOEU 1.8/3KV									
3x25+3x25/3E	6.4	37.5	40.5	2,400	1,125	330	0.33	0.795	131
3x35+3x25/3E	7.6	40.9	43.9	3,000	1,575	380	0.31	0.565	162
3x50+3x25/3E	9	45.4	48.4	3,600	2,250	430	0.3	0.393	202
3x70+3x35/3E	10.9	50.8	54.8	4,800	3,150	500	0.28	0.277	250
3x95+3x50/3E	12.6	57.1	61.1	6,200	4,275	520	0.27	0.21	301
3x120+3x70/3E	14.1	59.7	63.7	7,540	5,400	560	0.27	0.164	352
3x150+3x70/3E	16	67.6	71.6	8,700	6,750	630	0.26	0.132	404
3x185+3x95/3E	17.8	69.3	73.3	10,160	8,325	690	0.25	0.108	461
PROTOLON (ST) 3E NTSCGEWOEU 3.6/6KV									
3x185+3x95/3E	17.8	75.8	79.8	11,000	8,325	560	0.26	0.108	461
3x240+3x120/3E	20.4	82	86	13,500	10,800	600	0.25	0.0817	574
PROTOLON (ST) 3E NTSCGEWOEU 6/10KV									
3x25+3x16/3E	6.4	43.9	46.9	3,100	1,125	240	0.36	0.795	131
3x25+3x25/3E	6.4	44.1	47.1	3,100	1,125	240	0.36	0.795	131
3x35+3x16/3E	7.6	49.8	52.8	3,850	1,575	270	0.34	0.565	162
3x35+3x25/3E	7.6	46.7	49.7	3,740	1,575	270	0.34	0.565	162
3x50+3x25/3E	9	52.4	56.4	4,460	2,250	300	0.32	0.393	202
3x70+3x35/3E	10.9	57.3	61.3	5,840	3,150	340	0.31	0.277	250
3x95+3x50/3E	12.6	63.2	67.2	7,250	4,275	380	0.29	0.21	301
3x120+3x70/3E	14.1	67.1	71.1	8,560	5,400	420	0.29	0.164	352
3x150+3x70/3E	16	71.9	75.9	9,400	6,750	460	0.28	0.132	404
3x185+3x95/3E	17.8	77.6	81.6	11,300	8,325	500	0.27	0.108	461
PROTOLON (ST) 3E NTSCGEWOEU 8.7/15KV									
3x25+3x25/3E	6.4	48.4	52.4	3,700	1,125	200	0.39	0.795	139
3x35+3x25/3E	7.6	52.8	56.8	4,300	1,575	220	0.37	0.565	172
3x50+3x25/3E	9	56.6	60.6	5,000	2,250	240	0.35	0.393	215
3x70+3x35/3E	10.9	60.8	64.8	6,300	3,150	280	0.33	0.277	265
3x95+3x50/3E	12.6	68	72	7,700	4,275	310	0.31	0.21	319
3x120+3x70/3E	14.1	71.7	75.7	8,950	5,400	330	0.3	0.164	371
3x150+3x70/3E	16	77.9	82.9	10,500	6,750	370	0.29	0.132	428
3x185+3x95/3E	17.8	81.8	86.8	12,100	8,325	400	0.28	0.108	488
PROTOLON (ST) 3E NTSCGEWOEU 12/20KV									
3x25+3x25/3E	6.4	55.3	59.3	4,350	1,125	170	0.41	0.795	139
3x25+3x16/3E	6.4	55.3	59.3	4,580	1,125	170	0.41	0.795	139
3x35+3x16/3E	7.6	56.6	60.6	4,940	1,575	190	0.39	0.565	172
3x35+3x25/3E	7.6	57	61	4,930	1,575	190	0.39	0.565	172

MEDIUM VOLTAGE FLEXIBLE CABLES FOR USE IN WATER WITH COPPER CORE SHIELD

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
3x50+3x25/3E	9	59.9	63.9	5,790	2,250	210	0.37	0.393	215
3x70+3x35/3E	10.9	67.1	71.1	7,090	3,150	240	0.35	0.277	265
3x95+3x50/3E	12.6	71	75	8,280	4,275	260	0.33	0.21	319
3x120+3x70/3E	14.1	77.8	81.8	10,000	5,400	280	0.32	0.164	371
3x150+3x70/3E	16	82.3	87.3	11,400	6,750	310	0.31	0.132	428
3x185+3x95/3E	17.8	87.9	92.9	13,300	8,325	340	0.3	0.108	488
PROTOLON (ST) 3E NTSCGEWOEU 14/25KV									
3x25+3x25/3E	6.4	63	67	5,790	1,125	150	0.44	0.795	139
3x35+3x25/3E	7.6	64.5	68.5	5,900	1,575	160	0.41	0.565	172
3x50+3x25/3E	9	68.4	72.4	6,700	2,250	180	0.39	0.393	215
3x70+3x35/3E	10.9	72.5	76.5	8,000	3,150	200	0.37	0.277	265
3x95+3x50/3E	12.6	79.2	84.2	9,700	4,275	220	0.35	0.21	319
3x120+3x70/3E	14.1	82.9	87.9	11,000	5,400	240	0.34	0.164	371
3x150+3x70/3E	16	89.7	94.7	13,000	6,750	270	0.32	0.132	428
3x185+3x95/3E	17.8	93.6	98.6	15,000	8,325	290	0.31	0.108	488
PROTOLON (ST) 3E NTSCGEWOEU 18/30KV									
3x25+3x25/3E	6.4	67.1	71.1	6,300	1,125	140	0.46	0.795	139
3x35+3x25/3E	7.6	70.3	74.3	6,720	1,575	150	0.43	0.565	172
3x50+3x25/3E	9	75.4	79.4	7,900	2,250	160	0.41	0.393	215
3x70+3x35/3E	10.9	79	84	9,200	3,150	180	0.38	0.277	265
3x95+3x50/3E	12.6	86.2	91.2	10,950	4,275	200 0.37	0.21	319	
3x120+3x70/3E	14.1	89.9	94.9	12,400	5,400	220	0.35	0.164	371
3x150+3x70/3E	16	94.9	99.9	13,800	6,750	230	0.34	0.132	428
3x185+3x95/3E	17.8	100.5	105.5	15,950	8,325	250	0.33	0.108	488
3x240+3x120/3E+3x2,5ST	20.4	108.3	111.3	19,480	10,800	260	0.32	0.0817	574

PROTOLON (M)

F-(N)TSWOEU | 5 KV

For laying alongside the conveyor belts (also for shiftable units) and on material handling equipment (even with continuous movement such as in cable booms or as connection between upper and lower car) and for connection of submersible pump units.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN VDE 0298-4	Electrical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
DIN EN 50525-2-21	Chemical behaviour
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-25 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	acc. IEC/EN 60811-404
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth	10 m

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3: 6 x D fixed installation 10 x D flexible operation

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	1.8/3 (3,6) kV
Test voltage	11 kV

1 Finely stranded copper, bare, class 5
2 Semi-conductive EPR
3 EPR rubber PROTOLON HS Special compound 3GI3
4 Three main conductors laid-up
5 Rubber Special EPR compound GM1b
6 Chlorinated polyethylene (CM/CPE) Special compound 5GM3

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) F-(N)TSWOEU 1.8/3KV									
3x70	10.8	42.1	45.1	3,770	3,150	510	0.28	0.272	250

PROTOLON (M)

F-(N)TSCGEWOEU | 6 - 35 KV

For laying alongside the conveyor belts (also for shiftable units) and on material handling equipment (even with continuous movement such as in cable booms or as connection between upper and lower car) and for connection of submersible pump units.

STANDARDS / APPROVALS

DIN VDE 0250-813	General
DIN VDE 0298-4	Electrical parameters
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour
DIN EN 50525-2-21	Chemical behaviour
GOST -R/-K/-B Fire Certificate of Russian Federation	Certifications / Approvals
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-25 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

FFlame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth	10 m

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3:
	6 x D fixed installation
	10 x D flexible operation

1 Finely stranded copper, bare, class 5
2 Semi-conductive EPR
3 EPR rubber PROTOLON HS Special compound 3GI3
4 Three main conductors laid-up, with protective-earth conductor split into 3 in the outer interstices
6 Semi-conductive NBR easy strip
8 Rubber Special EPR compound GM1b
9 Chlorinated polyethylene (CM/CPE) Special compound 5GM3

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um) in kV	3.6/6 (7.2)	6/10 (12)	8.7/15 (17.5)	12/20 (24)	14/25 (29)	18/30 (36)	20/35 (42)
Test voltage	11 kV	17 kV	24 kV	29 kV	36 kV	43 kV	50 kV
Nominal voltage U	6,000 V	10,000 V	15,000 V	20,000 V	25,000 V	30,000 V	35,000 V

MEDIUM VOLTAGE FLEXIBLE CABLES FOR SEMI-FLEXIBLE INSTALLATION

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) F-(N)TSCGEWOEU 3.6/6KV									
3x25+3x25/3	6.4	33.6	36.6	2,090	1,125	350	0.32	0.78	131
3x25+3x50/3	6.4	40.2	41.9	2,730	1,125	350	0.36	0.78	131
3x35+3x25/3	7.6	36.1	39.1	2,510	1,575	390	0.31	0.554	162
3x35+2x25/2+1x10ST	7.6	41	44	3,000	1,575	390	0.31	0.554	162
3x35+3x50/3	7.6	41.7	44.7	3,190	1,575	390	0.33	0.554	162
3x50+3x25/3	9.1	40.4	43.4	3,210	2,250	450	0.29	0.386	202
3x50+3x50/3	9.1	42.9	45.9	3,640	2,250	460	0.29	0.386	202
3x70+3x35/3	10.8	43.9	46.9	4,070	3,150	510	0.28	0.272	250
3x70+3x50/3	10.8	44.4	47.4	4,240	3,150	510	0.28	0.272	250
3x95+3x50/3	12.7	49.7	53.7	5,300	4,275	580	0.27	0.206	301
3x120+3x70/3	14.3	53.1	57.1	6,430	5,400	640	0.26	0.161	352
3x150+3x70/3	16	56.8	60.8	7,310	6,750	710	0.25	0.129	404
3x185+3x95/3	17.7	61.7	65.7	9,000	8,325	770	0.25	0.106	461
3x240+3x120/3	20.6	68.4	72.4	11,280	10,800	800	0.24	0.0801	540
3x300+3x150/3	23.1	75.1	79.1	13,770	13,500	850	0.23	0.0641	620
PROTOLON (M) F-(N)TSCGEWOEU 6/10KV									
3x25+3x25/3	6.4	34.9	37.9	2,190	1,125	310	0.33	0.78	131
3x25+3x50/3	6.4	39.9	42.9	2,830	1,125	310	0.35	0.78	131
3x35+3x25/3	7.6	38.4	41.4	2,710	1,575	350	0.32	0.554	162
3x35+3x35/3	7.6	38.4	41.4	2,790	1,575	350	0.34	0.554	162
3x35+3x50/3	7.6	41.9	44.9	3,230	1,575	350	0.34	0.554	162
3x50+3x25/3	9.1	41.6	44.6	3,340	2,250	400	0.3	0.386	202
3x50+3x50/3	9.1	42.2	45.2	3,590	2,250	400	0.3	0.386	202
3x70+3x35/3	10.8	45.2	48.2	4,200	3,150	460	0.29	0.272	250
3x70+3x50/3	10.8	45.2	48.2	4,300	3,150	460	0.29	0.272	250
3x95+3x50/3	12.7	50.9	54.9	5,440	4,275	520	0.27	0.206	301
3x95+3x70/3	12.7	50.9	54.9	5,610	4,275	520	0.27	0.206	301
3x120+3x70/3	14.3	54.4	58.4	6,600	5,400	570	0.27	0.161	352
3x150+3x70/3	16	57.9	61.9	7,670	6,750	630	0.26	0.129	404
3185+3x95/3	17.7	62.5	66.5	9,170	8,325	680	0.25	0.106	461
3x240+3x120/3	20.6	68.7	72.7	11,540	10,800	700	0.25	0.0801	540
3x300+3x70	23.1	77.1	81.1	14,500	13,500	750	0.24	0.0641	620
3X50+2X25/2+1X(4X2,5)	9.1	43	46	3,580	2,250	490	0.27	0.386	202
3X70+2X35/2+1X(4X2,5)	10.8	46	49	4,400	3,150	460	0.25	0.272	250
3X185+2X95/2+1X(2X2,5ST)	17.7	63.5	67.5	9,050	8,325	680	0.23	0.106	461

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) F-(N)TSCGEWOEU 8.7/15KV									
3x25+3x25/3	6.4	40.2	43.2	2,690	1,125	240	0.36	0.78	139
3x25+3x50/3	6.4	41.8	44.8	3,050	1,125	240	0.38	0.78	139
3x35+3x25/3	7.6	41.8	44.8	2,930	1,575	270	0.34	0.554	172
3x35+3x50/3	7.6	41.8	44.8	3,300	1,575	270	0.34	0.554	172
3x50+3x25/3	9.1	45	48	3,550	2,250	300	0.32	0.386	215
3x50+3x50/3	9.1	45	48	3,930	2,250	300	0.32	0.386	215
3x70+3x35/3	10.8	49.5	53.5	4,590	3,150	340	0.31	0.272	265
3x70+3x50/3	10.8	49.9	53.9	4,950	3,150	340	0.31	0.272	265
3x95+3x50/3	12.7	54.4	58.4	5,930	4,275	390	0.29	0.202	319
3x120+3x70/3	14.3	57.3	61.3	7,020	5,400	420	0.28	0.161	371
3x150+3x70/3	16	63.8	67.8	8,220	6,750	460	0.28	0.129	428
3x185+3x95/3	17.7	65.9	69.9	9,760	8,325	500	0.27	0.106	488
3X240+3X120/3	20.6	76.3	80.3	12,400	10,800	530	0.27	0.08	574
PROTOLON (M) F-(N)TSCGEWOEU 12/20KV									
3x25+3x25/3	6.4	42.3	45.3	2,870	1,125	220	0.37	0.78	139
3x25+3x50/3	6.4	42.3	45.3	3,120	1,125	220	0.37	0.78	139
3x35+3x25/3	7.6	45.8	48.8	3,470	1,575	240	0.35	0.554	172
3x35+3x50/3	7.6	44.8	47.8	3,620	1,575	240	0.35	0.554	172
3x50+3x25/3	9.1	47.9	50.9	4,010	2,250	270	0.33	0.386	215
3x50+3x50/3	9.1	47.9	50.9	4,430	2,250	270	0.33	0.386	215
3x70+3x35/3	10.8	54.6	58.6	5,400	3,150	310	0.32	0.272	265
3x70+3x50/3	10.8	52.4	56.4	5,270	3,150	350	0.32	0.272	265
3x95+3x50/3	12.7	56.5	60.5	6,170	4,275	350	0.3	0.206	319
3x120+3x70/3	14.3	61.7	65.7	7,650	5,400	380	0.29	0.161	371
3x150+3x70/3	16	65.9	69.9	8,930	6,750	410	0.28	0.129	428
3x185+3x95/3	17.7	68.8	72.8	10,230	8,325	450	0.28	0.106	488
PROTOLON (M) F-(N)TSCGEWOEU 14/25KV									
3x25+3x25/3	6.4	46	49	3,120	1,125	190	0.4	0.78	139
3x35+3x25/3	7.6	49.5	53.5	3,930	1,575	210	0.37	0.554	172
3x35+3x35/3	7.6	49.5	53.5	3,890	1,575	210	0.37	0.554	172
3x50+3x25/3	9.1	53.3	57.3	4,760	2,250	230	0.35	0.386	215
3x70+3x35/3	10.8	56.2	60.2	5,570	3,150	260	0.33	0.272	265
3x70+3x50/3	10.8	56.8	60.8	5,710	3,150	260	0.33	0.272	265
3x95+3x50/3	12.7	61.9	65.9	6,990	4,275	290	0.32	0.206	319
3x120+3x70/3	14.3	65.9	69.9	8,200	5,400	320	0.31	0.161	371
3x150+3x70/3	16	70.6	74.6	9,210	6,750	350	0.3	0.129	428
3x185+3x95/3	17.7	75.5	79.5	10,820	8,325	380	0.29	0.106	488

MEDIUM VOLTAGE FLEXIBLE CABLES FOR SEMI-FLEXIBLE INSTALLATION

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self induct-ance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOLON (M) F-(N)TSCGEWOEU 14/25KV									
3x25+3x25/3	6.4	47	51	3,650	1,125	170	0.42	0.78	139
3x35+3x25/3	7.6	52.9	56.9	4,350	1,575	180	0.39	0.554	172
3x50+3x25/3	9.1	52.6	56.6	4,850	2,250	200	0.37	0.386	215
3x70+3x35/3	10.8	61.7	65.7	6,420	3,150	230	0.35	0.272	265
3x95+3x50/3	12.7	65.1	69.1	7,410	4,275 2	50	0.33	0.206	319
3x120+3x70/3	14.3	68.8	72.8	8,660	5,400	280	0.32	0.161	371
3x150+3x70/3	16	75.3	79.3	9,970	6,750	300	0.31	0.129	428
3x185+3x95/3	17.7	78.9	82.9	11,730	8,325	320	0.3	0.106	488
3x240+3x120/3	20.6	84.4	89.4	14,510	10,800	350	0.29	0.0801	574
PROTOLON (M) F-(N)TSCGEWOEU 20/35KV									
3x50+3x25/3	9.1	60.1	64.1	6,200	2,250			0.386	215
3x70+3x35/3	10.8	64.5	68.5	6,550	3,150			0.272	265
3x300+3x150/3	23.1	100	106	19,000	13,500			0.0641	660

PROTOMONT

NSSHOEU | 1 KV

For flexible use and fixed installation opencast mining applications, in quarries, on construction sites and similar applications, with heavy mechanical stresses. The cables can be used indoors as well as outdoors, in explosion-hazard areas, in industry and in agriculture. They can be used permanently in waste water up to 40°C at a depth of max. 2000 m and in industrial water, cooling water, surface water, rainwater and mixed water - and in groundwater and seawater to a more limited extent. The requirements for accessibility and inspection depend on the consistency of the water. In aggressive water or composed of special substances, the cable's resistance properties should be tested. In other respects the specifications of DIN VDE 0298 part 3 applies.

STANDARDS / APPROVALS

DIN VDE 0250-812	General
MSHA P-189-3	Certifications / Approvals
DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0293-308	Core identification
DIN EN 50363 / DIN VDE 0207-20	Compound
DIN EN 50363 / DIN VDE 0207-21	Compound
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
DIN VDE 0298-4	Electrical parameters
DIN EN 50525-2-21	Chemical behaviour
DIN EN 60811-404 / IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-25 °C
Ambient temperature flexible installation (max)	60 °C

CHEMICAL PARAMETERS

FFlame retardant	In accordance with EN/IEC 60332-1-2
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth	2,000 m

MECHANICAL PARAMETERS

Torsional stress +/-	100 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3:
	4 x D fixed installation
	5 x D flexible operation

1 Finely stranded copper, tinned, class 5
2 EPR rubber PROTOLON Special compound 3GI3
3 Three, four of five cores laid-up
5 Rubber Special EPR compound waterproof
6 Chlorinated polyethylene (CM/CPE) Special compound 5GM5

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Test voltage	3.5 kV
AC test voltage (control cores)	2 kV

LOW VOLTAGE FLEXIBLE RUBBER CABLE

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Bending radius moving (min)	Bending radius fix (min)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
PROTOMONT NSSHOEU 0.6/1KV											
1x16	5.4	10.6	11.6	46	35	240	240	420	0.26	1.24	135
1x25	6.3	12.8	13.7	69	55	360	375	420	0.26	0.795	178
1x35	7.4	13.7	14.9	75	60	460	525	490	0.25	0.565 220	
1x50	8.8	15.2	16.7	84	67	630	750	510	0.25	0.393	275
1x70	10.6	14.5	18.8	94	75	850	1,050	590	0.24	0.277	340
1x95	12.1	19.4	20.9	105	84	1,070	1,425	600	0.24	0.21	409
1x120	14.3	18.3	23.4	117	94	1,370	1,800	690	0.23	0.164	479
1x150	15.9	23.9	25.4	127	102	1,660	2,250	690	0.23	0.132	549
1x185	17.5	26.6	28.8	144	115	2,060	2,775	680	0.23	0.108	627
1x240	20.3	29.8	32	160	128	2,630	3,600	730	0.23	0.0817	734
1x300	23.1	34.6	36.8	184	147	3,300	4,500	760	0.23	0.0654	843
1x400	26.2	38.5	40.5	203	162	4,260	6,000	760	0.24	0.0495	1,024
1x500	29.7	41.4	44.4	222	178	5,300	7,500	770	0.24	0.0391	1,178
2x1,5	1.6	10.3	11.9	48	36	170	45	220	0.33	13.7	23
2x2,5	1.9	11.4	13	65	52	210	75	230	0.32	8.21	30
2x4	2.4	7.5	9.5	73	58	220	120	260	0.31	5.09	41
3x1,5 -O	1.6	10.8	12.4	62	50	180	68	220	0.33	13.7	23
3x1,5 -J	1.6	10.7	12.3	62	49	190	68	220	0.33	13.7	23
3x2,5 -O	1.9	12	13.6	68	54	240	113	230	0.32	8.21	30
3x2,5 -J	1.9	12	13.6	68	54	240	113	230	0.32	8.21	30
3x4 -J	2.4	14.2	16.2	81	65	350	180	260	0.31	5.09	41
3x4 -O	2.4	14.2	16.2	81	65	350	180	260	0.31	5.09	41
3x10 -O	3.9	20.7	21.8	109	87	680	450	320	0.28	1.95	74
3x16 -O	5.4	22.2	24.2	121	97	890	720	420	0.26	1.24	99
3x25 -O	6.3	26.8	28.5	143	114	1,330	1,125	420	0.26	0.795	131
3x35 -O	7.5	29.5	32.5	163	130	1,770	1,575	490	0.25	0.565	162
3x50 -O	8.9	35.2	38.3	192	153	2,450	2,250	550	0.27	0.393	202
3x70 -O	10.6	39.1	42.1	211	168	3,170	3,150	570	0.28	0.277	250
3x240 -O BLACK	20.3	67	71	382	306	9,640	14,400	730	0.23	0.0817	540
3x50/25	8.8	38.2	41.2	206	165	2,890	3,000	510	0.25	0.393	202
3x70/35	10.6	42.5	45.5	228	182	3,750	4,200	590	0.24	0.277	250
3x95/50	12.1	48.3	52.3	262	209	4,940	5,700	600	0.24	0.21	301
3x120/70	14.2	54.8	58.8	294	235	6,380	7,200	690	0.23	0.164	352
3x150/70	16.1	60.2	64.2	321	257	7,660	9,000	700	0.23	0.132	404
3x185/95	17.9	67.3	71.3	357	285	9,490	11,100	710	0.23	0.108	461

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Bending radius moving (min)	Bending radius fix (min)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
4x1,5 -O	1.6	12	13.1	66	52	220	90	220	0.33	13.7	23
4x1,5 -J	1.6	11.5	13.1	66	52	220	90	220	0.33	13.7	23
4x2,5 -J	1.9	13.7	15.7	79	63	320	150	230	0.32	8.21	30
4x4 -J	2.4	15.3	17.3	87	69	420	240	260	0.31	5.09	41
4x6 -J	2.9	16.5	18.5	93	74	520	360	300	0.29	3.39	53
4x10 -J	3.9	20.9	22.9	115	92	830	600	320	0.28	1.95	74
4x16 -J	5.4	25.9	27.6	138	110	1,190	960	420	0.26	1.24	99
4x16+4x2,5	5.4	27.1	30.1	151	120	1,480	960	420	0.26	1.24	99
4x25 -J	6.3	29.3	32.3	162	129	1,740	1,500	420	0.26	0.795	131
4x35 -J	7.5	32.1	35.1	176	140	2,200	2,100	490	0.25	0.565	162
4x50 -J	8.8	38.2	41.2	206	165	3,050	3,000	510	0.25	0.393	202
4x50+1x(4x2,5)	8.8	42.4	45.4	227	182	3,700	3,000	510	0.25	0.393	202
4x70 -J	10.6	42.5	45.5	228	182	3,980	4,200	590	0.24	0.277	250
4x95 -J	12.1	48.3	52.3	262	209	5,220	5,700	600	0.24	0.21	301
4x120 -J	14.2	54.8	58.8	294	235	6,690	7,200	690	0.23	0.164	352
4x150 -J	16.1	60.2	64.2	321	257	8,140	9,000	700	0.23	0.132	404
4x185 -J	17.9	67.3	71.3	357	285	10,010	11,100	710	0.23	0.108	461
4x240 -J	20.3	72.4	76.4	382	306	12,240	14,400	730	0.23	0.0817	540
5X1,5 -J	1.6	12.4	14	70	56	250	113	220	0.33	13.7	23
5x2,5	1.9	14.7	16.7	84	67	370	188	230	0.32	8.21	30
5x4	2.4	16.5	18.5	93	74	490	300	260	0.31	5.09	41
5x6	2.9	18.6	20.6	103	82	650	450	300	0.29	3.39	53
5x10	3.9	22.5	24.5	123	98	980	750	320	0.28	1.95	74
5x16	5.4	26.7	29.7	149	119	1,420	1,200	420	0.26	1.24	99
5x25	6.3	31.8	34.8	174	139	2,080	1,875	420	0.26	0.795	131
5x35	7.5	37.1	40.1	201	160	2,760	2,625	490	0.25	0.565	162
5x50	8.8	46.4	44.5	223	178	3,670	3,750	510	0.25	0.393	202
5x70	10.6	47	51	255	204	5,050	5,250	570	0.24	0.277	250
5x95	12.1	53.4	57.4	287	230	6,450	7,125	650	0.24	0.21	301
7x1,5	1.6	14.9	16.9	85	68	380	158	220	0.33	13.7	23
7x2,5	1.9	16.9	18.9	95	76	500	263	240	0.32	8.21	30
7x4	2.4	20	22	110	88	710	420	260	0.31	5.09	41
8x1,5	1.6	16.1	18.1	91	72	430	180	220	0.33	13.7	23
8x2,5	1.9	19	20.6	103	83	600	300	240	0.32	8.21	30
10x1,5	1.6	17.7	19.7	99	79	470	225	220	0.33	13.7	23
10x2,5	2	22.6	23.6	118	94	650	375	240	0.32	8.21	30
12x1,5	1.6	13	20.3	102	81	560	270	220	0.33	13.7	23
12x2,5	1.9	20.7	22.7	114	91	750	450	240	0.32	8.21	30

MEDIUM VOLTAGE FLEXIBLE CABLES FOR SEMI-FLEXIBLE INSTALLATION

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Bending radius moving (min)	Bending radius fix (min)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
12x4	2.4	23.5	26.5	133	106	1,060	720	260	0.31	5.09	41
18x2,5	1.9	24.5	27.5	138	110	1,070	675	240	0.32	8.21	30
19x1,5	1.6	19.7	23.7	119	95	790	428	220	0.33	13.7	23
19x2,5	2	26	28	140	112	1,140	713	240	0.32	8.21	30
24x2,5	1.9	27.6	30.6	153	122	1,360	900	230	0.32	8.21	30
24x1,5	1.6	24.3	27.3	137	109	950	540	220	0.33	13.7	23

(N)SSHOEU PUR

1 KV

For flexible use and fixed installation opencast mining applications, in quarries, on construction sites and similar applications, with heavy mechanical stresses. The cables can be used indoors as well as outdoors, in explosion-hazard areas, in industry and in agriculture. They can be used permanently in waste water up to 40°C at a depth of max. 2000 m and in industrial water, cooling water, surface water, rainwater and mixed water - and in groundwater and seawater to a more limited extent. The requirements for accessibility and inspection depend on the consistency of the water. In aggressive water or composed of special substances, the cable's resistance properties should be tested. In other respects the specifications of DIN VDE 0298 part 3 applies.

STANDARDS / APPROVALS

DIN VDE 0250-812	General
DIN EN 60228/ IEC 60228 / VDE 0295	Conductor
DIN VDE 0293-308	Core identification
DIN EN 50363 / DIN VDE 0207-20	Compound
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
DIN VDE 0298-4	Electrical parameters
IEC 60811-404	Chemical behaviour

THERMAL PARAMETERS

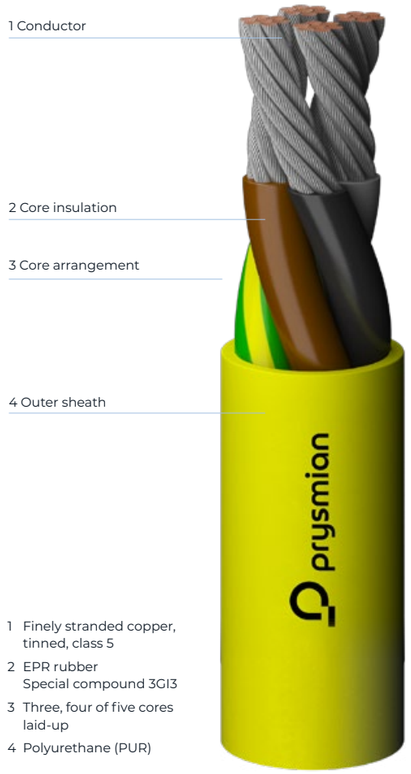
Max. conductor temperature	90 °C
Max. conductor temperature at short circuit	250 °C
Ambient temperature fix installation (min)	-40 °C
Ambient temperature fix installation (max)	80 °C
Ambient temperature flexible installation (min)	-30 °C
Ambient temperature flexible installation (max)	80 °C

CHEMICAL PARAMETERS

Flame retardant	In accordance with EN/IEC 60332-1-2
Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Yes
Max. water depth	10 m

MECHANICAL PARAMETERS

Torsional stress +/-	50 °/m
Permanent tensile strength (rule)	15 N/mm²
Bending radius (rule)	Acc. to VDE 0298-3:
	4 x D fixed installation
	5 x D flexible operation



1 Finely stranded copper, tinned, class 5
2 EPR rubber Special compound 3GI3
3 Three, four of five cores laid-up
4 Polyurethane (PUR)

ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	0.6/1 (1.2) kV
Test voltage	3.5 kV
AC test voltage (control cores)	2 kV

HALOGEN FREE LOW VOLTAGE FLEXIBLE PUR CABLE

ONLINE DATA SHEET
Here you can find the online data sheet of this product.

CABLE PROPERTIES

Basic construction	Conductor Ø	Cable Ø (min)	Cable Ø (max)	Bending radius moving (min)	Bending radius fix (min)	Cable weight	Max. tensile strength	Nominal operation capacitance	Operation self inductance	Conductor resistance at 20 °C	Current carrying capacity
mm²	mm	mm	mm	mm	mm	kg/km	N	nF/km	mH/km	Ω/km	A
(N)SSHOEU PUR 0.6/1KV											
3x2,5	1.9	10.4	11.9	60	48	160	113	230	0.32	8.21	30
4x1	1.3	10.5	12	60	48	140	60	210	0.32	20	18
4x1,5	1.6	11.5	13	65	52	170	90	220	0.33	13.7	23
7x1	1.3	13.5	15	75	60	240	105	220	0.32	20	18
7x2,5	1.9	16.2	17.7	89	71	380	263	240	0.32	8.21	30
12x1	1.3	16	17.5	88	70	340	180	220	0.32	20	18
12x2,5	1.9	20	21.5	108	86	570	450	240	0.32	8.21	30
24x1	1.3	20.5	22.5	113	90	570	360	220	0.33	20	18
24x2,5	1.9	26.4	28.4	142	114	1,040	900	230	0.32	8.21	30
4x120	14.2	50.7	54.7	274	219	5,800	7,200	690	0.23	0.161	352
4x185	17.9	63	67	335	268	9,000	11,100	710	0.23	0.106	461

Because We Care About Cables – and About You

At our Centers of Excellence in Germany, Prysmian offers cutting-edge services for rubber-insulated flexible cables, customized to fit your specific requirements. Our expertise spans three key areas:

Medium & High Voltage Cable Services

Medical & Low Voltage Cable Harnessing

Submersible Pump & Wind Turbine Cable Harnessing

We provide solutions that are not only quick but also crafted with the utmost attention to detail.

> From the start, their expert advice on component selection and system design was invaluable. The entire project was seamless, thanks to their comprehensive approach.

> We rely on Prysmian for regular VLF testing of our critical cable infrastructure. Their testing process is thorough and efficient, and we have complete confidence in the results.

ASSEMBLY & TERMINATION – PERFECT FIT, EVERY TIME

At our Centers of Excellence in Germany or directly on-site, we prepare your special cables (1–66 kV AC) for a seamless connection. Our services are customized to fit your exact requirements, ensuring flawless execution every time:

- **PRECISION SEALING**
  Cast-resin, hybrid, and vulcanization types
- **SPECIAL SEALING ENDS**
  Tailored to your needs
- **PLUG-ON SEALING ENDS**
  Medium and low voltage, with fiber optics

VLF-TESTING TECHNOLOGY – ENERGIZED AND SECURE

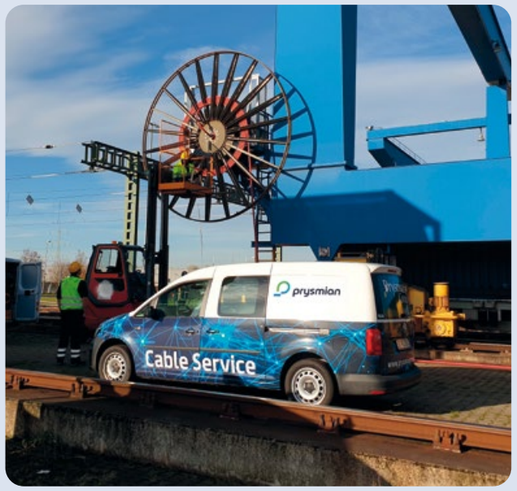
Our portable VLF-Testing System ensures your cable infrastructure is safe and reliable. Using a voltage waveform recommended by DIN VDE standards, we provide on-site testing that meets the highest safety benchmarks:

- **UP TO 60 kV VLF CR**
- **0.1 Hz TEST FREQUENCY**
- **MAX. TESTING LENGTHS:**
  240 mm² cables up to 5 km

FIBER-OPTIC MEASUREMENTS – PRECISION YOU CAN TRUST

We offer a comprehensive suite of fiber-optic measuring methods to guarantee precision and accuracy:

- **VISUAL INSPECTIONS**
  Thorough assessment of every fiber
- **ATTENUATION MEASUREMENT**
  Across various wavelengths
- **FAULT LOCATION**
  Through OTDR reflectometry
- **ADVANCED MONITORING**
  Temperature and stress tracking with Brillouin frequency measurement



CUSTOMIZED SYSTEM CONCEPTS – BUILT RIGHT FROM THE START

From the initial planning phase, our team is ready to support you. We provide expert advice on component selection, assembly configurations, and termination methods. If needed, we can supply all necessary components and manage sub-projects to ensure everything aligns perfectly with your goals.

FIBER-OPTIC PREASSEMBLY & CONNECTION – EXPERTISE IN ACTION

Our specialists develop and configure fiber-optic cable systems for industrial applications, offering:

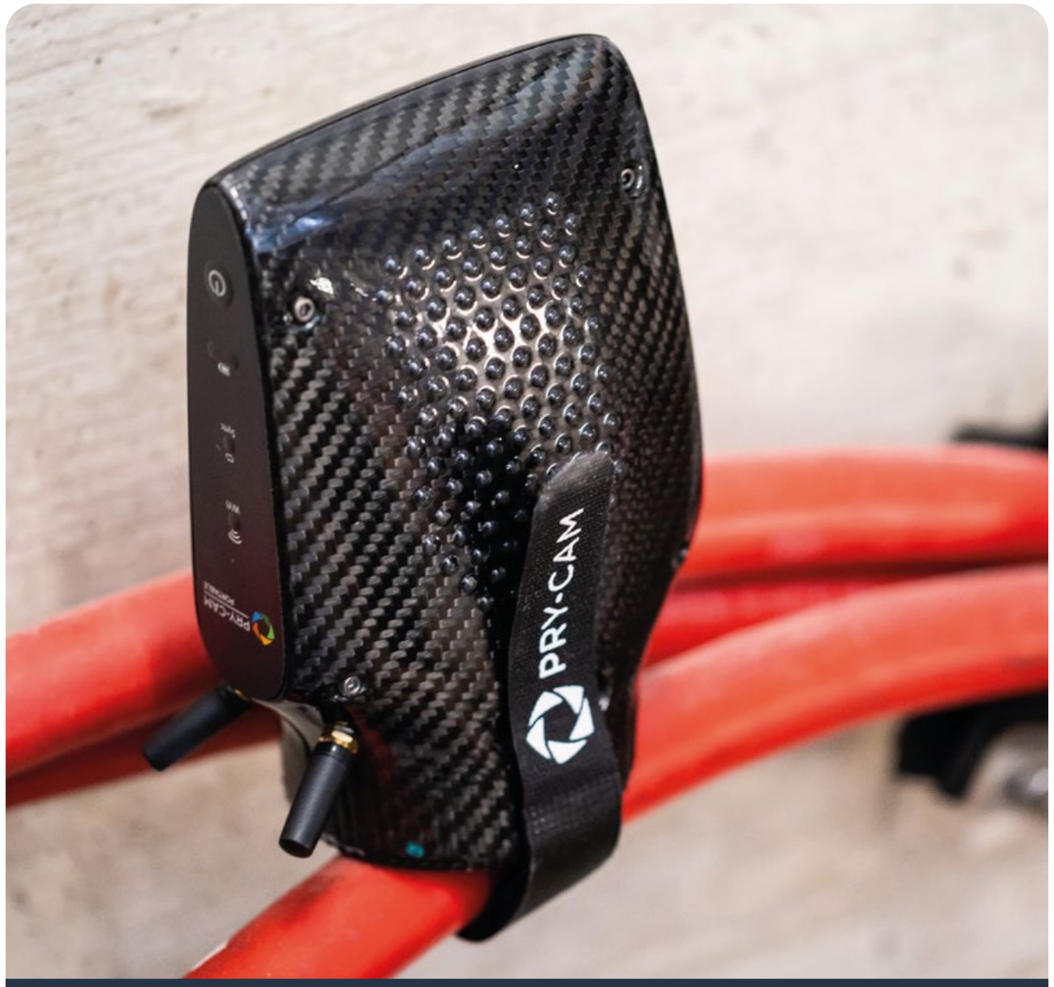
- **HIGH MECHANICAL STRENGTH**
- **MOISTURE PROTECTION**
- **SLEEK, COMPACT DESIGN**
- **OPTIONS FOR FIBER NUMBERS:**
  6, 12, 18, or 24

We also connect fiber-optic cables and combined cables with integrated optical fibers, using the latest techniques like fusion splicing, ensuring reliable and precise connections.

REPAIR & CONNECTION – FAST, RELIABLE, AND COST-EFFECTIVE

When your cables suffer damage, whether minor or major, we are here to help – quickly and affordably. We repair rubber-insulated flexible cables on-site or at our facilities, using original materials and proven technology. Our expert fitters ensure that your cables remain fully operational.

If you prefer to handle repairs yourself, we provide all necessary original materials in convenient installation sets, ensuring your cables are correctly connected using shrink-on, cast-resin, or vulcanization methods.



PRY-CAM ASSET MONITORING SYSTEM

Unlocking the Power of Data-Driven Efficiency

In port infrastructure, the reliability and safety of electrical systems are crucial. Ports are especially vulnerable to disruptions from power outages or malfunctions, leading to significant risks and economic losses.

PRY-CAM: REVOLUTIONIZING POWER MANAGEMENT

PRY-CAM is a groundbreaking technology for electrical system monitoring and condition assessment. It provides online, accurate, and reliable measurements, diagnosing and localizing defects remotely. This results in enhanced grid reliability, safety, and cost efficiency for port infrastructure.

Key Features

- **ADAPTABLE PLATFORM**
  Compatible with various SCADA protocols, customizable to customer requirements.
- **COMPREHENSIVE COVERAGE**
  Suitable for electrical equipment from 3 kV to 600 kV, including cables, transformers, and switchgear.
- **INTEGRATED MONITORING**
  Continuous or temporary monitoring of key parameters like partial discharge, temperature, and humidity.
- **FLEXIBLE SOLUTIONS**
  Configurable for specific maintenance and asset management strategies.
- **REAL-TIME DATA**
  Monitoring conditions, malfunctions, and overheating without the need for specific expertise.
- **ADVANCED TECHNOLOGY AND DATABASE**
  Harnessing IoT and a cloud-based system with over three million measurements for effective monitoring and continuous improvement.

Discover more at www.pry-cam.com

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