MINING REELING CONTROL CABLE · MOBILE MACHINERY | 0.6/1 kV | 5 sizes | PUR low-temp

# FC-MCR-A 7G 0.6/1 kV

Mining Reeling Control Cable 0.6/1 kV – 7-core reeling control cable, halogen-free low-temperature PUR sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, standards and installation guidance for 5 sizes.

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## 01 Application and Product Overview

FC-MCR-A 7G is a 7-core reeling control cable rated 0.6/1 kV for cable reels on drill rigs, LHD machines, shuttle cars and mobile mining plant. It has fine-wire class 5 copper cores with halogen-free cross-linked polyethylene (XLPE) insulation, an inner sheath and an outer sheath of halogen-free polyurethane (PUR), flame-retardant, low-temperature grade. Core cross-sections: 0.75 – 4 mm².

### Design

7 cores in concentric layers with a short lay length and polyester binder tape. Black cores carry white numbers; the green-yellow protective core lies in the outer layer. The cores are bound with halogen-free filler and covered by an inner sheath before the outer sheath is applied.

### Typical applications

- Control, signal and measuring circuits of drill rigs, LHD machines, shuttle cars and mobile crushers supplied through a cable reel
- Spring-driven and motor-driven cable reels on mining machines, cable handlers and conveyor take-up systems
- Operation with repeated winding, unwinding and bending within the permitted bending radius
- Wet, muddy, oily and abrasive environments typical of underground headings and open pits
- Control cabinets, junction boxes and remote-control stations of mining machinery
- Operations where the ambient temperature falls to −40 °C while the cable is in motion, such as open-pit mines and decline portals in cold climates

| 5 sizes | 0.6/1 kV | +90 °C | Halogen-free |
|---|---|---|---|
| Cross-section 0.75 – 4 mm² | Rated voltage $U_0/U$ | Maximum conductor temperature | Sheath: PUR low-temp |

### Key features

- Fine-wire class 5 copper cores with insulation thickness to 0.6/1 kV for reliable operation on a reel
- Cores laid in concentric layers with a short lay length and polyester binder tape
- Number-printed black cores; green-yellow protective core in the outer layer (G types)
- Halogen-free insulation and sheaths; no halogen acid gases when burned (IEC 60754-1/-2)
- Flexible in motion down to −40 °C (fixed installation −50 °C)
- Flame retardant to IEC 60332-1-2

### Service notes for mining duty

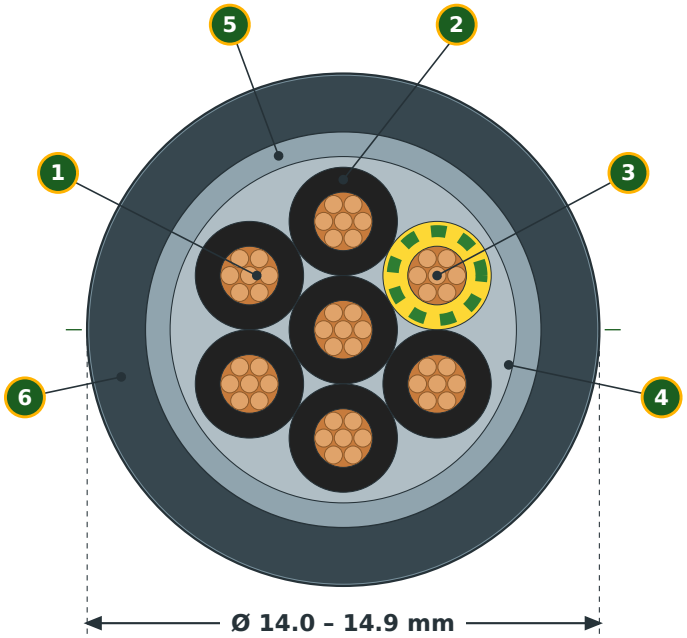
- Route control cables on the reel in a separate channel from MV or unscreened power cables, or use the screened version.
- Strip the outer sheath only as far as required for termination and seal the cable entry against water.


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## 02 Construction

**FEICHUN · CROSS-SECTION A-A · 0.6/1 kV**

**FC-MCR-A**
Sample size 7G1.5 · Rev 0 · Illustrative, not to scale




| No. | Component | Material |
|---|---|---|
| 1 | Conductor | Bare annealed fine-wire copper, class 5 to IEC 60228 |
| 2 | Insulation | Halogen-free cross-linked polyethylene (XLPE) |
| 3 | Protective (PE) core | Class 5 copper, green-yellow insulation |
| 4 | Filler and binder tape | Halogen-free compound, polyester tape |
| 5 | Inner sheath | Halogen-free polymer compound |
| 6 | Outer sheath | Halogen-free polyurethane (PUR), flame-retardant, low-temperature grade |

The drawing shows size 7G1.5. Other sizes have the same construction with scaled dimensions.

### Construction details

| | |
|---|---|
| **Conductor** | Bare annealed fine-wire copper, class 5 to DIN EN 60228 / IEC 60228 / VDE 0295 |
| **Insulation** | Halogen-free cross-linked polyethylene (XLPE) to IEC 60502-1, maximum conductor temperature 90 °C |
| **Core identification** | Black cores with white numbers; green-yellow protective core in the outer layer |
| **Stranding** | Cores stranded in concentric layers with a short lay length; polyester binder tape |
| **Inner sheath** | Halogen-free polymer compound, extruded tightly over the stranded cores |
| **Outer sheath** | Halogen-free polyurethane (PUR), flame-retardant, low-temperature grade |

### Sheath material

The low-temperature grade of halogen-free polyurethane (PUR) keeps the sheath flexible down to −40 °C in motion (−50 °C fixed), so the cable can be reeled and trailed at sub-zero surface temperatures without sheath cracking. It retains the abrasion, cut and tear resistance of standard PUR, resists mineral oil, UV radiation and ozone, and emits no halogen acid gases when burned. Typical use: open-pit and portal-to-decline operations in cold climates, and mines with cold intake air.

## 03 Electrical, Thermal and Mechanical Characteristics

### Electrical data

| | |
|---|---|
| **Rated voltage $U_0/U$** | 0.6/1 kV AC |
| **Test voltage** | 3.5 kV AC, 5 min |
| **Maximum operating voltage, DC** | 0.9/1.8 kV |
| **Current-carrying capacity** | To DIN VDE 0298-4 at 30 °C ambient; the table gives rated design values |
| **Conductor resistance** | Maximum at 20 °C, class 5 to IEC 60228 |


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### Thermal and mechanical data

| | |
|---|---|
| **Maximum conductor temperature** | +90 °C |
| **Maximum temperature at short circuit** | +250 °C |
| **Ambient temperature, fixed installation** | −50 °C to +80 °C |
| **Ambient temperature, in motion** | −40 °C to +80 °C |
| **Minimum bending radius** | Fixed: 4 × D (D ≥ 8 mm), 3 × D (D < 8 mm); moving or reeling: 6 × D (D ≤ 12 mm), 8 × D (D ≤ 20 mm), 10 × D (D > 20 mm) |
| **Maximum tensile load** | 15 N/mm² continuous, on the total copper cross-section of the power cores |
| **Maximum travelling speed** | 60 m/min on a cable reel; higher speeds on request |
| **Flame propagation** | IEC 60332-1-2 / DIN EN 60332-1-2 |
| **Halogen-free** | Yes (insulation, inner and outer sheath); IEC 60754-1/-2 |
| **UV and ozone resistance** | Resistant |
| **Mineral oil resistance** | Resistant, IEC 60811-404 |

## 04 Dimensions, Weights and Rated Data – 0.6/1 kV (5 sizes)

| Type designation cores × mm² | FeiChun article no. | Conductor Ø max mm | Outer Ø min mm | Outer Ø max mm | Min. bend radius mm | Weight approx. kg/km | Max. pull force N | $R_{20}$ max Ω/km | Current per core A | $I_k$ (1 s) kA |
|---|---|---|---|---|---|---|---|---|---|---|
| **7G0.75** | FC-MC023-001 | 1.2 | 12.4 | 13.2 | 106 | 175 | 79 | 26.0 | 10 | 0.107 |
| **7G1** | FC-MC023-002 | 1.4 | 13.0 | 13.8 | 110 | 201 | 105 | 19.5 | 12 | 0.143 |
| **7G1.5** | FC-MC023-003 | 1.7 | 14.0 | 14.9 | 120 | 250 | 158 | 13.3 | 16 | 0.214 |
| **7G2.5** | FC-MC023-004 | 2.2 | 15.5 | 16.5 | 132 | 341 | 262 | 7.98 | 22 | 0.357 |
| **7G4** | FC-MC023-005 | 2.7 | 17.4 | 18.4 | 148 | 470 | 420 | 4.95 | 29 | 0.572 |

Current-carrying capacity: rated design values to DIN VDE 0298-4 for flexible cables, free air, 30 °C ambient; values per core include the derating factor for the number of cores; for other ambient temperatures, grouping or layered winding on a reel, apply the factors below. Pull force = 15 N/mm² × total copper cross-section of the power cores. Diameters, dimensions and weights are nominal design values and vary within manufacturing tolerances; confirm critical dimensions before dimensioning reels, guides or festoon systems. Other sizes and configurations are produced to order.

### Ambient temperature factors (conductor 90 °C)

| °C | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
|---|---|---|---|---|---|---|---|
| Factor | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 |

### Short-circuit current rating

$I_k$ = 0.143 kA/mm² × cross-section of the power core (conductor 90 °C → 250 °C). For another short-circuit duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$ (0.1 s ≤ t ≤ 5 s).

## 05 Reeling Performance and Reel Design Data

The values below support the dimensioning of the cable reel: minimum reel core diameter, copper weight for earthing and loop-resistance calculations, cable weight, and the rated current for the number of layers wound on the reel.

| Type designation cores × mm² | Outer Ø max mm | Min. bend radius on reel, mm | Min. reel core Ø mm | Copper weight kg/km | Cable weight kg/100 m |
|---|---|---|---|---|---|
| **7G0.75** | 13.2 | 106 | 212 | 47 | 17.5 |
| **7G1** | 13.8 | 110 | 220 | 62 | 20.1 |
| **7G1.5** | 14.9 | 120 | 240 | 93 | 25.0 |
| **7G2.5** | 16.5 | 132 | 264 | 156 | 34.1 |
| **7G4** | 18.4 | 148 | 296 | 249 | 47.0 |

### Reel design guidance

- Spring reels suit short travel and low tensile load; motor-driven reels with torque control keep the cable under constant, low tension.
- Fit a guide or level-wind that keeps the cable parallel to the reel axis to prevent crossing turns.
- Rated current falls with the number of layers on the reel because heat is not dissipated; see the layer factors below.


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## 06 Selection Guide and Sizing Aid

FC-MCR-A 7G covers 5 sizes. The smallest, 7G0.75, has an outer diameter of up to 13.2 mm and weighs about 175 kg/km; the largest, 7G4, has an outer diameter of up to 18.4 mm and weighs about 470 kg/km, 2.7 times as much. Across the range the rated current per core rises from 10 A to 29 A at 30 °C, and the minimum bending radius from 106 mm to 148 mm.

**Example 1.** A circuit carries 10 A per core at an ambient temperature of 40 °C. Required table current = 10 / 0.91 = 11 A per core. The smallest suitable size is 7G1 with 12 A per core.

**Example 2.** A circuit carries 19 A per core at an ambient temperature of 35 °C. Required table current = 19 / 0.96 = 20 A per core. The smallest suitable size is 7G2.5 with 22 A per core.

| Type designation cores × mm² | Total copper mm² | Cable weight kg/100 m | Winding capacity m | Free-hanging length m (vertical) |
|---|---|---|---|---|
| **7G0.75** | 5.25 | 17.5 | 24,570 | 46 |
| **7G1** | 7 | 20.1 | 22,560 | 53 |
| **7G1.5** | 10.5 | 25.0 | 19,285 | 64 |
| **7G2.5** | 17.5 | 34.1 | 15,565 | 78 |
| **7G4** | 28 | 47.0 | 12,445 | 91 |

Winding capacity is an indicative value for a reel with 2,500 mm flange diameter, 1,000 mm traverse width, core diameter equal to the minimum reel core diameter and 90 % fill; it is not a substitute for the reel manufacturer’s calculation. Free-hanging length = permissible pull ÷ (weight × 9.81); it is the length at which the cable’s own weight reaches the rated pull, without any safety factor for hoisting.

## 07 Engineering Profile by Size

Each size of FC-MCR-A 7G with the values that matter when sizing a circuit: dimensions, weight, copper share, heat and voltage drop at rated current, and the permissible pull. Voltage drop is for 100 m of cable at rated current with conductors at 90 °C (single-phase AC or DC round trip).

For 7G0.75 the design values are: Ø 13.2 mm, 175 kg/km, 79 N permissible pull, 10 A rated current. The copper accounts for 27% of the weight, and 6.6 W/m is dissipated at full load, so heat-sensitive reel layers should be derated as shown in section 04. A 500 m length of 7G0.75 weighs about 88 kg; with a 212 mm minimum core the drum must be sized for that load.

Size 7G1 has a maximum conductor resistance of 19.50 Ω/km, a copper content of 62 kg/km and a minimum bending radius of 110 mm (reel core 220 mm). Short-circuit capability for 1 s is 0.14 kA. Expect 59.7 V of drop per 100 m at 12 A. Reel and handling: at 7G1 the minimum reel core is 220 mm and the cable weighs 20.1 kg per 100 m, so a 500 m length weighs about 100 kg before the drum.

At 7G1.5 the cable measures Ø 14.9 mm and weighs roughly 250 kg/km. It carries 16 A at 30 °C ambient, which produces 8.7 W/m of heat and a 54.3 V drop per 100 m. The permissible pull is 158 N, so a vertical length of 64 m can hang from its own weight before that limit is reached. Per 100 m, 7G1.5 contains 9.3 kg of copper and 15.7 kg of insulation, filler and sheath material, which sets the scrap value and the recycling split.

At 7G2.5 the cable measures Ø 16.5 mm and weighs roughly 341 kg/km. It carries 22 A at 30 °C ambient, which produces 9.8 W/m of heat and a 44.8 V drop per 100 m. The permissible pull is 262 N, so a vertical length of 78 m can hang from its own weight before that limit is reached. Handling 7G2.5: 34.1 kg per 100 m, bending radius 132 mm; two people can lift a 20 m piece of about 6.8 kg.

7G4: outer Ø 18.4 mm, about 470 kg/km of which 249 kg/km is copper (53%). Rated current is 29 A in free air at 30 °C; at that current the conductor loss is about 10.6 W per metre and the voltage drop over 100 m is 36.6 V (conductors at 90 °C). A 500 m length of 7G4 weighs about 235 kg; with a 296 mm minimum core the drum must be sized for that load.

## 08 Configuration Guidance and Variant Comparison

Typical case: a drill rig that moves its control and sensor signals in a separate channel from the power reel. For this case FC-MCR-A 7G is a fit in the 7G1.5 size (Ø 14.9 mm).

The low-temperature PUR grade is for cables that must be moved below −30 °C, for example at portals and open pits in winter.

Rated 0.6/1 kV, the cable covers the common 400 V, 690 V and 1,000 V mining supplies.

In the drawn size 7G1.5 the cores fill 69% of the circle inside the inner sheath, the inner sheath is 0.7 mm thick and the outer sheath 1.6 mm, giving a total wall of 2.3 mm around a core bundle of Ø 9.8 mm.


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FC-MCR-A 7G is one of 360 datasheets in the mining reeling control cable group and one of 953 in the library. The next smaller core count, FC-MCR-A 5G, has an outer Ø of 13.8 mm at 1.5 mm² against 14.9 mm here. The next larger core count, FC-MCR-A 8G, measures 17.7 mm and weighs 324 kg/km (this model: 250 kg/km).

## Element inventory and core layout

Element inventory of the drawn size 7G1.5: 7 elements with 10.5 mm² of copper in total. The 7 cores are stranded in 2 concentric layers (layer 1: 1 core; layer 2: 6 cores), counted from the centre outwards, each layer with a short lay length and alternating lay direction. Keeping about 15 % of the cores as spare leaves 4 usable circuits plus the protective core; plan the core allocation before ordering because the number cannot be changed after manufacture.

| Element | Quantity | Cross-section | Ø over insulation mm | Copper mm² |
|---|---|---|---|---|
| Power / main core | 6 | 1.5 mm² | 3.1 | 9.0 |
| Protective (PE) conductor | 1 | 1.5 mm² | 3.1 | 1.5 |

## Termination data (indicative)

| Type designation cores × mm² | Outer Ø or W × H mm | Cable gland thread | Lug / ferrule bolt | Strip length mm | Terminal row mm | Gland-to-bend straight mm |
|---|---|---|---|---|---|---|
| 7G0.75 | 13.2 | M25 | ferrule | 12 | 36 | 53 |
| 7G1 | 13.8 | M25 | ferrule | 12 | 36 | 55 |
| 7G1.5 | 14.9 | M25 | ferrule | 12 | 36 | 60 |
| 7G2.5 | 16.5 | M32 | ferrule | 12 | 36 | 66 |
| 7G4 | 18.4 | M32 | ferrule | 12 | 52 | 74 |

Gland, lug and terminal-row values are planning guides computed from the dimensions above; confirm them with the accessory manufacturer.

## Comparison with related variants at size 7G1.5

| Variant | Differs in | Outer Ø / H mm | Weight kg/km | Pull N | Current A |
|---|---|---|---|---|---|
| **This datasheet** FC-MCR-A 7G | – | 14.9 | 250 | 158 | 16 |
| FC-MCR-U 7G 0.6/1 kV | sheath | 14.9 (+0%) | 250 (+0%) | 158 (+0%) | 16 (+0%) |
| FC-MCR-S 7G 0.6/1 kV | sheath | 14.9 (+0%) | 276 (+10%) | 158 (+0%) | 16 (+0%) |
| FC-MCR-A 5G 0.6/1 kV | configuration | 13.8 (-7%) | 204 (-18%) | 112 (-29%) | 18 (+12%) |
| FC-MCR-A 8G 0.6/1 kV | configuration | 17.7 (+19%) | 324 (+30%) | 180 (+14%) | 14 (-12%) |
| FC-MCR-A-C 7G 0.6/1 kV | screen | 15.8 (+6%) | 306 (+22%) | 158 (+0%) | 16 (+0%) |
| FC-MCR-A-HT 7G 0.6/1 kV | tensile braid | 16.2 (+9%) | 290 (+16%) | 1,400 (+786%) | 16 (+0%) |

Percentages show the change against this datasheet for the same cross-section; use them to judge what a change of sheath, voltage class, screen or tensile braid costs in size and weight.


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## 09 Standards and Testing

| Standard | Scope |
|---|---|
| **DIN EN 60228 / IEC 60228 / VDE 0295** | Conductors, class 5 |
| **IEC 60502-1** | Insulation compound, power cables up to 1 kV |
| **DIN VDE 0298-3** | Application of cables – bending radii and tensile loads |
| **DIN VDE 0298-4** | Application of cables – current-carrying capacity |
| **DIN EN 60332-1-2 / IEC 60332-1-2** | Flame propagation, single cable |
| **DIN VDE 0293-308** | Core identification |
| **IEC 60754-1 / -2** | Halogen acid gas emission when burned |
| **IEC 60811-404** | Mineral oil immersion test |

### Routine and type tests

- AC voltage test on every reel length (routine test): 3.5 kV AC, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors and protective earth
- Bending, tensile tests (type test)
- Flame propagation (IEC 60332-1-2) and confirmation of halogen-free materials

**Test documentation:** every delivery is accompanied by a test certificate from FeiChun's own laboratory. Third-party witnessed tests can be arranged at the buyer's cost.

## 10 Installation, Marking and Delivery

### Installation guidance

- Use a reel core diameter of at least twice the minimum bending radius; keep the cable free of loops and kinks while winding.
- Do not exceed the tensile load in the table; relieve the cable of tension at the reel hub and at the machine.
- Keep control cables away from unscreened power cables running in parallel where possible.
- Inspect the sheath regularly for abrasion and mechanical damage.

### Sheath marking

```
FEICHUN FC-MCR-A [cross-section] 0.6/1 kV [year] [serial no.] [metre mark]
```

### Packing and delivery

| | |
|---|---|
| **Reel** | Steel or fumigated wooden reels; cable ends sealed with heat-shrink caps |
| **Delivery length** | As ordered, in one continuous length without joints |
| **Lead time** | 2–3 weeks after technical approval |
| **Warranty** | At least 3 years against manufacturing defects |
| **Reel label** | Type, cross-section, length, gross/net weight, batch no., reel no. |

### Ordering information

**Order example: FC-MCR-A 7G1.5 0.6/1 kV** – 500 m on one steel reel. When requesting a quotation, state the cable type, configuration, cross-section, voltage, length per piece, required standards and installation conditions.

## 11 Certification and Quality

All cable is subject to FeiChun's quality control, with routine testing over 100 % of the delivered length. Certificates, type tests and third-party tests (for example partial discharge or compatibility with cable accessories) are provided per project requirement; copies of the records are available on request.

Mine-specific approvals (for example coal-mine safety marks, MSHA, or ATEX / IECEx for gassy atmospheres) are not implied by this datasheet; they depend on the project, the machine and the country and are arranged with the end user.

## 12 Related Datasheets

Variants of this cable with a different sheath, configuration or voltage. All datasheets are in PDF format.

- FC-MCR-U 7G 0.6/1 kV – 7-core reeling control cable, PUR
- FC-MCR-S 7G 0.6/1 kV – 7-core reeling control cable, CSP rubber
- FC-MCR-A 5G 0.6/1 kV – 5-core reeling control cable, PUR low-temp
- FC-MCR-A 8G 0.6/1 kV – 8-core reeling control cable, PUR low-temp
- FC-MCR-A-C 7G 0.6/1 kV – 7-core reeling control cable with overall tinned-copper braid screen, PUR low-temp
- FC-MCR-A-HT 7G 0.6/1 kV – 7-core reeling control cable, with aramid tensile support braid, PUR low-temp


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- FC-MCR-A 4G 0.6/1 kV – 4-core reeling control cable, PUR low-temp
- FC-MCR-A 10G 0.6/1 kV – 10-core reeling control cable, PUR low-temp

Overview of all datasheets: Mining Reeling Control Cables 300/500 V and 0.6/1 kV

### Frequently asked questions

**What is FC-MCR-A 7G used for?**
Typical applications include control, signal and measuring circuits of drill rigs, LHD machines, shuttle cars and mobile crushers supplied through a cable reel.

**What are the outer diameter and minimum bending radius of 7G1.5?**
The outer diameter is 14.0 to 14.9 mm and the minimum bending radius in moving or reeling operation is 120 mm (6 to 10 × D depending on diameter).

**What minimum reel core diameter is needed for 7G1.5?**
At least 240 mm, which is twice the minimum bending radius of 120 mm. A larger core diameter extends cable life.

**What current can each core of 7G1.5 carry?**
The table gives 16 A per core in free air at 30 °C ambient, already reduced for the number of cores; apply the ambient temperature factor and, on a reel, the layer factor.

**How much tensile load can 7G1.5 take, and how long can it hang freely?**
The permissible pull force is 158 N. With a weight of about 250 kg/km this corresponds to a free-hanging vertical length of about 64 m before the rated pull is reached; apply your own safety factor for hoisting or suspended installations.

**What is the voltage drop and heat loss of 7G1.5 at rated current?**
At 16 A and a conductor temperature of 90 °C the voltage drop is about 54.3 V per 100 m and the conductor loss about 8.7 W per metre (maximum resistance 13.300 Ω/km at 20 °C).

**Is this cable halogen-free?**
Yes. The insulation and all sheaths are halogen-free; see section 03 for flame-retardancy and temperature data.

**Which cross-sections are available?**
FC-MCR-A 7G: 0.75, 1, 1.5, 2.5, 4 mm². Other sizes and special designs can be produced to order.

**Does this datasheet include mine-specific approvals?**
No. Mine-specific approvals, such as coal-mine safety marks, MSHA or ATEX/IECEx for gassy atmospheres, depend on the project and the country and are not implied by this document. Send the requirements to FeiChun technical support.

## 13 Trademark Notice and Intellectual Property

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### Technical and commercial contacts

**Anhui FeiChun Special Cable Co., Ltd.**
International Business Department
Park No. 1, Private Science and Technology Park, Hefei National Economic and Technological Development Zone, Hefei, Anhui, China
Technical support: Tech@feichuncables.com
Mining and heavy industry: mining@feichuncables.com
Zihao Yang, Global Sales Manager: zihao.yang@feichuncables.com
WhatsApp: +86 138 5512 3218
Web: www.feichuncables.com

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