ANHUI FEICHUN SPECIAL CABLE CO., LTD.

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SINGLE CORE ARMORED POWER CABLE - MASSIVE CONDUCTOR - TECHNICAL SPECIFICATION

1C × 400 MM²

Single Core Copper Armored Power Cable - Steel Wire Armoured (SWA) - 1.1kV

400MM² CONDUCTOR | SINGLE CORE | SWA ARMORED | ULTRA HEAVY DUTY

⚡ MASSIVE SINGLE CORE POWER CABLE

Extreme Current Capacity | Heavy Industrial Applications | Transformer Primary Feeders

Configuration	Conductor Size	Material	Armor	Voltage
1C	400mm²	Cu	SWA	1.1kV

Max Current

~950A

⚡ EXTREME CURRENT CARRYING CAPACITY (PER CABLE)

Direct Burial	Free Air	Cable Tray	3 Cables Grouped

920 A	980 A	950 A	750 A

🔧 SINGLE CORE CABLE SPECIAL CONSIDERATIONS

- ⚡ **Three Cables Required:** For 3-phase systems, three separate single core cables must be installed
- ⚡ **Trefoil Formation:** Cables should be arranged in trefoil (triangular) configuration to minimize inductance
- ⚡ **Magnetic Effects:** Single core cables with AC current create magnetic fields - non-magnetic glands required
- ⚡ **Armor Earthing:** Special consideration needed - armor may require bonding at one end only to prevent circulating currents
- ⚡ **Proximity Effects:** Cables must be properly spaced or grouped to account for heating effects
- ⚡ **Installation Flexibility:** Easier to handle individual cables in confined spaces than multi-core equivalents
- ⚡ **Higher Current Capacity:** Single core typically has higher ampacity than equivalent multi-core
- ⚡ **Non-Magnetic Fixings:** Use non-magnetic cleats and glands to avoid eddy current losses

1. GENERAL DESCRIPTION

This massive single core armored power cable features a 400mm² copper conductor with galvanized steel wire armor (SWA), representing one of the largest single core low voltage cables available. Rated at 1.1kV with current carrying capacity approaching 1,000A per cable, this cable is designed for the most demanding power transmission applications. The single core configuration offers advantages in terms of flexibility, installation ease in confined spaces, and higher current capacity compared to equivalent multi-core cables. With approximately 3,560 kg of copper per kilometer and total cable weight exceeding 8,000 kg/km, this cable requires specialized handling equipment and professional installation. The steel wire armor provides exceptional mechanical protection for direct burial, industrial environments, and applications subject to mechanical stress. Typical applications include primary transformer feeders (three cables for 3-phase), large motor connections (250+ kW), data center main distribution, industrial substation feeders, and major infrastructure power distribution requiring the highest current capacity.

Parameter	Specification
Cable Designation	**Single Core 400 MM² Copper Armored Power Cable**
Number of Cores	**1 Core (Single Core Configuration)**
Conductor Cross-Section	**400 mm² (Massive Conductor)**
Rated Voltage U_0/U	**0.6/1.1 kV**
Conductor Material	Annealed Copper (Cu) - Class 2 Stranded
Conductor Type	Circular compacted stranded
Insulation Material	XLPE (Cross-Linked Polyethylene) or PVC
Inner Sheath	PVC or Extruded separator

Armour Type	**Galvanized Steel Wire Armour (SWA)**
Outer Sheath	PVC - Black Standard (UV resistant)
Maximum Operating Temperature	70°C (PVC) / 90°C (XLPE)
Application Class	Ultra Heavy Duty Single Core Power Distribution

2. CABLE CONSTRUCTION & ARMOUR DETAILS

SINGLE CORE ARMORED CABLE STRUCTURE

1. Conductor Core: Circular stranded annealed copper, 400mm² nominal (Class 2)

2. Conductor Screen (optional): Semiconducting compound for XLPE variants

3. Insulation: XLPE (90°C) or PVC (70°C), heavy duty thickness

4. Insulation Screen (optional): Semiconducting layer for XLPE

5. Metallic Screen (optional): Copper wire screen or tape

6. Bedding/Inner Sheath: PVC bedding layer to protect from armor

⚙ **7. STEEL WIRE ARMOUR (SWA): Heavy galvanized steel wire for maximum protection**

8. Outer Sheath: Heavy-duty PVC compound, UV and weather resistant

Component	Material/Description	Technical Details
Conductor	Circular compacted stranded copper	Class 2 per IEC 60228
Conductor Construction	Multi-strand compressed	Approximately 61-91 strands
Copper Purity	Annealed copper	≥99.9% purity, electrical grade
DC Resistance (20°C)	**Maximum**	≤0.0469 Ω/km

Conductor Diameter	Nominal	Approximately 25.0 - 26.5 mm
Insulation Thickness	XLPE or PVC	2.0 - 2.5 mm nominal
Metallic Screen (if present)	Copper wires or tape	For equipotential bonding
Inner Sheath Thickness	PVC bedding	1.8 - 2.2 mm nominal
Steel Wire Armour	**Galvanized steel wires**	Wire diameter: 1.6 - 2.0 mm (heavy duty)
Armour Application	Helically laid steel wires	Close pitch, single layer, round wire
Galvanization	Hot-dip galvanized	Heavy zinc coating for corrosion protection
Outer Sheath Thickness	PVC protective layer	2.4 - 3.0 mm nominal
Overall Diameter	Approximate with armor	52 - 60 mm
Approximate Weight	**Per kilometer**	8,000 - 9,000 kg/km
Copper Content	**Pure copper weight**	Approximately 3,560 kg/km (400mm² Cu)

3. ELECTRICAL CHARACTERISTICS

Parameter	Value	Test Condition / Standard
Rated Voltage (U_0/U)	**0.6/1.1 kV**	AC 50/60 Hz
Maximum Conductor DC Resistance	0.0469 Ω/km	At 20°C per IEC 60228
Current Capacity (Direct Burial, Single)	**910 - 930 A**	Underground, 25°C soil, 90°C conductor (XLPE)
Current Capacity (Free Air, Single)	**970 - 1000 A**	Clipped direct, 30°C ambient, 90°C conductor
Current Capacity (3 Cables Trefoil, Air)	740 - 770 A	Three cables touching, 30°C ambient
Current Capacity (3 Cables Trefoil, Buried)	700 - 730 A	Three cables touching, underground
AC Voltage Test	3.5 kV for 5 minutes	Between conductor and armor/earth

Insulation Resistance	≥100 MΩ·km (XLPE) / ≥20 MΩ·km (PVC)	At 20°C
Maximum Operating Temperature	70°C (PVC) / 90°C (XLPE)	Continuous operation
Short Circuit Temperature	160°C (PVC) / 250°C (XLPE)	Maximum 5 seconds duration
Voltage Drop (Single Cable)	Approx. 0.10 mV/A/m	At power factor 0.8, 90°C conductor
Power Capacity (400V, 3-Phase System)	**Approx. 475-500 kW**	At 730A, 400V, 3-phase (3 cables), 0.8 PF
Power Capacity (Single Cable, 230V)	Approximately 224 kW	At 975A, 230V, single-phase
Impedance (Z) per cable	Approx. 0.0475 Ω/km	At 50 Hz, 90°C
Reactance (X) per cable	Approx. 0.074 Ω/km	At 50 Hz, depends on spacing
Short Circuit Current (1 sec, XLPE)	Approx. 188 kA	250°C final temperature
Armour Earthing	**Special consideration required**	May require single-end bonding for AC to prevent circulating currents
Magnetic Effects	Significant AC magnetic field	Non-magnetic glands and cleats required

4. MECHANICAL PROPERTIES & HANDLING

Parameter	Specification	Notes
Conductor Class	Class 2 - Stranded	Per IEC 60228
Mechanical Protection Level	**Ultra Heavy Duty - Armored**	Maximum impact and crush resistance
Minimum Bending Radius (Installation)	15 × Overall Diameter (≥900 mm)	During installation with armor
Minimum Bending Radius (Fixed)	12 × Overall Diameter (≥720 mm)	After installation complete
Radial Crushing Strength	Excellent - Very heavy loads	Heavy steel armor provides protection

Impact Resistance	**Excellent - Maximum protection**	Suitable for harsh environments
Rodent Protection	**Excellent - Steel barrier**	Prevents all rodent and pest damage
Installation Temperature	≥0°C	Preheating required below 0°C
Operating Temperature Range	-15°C to +70°C (PVC) -20°C to +90°C (XLPE)	Ambient operational limits
Direct Burial Capability	**YES - Primary Application**	No conduit required
Cable Weight Handling	**VERY HEAVY - Specialized Equipment REQUIRED**	Approximately 8-9 kg per meter
Pulling Equipment	Heavy-duty cable pulling winch mandatory	With tension monitoring and control
Maximum Pulling Tension	Approx. 20,000 N	50 N/mm² of conductor area
Flame Retardant	IEC 60332-1	Single vertical wire flame test

5. TYPICAL APPLICATIONS

Transformer Primary Feeders

Main power supply from utility transformers to industrial facilities (three cables for 3-phase)

Large Motor Connections

Very large motors 250-500 kW (335-670 HP) in heavy industrial applications

Data Center Main Distribution

Primary power distribution for mega data centers and critical facilities

Industrial Substation Feeders

Power distribution from substations to main switchgear and distribution boards

Large Commercial Buildings

Main power feeders for shopping malls, hotels, hospitals, and high-rise buildings

Manufacturing Plants

Heavy industrial power distribution for steel mills, chemical plants, and refineries

Infrastructure Projects

Airports, seaports, railway stations, and other major infrastructure facilities

Mining Operations

Surface mining power distribution for large excavators and processing equipment

Renewable Energy Plants

Solar farms, wind farms - main power collection and distribution

Marine & Offshore

Shipyard power distribution, offshore platforms, and port facilities

Single Core Cable Advantages: Higher current capacity per conductor | Easier handling in confined spaces | More flexible routing options | Better heat dissipation | Lower inductance in trefoil formation |

Individual cable replacement possible | Suitable for very high current applications | Reduced voltage drop | Better load sharing in parallel installations | Cost-effective for massive power requirements

6. LOAD CAPACITY & POWER TRANSMISSION

Application Example	Configuration	Power Rating
3-Phase Motor (Very Large)	3 cables in trefoil, 400V	350-450 kW (470-600 HP)
Industrial Substation Feeder	3 cables, 400V 3-phase	Up to 500 kW
Data Center Main Distribution	3 cables, 400V 3-phase	400-475 kW per set
Large Transformer Secondary (1 MVA)	3 cables, 400V 3-phase	Distribution feeder
Manufacturing Plant Main Feed	3 cables, 400V 3-phase	Up to 500 kW
Large Commercial HVAC	3 cables, 400V 3-phase	300-400 kW chiller systems
Heavy Industrial Compressor	3 cables, 400V 3-phase	350-500 kW (470-670 HP)
Mining Equipment Feeder	3 cables, 400V 3-phase	Large excavators and processing

Three Phase Installation: For 3-phase systems, three separate single core cables are required (one per phase). An additional neutral and/or earth cable may be required depending on system design. Always install in accordance with electrical design specifications and local codes.

7. TECHNICAL STANDARDS & COMPLIANCE

Standard	Description
IEC 60502-1	Power cables with extruded insulation for rated voltages from 1 kV to 30 kV
IEC 60228	Conductors of insulated cables - Class 2 stranded conductors
IEC 60332-1-2	Tests on electric cables under fire conditions - Single vertical wire flame test
IEC 60364-5-52	Electrical installations of buildings - Selection and erection of electrical equipment - Wiring systems
IEC 60364-5-54	Earthing arrangements and protective conductors
BS 5467	Electric cables - Armoured cables with thermosetting insulation (Reference)
BS 6346	Electric cables - PVC insulated, armoured cables for voltages up to 0.6/1kV (Reference)

BS 7671	Requirements for Electrical Installations - UK Wiring Regulations (Reference)
GB/T 12706.1	Chinese National Standard for power cables rated 0.6/1kV to 26/35kV
NEC Article 310	US National Electrical Code - Conductors for general wiring (Reference)
RoHS Directive	Restriction of Hazardous Substances - Full environmental compliance
CE Marking	European Conformity marking (where applicable)

8. INSTALLATION GUIDELINES - CRITICAL REQUIREMENTS

⚠ **CRITICAL SAFETY WARNING:**

This cable is EXTREMELY HEAVY (8-9 kg/meter). Improper handling can result in serious injury or death. Professional installation with specialized equipment is MANDATORY. Do not attempt manual handling or installation without proper training and equipment.

Installation Parameter	Requirement / Specification
Installation Team	**MINIMUM 4-6 qualified electricians with specialized training**
Equipment Required	Heavy-duty cable drum jack, motorized cable pulling winch, rollers, lifting equipment
Drum Handling	Forklift or crane REQUIRED - drums can exceed 2,500 kg
Cable Formation (3-Phase)	**Trefoil (triangular) or flat formation with proper spacing**
Trefoil Spacing	Cables touching or with minimal spacing to minimize inductance
Flat Formation Spacing	One cable diameter spacing between centers if not in trefoil
Cable Cleats/Supports	**NON-MAGNETIC cleats REQUIRED for single core AC cables**
Support Spacing (Vertical)	Maximum 0.3 - 0.4 meters due to extreme weight
Support Spacing (Horizontal)	Maximum 0.8 - 1.0 meters on heavy-duty cable tray
Burial Depth (General Areas)	Minimum 600mm from finished grade
Burial Depth (Under Roads)	Minimum 900mm from finished grade
Trench Width	Minimum 450mm for three cables in trefoil formation

Trench Bottom	100mm sand bedding, compacted, level, free from sharp objects
Cable Separation in Trench	Trefoil formation preferred, or minimum 50mm spacing
Cable Glands	**NON-MAGNETIC SWA glands REQUIRED - Size 63mm or 75mm**
Armour Bonding (AC Circuits)	**May require single-end bonding only to prevent circulating currents**
Armour Earthing Design	Consult electrical engineer - special consideration for single core AC
Cable Termination	Heavy-duty compression lugs rated for 400mm² - M20 or M24 stud
Crimping Equipment	**Hydraulic crimping tool MANDATORY - 400mm² dies required**
Pulling Force	Maximum 20,000 N - Use motorized winch with load monitoring
Maximum Pull Length	20-30 meters depending on route - Use intermediate pull boxes
Cable Tray Requirements	Heavy-duty tray minimum 300mm wide, rated for 25 kg/meter minimum
Warning Tape	Install 300mm above buried cables
Route Marking	Install permanent markers every 50 meters
Testing Before Energization	Insulation resistance, continuity, phase sequence, armour bonding verification

⚠ **SINGLE CORE AC CABLE SPECIAL REQUIREMENTS:**

- **Non-Magnetic Materials:** ALL cable glands, cleats, and fixings MUST be non-magnetic (brass, aluminum, plastic) to prevent eddy current heating and losses
- **Armour Bonding:** For AC circuits, armor may need to be bonded at ONE END ONLY to prevent circulating currents that cause heating and reduce capacity
- **Magnetic Fields:** Single core AC cables create strong magnetic fields - keep away from steel structures and magnetic materials
- **Cable Formation Critical:** Trefoil formation minimizes inductance and maximizes current capacity - never install single cores widely spaced
- **Proximity Effects:** Current capacity is significantly affected by cable spacing and formation - follow design specifications exactly
- **Professional Design Required:** Installation design MUST be performed by qualified electrical engineer familiar with single core AC cable systems
- **Do NOT use steel glands:** Steel glands on single core AC cables will overheat and fail - this is a critical safety issue

9. QUALITY ASSURANCE & FACTORY TESTING

Comprehensive testing program for every production batch:

- **Conductor DC resistance test:** Verified ≤0.0469 Ω/km at 20°C
- **High voltage withstand test:** 3.5 kV AC for 5 minutes
- **Insulation resistance test:** Minimum 100 MΩ·km (XLPE) or 20 MΩ·km (PVC)
- **Dimensional verification:** Conductor diameter, insulation thickness, armor wire gauge, overall diameter
- **Conductor compaction test:** Verification of circular compacted construction
- **Armour wire tensile test:** Steel wire tensile strength and elongation
- **Galvanization quality test:** Zinc coating thickness and adhesion
- **Mechanical strength test:** Tensile and elongation properties
- **Thermal cycling test:** Performance under temperature variations
- **Fire performance test:** Vertical flame test per IEC 60332-1-2
- **Armour continuity test:** Electrical continuity of steel wire armor
- **Complete visual inspection:** Construction quality, marking, overall appearance
- **Weight verification:** Confirm copper content and overall weight

Quality Certification: Manufactured under ISO 9001:2015 certified quality management system. Complete documentation includes: Type test reports (witness testing available), Routine test certificates, Certificate of conformity, Material declarations (RoHS compliant), Installation guidelines and engineering data. Third-party testing and certification available. Factory acceptance testing (FAT) recommended for large orders. Full traceability maintained for every production batch.

10. PACKAGING, STORAGE & LOGISTICS

Item	Specification / Details
Standard Lengths	100m, 200m, 250m maximum (limited by drum capacity and weight)
Maximum Practical Length	250m per drum (approx. 2,000-2,250 kg cable weight)
Packaging Type	**Heavy-duty steel cable drum ONLY - wooden drums insufficient**
Typical Drum Dimensions	Diameter: 2.5-3.5m, Width: 1.2-1.8m depending on length
Gross Weight (250m)	**Approximately 2,500-3,000 kg including drum**
Cable Marking	Sequential meter marking every 1 meter on sheath
Marking Information	Manufacturer, specification 1C×400mm² SWA, voltage 0.6/1kV, batch code, date
Drum Labeling	Complete specification, cable length, gross/net weight, handling instructions, lifting points

Documentation Package	Test certificates, conformity certificate, installation guide, single core cable guide, material declaration
Storage Requirements	**Store drums upright on reinforced, level surface capable of supporting 3+ tons**
Storage Location	Covered, dry, well-ventilated warehouse or storage area
Storage Temperature	-5°C to +35°C (protect from temperature extremes)
Protection Requirements	Protect from direct sunlight, moisture, chemicals, mechanical damage
Shelf Life	24 months under proper storage conditions
Handling Equipment	**CRANE or heavy-duty forklift REQUIRED - minimum 3-ton capacity**
Lifting Method	Use drum lifting shaft through arbor hole - NEVER lift by armor or conductor
Transportation	Flatbed truck or container - secure drums with heavy chains and chocks
Special Transport Permit	May be required for oversized drums - check local regulations
Production Lead Time	30-45 working days after order confirmation (subject to order size)
Minimum Order Quantity	500 meters total (can be split into multiple drum lengths)

Handling Safety: Drums containing this cable are EXTREMELY HEAVY (up to 3 tons). Improper handling can cause serious injury or death. Always use appropriate lifting equipment with adequate capacity. Never attempt to roll or manually move loaded drums. Ensure storage surface can support the weight without subsidence. Follow all occupational health and safety regulations for handling heavy loads.

⚠ **IMPORTANT DISCLAIMERS & TECHNICAL INFORMATION:**

- This specification is for reference and subject to technical modifications
- **Professional Engineering Design MANDATORY:** Single core AC cable systems require specialized electrical engineering design - Do NOT install without proper engineering specifications
- **Installation by Licensed Professionals ONLY:** This cable requires specialized knowledge, equipment, and installation techniques
- Current carrying capacity depends critically on installation method, cable spacing, and formation - values shown are indicative only
- Non-magnetic materials (glands, cleats) are ESSENTIAL for single core AC installations - steel components will overheat
- Armour bonding strategy must be determined by electrical engineer based on system design

- Cable selection must consider: actual load, installation method, ambient conditions, grouping, voltage drop, short circuit capacity
- Appropriate circuit protection (circuit breakers, fuses) rated correctly is mandatory
- For 3-phase systems, THREE separate cables are required - this specification is for ONE cable
- Installation must comply with IEC 60364, NEC, BS 7671, or applicable local electrical codes and standards
- Heavy lifting equipment and proper rigging techniques are essential for safety
- Consult factory technical department for: custom specifications, special requirements, installation support, or engineering assistance
- Manufacturer liability limited to cable manufacturing quality - installation responsibility rests with installer and system designer

FEICHUN SPECIAL CABLES

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