Caledonian

TUNNEL CABLES

ADDISON

www.addison-cables.com

Company Profile

Caledonian. established in 1978.offers one of the most complete lines of fiber and copper cabling system solutions with over hundreds of different cabling system products. . Our superior products provide leading edge within every cable series and for every application.

Among the national and international standards with which our cables could comply are: BS - British Standard; LPCB Fire Performance Standard. ISO Standard etc. Caledonian Cables offers a comprehensive stock of cables and cabling products through its nationwide network of resellers and distributors. Caledonian Cables has continually expanded its global presence in Europe and Asia.

Caledonian & Addison. produces a wide range of cables for communication. power and electronics in its primary plants in UK. Italy and Spain. To stay in front. we continually keep expanding our manufacturing capabilities in more low cost region such as Romania. Taiwan. Malaysia etc. This low-cost manufacturing facilities enable us provide a flexible. scalable global system that delivers superior operational performance and optimal results for our customers.

Our extensive global network of manufacturing facilities gives us significant scale and the flexibility to fulfill our customer requirements. This global presence provides design and consultancy solutions that are combined with core cable manufacturing. logistic services. and vertically integrated with our E commerce technologies. to optimize customer operations by lowering costs and reducing time to market.

Caledonian & Addison has been respected for its high standards of quality. excellent service level. competitive pricing and a unique and innovative spirit. With our latest technologies. we are both inspired and well-positioned to meet the changing needs of our customers. We have the resources to diversify and to enhance our product lines and services. We understand the need for change and with our accurate planning. we are ready for the future and the promise of new marketing opportunities. Our tradition of growth through excellence is assured.

Our Design Centers work closely with customers to constantly improve its standard range of products and technologies and to develop customized. country and industry-specific solutions. Caledonian & Addison has established an extensive network of design. manufacturing. and logistics facilities in the world's major markets to serve the growing outsourcing needs of both multinational and regional customers.

CONTENTS

(N)SHÖU

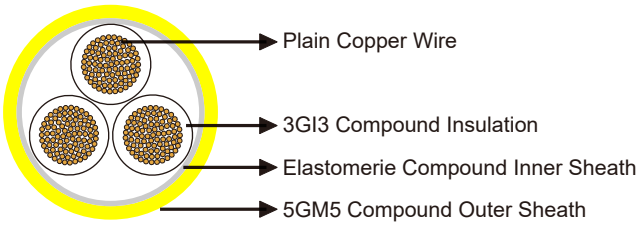
§ APPLICATION

For use in open-cast mining and quarries and similar plants. Also suitable for laying alongside conveyor belts on material handing equipment. It can be used for tunneling sites and similar applications.

§ STANDARDS

Construction	DIN VDE 0250-812
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Electrolytic stranded plain copper wire DIN VDE 0295 Class 5
Insulation	All cores are insulated with 3GI3 compound
Lay Up	All cores are laid up in contact with each other and intersititial ground cores
Inner Sheath	Special extruded elastomeric compound
Outer sheath	Heavy-duty elastomer outer sheath 5GM5.Yellow or black.

§ TECHNICAL CHARACTERISTICS

Rated Voltage	0.6 / 1 KV
Max.Permissible Operating Voltage AC	0.7 / 1.2 KV
Max.Permissible Operating Voltage DC	0.9 / 1.8 KV
AC Test Voltage	3KV
Min Bending Radius Current Carrying	Acc. to DIN VDE 0298 part 3

Capacity	According to DIN VDE0298, Part 4
Working Temperature	
Fixed	-40°C-+80°C
Mobile	-25°C-+80°C
Max.Tensile Load Of cable	15N/mm²

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3×1.5	9.7-10.3	145
3×2.5	11.2-12.8	220
3×4	12.5-14.1	300
3×6	13.2-15.0	380
3×10	16.6-18.6	590
3×16	19.5-21.0	797
3×25	22.9-24.9	1206
3×35	24.9-27.9	1670
3×50	29.4-33.0	2195
3×70	34.8-37.8	3124
3×95	40.9-43.9	4100
3×120	43.4-47.7	4730
3×150	47.8-54.0	5916
3×185	53.1-58.6	7270
4×1.5	10.5-12.6	200
4×2.5	12.0-13.7	260
4×4	13.5-15.1	360
4×6	15.7-17.7	458
4×10	17.4-20.2	670
4×16	21.4-23.1	1038
4×25	24.5-28.1	1576
4×35	28.4-31.4	1978

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
4×50	33.6-36.6	2765
4×70	38.8-42.5	3930
4×95	44.8-47.8	5165
4×120	50.0-53.9	6200
4×150	55.0-58.9	7537
4×185	59.0-63.3	9420
5×1.5	11.4-13.5	234
5×2.5	12.9-14.6	318
5×4	14.7-16.7	434
5×6	16.1-18.6	594
5×10	19.0-22.0	820
5×16	23.2-25.2	1285
5×25	28.0-31.0	1864
5×35	34.0-37.5	2675
7×1.5	12.9-14.5	300
7×2.5	14.9-17.4	458
12×1.5	15.8-17.8	420
12×2.5	17.3-19.6	580
18×1.5	18.5-20.5	610
18×2.5	21.2-23.4	900
24×1.5	20.9-23.1	760
24×2.5	22.8-24.8	1140
3×50/25	29.0-33.5	2510
3×70/35	34.8-37.8	3500
3×95/50	44.0-49.0	4300
3×120/70	44.7-47.7	5470
3×150/70	49.5-54.8	7000
3×185/95	54.5-58.5	8300

Tunnel Cable

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3×240/120	60.9-66.2	10500

(N)SSHÖU

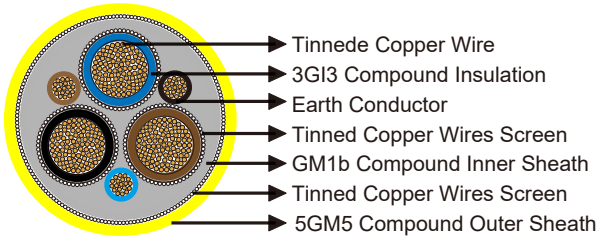
§ APPLICATION

For use in mines, quarries, industrial areas, construction sites agricultural operations and as trailing cable. The cables are also suitable for fixed application as power supply cable for underground mining and open-cast mining applications, for tunneling applications and similar applications.

§ STANDARDS

Construction	DIN VDE 0250-812
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Electrolytic, stranded, tinned copper wire DIN VDE 0295 Class 5
Insulation	All cores are insulated with 3GI3 compound (acc.to DIN VDE 0207 Part 20)
Screen	3/E coded types has individual screens made by laying up tinned copper wires over the insulation.
Lay Up	All cores are laid up in contact with each other and intersititial ground cores.
Inner Sheath	Special elastomeric compound GM1b (acc. to DIN VDE 02(17 Part 21)
Screen	Overall-screen made of tinned copper wires in between inner and outer sheaths
Outer Sheath	Heavy-duty elastomer outer sheath 5GM5(acc.to DIN VDE 0207 Part 21)

§ TECHNICAL CHARACTERISTICS

Rated Voltage	0.6 / 1 KV
Max.Permissible Operating Voltage AC	0.7 / 1.2 KV
Max.Permissible Operating Voltage DC	0.9 / 1.8 KV
AC Test Voltage	3KV
Min Bending Radius Current Carrying	VDE 0298-3 Tab 3
Current Carrying Capacities	VDE 0298-4
Working Temperature	
Fixed	-40°C-+80°C
Mobile	-25°C-+80°C
Max.Tensile Load Of cable	15N/mm²

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
1×16	11-14	250
1×25	13-18	400
1×35	14-18	500
1×50	16-19	700
1×70	18-21	950
1×95	20-24	1200
1×120	23-26	1500
1×150	25-28	1800
1×185	28-31	2300
1×240	32-36	3000
3×1.5	11-14	250
3×2.5	13-16	300
4×2.5	15-18	400
4×4	17-20	500
4×6	19-22	600
4×10	23-26	950

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
4×16	27-30	1400
4×25	33-37	2100
4×35	35-39	2600
4×50	42-46	3700
4×70	45-49	4600
4×95	53-57	6300
4×120	59-63	7800
5×4	19-22	600
5×6	21-24	750
7×2.5	18-21	600
12×2.5	23-26	850
19×2.5	28-32	1200
3x2.5+3x2.5/3E	16-19	350
3x4+3x4/3E	19-22	500
3x6+3x6/3E	20-23	600
3x10+3x10/3E	24-28	950
3x16+3x16/3E	27-30	1200
3x 25+3x16/3E	29-33	1800
3x35+3xl6/3E	34-38	2300
3x50+3x25/3E	40-44	3300
3x70+3x35/3E	44-48	4100
3x95+3x50/3E	50-55	5500
3x120+3x70/3E	55-60	6800
3x150+3x70/3E	59-64	8000
3x2.5+3x2.5/3E+3x1.5St	18-20	500
3x4+3x4/3E+3x1.5St	19-22	550
3x6+3x6/3E+3x1.5St	20-24	650
3x10+3x10/3E+3x2.5St	24-28	1000

Tunnel Cable

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x16+3x16/3E+3x2.5St	27-30	1300
3x25+3x16/3E+3x2.5St	30-34	1800
3x35+3x16/3E+3x2.5St	34-38	2400
3x50+3 x25/3E+3x2.5St	40-44	3200
3x70+3x35/3E+3x2.5St	44-48	4200
3x95+3x50/3E+3X2.5St	48-53	5600
3x120+3x70/3E+3x2.5St	51-56	6800
3x150+3x70/3E+3x2.5St	59-64	8100
3x2.5/2.5 kon	15-18	350
5x2.5/2.5 kon	19-23	500
5x4/4 kon	20-23	650
5x6/6 kon	21-24	800
10x1.5 /1.5 kon	20-24	800
10x2.5/2.5 kon	26-29	1100

(N)SSHCÖU

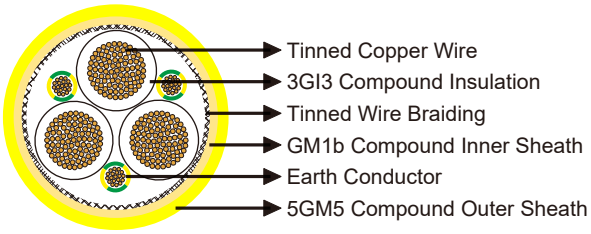
§ APPLICATION

The cables are suitable for fixed installation and flexible operation as motor power supply cables for frequency converter controlled drives in the mining and tunneling.

§ STANDARDS

Construction	DIN VDE 0250-811
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Electrolytic, stranded, tinned copper wire DIN VDE 0295 Class 5
Insulation	All cores are insulated with 3GI3 compound
Lay Up	Three power cores laid up with the protective earth conductors split into three in the outer interstices
Screen	Concentric tinned copper wire braiding
Inner Sheath	Special extruded elastomeric compound GMI1b
Outer Sheath	Heavy-duty elastomer outer sheath 5GM5

§ TECHNICAL CHARACTERISTICS

Rated Voltage	0.6 / 1 KV
Max.Permissible Operating Voltage AC	0.7 / 1.2 KV
Max.Permissible Operating Voltage DC	0.9 / 1.8 KV
AC Test Voltage	3KV
Min Bending Radius Current Carrying	Acc. to VDE 0298-3
Current Carrying Capacities	According to DIN VDE 0298-4

Working Temperature	
Fixed	-40°C-+80°C
Mobile	-25°C-+80°C
Max.Tensile Load Of cable	15N/mm²
Max.Torsion	25°/m

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x16+3x2.5	24.4 -27.4	1200
3x25+3x4	28.2- 31.2	1700
3x35+3x16/3	30.5-33.5	2200
3x50+3x25/3	36.0-39.0	2800
3x70+3x35/3	41.2-44.2	3850
3x95+3x50/3	45.7-48.7	4650
3x120+3x70/3	48.7-52.7	5800
3x150+3x70/3	55.7-59.7	7150
3x185+3x95/3	60.4-64.4	8500
3x240+3x120/3	68.2-72.2	10100

NSHCGEÖU
KON+ST+UL

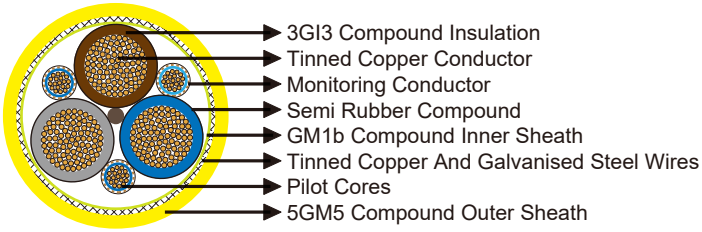
§ APPLICATION

It is used for connection of mobile machines with very high mechanical load, especially in mines for coal cutting and loading machines as well as for supplying appliances and auxiliary and auxiliary electrical circuits. Concentric phase monitoring screen and overall concentric earth conductor facilitate in connection with a suitable monitoring equipment monitoring of the cable from standpoint of insulation faults and damages that are caused by external effects.

§ STANDARDS

Construction	DIN VDE 0250-812
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Power Cores	
Conductor	Tinned copper conductor DIN VDE 0295 class 5
Insulation	Based on 3GI3-EPR rubber and semi rubber compound
Control Cores+Monitoring Pe Core(S)	
Conductor	Tinned copper conductor DIN VDE 0295 class 5
Insulation	3GI3 type EPR compound and semi conductive rubber compound
Lay Up	Three power cores laid up with the protective earth conductors split into three in the outer interstices. If there are 3 control cores. the monitoring core is concentrically wrapped over insulation of control cores.
Inner Sheath	GM1b type EPR compound

Screen	Flexible- pliable armour in helix of tinned copper and galvanised steel wires.
Outer Sheath	Heavy-duty elastomer 5GM5 type rubber compound Yellow or Red.

§ TECHNICAL CHARACTERISTICS

Rated Voltage	0.6 / 1 KV
Max.Permissible Operating Voltage AC	0.7 / 1.2 KV
Max.Permissible Operating Voltage DC	0.9 / 1.8 KV
AC Test Voltage	3KV
AC Test Voltage(For control cores)	2KV
Min. 011otance with S-Type Directional Changes	20×D
Current Carrying Capacities	According to DIN VDE 0298-4
Working Temperature	
Fixed	-40°C-+80°C
Mobile	-25°C-+80°C
Max.Tensile Load Of cable	15N/mm²

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3×16/16 KON + (2x1.5 St+1.5 ÜL)	35-38	2150
3×25/16 KON + (2x1.5 St+1.5 ÜL)	41-46	3000
3×35/16 KON + (2x1.5 St+1.5 ÜL)	42-47	3400
3×70/35 KON + (2x1.5 St+1.5 ÜL)	46-51	4300
3×70/35 KON + (2x1.5 St+1.5 ÜL)	52-56	5600
3×95/50 KON + (2x1.5 St+1.5 ÜL)	58-62	7100
3x25/16 KON+3x(1.5 ST KON/1.5 ÜL KON)	42-46	3130
3x35/16 KON+3x(1.5 ST KON/1.5 ÜL KON)	43-47	3610
3x50/35 KON+3x(1.5 ST KON/1.5 ÜL KON)	49-53	4580
3x70/35 KON+3x(1.5 ST KON/1.5 ÜL KON)	52-56	5920
3x95/50 KON+3x(1.5 ST KON/1.5 ÜL KON)	60-64	7400

NTSWÖU-J

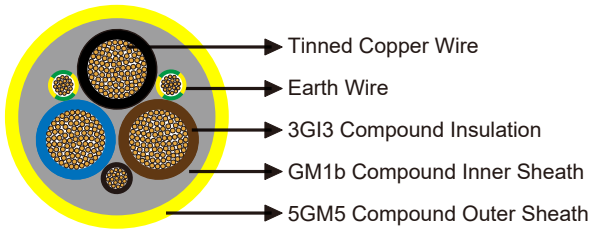
§ APPLICATION

Used in dry, damp and wet places where there are mechanical effects, in mines, in trolley, systems, in cranes, in tunneling applications as trailing and cable power supply.

§ STANDARDS

Construction	DIN VDE 0250-813
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Electrolytic,stranded,tinned copper wire DIN VDE 0295 class 5
Insulation	All cores are insulated with 3GI3 compound (acc. to DIN VDE 0207 part 20).
Lay Up	All cores are laid up in contact with each other and interstitial ground cores.
Inner Sheath	Special elastomeric compound CM1b (acc. to DIN VDE 0207 Teil 21)
Outer Sheath	Heavy-duty elastomer 5GM5 (acc. to DIN VDE 0207 Teil 21) Yellow or black

§ TECHNICAL CHARACTERISTICS

Rated Voltage	0.6 / 1 KV
AC Test Voltage	3KV
Operating Temperature	Max. 90°C
Short - CIrcult Temperature	Max. 250°C
Working Temperature	
Fixed	-40°C-+80°C

Mobile	-25°C-+80°C
Min Bending Radius	VDE 0298-3 Tab.3
Current Carrying Capacities	VDE 0298-4

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25+3x25/3	40.0-44.0	2470
3x35+3x25/3	44.4-48.4	3150
3x50+3x25/3	47.7-51.7	3750
3x70+3x35/3	52.3-56.3	4690
3x95+3x50/3	59.9-63.9	6210
3x120+3x70/3	63.8-67.8	7430
3x150+3x70/3	69.2-73.2	8900
3x185+3x95/3	73.1-77.1	10330

NTSCGEWÖU

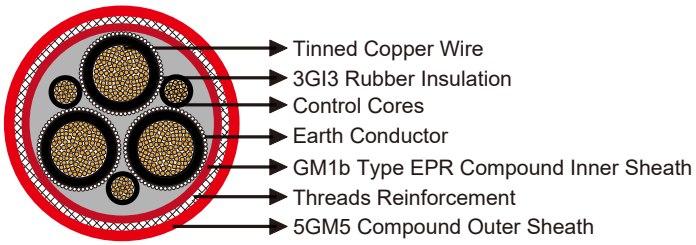
§ APPLICATION

For the connection of electrical equipment large material handling machines such as excavators, cranes, dumpers in mining and tunneling applications. The flexible cable design allows for movement of the equipment during operation.

§ STANDARDS

Construction	DIN VDE 0250-813
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Electrolytic, stranded, tinned copper wire DIN VDE 0295 Class 5
Insulation	3GI3 type EPR compound
Electrical Field Control	Inner and Outer semiconductive layer of semiconductive rubber
Protective-Earth Conductor	Tinned Copper conductor with semiconductive layer
Lay Up	Three main conductors laid-up with three control cores in the outer interstice
Inner Sheath	GM1b Type EPR Compound
Reinforcement	Embedded braid made of anti torsion synthetic threads
Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	3.6/6 KV	6/10 KV	8.7/15KV	12/20 KV	18/30 KV
AC Test Voltage	11KV	17KV	24KV	29KV	43KV

Max.Permissible Operating Voltage AC	4.2/7.2KV	6.9/12 KV	10.4/18KV	13.9/24 KV	20.8/36 KV
Min Bending Radius	VDE 0298-3 Tab 3				
Current Carrying Capacities	VDE 0298-4				
Working Temperature					
Fixed	-40°C-+80°C				
Mobile	-25°C-+80°C				
Max.Tensile Load Of cable	15N/mm²				
Max.Torsion	25°/m				
Trawl Speed For Tunnelling App	Max.30 m/min				
Minimum Distarce For Change Of Direction	20×D				

§ DIMENSIONS AND WEIGHT

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25 + 3x25/3	41.8-45.0	2530
3x35 + 3x25/3	44.2-48.9	2900
3x50 + 3x25/3	48.5-51.4	3600
3x70 + 3x35/3	52.6-55.6	4400
3x95 + 3x50/3	55.7-58.8	5630
3x120 + 3x70/3	59.6-65.9	6200

6/10 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25 + 3x25/3	43.6-48.1	2600
3x35 + 3x25/3	45.6-50.4	2980
3x50 + 3x25/3	48.3-51.4	3720
3x70 + 3x35/3	53.4-59.1	4510
3x95 + 3x50/3	57.1-63.2	5720
3x120 + 3x70/3	63.0-69.7	6300

8.7/15 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)

3x25 + 3x25/3	48.1-53.2	3675
3x35 + 3x25/3	51.8-57.3	4415
3x50 + 3x25/3	55.5-61.4	5135
3x70 + 3x35/3	58.0-64.1	6005
3x95 + 3x50/3	63.4-70.1	7200
3x120 + 3x70/3	67.5-74.6	8700

12/20 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25 + 3x25/3	51.1-55.3	4460
3x35 + 3x25/3	54.4-58.2	4990
3x50 + 3x25/3	59.4-63.6	5740
3x70 + 3x35/3	64.2-68.4	6950
3x95 + 3x50/3	69.6-73.8	7870
3x120 + 3x70/3	73.6-77.8	9425

18/30 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25 + 3x25/3	66.0-72.8	6360
3x35 + 3x25/3	68.0-75.0	6925
3x50 + 3x25/3	71.6-79.1	7800
3x70 + 3x35/3	75.8-83.7	9140
3x95 + 3x50/3	79.4-87.7	10100
3x120 + 3x70/3	85.3-94.2	12260

20/35 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x35 + 3x25/3	75.7-83.6	8400
3x50 + 3x25/3	79.5-87.8	9360
3x70 + 3x35/3	82.0-90.6	10400
3x95 + 3x50/3	87.3-96.4	11770
3x120 + 3x70/3	91.4-101.1	13680

(N)TSCGEWÖU-TBM

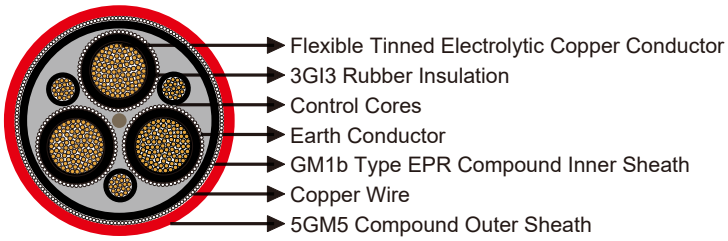
§ APPLICATION

The cables are suitable for reeling power supply cables for TBM's machines and in underground mines for tunnel constructions.

§ STANDARDS

Construction	DIN VDE 0250-813
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Conductor	Flexible Tinned Electrolytic copper conductor DIN VDE 0295 Class 5
Insulation	3GI3 type EPR compound
Electrical Field Control	Inner and Outer semiconductive layer of semiconductive rubber
Control core	Tinned Copper conductor with semiconductive layer
Protective-Earth Conductor	Tinned Copper/ Textile braiding combinated cores laying concentric around each power core.
Core Identification	Main Cores: Natural coloring with black semiconductive rubber. Control cores: Black
Lay Up	Three main conductors laid-up with three control cores in the outer interstice
Inner Sheath	GM1b Type EPR Compound
Screen	Overall concentric lay of copper wire spinning.
Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	3.6/6 KV	6/10 KV	8.7/15KV	12/20 KV	18/30 KV
AC Test Voltage	11KV	17KV	24KV	29KV	43KV
Max.Permissible Operating Voltage AC	4.2/7.2 KV	6.9/12KV	10.4/18 KV	13.9/24KV	20.8/36 KV
Max.Permissible Operating Voltage DC	5.4/10.8 KV	9/18 KV	13.5/27 KV	18/36 KV	27/54 KV
Min Bending Radius	VDE 0298-3 Tab 3				
Current Carrying Capacities	VDE 0298-4				
Working Temperature					
Fixed	-40°C-+80°C				
Mobile	-25°C-+80°C				
Max.Tensile Load Of cable	15N/mm²				
Max.Torsion	25°/m				
Trawl Speed For Tunnelling App	Max.30 m/min				
Minimum Distarce For Change Of Direction	20×D				

§ DIMENSIONS AND WEIGHT

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+6ÜLKON	42.2-45.4	2770
3x35+3x25/3E+3x2.5ST+6ÜLKON	46.8-50.0	3200
3x50+3x25/3E+3x2.5ST+6ÜLKON	50.1-53.2	4040
3x70+3x35/3E+3x2.5ST+6ÜLKON	54.6-57.7	5035
3x95+3x50/3E+3x2.5ST+6ÜLKON	56.4-60.5	6270
3x120+3x70/3E+3x2.5ST+6ÜLKON	64.0-68.0	7400

6/10 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+6ÜLKON	45.5-48.2	2975
3x35+3x25/3E+3x2.5ST+6ÜLKON	47.8-51.0	3420
3x50+3x25/3E+3x2.5ST+6ÜLKON	50.7-54.9	4260
3x70+3x35/3E+3x2.5ST+6ÜLKON	57.2-61.4	5270

3x95+3x50/3E+3x2.5ST+6ÜLKON	61.1-65.3	6540
3x120+3x70/3E+3x2.5ST+6ÜLKON	65.1-69.3	7840

12/20 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+6ÜLKON	51.1-55.3	3600
3x35+3x25/3E+3x2.5ST+6ÜLKON	54.0-58.2	4140
3x50+3x25/3E+3x2.5ST+6ÜLKON	59.4-63.6	5030
3x70+3x35/3E+3x2.5ST+6ÜLKON	64.2-68.4	6200
3x95+3x50/3E+3x2.5ST+6ÜLKON	69.2-73.8	7520
3x120+3x70/3E+3x2.5ST+6ÜLKON	73.6-77.8	8740

(N)TSCGEWÖU FO(LWL)

§ APPLICATION

For the connection of electrical equipment large material handling machines such as excavators, cranes, dumpers in mining and tunneling applications in combination of power and data transmission. The flexible cable design allows for movement of the equipment during operation. Suitable also as flex MV reeling cable and also for festoon systems.

§ STANDARDS

Construction	DIN VDE 0250-812
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION

Conductor	Electrolytic stranded tinned copper wire DIN VDE 0295 Class 5
Insulation	3GI3 type EPR compound
Electrical Field Control	Inner and Outer semiconductive layer of semiconductive rubber
Protective-Earth Conductor	Tinned Copper conductor with semiconductive layer
Optical Fiber	Fibre core diameter of fiber 9µm, 625µm or 50µm; Diameter over cladding 125µm; diameter over coating 250 µm; designs up to 24 fibers available.
Fiber coading	Color coding of the fibers and buffering tube for identification of the fiber type.
Fiber covering	Hollow core with filling compound,basic material ETFE
Arrangement of Fiber cores	Six cores in one layer and specially laid-up around the central support element

Lay Up	Three main conductors laid-up with two control cores and fiber optic element in the outer interstice
Inner Sheath	GM1b Type EPR compound
Reinforcement	Embedded braid made of anti torsion synthetic threads
Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	3.6/6 KV	6/10 KV	8.7/15KV	12/20KV	18/30KV
AC Test Voltage	11KV	17KV	24KV	29KV	43KV
Max.Permissible Operating Voltage AC	4.2/7.2 KV	6.9/12 KV	10.4/18 KV	13.9/24 KV	20.8/36 KV
Max.Permissible Operating Voltage DC	5.4/10.8 KV	9/18 KV	13.5/27 KV	18/36 KV	27/54 KV
Min Bending Radius	DIN VDE 0298-3				
Current Carrying Capacities	DIN VDE 0298-4				
Working Temperature					
Fixed	-40°C-+80°C				
Mobile	-25°C-+80°C				
Max.Tensile Load Of cable	15N/mm²				
Max.Torsion	25°/m				
Trawl Speed For Tunnelling App	Max.30 m/min				
Minimum Distarce For Change Of Direction	20×D				

§ DIMENSIONS AND WEIGHT

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	42.2-45.2	1500	0.78	2660
3x25+2x50/2+FO	45.0-48.0	1500	0.78	2990
3x35+2x25/2+FO	43.8-46.8	2100	0.554	3050
3x35+2x50/2+FO	45.9-48.9	2100	0.554	3400
3x50+2x25/2+FO	45.1-48.1	3000	0.386	3540
3x50+2x50/2+FO	48.8-51.8	3000	0.386	4070
3x70+2x35/2+FO	48.8-51.8	4200	0.272	4480
3x70+2x50/2+FO	52.5-56.5	4200	0.272	4840
3x95+2x50/2+FO	54.3-58.3	5700	0.206	5800

3x120+2x70/2+FO	58.2-62.2	7200	0.161	7010
3x150+2x70/2+FO	62.4-66.4	9000	0.129	8210
3x185+2x95/2+FO	67.8-71.8	11100	0.106	9920
3x240+2x120/2+FO	74.4-78.4	14400	0.08	12530
3x300+2x150/2+FO	80.6-85.6	18000	0.064	15330

6/10 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	42.7-45.7	1500	0.78	2740
3x25+2x50/2+FO	46.0-49.0	1500	0.78	2980
3x35+2x25/2+FO	45.2-48.2	2100	0.554	3160
3x35+2x50/2+FO	47.6-50.6	2100	0.554	3610
3x50+2x25/2+FO	46.5-49.5	3000	0.386	3670
3x50+2x50/2+FO	50.4-53.4	3000	0.386	4020
3x70+2x35/2+FO	50.3-53.3	4200	0.272	4610
3x70+2x50/2+FO	53.8-56.8	4200	0.272	5160
3x95+2x50/2+FO	55.6-59.6	5700	0.206	5940
3x120+2x70/2+FO	60.4-63.4	7200	0.161	7150
3x150+2x70/2+FO	65.2-69.2	9000	0.129	8600
3x185+2x95/2+FO	69.2-73.2	11100	0.106	10110
3x240+2x120/2+FO	77.2-81.2	14400	0.08	12980
3x300+2x150/2+FO	81.8-86.8	18000	0.064	15550

8.7/15 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	46.0-49.0	1500	0.78	3000
3x25+2x50/2+FO	47.4-51.4	1500	0.78	3350
3x35+2x25/2+FO	46.3-49.3	2100	0.554	3550
3x35+2x50/2+FO	50.1-53.1	2100	0.554	3710
3x50+2x25/2+FO	50.1-53.1	3000	0.386	4020

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x50+2x50/2+FO	53.8-57.8	3000	0.386	4640
3x70+2x35/2+FO	54.8-58.8	4200	0.272	5170
3x70+2x50/2+FO	54.8-58.8	4200	0.272	5280
3x95+2x50/2+FO	59.2-63.2	5700	0.206	6370
3x120+2x70/2+FO	64.6-68.6	7200	0.161	7830
3x150+2x70/2+FO	68.8-72.8	9000	0.129	9090
3x185+2x95/2+FO	72.8-76.8	11100	0.106	10610
3x240+2x120/2+FO	76.8-79.7	14400	0.08	13540
3x300+2x150/2+FO	87.9-92.9	18000	0.064	16530

12/20 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	46.5-49.5	1500	0.78	3070
3x25+2x50/2+FO	49.5-52.5	1500	0.78	3400
3x35+2x25/2+FO	49.3-52.3	2100	0.554	3590
3x35+2x50/2+FO	53.1-57.1	2100	0.554	4200
3x50+2x25/2+FO	54.1-58.1	3000	0.386	4500
3x50+2x50/2+FO	54.1-58.1	3000	0.386	4590
3x70+2x35/2+FO	58.0-62.0	4200	0.272	5540
3x70+2x50/2+FO	58.0-62.0	4200	0.272	5650
3x95+2x50/2+FO	62.4-66.4	5700	0.206	6750
3x120+2x70/2+FO	67.7-71.7	7200	0.161	8400
3x150+2x70/2+FO	71.9-75.9	9000	0.129	9520
3x185+2x95/2+FO	77.3-81.3	11100	0.106	11340
3x240+2x120/2+FO	83.8-87.8	14400	0.08	14060
3x300+2x150/2+FO	91.0-96.0	18000	0.064	17090

14/25 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	50.5-53.5	1500	0.78	3460
3x25+2x50/2+FO	50.5-53.5	1500	0.78	3550
3x35+2x25/2+FO	54.2-57.2	2100	0.554	4180
3x35+2x50/2+FO	54.2-57.2	2100	0.554	4260
3x50+2x25/2+FO	57.0-61.0	3000	0.386	4980
3x50+2x50/2+FO	57.0-61.0	3000	0.386	5050
3x70+2x35/2+FO	62.0-66.0	4200	0.272	6020
3x70+2x50/2+FO	62.0-66.0	4200	0.272	6130
3x95+2x50/2+FO	67.9-71.9	5700	0.206	7500
3x120+2x70/2+FO	71.6-75.6	7200	0.161	8790
3x150+2x70/2+FO	77.3-81.3	9000	0.129	10390
3x185+2x95/2+FO	81.4-85.4	11100	0.106	11980
3x240+2x120/2+FO	89.2-94.2	14400	0.08	15130
3x300+2x150/2+FO	95.0-100.0	18000	0.064	17830

18/30 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	55.1-59.1	1500	0.78	4020
3x25+2x50/2+FO	55.1-59.1	1500	0.78	4100
3x35+2x25/2+FO	58.0-62.0	2100	0.554	4590
3x35+2x50/2+FO	58.0-62.0	2100	0.554	4670
3x50+2x25/2+FO	61.8-65.8	3000	0.386	5410
3x50+2x50/2+FO	61.8-65.8	3000	0.386	5480
3x70+2x35/2+FO	67.0-71.0	4200	0.272	6710
3x70+2x50/2+FO	67.0-71.0	4200	0.272	6810
3x95+2x50/2+FO	71.4-75.4	5700	0.206	7960
3x120+2x70/2+FO	76.7-80.7	7200	0.161	9510

3x150+2x70/2+FO	81.0-85.0	9000	0.129	10950
3x185+2x95/2+FO	83.9-88.9	11100	0.106	12560
3x240+2x120/2+FO	92.8-97.8	14400	0.08	15770
3x300+2x150/2+FO	99.6-104.6	18000	0.064	18770

20/35 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Permissible Tensile Force Max.(N)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+2x25/2+FO	59.8-63.8	1500	0.78	4580
3x35+2x25/2+FO	64.4-68.4	2100	0.554	5410
3x50+2x25/2+FO	68.1-72.1	3000	0.386	6270
3x50+2x50/2+FO	68.1-72.1	3000	0.386	6350
3x70+2x35/2+FO	71.8-75.8	4200	0.272	7350

NTSKCGEWÖU

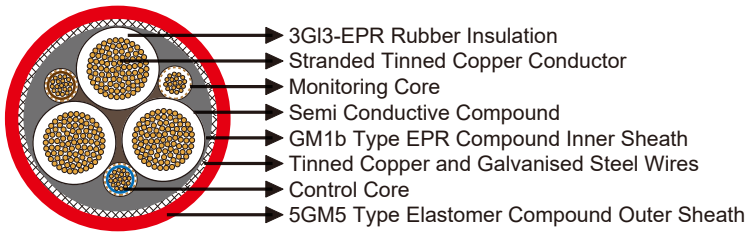
§ APPLICATION

For the connection of mobile electrical equipment in mines and tunnels. Suitable also for coal cutting machines, particularly for extreme bending loads inside of steel or plastic track chains.

§ STANDARDS

Construction	DIN VDE 0250-813
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1
Oil Resistant	HD/EN/IEC 60811-2-1.,DIN VDE0473-811-2-1

§ CABLE CONSTRUCTION



Power Cores	
Conductor	Tinned copper conductor DIN VDE 0295 class 5
Insulation	Based on 3GI3-EPR rubber and semi rubber compound
CONTROL CORES+MONITORING PE CORE(S)	
Conductor	Tinned copper conductor DIN VDE 0295 class 5
Insulation	3GI3 type EPR compound and semi conductive rubber compound
Cradle Separator	A shaped section of elastomeric material. Semi conductive, with control wire in the center. designed to support the core assembly. fill the center interstice and provide a specified separation between individual power cores
Electrical Field Control	Inner and Outer semiconductive layer of semiconductive rubber
Core Identification	Power cores naturally colored. Control cores blue colored
Lay Up	Three main conductors laid-up with three control cores & PE conductors in interstice over a cradle separator.
Inner Sheath	GM1b Type EPR compound
Screen / Armour	Flexible- pliable armour in helix of tinned copper and galvanised steel wires

Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	1.8/3 KV	3.6/6 KV
AC Test Voltage	6KV	11KV
Max.Permissible Operating Voltage AC	2.1/3.6 KV	4.2/7.2 KV
Max.Permissible Operating Voltage DC	2.7/5.4 KV	5.4/10.8 KV
Min Bending Radius	DIN VDE 0298-3	
Current Carrying Capacity	DIN VDE 0298-4	
Working Temperature		
Fixed	-40°C-+80°C	
Mobile	-25°C-+80°C	

§ DIMENSIONS AND WEIGHT

1.8/3 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3×(1.5 ST KON+ 16/3 KON)	42.1-45.3	0.795	3190
3x35+3×(1.5 ST KON+ 16/3 KON)	46.5-49.7	0.565	3920
3x50+3×(1.5 ST KON+ 25/3 KON)	50.4-53.5	0.393	4730
3x70+3×(1.5 ST KON+ 35/3 KON)	55.8-60.0	0.277	6070
3x95+3×(1.5 ST KON+ 50/3 KON)	61.5-65.7	0.21	7620
3x120+3×(1.5 ST KON+ 70/3 KON)	66.0-70.3	0.164	9270
3x150+3×(1.5 ST KON+ 70/3 KON)	71.8-76.0	0.132	10920
3x185+3×(1.5 ST KON+ 95/3 KON)	76.2-80.3	0.108	12770
3x240+3×(1.5 ST KON+ 120/3 KON)	84.1-89.4	0.0817	15860

1.8/3 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x35+3×(1.5 ST KON+ 25/3 KON)+ÜL KON	46.0-51.0	0.554	3960
3x50+3×(1.5 ST KON+ 25/3 KON)+ÜL KON	51.0-55.0	0.368	4980
3x70+3×(1.5 ST KON+ 35/3 KON)+ÜL KON	57.0-62.0	0.272	6360
3x95+3×(1.5 ST KON+ 50/3 KON)+ÜL KON	64.0-69.0	0.206	8150
3x50+3×(35+35/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	66.0-71.0	0.368	8390
3x70+3×(50+50/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	74.0-79.0	0.272	10350
3x95+3×(70+70/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	85.0-90.0	0.206	13340

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3×(1.5 ST KON+ 16/3 KON)	47.3-50.4	0.795	3710
3x35+3×(1.5 ST KON+ 16/3 KON)	50.2-53.4	0.565	4320
3x50+3×(1.5 ST KON+ 25/3 KON)	53.5-57.7	0.393	5250
3x70+3×(1.5 ST KON+ 35/3 KON)	59.6-63.8	0.277	6600
3x95+3×(1.5 ST KON+ 50/3 KON)	64.3-68.5	0.21	8030
3x120+3×(1.5 ST KON+ 70/3 KON)	70.7-74.8	0.164	9990
3x150+3×(1.5 ST KON+ 70/3 KON)	74.5-78.8	0.132	11330
3x185+3×(1.5 ST KON+ 95/3 KON)	78.5-93.0	0.108	13280
3x240+3×(1.5 ST KON+ 120/3 KON)	86.8-92.1	0.0817	16380

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x35+3×(1.5 ST KON+ 25/3 KON)+ÜL KON	46.0-51.0	0.554	3960
3x50+3×(1.5 ST KON+ 25/3 KON)+ÜL KON	51.0-55.0	0.368	4980
3x70+3×(1.5 ST KON+ 35/3 KON)+ÜL KON	57.0-62.0	0.272	6360
3x95+3×(1.5 ST KON+ 50/3 KON)+ÜL KON	64.0-69.0	0.206	8150
3x35+3x(35+35/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	69.0-74.0	0.554	7800
3x50+3x(50+50/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	73.0-78.0	0.368	9340
3x70+3x(70+70/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	80.0-85.0	0.272	11580
3x95+3x(95+95/3KON) +2x(0.75ST KON)+1x(2x0.75ÜL KON)	89.0-94.0	0.206	13930

(N)3GHSSYCY

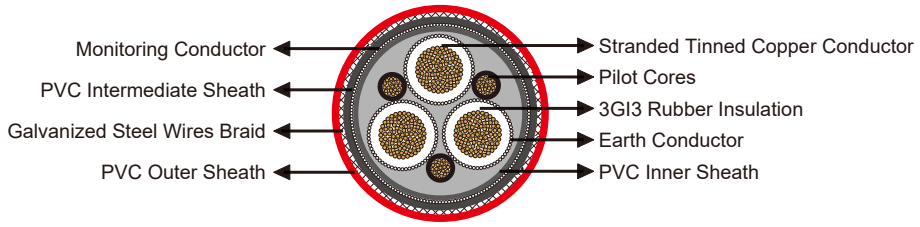
§ APPLICATION

These cables are used for the connection of mobile operating equipments in mines and underground excavations with hazardous environments. In stationary operation, e.g.high-voltage transformers in mining and tunnelling.

§ STANDARDS

Construction	DIN VDE 0250-605 & IEC 60502-2
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1

§ CABLE CONSTRUCTION



Conductor	Flexible electrolytic stranded tinned copper wire DIN VDE 0295 Class 5
Insulation	
Main Cores	3GI3 type EPR compound
Pilot Control Cores	3GI3 type EPR compound
Electrical Field Control	Extruded inner and outer rubber semiconductive layer For 3.6/6 kV cables outer semiconductive layer only
Protective Conductor	Made of plain copper wires or copper wire braiding laid up concentrically around each main core
Core Identification	
Main Cores	Natural coloring, design acc to DIN VDE 0250 Part 1
Pilot Cores	Black colored and number coded
Lay Up	Three main conductors laid-up with three pilot control cores in the outer interstice.Protective cores are concentricalty wrapped over insulation of power cores
Inner Sheath	YM5 type PVC compound
Monitoring Conductor	Semioonductive tape + overall concentric lay of copper wires and syntetic tape over wires
Inner Sheath	PVC compound type DMV6 acc. to DIN VDE 0276-603

Armour	Galvanized steel wire braiding, coverage minimum 75% ST2 Type to IEC60502
Outer Sheath	PVC compound type DMV6 acc. to DIN VDE 0276-603, Red or Black

§ TECHNICAL CHARACTERISTICS

Rated Voltage	3.6/6 KV	6/10 KV	8.7/15KV	12/20 KV	18/30 KV
AC Test Voltage	11KV	17KV	24KV	29KV	43KV
Max.Permissible Operating Voltage AC	4.2/7.2KV	6.9/12KV	10.4/18KV	13.9/24KV	20.8/36 KV
Max.Permissible Operating Voltage DC	5.4/10.8 KV	9/18 KV	13.5/27 KV	18/36 KV	27/54 KV
Min Bending Radius	DIN VDE 0298-3				
Current Carrying Capacities	DIN VDE 0298-4				
Working Temperature					
Fixed	-40°C- +80°C				
Mobile	+5°C- +80°C				
Max.Tensile Load Of cable	20N/mm²				
Max.Torsion	25°/m				
Trawl Speed For Tunnelling App	Max.30 m/min				
Minimum Distarce For Change Of Direction	20×D				

§ DIMENSIONS AND WEIGHT

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	47.0-51.0	0.780	3600
3x35+3x16/3E+3x2.5ST+ÜL	49.0-54.0	0.554	4170
3x50+3x25/3E+3x2.5ST+ÜL	52.0-57.8	0.386	4850
3x70+3x35/3E+3x2.5ST+ÜL	56.1-61.2	0.272	5900
3x95+3x50/3E+3x2.5ST+ÜL	60.3-66.2	0.206	7044
3x120+3x70/3E+3x2.5ST+ÜL	63.8-70.2	0.161	8620
3x150+3x70/3E+3x2.5ST+ÜL	66.0-72.0	0.129	9860
3x185+3x95/3E+3x2.5ST+ÜL	70.0-74.0	0.106	11300

6/10 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	54.0-57.0	0.780	4200
3x35+3x16/3E+3x2.5ST+ÜL	57.1-60.2	0.554	4650
3x50+3x25/3E+3x2.5ST+ÜL	60.4-63.6	0.386	5380
3x70+3x35/3E+3x2.5ST+ÜL	65.2-68.8	0.272	6450
3x95+3x50/3E+3x2.5ST+ÜL	68.0-71.9	0.206	7700
3x120+3x70/3E+3x2.5ST+ÜL	70.1-76.1	0.161	9260
3x150+3x70/3E+3x2.5ST+ÜL	73.0-78.0	0.129	10840
3x185+3x95/3E+3x2.5ST+ÜL	74.0-79.2	0.106	12400

8.7/15KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	58.0-62.0	0.780	4530
3x35+3x16/3E+3x2.5ST+ÜL	61.0-65.0	0.554	5100
3x50+3x25/3E+3x2.5ST+ÜL	64.7-68.7	0.386	5840
3x70+3x35/3E+3x2.5ST+ÜL	67.9-71.9	0.272	7840
3x95+3x50/3E+3x2.5ST+ÜL	72.4-76.4	0.206	9210

12/20 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	62.3-66.3	0.780	4920
3x35+3x16/3E+3x2.5ST+ÜL	65.3-69.3	0.554	5400
3x50+3x25/3E+3x2.5ST+ÜL	69.0-73.0	0.386	6200
3x70+3x35/3E+3x2.5ST+ÜL	72.2-76.2	0.272	8240
3x95+3x50/3E+3x2.5ST+ÜL	76.8-80.8	0.206	9610
3x120+3x70/3E+3x2.5ST+ÜL	81.0-84.0	0.161	11260
3x150+3x70/3E+3x2.5ST+ÜL	84.5-88.7	0.129	13840
3x185+3x95/3E+3x2.5ST+ÜL	89.0-93.5	0.106	15400

(N)3GHSSHCH

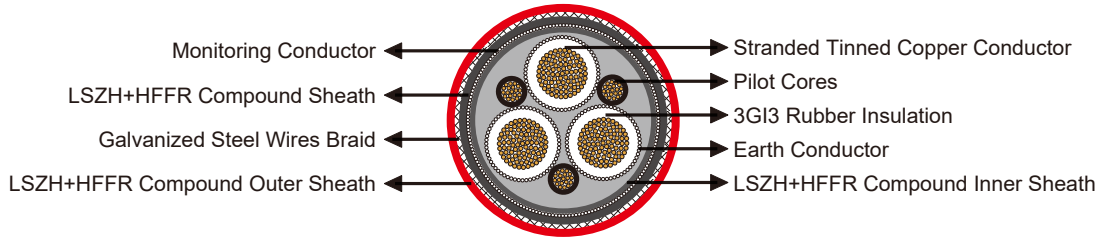
§ APPLICATION

These cables are used for the connection of mobile operating equipments in mines and underground excavations with hazardous environments. In stationary operation, e.g.high-voltage transformers in mining and tunnelling.

§ STANDARDS

Construction	DIN VDE 0250-605 & IEC 60502-2
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1

§ CABLE CONSTRUCTION



Conductor	Flexible electrolytic stranded tinned copper wire DIN VDE 0295 Class 5
Insulation	
Main Cores	3GI3 type EPR compound
Pilot Control Cores	3GI3 type EPR compound
Electrical Field Control	Extruded inner and outer rubber semiconductive layer for 3.6/6 kV cables outer semiconductive layer only
Protective Conductor	Made of plain copper wires or copper wire braiding laid up concentrically around each main core
Core Identification	
Main Cores	Natural coloring, design acc to DIN VDE 0250 Part 1
Pilot Cores	Black colored and number coded
Lay Up	Three main conductors laid-up with three pilot control cores in the outer interstice.Protective cores are concentricalty wrapped over insulation of power cores
Inner Sheath	Special Halogen free and flame retardant HFFR compound
Monitoring Conductor	Semioonductive tape + overall concentric lay of copper wires and syntetic tape over wires
Inner Sheath	Special Halogen free and flame retardant HFFR compound

Armour	Galvanized steel wire braiding, coverage minimum 75%
Outer Sheath	Special Halogen free and flame retardant HFFR compound, Red or Black

§ TECHNICAL CHARACTERISTICS

Rated Voltage	3.6/6KV	6/10KV	8.7/15KV	12/20KV	18/30KV
AC Test Voltage	11KV	17KV	24KV	29KV	43KV
Max.Permissible Operating Voltage AC	4.2/7.2 KV	6.9/12 KV	10.4/18 KV	13.9/24 KV	20.8/36 KV
Max.Permissible Operating Voltage DC	5.4/10.8 KV	9/18 KV	13.5/27 KV	18/36 KV	27/54 KV
Min Bending Radius	DIN VDE 0298-3				
Current Carrying Capacities	DIN VDE 0298-4				
Working Temperature					
Fixed	-40°C- +80°C				
Mobile	+5°C- +80°C				
Max.Tensile Load Of cable	20N/mm²				
Max.Torsion	25°/m				
Trawl Speed For Tunnelling App	Max.30 m/min				
Minimum Distarce For Change Of Direction	20×D				

§ DIMENSIONS AND WEIGHT

3.6/6 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	47.0-51.0	0.780	3600
3x35+3x16/3E+3x2.5ST+ÜL	49.0-54.0	0.554	4170
3x50+3x25/3E+3x2.5ST+ÜL	52.0-57.8	0.386	4850
3x70+3x35/3E+3x2.5ST+ÜL	56.1-61.2	0.272	5900
3x95+3x50/3E+3x2.5ST+ÜL	60.3-66.2	0.206	7044
3x120+3x70/3E+3x2.5ST+ÜL	63.8-70.2	0.161	8620
3x150+3x70/3E+3x2.5ST+ÜL	66.0-72.0	0.129	9860
3x185+3x95/3E+3x2.5ST+ÜL	70.0-74.0	0.106	11300

6/10 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	54.0-57.0	0.780	4200
3x35+3x16/3E+3x2.5ST+ÜL	57.1-60.2	0.554	4650
3x50+3x25/3E+3x2.5ST+ÜL	60.4-63.6	0.386	5380
3x70+3x35/3E+3x2.5ST+ÜL	65.2-68.8	0.272	6450
3x95+3x50/3E+3x2.5ST+ÜL	68.0-71.9	0.206	7700
3x120+3x70/3E+3x2.5ST+ÜL	70.1-76.1	0.161	9260
3x150+3x70/3E+3x2.5ST+ÜL	73.0-78.0	0.129	10840
3x185+3x95/3E+3x2.5ST+ÜL	74.0-79.2	0.106	12400

8.7/15KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	58.0-62.0	0.780	4530
3x35+3x16/3E+3x2.5ST+ÜL	61.0-65.0	0.554	5100
3x50+3x25/3E+3x2.5ST+ÜL	64.7-68.7	0.386	5840
3x70+3x35/3E+3x2.5ST+ÜL	67.9-71.9	0.272	7840
3x95+3x50/3E+3x2.5ST+ÜL	72.4-76.4	0.206	9210

12/20 KV

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Conductor Resistance at 20°C (Ω/km)	Appro. Weight (kg/km)
3x25+3x16/3E+3x2.5ST+ÜL	62.3-66.3	0.780	4920
3x35+3x16/3E+3x2.5ST+ÜL	65.3-69.3	0.554	5400
3x50+3x25/3E+3x2.5ST+ÜL	69.0-73.0	0.386	6200
3x70+3x35/3E+3x2.5ST+ÜL	72.2-76.2	0.272	8240
3x95+3x50/3E+3x2.5ST+ÜL	76.8-80.8	0.206	9610
3x120+3x70/3E+3x2.5ST+ÜL	81.0-84.0	0.161	11260
3x150+3x70/3E+3x2.5ST+ÜL	84.5-88.7	0.129	13840
3x185+3x95/3E+3x2.5ST+ÜL	89.0-93.5	0.106	15400

2XSEYQY

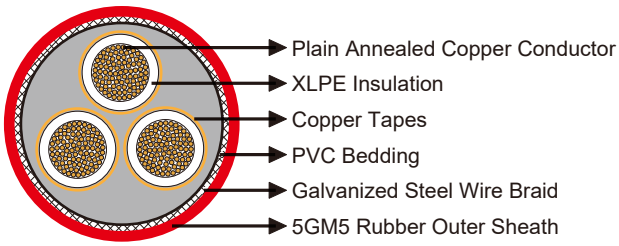
§ APPLICATION

These cables are used for the connection of mobile operating equipments. In mines and underground excavations with hazardous environments, in stationary operation, e.g.high-voltage transformers in mining and tunneling. It can be used also for powering main pannels and switchboards in tunneling applications.

§ STANDARDS

Construction	DIN VDE 0250-605 & IEC 60502-2
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1

§ CABLE CONSTRUCTION



Conductor	Circular Stranded Plain Annealed Copper Conductor (class2 acc. to IEC 60228)
Insulation	XLPE Insulation
Electrical Field Control	Extruded inner and outer rubber semiconductive layer
Core Identification	Natural coloring with black semiconductive layer
Screen	Copper tapes applied over each main core
Lay Up	3-Screened Cores will be laid up in concentrically
Bedding	PVC filler
Armour	Galvanized Steel Wire Braid (CSWB) Min90%
Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	6 / 10 KV
AC Test Voltage	17 KV
Max.Permissible Operating Voltage AC	6.9 / 12 KV
Max.Permissible Operating Voltage DC	9 / 18 KV
Min Bending Radius	Acc. to DIN VDE 0298 part 3
Current Carrying Capacity	According to DIN VDE0298, Part 4
Working Temperature	
Fixed	-25°C - +80°C
Mobile	+5°C - +80°C
Max.Tensile Load Of cable	15N/mm²
Max.Torsion	25°/m

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Max.DC Resistance (20°C) (Ω/km)	Appro. Weight (kg/km)
3x25/16	45.0-49.6	0.727	3650
3x35/16	47.7-52.8	0.524	4200
3x50/16	50.6-56.0	0.387	4960
3x70/16	54.5-60.2	0.268	6030
3x95/16	58.8-65.0	0.193	7300
3x120/16	62.0-68.5	0.153	8410

3GSEYQY

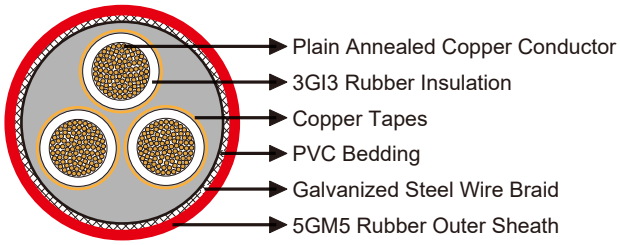
§ APPLICATION

These cables are used for the connection of mobile operating equipments. In mines and underground excavations with hazardous environments, in stationary operation, e.g.high-voltage transformers in mining and tunneling. It can be used also for powering main pannels and switchboards in tunneling applications.

§ STANDARDS

Construction	DIN VDE 0250-605 & IEC 60502-2
General Requirements	DIN VDE 0250-1
Guide Use	DIN VDE 0298-3
Electrical Tests	DIN VDE 0472-501, 503, 508
Non-Electrical Tests	DIN VDE 0472-401. 402,602,303, 615
Under Fire Condition Tests	DIN VDE 0472-803, 804
Flame Retardant	VDE 0482-332-1-2,DIN EN 60332-1-2,IEC 60332-1

§ CABLE CONSTRUCTION



Conductor	Circular Stranded Plain Annealed Copper Conductor (class 2 acc. to IEC 60228)
Insulation	3GI3 type EPR Compound
Electrical Field Control	Extruded inner and outer rubber semiconductive layer
Core Identification	Natural coloring with black semiconductive layer
Screen	Copper tapes applied over each main core
Lay Up	3-Screened Cores will be laid up in concentrically
Bedding	PVC filler
Armour	Galvanized Steel Wire Braid (CSWB) Min90%
Outer Sheath	5GM5 Type elastomer compound. Red

§ TECHNICAL CHARACTERISTICS

Rated Voltage	18 / 30 KV
AC Test Voltage	48 KV
Max.Permissible Operating Voltage AC	20.8 / 36 KV
Max.Permissible Operating Voltage DC	27 / 54 KV
Min Bending Radius Current Carrying	Acc. to DIN VDE 0298 part 3
Capacity	According to DIN VDE0298, Part 4
Max. Short circuit Temperature	250°C
Max. conductor Temperature	90°C
Working Temperature	
Fixed	-25°C - +80°C
Mobile	+5°C - +80°C
Max.Tensile Load Of cable	15N/mm²
Max.Torsion	25°/m

§ DIMENSIONS AND WEIGHT

Cross Section (mm²)	Overall Diameter Min-Max (mm)	Max.DC Resistance (20°C) (Ω/km)	Appro. Weight (kg/km)
3x25/16	65.1-72.0	0.727	6860
3x35/16	68.0-75.1	0.524	7640
3x50/16	70.8-78.3	0.387	8520
3x70/16	74.5-82.4	0.268	9760
3x95/16	79.0-87.2	0.193	11280
3x120/16	82.2-90.9	0.153	12600

LETTER CODING OF CABLE TYPES

The type designation or coding is letter combination in conformity with DIN VDE that describes the type of cable coded

N Design according to the corresponding standard
(N) Based on standard
C Metallic screen over the stranded cores or between the inner and outer sheath (shield)
CE Metallic screen over the insulation of the outer conductors
CG Semiconductive (non-metallic) cover over the stranded cores or between the inner and outer sheath (shield)
CCE Semiconductive (non-metallic) cover over the insulation of the outer conductors
FM Telecommunication lines within the cable
HSS Heavy duty cable type,screened with protective conductors
K Rubber cradle separator in the centre of the cables
KON Concentric protective conductor between the inner and outer sheath or concentric control/monitoring conductor
LWL (FO) Cable includes Fibre-optic (FO)cores
0 (OE) Oil-resistant outer sheath
R Round wire reinforcement
SE Protective conductor symmetrically split over cores
SH Heavy tough rubber-sheathed flexible mining-type cable (Rough handling)
SSH Heavy tough rubber-sheathed flexible mining-type cable (Rough handling)
SHT 1 KV reeling cable
SL Control cable
ST Control / Pilot Cores within the cables
T Reinforcement -Support element
TM Trailing cable for medium mechanical stresses
TS Trailing cables-Heavy duty rubber insulated flex cable
U Frame-retardant outer sheath (according to EN 60332-1•2)
ÜL(UEL) Monitoring conductor within the cable
W Weather resistant
2Y PE-Polyethylene Compound
2X XLPE - Crosslinked polyethylene Compound
3G Definition of the insulating material (3G= EPR)
V PVC compound
/3 Protective-earth conductor uniformly distributed in the three interstices
/3E Protective-earth conductor uniformly distributed over the insulation of the outer conductor
-0 Without green/yellow core
-J With green/yellow core

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