ANHUI FEICHUN SPECIAL CABLE CO., LTD.

安徽飞纯特种电缆有限公司

ARMOURED ELECTRICAL CABLE - TECHNICAL SPECIFICATION

4C × 6 MM²

4 Core Armoured Electrical Cable - 1000V/1.1kV Insulation

ARMOURED PROTECTION | FLEXIBLE COPPER | 1000V RATED

STEEL WIRE ARMOURED CONSTRUCTION

Enhanced Mechanical Protection for Industrial & Underground Applications

Number of Cores	Conductor Size	Rated Voltage	Armour Type	Current Rating
4C	6 mm²	1000V	SWA	~46 A

1. GENERAL DESCRIPTION

This 4 core armoured electrical cable features 6mm² copper conductors with galvanized steel wire armour (SWA) providing superior mechanical protection. Rated at 1000V (1.1kV), this cable is specifically designed for installations requiring robust protection against mechanical damage, impact, and rodent attack. The steel wire armour makes it ideal for direct burial, industrial environments, and exposed outdoor installations. With Class 5 flexible copper conductors and current carrying capacity of approximately 46A, this cable is suitable for power distribution, motor connections, and heavy-duty industrial applications where both electrical performance and mechanical durability are essential.

Parameter	Specification
Cable Designation	**4 Core × 6 MM² Armoured Electrical Cable**
Number of Cores	**4 Cores**
Conductor Cross-Section	**6 mm² per core**
Rated Voltage U_0/U	**0.6/1.0 kV (1000V)**
Conductor Material	Annealed Bare Copper (Cu) - Class 5 Stranded

Conductor Type	Flexible Multi-Wire Stranded
Insulation Material	Cross-Linked Polyethylene (XLPE) or PVC
Inner Sheath	Polyvinyl Chloride (PVC) Bedding
Armour Type	**Galvanized Steel Wire Armour (SWA)**
Outer Sheath	PVC - Black Standard (Other colors available)
Flexibility Grade	Class 5 - High Flexibility
Application Class	Armoured Power Distribution Cable

2. CABLE CONSTRUCTION & ARMOUR DETAILS

ARMOURED CABLE STRUCTURE (Core to Outer Layer)

1. Conductor Core: Fine stranded annealed copper wires (Class 5), 6mm² nominal per core

2. Conductor Insulation: XLPE or PVC insulation with standard color identification

3. Core Assembly: Four insulated cores twisted or laid in parallel

4. Filler Material: Non-hygroscopic polypropylene filler to maintain roundness

5. Bedding/Inner Sheath: PVC bedding layer to protect cores from armour

⚙ **6. STEEL WIRE ARMOUR (SWA): Galvanized steel wire armour for mechanical protection**

7. Outer Sheath: Heavy-duty PVC compound (Black standard, UV resistant)

Component	Material/Description	Technical Details
Conductor	Class 5 flexible stranded copper	Per IEC 60228, wire diameter ≤0.41mm
Number of Strands	Multiple fine copper wires	Approximately 84+ strands per conductor
Copper Purity	Annealed copper	≥99.9% purity, high conductivity
DC Resistance	Maximum at 20°C	≤3.39 Ω/km per conductor

Conductor Diameter	Nominal	Approximately 3.1 - 3.3 mm per core
Insulation Thickness	XLPE or PVC Type	0.7 - 1.0 mm nominal
Core Colors	Standard identification	Brown, Black, Grey, Blue or as specified
Inner Sheath Thickness	PVC bedding layer	1.0 - 1.2 mm nominal
Steel Wire Armour	**Galvanized steel wires**	Wire diameter: 0.8 - 1.25 mm (typically 0.9mm)
Armour Application	Helically laid steel wires	Close pitch, single layer
Galvanization	Hot-dip galvanized	Corrosion protection per standards
Outer Sheath Thickness	PVC protective layer	1.8 - 2.0 mm nominal
Overall Diameter	Approximate	17 - 19 mm (including armour)
Approximate Weight	Per kilometer	650 - 750 kg/km
Copper Content	Pure copper weight	Approximately 214 kg/km (4 × 6mm²)

3. ELECTRICAL CHARACTERISTICS

Parameter	Value	Test Condition / Standard
Rated Voltage (U_0/U)	**0.6/1.0 kV (1000V)**	AC 50/60 Hz
Maximum Conductor DC Resistance	3.39 Ω/km	At 20°C per IEC 60228
Current Carrying Capacity (Direct Burial)	**44 - 48 A**	Underground, 25°C soil temperature
Current Carrying Capacity (Clipped to Wall)	**48 - 52 A**	Free air, 30°C ambient
Current Carrying Capacity (Cable Tray)	46 - 50 A	Perforated tray, 30°C ambient
Current Carrying Capacity (In Conduit)	42 - 46 A	Enclosed conduit, 30°C ambient
AC Voltage Test	3.5 kV for 5 minutes	Between conductors and armour/earth
Insulation Resistance	≥20 MΩ·km	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	Approx. 7.5 mV/A/m	At power factor 0.8, 90°C
Power Transmission (3-Phase, 400V)	Approximately 32-34 kW	At 46A, 400V, 3-phase, 0.8 PF
Power Transmission (Single-Phase, 230V)	Approximately 10.6 kW	At 46A, 230V, single-phase
Armour Earthing	**Required at both ends**	Steel wire armour provides earth path

4. MECHANICAL PROPERTIES & ARMOUR PERFORMANCE

Parameter	Specification	Notes
Flexibility Class	**Class 5 - High Flexibility**	Per IEC 60228
Mechanical Protection Level	**Heavy Duty - Armoured**	Superior impact and crush resistance
Minimum Bending Radius (Installation)	10 × Overall Diameter (≥190 mm)	Due to steel wire armour
Minimum Bending Radius (Fixed)	8 × Overall Diameter (≥152 mm)	After installation
Radial Crushing Strength	Excellent	Steel wire armour provides protection
Impact Resistance	**Excellent - Armour prevents damage**	Suitable for areas with mechanical hazards
Rodent Protection	**Excellent - Steel barrier**	Steel wire prevents gnawing damage
Installation Temperature	≥0°C	Preheating may be required below 0°C
Operating Temperature Range	-15°C to +70°C (PVC) -20°C to +90°C (XLPE)	Ambient conditions
Direct Burial	**Suitable without additional protection**	Primary application - Armour provides protection
Flame Retardant	IEC 60332-1	Single vertical wire flame test
Cable Weight (Handling)	Medium - Manageable	Approximately 650-750 g per meter

5. TYPICAL APPLICATIONS

Underground Power Distribution

Direct burial in trenches for power supply to buildings, facilities, and equipment

Industrial Plants

Power distribution in factories, manufacturing plants, and processing facilities

Motor Connections

Power supply to medium-sized motors (11-22 kW), pumps, and compressors

Outdoor Installations

Exposed cable runs on building exteriors and across open areas

Agricultural Facilities

Farms, barns, and agricultural processing where rodent protection is critical

Construction Sites

Temporary and permanent power distribution on construction projects

Commercial Buildings

Main distribution cables for offices, retail spaces, and commercial facilities

Parking Structures

Underground parking power distribution and lighting circuits

Garden & Landscape Lighting

Underground power supply to outdoor lighting and irrigation systems

Mining Operations

Surface mining installations requiring mechanical protection

Key Advantages of Armoured Construction: Superior mechanical protection against impact | Rodent and pest resistant | Suitable for direct burial without conduit | Cost-effective for underground installations | Armour provides earthing path | Excellent long-term durability | UV resistant outer sheath | Suitable for harsh environments | No additional protection required

6. LOAD CAPACITY & APPLICATION EXAMPLES

Application Example	Typical Load	Configuration
Small Industrial Motor	11-15 kW (15-20 HP)	400V, 3-phase
Water Pump Station	11-18 kW	400V, 3-phase
HVAC Package Unit	10-15 kW	400V, 3-phase
Commercial Kitchen Equipment	Up to 30 kW	400V, 3-phase distribution
Conveyor System	7.5-15 kW	400V, 3-phase motor
Workshop Power Feed	Up to 32 kW	400V, 3-phase distribution
Commercial Building Sub-Main	Up to 30 kW	400V, 3-phase feeder
Agricultural Irrigation Pump	11-18 kW	400V, 3-phase
Outdoor Lighting Circuit	Up to 10 kW	230V or 400V distribution

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 5 flexible conductors
IEC 60332-1	Tests on electric cables under fire conditions - Single vertical wire flame test
IEC 60364	Low-voltage electrical installations - Earthing arrangements
BS 5467	Electric cables - Armoured cables with thermosetting insulation (Reference standard)
BS 6346	Electric cables - PVC insulated armoured cables (Reference standard)
GB/T 12706	Chinese National Standard for power cables (0.6/1kV to 26/35kV)
RoHS Compliant	Restriction of Hazardous Substances - Environmental compliance
CE Marking	European Conformity (where applicable)

8. INSTALLATION GUIDELINES FOR ARMOURED CABLES

Installation Parameter	Requirement
Burial Depth	Minimum 600mm (general areas), 900mm (under roads/driveways)
Trench Bottom Preparation	100mm sand bedding layer, free from sharp stones and debris
Cable Laying Method	Lay cable on sand bed, cover with 100mm sand, install warning tape
Warning Tape	Install at 300mm above cable - "Electric Cable Below"
Armour Earthing	**MANDATORY - Earth armour at both ends using SWA glands**
Cable Glands	Use SWA glands (BW type) size M25 or M32 with earthing tag
Pulling Force	Maximum 50 N/mm² of conductor area (~1,200N total)
Support Spacing (Vertical)	Maximum 0.4 - 0.6 meters
Support Spacing (Horizontal)	Maximum 1.0 - 1.5 meters on cable tray
Cable Tray Width	Minimum 100mm to accommodate cable diameter
Termination	Use cable lugs rated for 6mm² (M6 or M8 stud)
Crimping Tools	Ratchet or hydraulic crimping tools for 6mm² lugs
Route Marking	Install route markers above ground for future identification

Critical Installation Requirements:

- **ARMOUR EARTHING IS MANDATORY:** Failure to earth the steel wire armour creates shock hazards and violates safety codes
- Never use standard cable glands - always use SWA-specific glands with earthing continuity
- Do not exceed minimum bending radius (190mm) - armour wires can break
- Ensure earthing continuity throughout the installation
- Install warning tape 300mm above buried cable to prevent accidental damage
- Use appropriate personal protective equipment when handling cable
- Follow local electrical codes and regulations
- Test armour earthing continuity before energizing
- Professional installation by qualified electricians required

9. VOLTAGE DROP CALCULATIONS

Example voltage drop calculations for typical installations:

Application	Current	Distance	Voltage Drop	% Drop
11kW Motor (400V, 3-phase)	20 A	50 m	7.5 V	1.9%
15kW Motor (400V, 3-phase)	27 A	40 m	8.1 V	2.0%
Distribution Board (400V)	40 A	30 m	9.0 V	2.3%
Outdoor Lighting (230V)	15 A	60 m	6.8 V	3.0%
Workshop Supply (400V)	45 A	25 m	8.4 V	2.1%

Voltage Drop Guidelines: IEC standards recommend maximum 3% for lighting and 5% for power. This 4×6mm² cable provides excellent voltage drop performance for runs up to 60-80 meters at typical load currents. For longer distances, consider larger conductor sizes (10mm² or 16mm²).

10. QUALITY ASSURANCE & TESTING

Comprehensive factory testing for every production batch:

- **Conductor DC resistance test:** Verified ≤3.39 Ω/km at 20°C
- **High voltage test:** 3.5 kV AC for 5 minutes between conductors and armour
- **Insulation resistance test:** Minimum 20 MΩ·km at 20°C
- **Dimensional verification:** Conductor diameter, insulation thickness, armour wire diameter, overall diameter
- **Armour wire quality test:** Tensile strength and galvanization thickness
- **Galvanization adhesion test:** Ensuring corrosion protection
- **Flexibility test:** Bending test per IEC 60228 Class 5 requirements
- **Mechanical strength test:** Tensile and elongation testing

- **Fire performance test:** Flame propagation per IEC 60332-1
- **Armour continuity test:** Electrical continuity of steel wire armour
- **Visual inspection:** Complete construction and marking verification

Quality Certification: Manufactured under ISO 9001:2015 quality management system. Complete type test reports, routine test certificates, and certificates of conformity provided. Third-party testing available. Factory acceptance testing (FAT) can be arranged for large projects.

11. PACKAGING, STORAGE & DELIVERY

Item	Details
Standard Length	100m, 200m, 500m, or customized length
Packaging Type	Steel or wooden cable drum suitable for armoured cable
Typical Drum Weight	150-400 kg depending on cable length (cable: ~700g/m)
Cable Marking	Sequential meter marking every 1 meter on outer sheath
Marking Information	Manufacturer, cable type, 4C×6mm², voltage rating, date code
Documentation	Test report, certificate of conformity, installation guide, drum data sheet
Storage Conditions	Store drums upright in dry, covered area away from sunlight
Storage Temperature	-5°C to +35°C
Shelf Life	24 months under proper storage conditions
Handling Equipment	Manual handling or forklift depending on drum size
Lead Time	15-30 working days after order confirmation
Minimum Order Quantity	500 meters (negotiable for projects)

12. ENVIRONMENTAL SUITABILITY

Environmental Factor	Suitability	Notes
Direct Burial	✓ **Excellent - Primary Application**	No additional protection required
Indoor Installation	✓ Suitable	On cable tray or clipped to wall
Outdoor Exposure	✓ Suitable	UV resistant sheath standard
Wet Locations	✓ Suitable	With proper termination and glands

Underground Parking	✓ Excellent	Ideal application
Agricultural Areas	✓ Excellent	Rodent protection from armour
Industrial Environments	✓ Suitable	Mechanical protection adequate
Corrosive Atmospheres	⚠ Limited	Check galvanization suitability
High Temperature Areas	⚠ Limited to rated temperature	Use XLPE for 90°C applications
Submerged Installation	✗ Not Recommended	Use submarine-grade cables

Important Technical Information:

- This specification is for reference and subject to technical modifications
- Custom options available: LSZH (Low Smoke Zero Halogen) sheath, XLPE insulation, special colors
- For highly corrosive environments, consider stainless steel wire armour or additional protection
- Always use SWA-specific cable glands - standard glands will not provide proper earthing
- Installation must comply with IEC 60364, NEC, or local electrical codes
- Professional installation by qualified, experienced electricians mandatory
- Armour earthing must be tested and verified before commissioning
- For hazardous area installations (ATEX/IECEx), use certified glands and proper procedures
- Consult technical department for special applications or custom requirements
- Proper circuit protection devices (MCB/MCCB) rated appropriately required

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FEICHUN SPECIAL CABLES

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