

Diamonds are forever, technology jewels, too.

Cable Solutions for the Mining industry



Prysmian
Group

Linking
the Future

CONNECTING THE WORLD. TODAY AND IN THE FUTURE

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

With 140 years' experience, the Group is strongly positioned in high-tech markets and offers the widest possible range of products, services, technologies and know-how.

140

YEARS OF EXPERIENCE

25

R&D CENTRES AROUND THE WORLD



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, the Group 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.

Mining Cables

Global growth and infrastructure development depend heavily on natural resources such as minerals, metal ores and coal. In parallel, innovation in mining work practices and increased efficiency requirements in mines are leading to an increasingly extensive use of equipment operating at higher and higher voltages. The safety of personnel working in proximity of energized equipment, especially in underground mines, has become an increasingly crucial theme, too. Elastomeric cables are the natural choice for applications, like the mining industry, where durability, flexibility, and safe operation under extreme environmental conditions are important. In mining applications, cable designs and materials must be developed and selected to provide maximum reliability and safety both during normal operations and in the case of short circuit, and to keep the pace of the continuously evolving technology scenario.

Prysmian Group has developed extensive know-how about mining equipment's special operational conditions over many years of close and continued cooperation with major mining operators, translating the experience gained on a daily basis into cable designs with outstanding operational reliability and extended service life.

Opencast mining requires ever-increasing performance of machines and methods. The larger and larger, movable machines in use nowadays require medium voltage flexible reeling and trailing cables for power supply suitable for operation under the most extreme conditions. Specialized energy and data transmission systems in such large machines need specially designed and optimized cables adapted to such individual demands.

Underground mining is characterized by a strong focus on critical electrical and mechanical safety aspects in addition to performance features. The cable designs should include all necessary power and control elements to fully match requirements, as well as control and signaling elements to notify any malfunctioning in order to minimize downtimes of machines and keeping the highest levels of safety.

The digging of tunnels for highways, railways, mines or dams is done with very large tunneling machines, called TBM - Tunnel Boring Machines that require special reeling cables. Such cables must fulfil the highest levels of safety and feed the heavy machines with power, further compressed air and water needs to be pumped to enable the tunnel construction.

Prysmian Group's elastomeric cables have been "field proven" worldwide for decades. They are the result of continuous development and offer the best features available in the world for all types of opencast and underground mining applications.

UNIQUE MECHANICAL PERFORMANCE

Prysmian Group's Mining and Tunneling cables have been designed to withstand extreme conditions in terms of increased tensile loads, resistance to torsional stresses, minimum bending radius at any ambient temperature range and stress conditions and response to high travel speeds and acceleration.

CHEMICAL AND CLIMATE RESISTANCE

Our Mining Cables are designed to withstand the most severe situations and guarantee resistance to extreme conditions (such as high-speed, oil and fuel, mud, moisture, and acids and basis), as well as to harsh environments (extreme low/high temperature, UV irradiation and ozone).

CUSTOMIZED AND MULTIFUNCTIONAL ENGINEERING

Prysmian Group designs, compounds and manufactures cables according to specific customer needs, including multifunctional cables from the simplest to the most sophisticated.

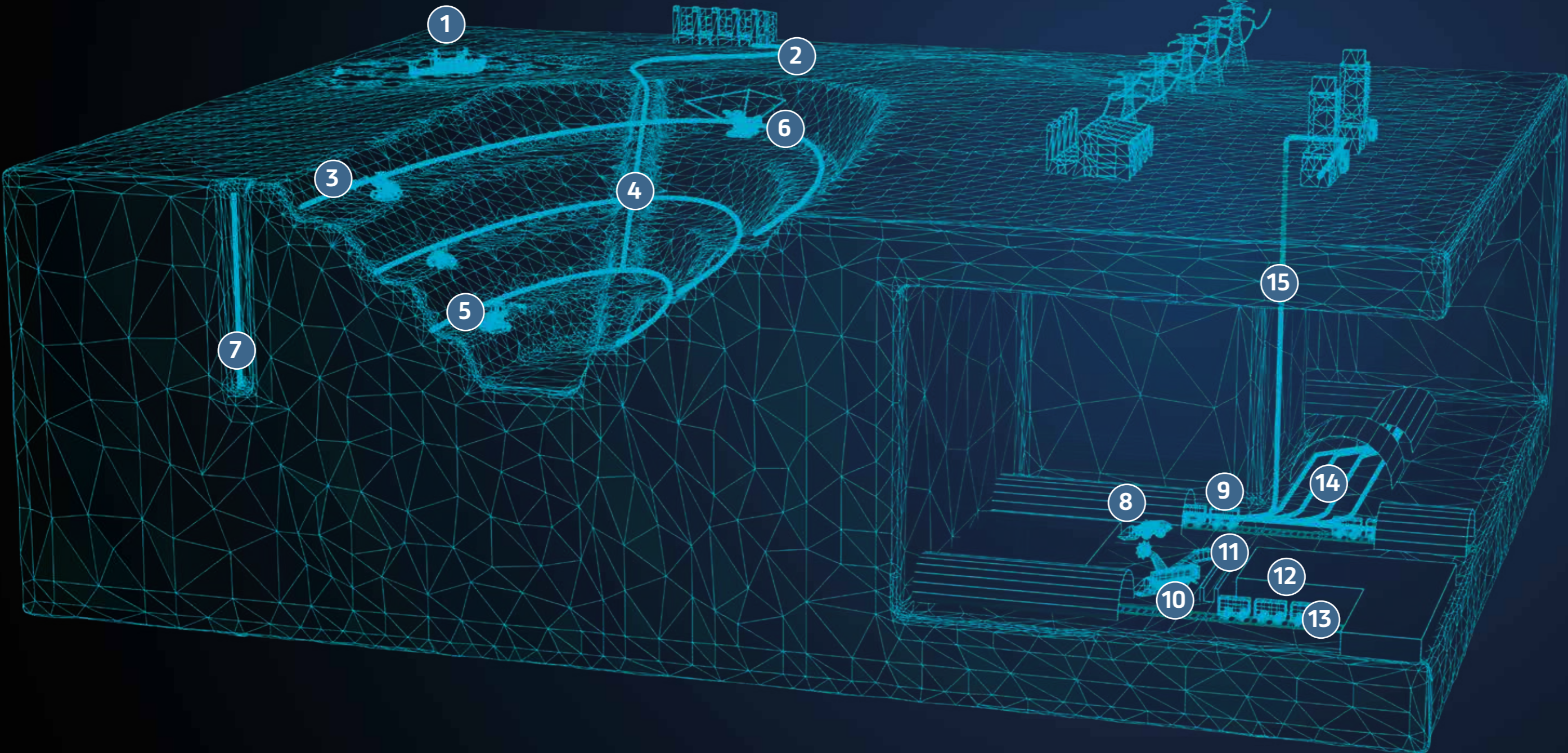
LONGER LIFETIME

We guarantee an extended working lifetime (lower failure rate) in comparison with standard and traditional Mining and Tunneling cables, resulting into lower total cost of ownership and increased efficiency of the mining machines.

CONTINUOUS PRODUCT INNOVATION


It is our mission to be always ready to address demands and technical developments coming from new market challenges. Our innovation capabilities are always one step ahead.

Product Families at a glance



Opencast Mining

- 1



Dredger
- 2



Stacker/ Reclaimer
- 3




On board installation
- 4



Semi-fixed
- 5



Excavator Bucket wheel
- 6




Trailing
- 7




Submersible pump

Underground Mining


- 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

Product Mapping

| Product Brand | Standards | Surface/Opencast Mining | | | | Surface/Opencast Mining | | | | Special Applications |
|---|---|---|--|---|--|--|---|---|---|---|
| | |  |  |  | |  |  |  |  | |
| | | Reeling | Trailing | Dredging | | Semi-Flexible | Single Core | Submersible Pumps | Control & Signaling | |
| PROTOLON PROTOMONT OPTOFLEX SUPROMONT CORDAFLEX | DIN VDE 0250-813 and 812 BS 6708 AS/NZS 1802 / 2802 IS 14494 | PROTOLON (M)-R: MV 6-35 kV Insulation: HEPR Outer sheath: High-Grade CR | PROTOLON (SB) MV 6-20 kV Insulation: EPR Outer sheath: Rubber, CR | PROTOLON (ST) MV 6-35 kV Insulation: HEPR Outer sheath: CM | | PROTOLON (M)-F: MV 3-30 kV Insulation: HEPR Outer sheath: CM | PROTOLON(M) MV 6-35 kV Insulation: HEPR Outer sheath: CM | PROTOMONT (MT) - 1 kV; Insulation: HEPR Outer sheath: CPE | PROTOMONT MSR - 250 V Insulation: PE Sheath: CR OPTOFLEX(M) FO | PROTOLON SB IQ PROTOLON(M)-R IQ |
| TENAX FELTOFLEX TROMMELFLEX TENAX LUMEN | DIN VDE 0250-813 and 812 CZ, EPN78 | TENAX SAS TROMMELFLEX M-PUR | TENAX SAS: MV 6-20 kV Insulation: EPR Outer sheath: Rubber/ PUR | n.a | | MV 3-30 kV Insulation: EPR | FELTOFLEX MV 6-35 kV Insulation: EPR Outer sheath: CM | n.a | n.a | TENAX LUMEN; Enhanced Visibility MV 6-20 kV Insulation: EPR Outer sheath: PUR |
| ANACONDA, SNAKE STRIPE CAROL | ICEA, UL, CSA, | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | Anaconda Type 2 kV to 35 kV SHD-GC | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | n.a | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | North American product offering from Carol Cord, Electronics and Datacom | Snake Stripe |
| BOSTMINE | CSA | Bostmine Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | Bostmine Type 2 kV to 35 kV SHD-GC | Bostmine Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | | Bostmine Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | n.a | Bostmine Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | n.a | Fiber Optic Members |
| Mineflex | ICEA 5-75-381, Based on VDE 250 p813 IEC 60502-1 ICEA 5-93-639, IEC 60502-2 | n.a | SHD-GC 2-35 kV Insulation: EPR Metallic shield braided Outer Sheath: TPU and CSPE | n.a | | MV 5-35 kV Insulation: EPR Outer jacket: LSOH, PVC | MV 5-35 kV Insulation: EPR Outer jacket: LSOH, PVC | SHD-GC 2-35 kV Insulation: EPR Metallic shield braided Outer Sheath: TPU | n.a | MV 5-35 kV Insulation: XLPE Copper tape LSOH bedding SW and/or ST Armors PVC or LSOH-FR jacket |
| MINEMASTER | AS/NZS 1802 / 2802 | T455 3.3/11 kV Insulation: EPR Sheath: PCP | T409 1.1/22kV .Ins Class2 EPR Sheath PCP. T441 1.1/22kV Ins Class 1 EPR Sheath PCP. T450 3/33kV Ins EPR Sheath PCP | n.a | | T409 1.1/22kV .Ins Class2 EPR Sheath PCP. T441 1.1/22kV Ins Class 1 EPR Sheath PCP. T450 3/33kV Ins EPR Sheath PCP | n.a | n.a | n.a | T451 3.3/33 kV - Insulation: EPR Sheath: PCP for mobile equipment. T455 3.3/11 kV - Insulation: EPR Sheath: PCP stacker reclamer, shiploader available with fibre |
| TEMK TUNC TEHF FLEX TEMK TD/HDGC3-C MSPB | MT818 VDE 0250 (LV, MV) ICEA 5-75-381 (MV) | MSPB 0.6/1 kV (N) SHTOEU-J 0.6/1 kV Insulation: EPR Sheath: CPE/TPU | TEMK TD/HDGC3-C Insulation: EPR Sheath: CPE/TPU | | | TEMK TD/HDGC3-C Insulation: EPR Sheath: CPE/TPU | | | | |
| TUNNELFLEX PANZERFLEX | IEC 60502-1 (LV) VDE 0250 (LV, MV) ICEA 5-75-381 (LV, MV) AS/NZS 2802 (MV) | MV 6-20 kV Insulation: HEPR Outer sheath: High-Grade Chloroprene Compound | n.a | n.a | | n.a | MV 6-20 kV Insulation: HEPR Outer sheath: High-Grade Chloroprene Compound | n.a | n.a | n.a |

| Product Brand | Standards | Underground Mining | | | | Underground Mining | | | | Tunneling |
|---|---|---|---|---|--|---|--|---|---|---|
| | |  |  |  | |  |  |  |  | |
| | | Shearer Chain | Trailing | Reeling | | Festoon | Control & Signaling | Fixed installation | Semi-Fixed Installation | |
| PROTOMONT OPTOFLEX SUPROMONT CORDAFLEX | Based on DIN VDE 0250-813 and 812 BS 6708 AS/NZS 1802 / 2802 IS 14494 | PROTOMONT (V): LV: 1kV MV: 3 kV and 6 kV Insulation: EPR Sheath: CM | PROTOMONT (Z) LV: 1kV Insulation: EPR Sheath: CM | CORDAFLEX (S) PROTOMONT(S) LV: 1kV Insulation: EPR Sheath: CM | | PROTOMONT 1kV and 6kV Insulation EPR Sheath: CM | PROTOMONT MSR 250V Insulation: PE Sheath: CR OPTOFLEX(M) FO | SUPROMONT MV 6-35 kV Insulation: HEPR Outer sheath: PVC or Compound or LSOH | PROTOMONT 1 kV Insulation: EPR - Sheath: CM SUPROMONT - MV 6-35 kV Insulation: HEPR Outer sheath: PVC / EVA | PROTOMONT TBM MV 6-35 kV Insulation: HEPR Outer sheath: High-Grade Chloroprene Compound or LSOH |
| TENAX FELTOFLEX TROMMELFLEX | Based on DIN VDE 0250-813 and 812 CZ, EPN78 | TENAX CTE: LV: 1kV Insulation: EPR Sheath: CM | | TENAX LK - TROMMELFLEX: M-PUR LV: 1kV Insulation: EPR Sheath: CM | | n.a | n.a | n.a | n.a | TENAX HTT MV 6-35 kV Insulation: HEPR Outer sheath: High-Grade Chloroprene Compound- |
| ANACONDA, SNAKE STRIPE CAROL | ICEA, CSA | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC | | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC | | n.a | North American product offering from Carol Cord, Electronics and Datacom | Anaconda 5-35 kV Type MP-GC | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC | Anaconda Types W, G, G-GC and 2 kV to 35 kV SHD-GC and 5-35 kV MP-GC |
| Mineflex, XAT/EVA, EAT/EVA | ICEA 5-75-381, Based on VDE 250 p813 IEC 60502-1 ICEA 5-93-639, IEC 60502-2 | | | Mineflex TPU 0,6/1 kV | | n.a | n.a | n.a | Exzhellent RZ1-K 0,6/1 kV | n.a |
| MINEMASTER | AS/NZS 1802 / 2802 | T245 3.3 kV superflex Insulation: EPR Sheath: PCP | T209 1.1/11 kV Insulation: EPR - Sheath: PCP T241 1.1/11 kV Insulation: EPR - Sheath: PCP | T275 1.1 kV Insulation: EPR Sheath: PCP | | T241 1.1/11 kV superflex Insulation EPR Sheath PCP | n.a | T241 1.1/11 kV superflex Insulation: EPR Sheath: PCP | T241 1.1/11 kV superflex Insulation: EPR Sheath: PCP | T241 and T241 superflex Insulation: EPR Sheath: PCP |
| TEMK TUNC TEHF FLEX TEMK TD/HDGC3-C MSPB | MT818 VDE 0250 (LV, MV) ICEA 5-75-381 (MV) | MCP/MYPT 0.66/1.14 kV, 1.9/3.3 kV Insulation: EPR Sheath: CPE | MCP / MCPT/MYPT 0.66/1.14 kV 1.9/3.3 kV Insulation: EPR Sheath: CPE | (N)SHTOEU MSPB 0.6/1 kV Insulation: EPR Sheath: CM/TPU | | MY / MYP / MYPT Insulation EPR Sheath: CPE | n.a | MCP / MCPT/MYPT MV /MYP /MYPTJ Insulation: EPR Sheath: CPE | MCP / MCPT/MYPT MV /MYP /MYPTJ Insulation: EPR Sheath: CPE | TEMK TUNC MV TEHF FLEX MV Insulation: EPR Sheath: CPE |
| TUNNELFLEX TX, FG7ORPu, TUNNELFLEX-R/PUR | IEC 60502-1 (LV) VDE 0250 (LV, MV) ICEA 5-75-381 (LV, MV) AS/NZS 2802 (MV) | n.a | MV 6-35 kV Insulation: HEPR Outer sheath: LSOH or PCP Compound | Tunnelflex 1kV Insulation: EPR Sheath: PUR or CR | | n.a | LV 1kV Insulation: HEPR Outer sheath: PUR | n.a | MV 6-20 kV Insulation: HEPR Outer sheath: PVC Compound | MV 6-20 kV Insulation: HEPR Outer sheath: LSOH Compound |
| EPRONEO MINAS SINTENAX MINAS TELEFONICO MINAS SEÑALIZACION MINAS | UNE 22511 UNE 22512 UNE 22513-1/2 UNE 22560 UNE 22561 | n.a | n.a | n.a | | n.a | TELEFONICO LV 500V Insulation: PE Outer sheath: PVC SEÑALIZACION LV 500V Insulation: PVC Outer sheath: PVC | SINTENAX LV 1 kV - 6 kV Insulation: PVC Outer sheath: PVC | EPRONEO LV 3 kV- 6 kV Insulation: HEPR Outer sheath: CPE | n.a |

Product & Brands

PROTOMONT

Worldwide most known brand for mining applications. The family covers single and multicore cables from 100 V to 35 kV. Power, signalling and fibre optic cables for mining operations available. Designs for special chain and reeling application.

PROTOLON (M)/PROTOLON IQ

Highly flexible MV reeling cable equipped with fibre sensors. Measuring temperature and checking strain elongation and compression; **PROTOLON IQ** monitoring system for data collection. MV reeling cables for opencast use. Special long-life cables with semi-conductive layer.

TENAX/TENAX LUMEN

Best known premium mining cables. MV cables for the use in trailing and reeling applications in opencast mines for the power supply of excavators, drills etc. **TENAX LUMEN**: self-luminous PUR power trailing cable, visible all the time.

SUPROMONT

Typical underground MV cable for fixed installation and used as feeder cable for shiftable MV equipment in tunneling sites. According to VDE standards.

TUNNELFLEX

Flexible cables used for tunnelling sites. Available as low voltage cable (0.6/1 kV) and as reeling cable for TBM (Tunnel Boring Machines) with MV range from 6/10 kV up to 18/30 kV.

MINEMASTER

Made-in-Australia flexible and semi-flexible cables acc. local AS/NZS 1802 standards for use in underground mines, e.g. Type 241. Flexible and semi-flexible cables acc. to AS/NZS 2802 for use in opencast mines, e.g. Type 450. Different cable types for trailing, reeling and semi-fixed installation available.



ANACONDA SHD-GC/SHD (round and flat)

Best-performing made-in-USA extra-heavy-duty, lead-cured chlorinated polyethylene (CPE); full range of listings and certifications with MSHA and CSA. General requirements as per ICEA S-75-381, NEMA WC58. The family covers from 2 kV (multicore) and 5 kV to 25 kV (single and multicore).

ANACONDA/CAROL G-GC, G, W

General requirements as per ICEA S-75-381, NEMA WC58, SA and MSHA prescriptions. The family covers from 2 kV (multicore) and 5 kV to 25 kV (single and multicore). Construction: two ground wires and insulated ground check, tinned copper, 90 °C rated EPR, CPE sheath.

CORDAFLEX

Worldwide well-known brand as low voltage (0.6/1 kV) reeling cable. In mining applications it is used for underground scoop/LHD operations and in opencast stacker/reclaimer operations.

OPTOFLEX (M)/Fibre Optic

General requirements as per MSHA, TIA/EIA-568, ANSI/ICEA S-104-696, UL-1666, CSA 22,2; Telecordia GR-409, Telecordia GR-20, RoHS. Available with single-mode and multi-mode fibres in loose tube or tight buffer configuration from 2 to 144 fibres, interlocked armoring.



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