FEICHUN SPECIAL CABLES · 飞纯特种电缆

TDS · MV POWER CABLE | 3C × 120 mm² | Cu / XLPE / PVC / DWA / PVC

8.7/15 kV · IEC 60502-2

Medium Voltage Armoured Power Cable 3C × 120 mm², 8.7/15 kV

Technical specification for a three-core, copper conductor, XLPE insulated, copper tape screened, double-layer galvanized steel wire armoured (DWA) cable with red PVC outer sheath. Low smoke halogen-free (SHF1 / SHF2) sheath options available.

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01 Scope and Application

This specification covers the design, materials, construction, testing, marking and packing of the **FeiChun 3C × 120 mm² Cu/XLPE/PVC/DWA/PVC, 8.7/15 kV** medium voltage power cable. The cable is intended for fixed installation in power distribution networks, industrial plants, substations, and for direct burial, cable trays, ducts and tunnels, where high mechanical protection is required.

- Three-core copper conductor with XLPE insulation, suitable for continuous operation at a conductor temperature of 90 °C.
- Copper tape screen on each core, double-layer galvanized steel wire armour for high tensile and crush resistance.
- Flame-retardant, low smoke, halogen-free (SHF1 / SHF2) bedding and sheaths available as an option (see Section 07).

RATED VOLTAGE UO/U (UM)
8.7/15 (17.5) kV

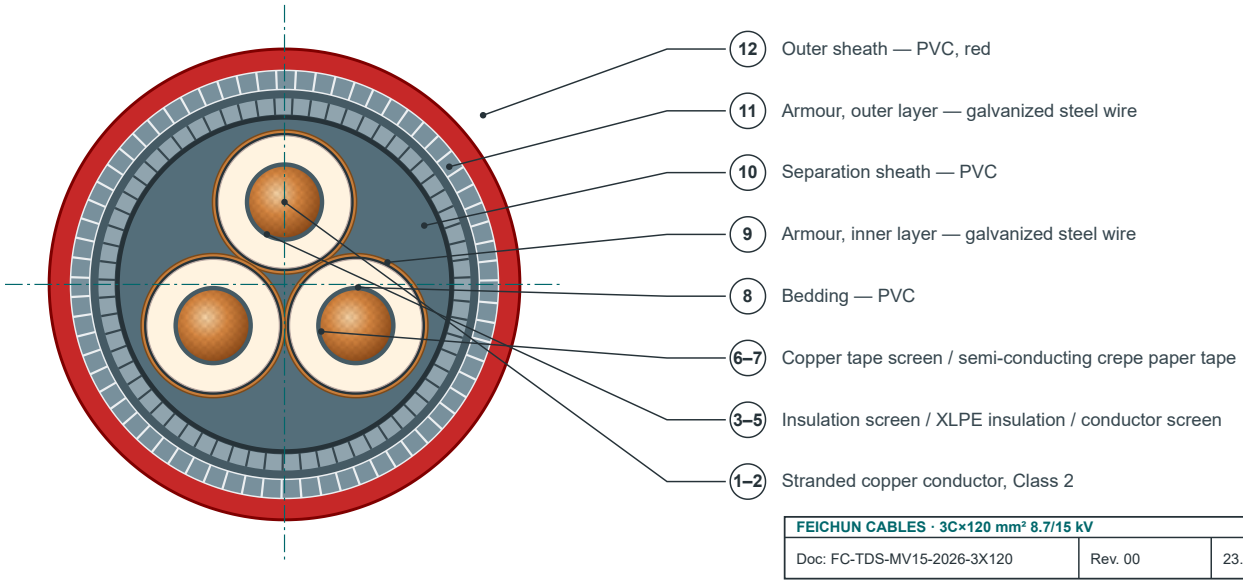
CONSTRUCTION
3C × 120 mm²

OVERALL DIAMETER (APPROX.)
≈ 70–76 mm

WEIGHT (APPROX.)
≈ 16–19 kg/m

02 Cable Construction — Cross-Section

Fig. 1 · Cross-section · 3C × 120 mm² 8.7/15 kV Cu/XLPE/PVC/DWA/PVC (schematic, not to scale)



Pos.	Component	Material / requirement
1	Conductor	Stranded annealed plain copper (STC), compacted circular, **IEC 60228 Class 2**
2	Conductor screen	Extruded semi-conducting compound (XLPE-based), IEC 60092-360
3	Insulation	XLPE (cross-linked polyethylene), dry cured; screens and insulation extruded in one pass
4	Insulation screen	Extruded semi-conducting compound (XLPE-based), IEC 60092-360
5	Semi-conducting tape	Semi-conducting crepe paper tape over the insulation screen
6	Metallic screen	Copper tape, helically applied with overlap, on each core
7	Core laying-up	Three cores laid up; flame-retardant, non-hygroscopic fillers may be used; suitable tape may be applied over the core assembly
8	Bedding	PVC, extruded
9	Armour, inner layer	Galvanized steel wire (SWA)
10	Separation sheath	PVC, between the two armour layers
11	Armour, outer layer	Galvanized steel wire, opposite lay direction to the inner layer
12	Outer sheath	PVC, **red**

Designation. Cu/XLPE/PVC/DWA/PVC = copper conductor / XLPE insulation / PVC bedding / double wire armour / PVC outer sheath. Rated voltage 8.7/15 kV. The cross-section figure is schematic; final dimensions are confirmed by the manufacturer's production drawing.

03 Applicable Standards

Standard	Subject
IEC 60502-2	Power cables with extruded insulation, rated voltages 6 kV to 30 kV
IEC 60228	Conductors of insulated cables (Class 2)
IEC 60092-360	Insulating and sheathing materials for shipboard and offshore cables
IEC 60811 series	Test methods for insulating and sheathing materials
IEC 60332-1 / 60332-3	Flame propagation — single cable / bunched cables
IEC 60754-1 / -2	Halogen content and acidity of gases evolved (for SHF options)
IEC 61034-1 / -2	Smoke density of burning cables

04 Dimensions and Weights (Approximate)

Parameter	Value
Number of cores	**3**
Nominal cross-section	**120 mm²**
Conductor, min. no. of wires (Class 2)	**15–18**
Conductor diameter (approx.)	**12.5–13.0 mm**
Conductor screen thickness	**≈ 0.6–0.8 mm**
Insulation thickness, nominal	**4.5 mm (min. 4.05 mm)**
Insulation screen thickness	**≈ 0.6–0.8 mm**

Parameter	Value
Copper tape screen area per core	**≥ 25 mm² (or as agreed)**
Bedding thickness	**≈ 1.2 mm**
Armour wire diameter (each layer)	**≈ 2.5 mm**
Outer sheath thickness	**≈ 3.0–3.5 mm**
Overall diameter	**≈ 70–76 mm**
Weight	**≈ 16–19 kg/m**
Min. bending radius (installation)	**15 × overall diameter**

Values are approximate and are confirmed by the manufacturer's final design data sheet and routine test report.

05 Electrical Characteristics

Parameter	Value
Rated voltage Uo/U (Um)	**8.7/15 (17.5) kV**
Max. DC resistance at 20 °C	**0.153 Ω/km**
Max. conductor temp., normal operation	**90 °C**
Max. conductor temp., short circuit (≤ 5 s)	**250 °C**
Short-circuit current, conductor, 1 s	**≈ 17.2 kA (k = 143)**

Parameter (approx.)	Value
AC resistance at 90 °C	**≈ 0.196 Ω/km**
Capacitance	**≈ 0.30 µF/km**
Current rating, direct in ground (20 °C, 1.0 K·m/W)	**≈ 280–300 A**
Current rating, in air (30 °C)	**≈ 300–330 A**
Short-circuit current, copper tape screen	**Per screen area, by calculation**

Current ratings are indicative only and depend on installation conditions.

06 Tests

Routine tests (every drum length)

- Conductor resistance measurement
- Partial discharge test, ≤ 5 pC at 1.73 Uo
- Voltage test, 3.5 Uo (≈ 30 kV), 5 min
- Visual inspection and marking check

Sample tests

- Conductor examination; dimensions of insulation, sheath and armour wire
- Hot-set test for XLPE insulation
- Tensile and elongation tests, before and after ageing
- Water absorption test (as applicable)
- Armour wire tests: tensile, torsion, zinc coating
- Volume resistivity of semi-conducting screens

Type tests. As per IEC 60502-2 (bending test with PD, tan δ, heating cycle, impulse voltage, 4 h voltage test, etc.). Type test reports are provided on request.

07 Fire Performance and Alternative Materials

Property	Requirement
Flame retardancy	IEC 60332-1 (single cable); IEC 60332-3 Cat. A/B/C if specified
Halogen content / acid gas	IEC 60754-1/-2 (for SHF options)
Smoke density	IEC 61034, light transmittance ≥ 60 % (for SHF options)

Optional materials (per project requirement)

Item	Option
Bedding and sheaths, low smoke halogen-free	SHF1 — halogen-free flame retardant thermoplastic compound SHF2 — halogen-free flame retardant thermoset compound
Screen alternative	Tinned copper wire braid (TCWB)
Armour alternative	Galvanized steel wire braid (GSWB)

Note. PVC is not a halogen-free material. If a low smoke halogen-free (LSZH) cable is required, the bedding, separation sheath and outer sheath shall be SHF1 or SHF2 instead of PVC — please confirm (Section 10).

08 Marking, Packing and Delivery

Item	Requirement
Required quantity	2,000 m
Length per drum	500 m (tolerance as agreed)
Number of drums	4 drums × 500 m
Drum type	Metallic (steel) drum
Cable weight, 2,000 m (approx.)	≈ 32–38 t (≈ 8–10 t per drum, excl. drum)
Marking on outer sheath	Embossed or printed at intervals ≤ 1 m: FEICHUN CABLE – Cu/XLPE/PVC/DWA/PVC – 3C×120 mm² – 8.7/15 kV – IEC 60502-2 – [YEAR] – [METRE MARK]
Core identification	By colour or numbers, as agreed
Drum marking	Manufacturer, cable type, size, voltage, length, gross/net weight, drum number, rolling direction arrow
Cable ends	Sealed with heat-shrink end caps against moisture ingress

09 Documents to be Supplied

- Cable data sheet and drawing
- Routine test certificates (per drum)
- Type test reports
- Material certificates (copper, XLPE, steel wire)
- Packing list, Certificate of Origin, Quality Certificate

10 Points to Confirm Before Production

1. **Sheath material:** PVC or low smoke halogen-free (SHF1 / SHF2) for the bedding, separation sheath and outer sheath. PVC is not halogen-free.
2. **Screen:** copper tape (main construction) or tinned copper wire braid (TCWB) — is TCWB an alternative or an addition?
3. **Armour:** double-layer galvanized steel wire (DWA) or galvanized steel wire braid (GSWB) — is GSWB an alternative?
4. **Standard:** IEC 60092-360 is a shipboard cable material standard, while the construction and tests follow IEC 60502-2. Please confirm whether marine type approval (e.g. IEC 60092-353 / class society) is required.
5. **Drum weight:** a 500 m length weighs approx. 8–10 t. Please confirm that drum size, handling and transport can accommodate it, or consider 250 m drums.
6. **Interpretation:** "Crape paper" is read as *crepe paper* tape; "aero halogen" is read as *zero halogen*.

Prepared by: design engineer	Checked by: technical dept. / QA	Approved by: technical director

ANHUI FEICHUN SPECIAL CABLE CO., LTD.

安徽飞纯特种电缆有限公司

Hefei, Anhui Province, China

National Economic & Technological Development Zone

www.feichuncables.com

CONTACTS

Technical dept.: Tech@feichuncables.com

Sales: zihao.yang@feichuncables.com

Zihao Yang, Sales Manager

WhatsApp: +86 138 5512 3218

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