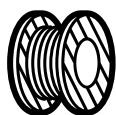


# We are with you down to the core.

Prysmian mining cables  
– stronger, faster, safer.



Scottish Cables  
Electrical And Mining Supplies







# Prysmian mining cables – stronger, faster, safer.

Cables used in hazardous areas must be of particularly high quality. Our mining cables are manufactured to apply to all relevant standards and has a proven track record of long-lived, safe and reliable performance. To match different kinds of mining operations, you can count on our cables being tailored to suit very varied tasks and challenges. So, rest assured, we'll be with you – all the way.



## Hardwearing

Superior impact and abrasion resistance, in cold as well as in warm ambient conditions.



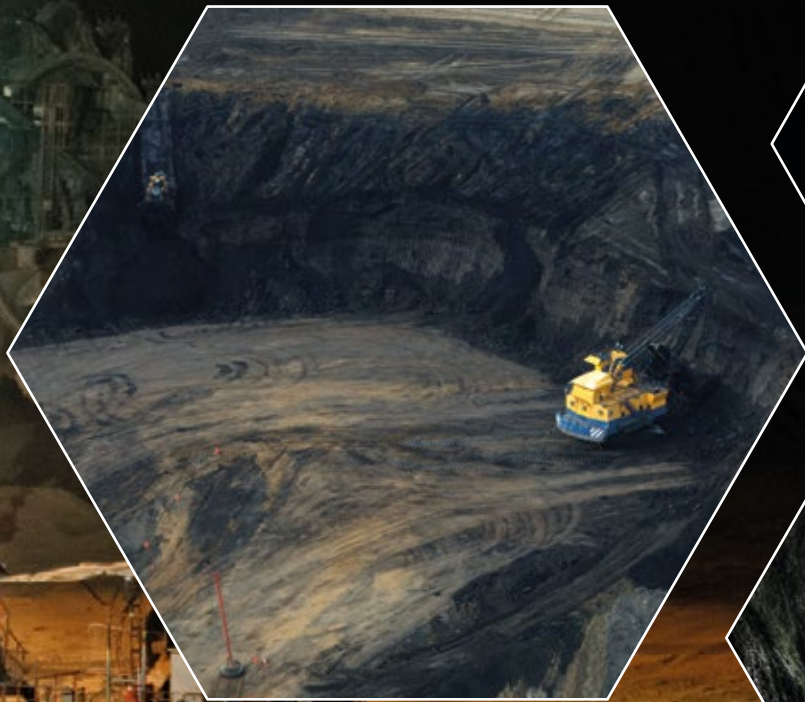
## Great longevity

The mix of quality components increase the service life, even in very hot environments.



## Flexible

Very pliable and easy to work with, also in low temperatures.



### Impervious

Resistant to oil, ozone, UV, moisture and water.



### Top performing

First-rate mechanical and electrical characteristics.



### Double function

Provides both electricity and digital information.

Click or scan QR-code for → complete product information





# German Art of Engineering.



Having total control over everything – from choice in raw materials to designing, manufacturing, testing and transporting – we're able to guarantee our customers highest possible quality in all that we do.

We've been making cables in Germany for more than 160 years. During all this time we've done what Germans do best: provided customers and communities worldwide with products and solutions based on state-of-the-art technology, consistent excellence in execution and in-depth understanding of the needs of an evolving market. At our disposal we have both Centres of Excellence with highly-developed R&D teams and cable plants all across the country, making sure that we deliver the highest quality with service beyond the ordinary and within set time frames.

It is not for nothing that German Art of Engineering is well-known throughout the world.

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Product designation	Application and voltage level	Construction	Mechanical stress	Sheath quality	Special feature	Page
PROTOMONT TRAILING CABLES ACC. TO SANS 1520-1						
 <b>TYPE 41</b>	PUMP & TRAILING 1.1 kV	3-cores screened and 1-pilot screened or unscreened	Medium	Special CPE, highly abrasion resistant (better than RS6)	Special sheath combination for water immersion (500m depth)	Page 6
 <b>TYPE 61A</b>	TRAILING & REELING 1.1 kV	3-cores screened and 3-pilots unscreened	High	Special CPE, highly abrasion resistant (better than RS6)	Highly flexible construction for improved reeling performances	Page 8
 <b>TYPE 61B</b>	TRAILING 1.1 kV	3-cores screened and 3-pilots unscreened	High	Special CPE, highly abrasion resistant (better than RS6)	Reinforced with central support element for very high tensile load	Page 10
 <b>TYPE 63B</b>	TRAILING 3.3 kV	3-cores screened and 3-pilots unscreened	High	Special CPE, highly abrasion resistant (better than RS6)	Reinforced with central support element for very high tensile load	Page 12
 <b>TRACKLESS</b>	TRAILING & REELING 1.1 kV	3-cores screened, 2-pilots unscreened, 1-ECC	High	Special CPE, highly abrasion resistant (better than RS6)	Highly flexible construction for improved reeling performances	Page 14
PROTOLON MV TRAILING CABLES ACC. TO SANS 1520-2						
 <b>TYPE 66 / ECC</b>	TRAILING 6.6 kV	3-cores screened, 2-pilots unscreened, 1-ECC	High	Special PCP, highly abrasion resistant (better than RS6)	Extremely robust and tough against abrasion and tearing	Page 16
 <b>TYPE 611 / ECC</b>	TRAILING 11 kV	3-cores screened, 2-pilots unscreened, 1-ECC	High	Special PCP, highly abrasion resistant (better than RS6)	Extremely robust and tough against abrasion and tearing	Page 18
 <b>TYPE 622 / ECC</b>	TRAILING 22 kV	3-cores screened, 2-pilots unscreened, 1-ECC	High	Special PCP, highly abrasion resistant (better than RS6)	Extremely robust and tough against abrasion and tearing	Page 20
 <b>PROTOLON(M)-R(SB)</b>	TRAILING & REELING 10 kV	3-cores with non-metallic screen, 2-pilots, 1-earth	Very high	Special PCP, highly abrasion resistant (better than RS6)	Highly flexible construction for improved reeling performances and extremely robust and tough against abrasion and tearing	Page 22
SELF-LUMINESCENT MV TRAILING CABLE						
 <b>TENAX-LUMEN</b>	TRAILING 6 kV	3-cores* with non-metallic screen, 2-pilots, 1-earth	Very high	Special PUR, highly abrasion resistant and transparent	With self-illuminating function for improved visibility at night	Page 24
 <b>TENAX-LUMEN</b>	TRAILING 10 kV	3-cores* with non-metallic screen, 2-pilots, 1-earth	Very high	Special PUR, highly abrasion resistant and transparent	With self-illuminating function for improved visibility at night	Page 26

\*available also as screened version.



# PROTOMONT (N)SSHOEU TYPE 41 640/1100 V SANS

PUMP & TRAILING CABLES based on SANS 1520-1.



Optimized cable for movable electric equipment in underground mines, e.g. pumps, drills, shuttle cars, subject to medium mechanical stress. Suitable for permanent immersion in water up to 500m depth.

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## STANDARDS / APPROVALS

<b>Based on SANS 1520-1</b>	General
<b>Based on DIN VDE 0250-812</b>	General
<b>SANS 1411-3</b>	General
<b>DIN VDE 0295 / DIN EN 60228 / IEC 60228</b>	Conductor
<b>DIN EN 60332-1-2 / IEC 60332-1-2</b>	Fire performance
<b>IEC 60811-404</b>	Chemical behaviour
<b>DIN VDE 0298-3</b>	Application
<b>DIN VDE 0298-4</b>	Electrical parameters

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## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Core insulation material	EPR rubber
-	Special compound > RD3
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Four core design with three mix screened power cores and one pilot core (unscreened or screened based on request). Core identification: red, yellow and blue power cores and one black pilot. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material inner sheath	Rubber
Material outer sheath	Chlorinated polyethylene (CM/CPE)
-	Special compound > RS6

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## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (U <sub>m</sub> )	0,64/1,1 kV
Test voltage [kV]	3
Nominal voltage U [V]	1,100

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## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Excellent
Max. water depth [m]	500

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 4 X D fixed installation 5 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x4+3x4/3E+1x4	20390367	2.4	19	21	560	180	105	5.09	41
3x16+3x16/3E+1x16ST	20377027	5.4	32	35	1,850	720	175	1.24	99
4x2,5+4x2,5/4E	20353488	1.9	17.3	19.3	450	112	77	8.21	30
4x4+4x4/4E	20355802	2.4	19	21	570	180	105	5.09	41
4x16+4x16/4E	20377415	5.4	32	35	1,850	720	175	1.24	99
4x25+4x25/4E	20377028	6.85	33	36	2,200	1,125	180	0.795	131

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOMONT (N)SSHOEU TYPE 61A 640/1100 V SANS

TRAILING & REELING CABLES based on SANS 1520-1.



Optimized reeling cable for self propelled electrically driven machines in underground mines, e.g. shuttle cars and LHD's, subject to the high mechanical stress expected in trailing and reeling operation.

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## STANDARDS / APPROVALS

<b>Based on SANS 1520-1</b>	General
<b>Based on DIN VDE 0250-812</b>	General
<b>SANS 1411-3</b>	General
<b>DIN VDE 0295 / DIN EN 60228 / IEC 60228</b>	Conductor
<b>DIN EN 60332-1-2 / IEC 60332-1-2</b>	Fire performance
<b>IEC 60811-404</b>	Chemical behaviour
<b>DIN VDE 0298-3</b>	Application
<b>DIN VDE 0298-4</b>	Electrical parameters

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## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Core insulation material	EPR rubber
-	Special compound > RD3
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with three unscreened pilots in the interstices. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Chlorinated polyethylene (CM/CPE)
-	Special compound > RS6

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## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	0,64/1,1 kV
Test voltage [kV]	3
Nominal voltage U [V]	1,100

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## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 4 X D fixed installation 5 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x16+3x16/3E+3x6ST	20377786	5.7	30	33	1,730	960	165	1.24	99
3x25+3x16/3E+3x6ST	PROTOMNT_61A_01	6.5	37	40	3,300	1,500	200	0.795	131
3x35+3x16/3E+3x6ST	PROTOMNT_61A_02	8.5	42	45	3,500	2,100	225	0.565	199

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOMONT (N)SSHOEU TYPE 61B 640/1100 V SANS

TRAILING CABLES based on SANS 1520-1.



Optimized trailing cable for movable electric equipment in underground mines, e.g. roadheader, subject to very high mechanical stresses in which abrasion and pulling tension are to be expected in trailing operation.

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## STANDARDS / APPROVALS

<b>Based on SANS 1520-1</b>	General
<b>Based on DIN VDE 0250-812</b>	General
<b>SANS 1411-3</b>	General
<b>DIN VDE 0295 / DIN EN 60228 / IEC 60228</b>	Conductor
<b>DIN EN 60332-1-2 / IEC 60332-1-2</b>	Fire performance
<b>IEC 60811-404</b>	Chemical behaviour
<b>DIN VDE 0298-3</b>	Application
<b>DIN VDE 0298-4</b>	Electrical parameters

---

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Core insulation material	EPR rubber
-	Special compound > RD3
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with three unscreened pilots in the interstices laid up around a semiconductive cradle centre with an embedded support element. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Chlorinated polyethylene (CM/CPE)
-	Special compound > RS6

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## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	0,64/1,1 kV
Test voltage [kV]	3
Nominal voltage U [V]	1,100

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## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup> (optional with central support element )
Bending radius (rule)	Acc. to VDE 0298-3: 4 X D fixed installation 5 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x4+3x4/3E+3x1,5	PROTOMNT_61B_01	2.4	19.6	21.6	670	180	108	5.09	41
3x95+3x50/3E+3x16ST	PROTOMNT_61B_02	13.3	52	56	6,010	6,075	280	0.21	301
3x120+3x70/3E+3x16	PROTOMNT_61B_03	15.3	56	60	7,000	7,200	300	0.164	352

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOMONT (N)SSHOEU TYPE 63B 1900/3300 V SANS

TRAILING CABLES based on SANS 1520-1.



Optimized trailing cable for movable electric equipment in underground mines, e.g. roadheader, subject to very high mechanical stresses in which abrasion and pulling tension are to be expected in trailing operation.

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## STANDARDS / APPROVALS

<b>Based on SANS 1520-1</b>	General
<b>Based on DIN VDE 0250-812</b>	General
<b>SANS 1411-3</b>	General
<b>DIN VDE 0295 / DIN EN 60228 / IEC 60228</b>	Conductor
<b>DIN EN 60332-1-2 / IEC 60332-1-2</b>	Fire performance
<b>IEC 60811-404</b>	Chemical behaviour
<b>DIN VDE 0298-3</b>	Application
<b>DIN VDE 0298-4</b>	Electrical parameters

---

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Core insulation material	EPR rubber
-	Special compound > RD3
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with three unscreened pilots in the interstices laid up around a semiconductive cradle centre with an embedded support element. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Chlorinated polyethylene (CM/CPE)
-	Special compound > RS6

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## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	1,9/3,3 (4) kV
Test voltage [kV]	7.5
Nominal voltage U [V]	3,300

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## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 4 X D fixed installation 5 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x50+3x25/3E+3x16ST	PROTOMNT_63B_01	10.4	50	54	5,000	4,050	270	0.393	202
3x95+3x50/3E+3x16ST	PROTOMNT_63B_02	13.3	60	64	7,300	6,075	320	0.21	301

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOMONT (N)SSHOEU TRACKLESS 640/1100 V

TRAILING & REELING CABLES based on SANS 1520-1.



Optimized reeling cable for self propelled electrically driven machines in underground mines, e.g. drill-rigs and LHD's, subject to the high mechanical stress expected in trailing and reeling operation.

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## STANDARDS / APPROVALS

<b>Based on SANS 1520-1</b>	General
<b>Based on DIN VDE 0250-812</b>	General
<b>SANS 1411-3</b>	General
<b>DIN VDE 0295 / DIN EN 60228 / IEC 60228</b>	Conductor
<b>DIN EN 60332-1-2 / IEC 60332-1-2</b>	Fire performance
<b>IEC 60811-404</b>	Chemical behaviour
<b>DIN VDE 0298-3</b>	Application
<b>DIN VDE 0298-4</b>	Electrical parameters

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## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Core insulation material	EPR rubber
-	Special compound > RD3
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power cores with two pilots and one earth in the interstices. Core identification: red, yellow and blue power cores and pilots in black and one bare earth. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Chlorinated polyethylene (CM/CPE)
-	Special compound > RS6

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## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	0,64/1,1 kV
Test voltage [kV]	3
Nominal voltage U [V]	1,100

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## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 4 X D fixed installation 5 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x35+1x16+2x6ST	20377126	8.4	36.8	39.8	2,635	1,575	199	0.565	162
3x50+1x25+2x6ST	TRACKLESS_02	10.4	44	47	3,700	2,250	235	0.393	202

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOLON(SB) NTSCGECEWUEU TYPE 66 ECC 3.8/6.6 kV SANS

MV TRAILING CABLES based on SANS 1520-2.



For connection of large material handling machines such as excavators, shovels, draglines in open-cast mines, in trailing applications, with a reinforced outer sheath suitable for high demanding trailing operation, extremely robust and tough against abrasion and tearing (5GM5+).

## STANDARDS / APPROVALS

Based on SANS 1520-2	General
Based on DIN VDE 0250-813	General
SANS 1411-3	General
DIN VDE 0295 / DIN EN 60228 / IEC 60228	Conductor
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour
DIN VDE 0298-3	Application
DIN VDE 0298-4	Electrical parameters

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Inner semi-conducting layer	Yes
-	Semi-conductive EPR
Core insulation material	EPR rubber
-	Special compound > RD3
Outer semi-conducting layer	Yes
-	Semi-conductive NBR easy-strip
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with two pilots and one ECC in the interstices. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Rubber - polychloroprene (PCP)
-	Special compound > RS6

## ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	3.8/6.6 (7.2) kV
Test voltage [kV]	11
Nominal voltage U [V]	6,600

## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 6 X D fixed installation 10 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
35mm <sup>2</sup>	SB_TYPE_66_ECC_01	7.6	49	53	3,900	1,575	530	0.565	162
50mm <sup>2</sup>	20377427	9.1	52	56	5,100	2,250	560	0.393	202
70mm <sup>2</sup>	20377426	10.9	56	60	6,300	3,150	600	0.277	250
95mm <sup>2</sup>	SB_TYPE_66_ECC_04	12.6	63	67	7,700	4,275	670	0.21	301
120mm <sup>2</sup>	SB_TYPE_66_ECC_05	14.2	67	71	9,000	5,400	710	0.164	352

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOLON(SB) NTSCGECEWUEU TYPE 611 ECC 6.35/11 kV SANS

MV TRAILING CABLES based on SANS 1520-2.



For connection of large material handling machines such as excavators, shovels, draglines in open-cast mines, in trailing applications, with a reinforced outer sheath suitable for high demanding trailing operation, extremely robust and tough against abrasion and tearing (5GM5+).

## STANDARDS / APPROVALS

Based on SANS 1520-2	General
Based on DIN VDE 0250-813	General
SANS 1411-3	General
DIN VDE 0295 / DIN EN 60228 / IEC 60228	Conductor
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour
DIN VDE 0298-3	Application
DIN VDE 0298-4	Electrical parameters

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Inner semi-conducting layer	Yes
-	Semi-conductive EPR
Core insulation material	EPR rubber
-	Special compound > RD3
Outer semi-conducting layer	Yes
-	Semi-conductive NBR easy-strip
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with two pilots and one ECC in the interstices. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Rubber - polychloroprene (PCP)
-	Special compound > RS6

## ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	6.35/11 (12) kV
Test voltage [kV]	17
Nominal voltage U [V]	11,000



## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 6 X D fixed installation 10 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
35mm <sup>2</sup>	SB_TYPE_611_ECC_01	7.6	51	55	4,100	1,575	550	0.565	162
50mm <sup>2</sup>	SB_TYPE_611_ECC_02	9.1	54	58	5,300	2,250	580	0.393	202
70mm <sup>2</sup>	20370743	10.9	58	62	6,430	3,150	620	0.277	250
95mm <sup>2</sup>	SB_TYPE_611_ECC_04	12.6	65.5	69.5	8,150	4,275	695	0.21	301
120mm <sup>2</sup>	SB_TYPE_611_ECC_05	14.2	69	73	9,500	5,400	730	0.164	352

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOLON(SB) NTSCGECEWUEU TYPE 622 ECC 12.7/22 kV SANS

MV TRAILING CABLES based on SANS 1520-2.



For connection of large material handling machines such as excavators, shovels, draglines in open-cast mines, in trailing applications, with a reinforced outer sheath suitable for high demanding trailing operation, extremely robust and tough against abrasion and tearing (5GM5+).

## STANDARDS / APPROVALS

Based on SANS 1520-2	General
Based on DIN VDE 0250-813	General
SANS 1411-3	General
DIN VDE 0295 / DIN EN 60228 / IEC 60228	Conductor
DIN EN 60332-1-2 / IEC 60332-1-2	Fire performance
IEC 60811-404	Chemical behaviour
DIN VDE 0298-3	Application
DIN VDE 0298-4	Electrical parameters

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5
Inner semi-conducting layer	Yes
-	Semi-conductive EPR
Core insulation material	EPR rubber
-	Special compound > RD3
Outer semi-conducting layer	Yes
-	Semi-conductive NBR easy-strip
Screen construction	Braiding
Screen material	Copper, tinned
-	Mix braid of copper/nylon
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	Three power core design with two pilots and one ECC in the interstices. Core identification: red, yellow and blue power cores and pilots in white with black numbers. Tear-resistant reinforcing mesh tape over assembly which prevents sheath movement.
Armouring/reinforcement	Mesh tape
Material outer sheath	Rubber - polychloroprene (PCP)
-	Special compound > RS6

## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	12.7/22 (24) kV
Test voltage [kV]	29
Nominal voltage U [V]	22,000

## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Permanent tensile strength (rule)	15 N/mm <sup>2</sup>
Bending radius (rule)	Acc. to VDE 0298-3: 6 X D fixed installation 10 X D flexible operation

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]	Max. tensile strength [N]	Bending radius moving (min) [mm]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
35mm <sup>2</sup>	SB_TYPE_622_ECC_01	7.6	62	68	5,200	1,575	680	0.565	162
50mm <sup>2</sup>	SB_TYPE_622_ECC_02	9.1	68	72	6,400	2,250	720	0.393	202
70mm <sup>2</sup>	SB_TYPE_622_ECC_03	10.9	72	76	7,600	3,150	760	0.277	250
95mm <sup>2</sup>	SB_TYPE_622_ECC_04	12.6	76	80	9,300	4,275	800	0.21	301
120mm <sup>2</sup>	20348131	14.2	79	83	11,200	5,400	830	0.164	352

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# PROTOLON (M)-R(SB) (N)TSCGEW0EU 6/10 kV

Medium voltage reeling cable.



For connection of large material handling machines such as excavators, shovels, draglines in open-cast mines, in trailing and reeling applications. Combines a highly flexible MV cable design suitable for reeling operation on mono spiral and cylindrical reels under high mechanical stresses, with a reinforced outer sheath suitable for high demanding trailing operation, extremely robust and tough against abrasion and tearing (5GM5+).

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## STANDARDS / APPROVALS



DIN VDE 0207-21

DIN VDE 0298-3

Based on DIN VDE 0250-813

DIN VDE 0298-4

DIN EN 60811-404 / IEC 60811-404

DIN EN 60332-1-2 / IEC 60332-1-2

Compound

Mechanical parameters

General

Electrical parameters

Chemical behaviour

Fire performance

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## CABLE DESIGN

Conductor	Very finely stranded copper, bare (class FS) PE: Very finely stranded copper, bare (class FS)
Inner semi-conducting layer	Yes
-	Semi-conductive EPR
Core insulation material	EPR rubber
-	PROTOLON
-	Special compound > 3GI3
Outer semi-conducting layer	Yes
-	Semi-conductive NBR easy-strip
Core arrangement	Three core design, with earth conductor and two control cores in the interstices. Reinforcement with open mesh tape over assembly.
Material inner sheath	Rubber
-	Special sandwich EPR/CR
Armouring/reinforcement	Braiding
Armouring/reinforcement material	Polyester
Material outer sheath	Rubber - polychloroprene (PCP)
-	Special compound > 5GM5

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## ELECTRICAL PARAMETERS

Rated voltage U0/U (Um)	6/10 (12) kV
Test voltage [kV]	17
Nominal voltage U [V]	10,000

## THERMAL PARAMETERS

Max. conductor temperature [°C]	90
Max. conductor temperature at short circuit [°C]	250
Ambient temperature fix installation (min) [°C]	-40
Ambient temperature fix installation (max) [°C]	80
Ambient temperature flexible installation (min) [°C]	-35
Ambient temperature flexible installation (max) [°C]	80

## CHEMICAL PARAMETERS

Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes
Sea water resistance	Yes

## MECHANICAL PARAMETERS

Torsional stress +/- [°/m]	100
Permanent tensile strength (rule)	20 N/mm <sup>2</sup> static 25 N/mm <sup>2</sup> 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

## CABLE PROPERTIES

Basic construction	SAP code	External code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]
3X120+1X70+2x16ST	20342223	5DK4738	15.5	66.6	70.6	7,990

## CABLE PROPERTIES ELECTRIC / MECHANICAL

Basic construction	SAP code	External code	Max. tensile strength [N]	Nominal operation capacitance [nF/km]	Operation self inductance [mH/km]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3X120+1X70+2x16ST	20342223	5DK4738	7,200	650	0.29	0.161	352

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# TENAX-LUMEN (N)TSCGH3S 3.6/6 kV

Luminescent power cable for trailing application.



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 abrasion and tearing, suitable for fully flexible operation down to -50°C.

## STANDARDS / APPROVALS

Based on 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

## CABLE DESIGN

Conductor	Finely stranded copper, tinned, class 5 PE: Finely stranded copper, tinned, class 5 with semi conductive special rubber compound
Inner semi-conducting layer	Yes
-	Semi-conductive EPR
Core insulation material	EPR rubber
-	Special compound 3GI3
Outer semi-conducting layer	Yes
-	Semi-conductive NBR easy-strip
Pilot conductor	Copper, tinned cl.5; EPR-insulation
Core arrangement	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
Material outer sheath	Polyurethane (PUR)
-	Special compound transparent

## NOTES ON INSTALLATION:

Complete termination & installation set can be offered on request. The illuminating strings shall be connected to an AC/AC inverter suitable for electroluminescent strings, with output voltage of max. 130Vac and output frequency of 800-1300Hz.

## ELECTRICAL PARAMETERS

Rated voltage U <sub>0</sub> /U (Um)	3.6/6 (7.2) kV
Test voltage [kV]	11
Nominal voltage U [V]	6,000

## 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°

## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Torsional stress +/- [°/m]	100
Permanent tensile strength (rule)	25 N/mm <sup>2</sup>
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

## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]
3x35+3x25/3	20296568	7.5	45.2	48.5	3,100
3x35+2x16+1x16	LUMEN_6KV_002	7.5	44.5	48.5	3,150
3x50+2x16+1x16	20262553	9	49.3	53.8	3,800
3x70+3x35/3	20339281	10.6	52	56	4,650
3x95+2x25+1x16	20301807	12.6	58.9	63.4	5,750
3x70+2x25+1x16	LUMEN_6KV_003	10.6	52	56	4,700
3x150+2x35+1x16	20312671	16	68.8	72.4	8,350
3x120+2x35+1x16	20347960	14.8	60.5	64.5	6,700
3x185+2x50+1x16	20310636	17.7	71.7	76.2	9,850
3x240+2x70+1x16	LUMEN_6KV_001	20.3	74.3	78.3	12,000

## CABLE PROPERTIES ELECTRIC / MECHANICAL

Basic construction	SAP code	Max. tensile strength [N]	Nominal operation capacitance [nF/km]	Operation self inductance [mH/km]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x35+3x25/3	20296568	2,625	260	0.34	0.565	162
3x35+2x16+1x16	LUMEN_6KV_002	2,625	260	0.34	0.565	162
3x50+2x16+1x16	20262553	3,750	290	0.32	0.393	202
3x70+3x35/3	20339281	5,250	320	0.3	0.277	250
3x95+2x25+1x16	20301807	7,125	370	0.29	0.21	301
3x70+2x25+1x16	LUMEN_6KV_003	5,250	320	0.3	0.277	250
3x150+2x35+1x16	20312671	11,250	440	0.27	0.132	404
3x120+2x35+1x16	20347960	9,000	400	0.28	0.164	352
3x185+2x50+1x16	20310636	13,875	480	0.27	0.108	461
3x240+2x70+1x16	LUMEN_6KV_001	18,000	540	0.26	0.0817	540

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

# TENAX-LUMEN (N)TSCGH3S 6/10 kV

Luminescent power cable for trailing application.



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 abrasion and tearing, suitable for fully flexible operation down to -50°C.

## STANDARDS / APPROVALS

DIN VDE 0298-4

Based on DIN VDE 0250-813

DIN EN 60228/ IEC 60228 / VDE 0295

DIN EN 60811-404 / IEC 60811-404

DIN EN 60332-1-2 / IEC 60332-1-2

IEC 60754-2

GOST -R/-K/-B Fire Certificate of Russian Federation

Electrical parameters

General

Conductor

Chemical behaviour

Fire performance

Fire performance

Certifications / Approvals

## CABLE DESIGN

Conductor

Finely stranded copper, tinned, class 5

PE: Finely stranded copper, tinned, class 5 with semi conductive special rubber compound

Inner semi-conducting layer

Yes

-

Semi-conductive EPR

Core insulation material

EPR rubber

-

Special compound 3GI3

Outer semi-conducting layer

Yes

-

Semi-conductive NBR easy-strip

Pilot conductor

Copper, tinned cl.5; EPR-insulation

Core arrangement

Cores laid up around semi-conductive central filler with armid yarns; EL-strings in the outer interstices

-

Special electroluminescent string designed for high visibility and low power consumption

Material outer sheath

Polyurethane (PUR)

-

Special compound transparent

## NOTES ON INSTALLATION:

Complete termination & installation set can be offered on request. The illuminating strings shall be connected to an AC/AC inverter suitable for electroluminescent strings, with output voltage of max. 130Vac and output frequency of 800-1300Hz.

## ELECTRICAL PARAMETERS

Rated voltage U<sub>0</sub>/U (Um)

6/10 (12) kV

Test voltage [kV]

17

Nominal voltage U [V]

10,000

## 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°



## THERMAL PARAMETERS

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

## CHEMICAL PARAMETERS

Halogen free	Yes
Oil resistant	Yes
Ozone resistance	Yes
Resistant to UV	Yes

## MECHANICAL PARAMETERS

Torsional stress +/- [°/m]	100
Permanent tensile strength (rule)	25 N/mm <sup>2</sup>
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

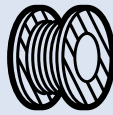
## CABLE PROPERTIES

Basic construction	SAP code	Diameter conductor [mm]	Cable diameter (min) [mm]	Cable diameter (max) [mm]	Cable weight [kg/km]
3x35+2x16+1x16	20330776	7.5	46	50	3,380
3x50+2x16+1x16	20299287	9	49.2	53.2	3,950
3x70+2x25+1x16	20317279	10.6	53.5	57.5	4,850
3x95+2x25+1x16	20330777	12.6	57	61	5,700
3x120+2x35+1x16	20330778	14.8	61.7	65.7	6,990
3x150+2x35+1x16	LUMEN_10KV_001	16	65.5	69.5	7,800
3x185+2x50+1x16	LUMEN_10KV_002	17.7	72.8	76.8	10,000
3x240+2x70+1x16	LUMEN_10KV_003	20.3	77.3	81.3	12,500
3x50+3x25/3	20339232	9	49.2	53.2	3,900
3x70+3x35/3	20339233	10.6	53.5	57.5	4,800

## CABLE PROPERTIES ELECTRIC / MECHANICAL

Basic construction	SAP code	Max. tensile strength [N]	Nominal operation capacitance [nF/km]	Operation self inductance [mH/km]	Conductor resistance at 20° C [Ohm/km]	Current carrying capacity [A]
3x35+2x16+1x16	20330776	2,625	240	0.35	0.565	162
3x50+2x16+1x16	20299287	3,750	270	0.33	0.393	202
3x70+2x25+1x16	20317279	5,250	310	0.31	0.277	250
3x95+2x25+1x16	20330777	7,125	340	0.3	0.21	301
3x120+2x35+1x16	20330778	9,000	380	0.29	0.164	352
3x150+2x35+1x16	LUMEN_10KV_001	11,250	410	0.28	0.132	404
3x185+2x50+1x16	LUMEN_10KV_002	13,875	440	0.27	0.108	461
3x240+2x70+1x16	LUMEN_10KV_003	18,000	490	0.26	0.0817	540
3x50+3x25/3	20339232	3,750	270	0.33	0.393	202
3x70+3x35/3	20339233	5,250	310	0.31	0.277	250

Current carrying capacity acc. VDE 0298-4, Tab. 15, on a surface at 30°C ambient temperature.

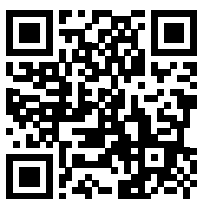


Scottish Cables  
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