



Product Overview

The EPN 79 series represents a specialized line of flexible medium voltage cables engineered specifically for the demanding conditions of open-pit mining, quarrying, and heavy industrial operations. These cables bridge the critical gap between fixed electrical distribution systems and mobile heavy machinery, providing reliable electrical connections for equipment such as excavators, dump trucks, crushers, and conveyor systems operating in harsh outdoor environments.

Unlike standard industrial cables designed for fixed installations, the EPN 79 series incorporates advanced materials science and engineering principles to withstand the mechanical stress, environmental challenges, and electrical demands inherent in mobile heavy equipment applications. The cable's design philosophy centers on maintaining electrical integrity while providing superior mechanical flexibility, chemical resistance, and thermal stability under extreme working conditions.

Key Features & Benefits

- ✓ Class 5 extra-flexible tinned copper conductors for superior flexibility and corrosion resistance
- ✓ Advanced three-layer EPR insulation system with semiconductor stress control layers
- ✓ Dual protective ground conductors for enhanced safety in mobile applications
- ✓ CPE outer sheath providing exceptional resistance to chemicals, abrasion, and environmental factors
- ✓ Operating temperature range: -25°C to +90°C for continuous operation
- ✓ Rated voltage: 3.6/6 kV ($U_m = 7.2$ kV) for medium voltage power distribution
- ✓ Compliant with international standards including IEC 60228, IEC 60332, and DIN VDE specifications

Standard Product Configurations

Anhui Feichun Special Cable Co., Ltd. offers four standard configurations of the EPN 79 series, each optimized for specific power requirements and application demands. All configurations feature Class 5 extra-flexible tinned copper conductors, dual protective ground conductors, and a pilot conductor for enhanced operational safety and monitoring capabilities.

Model Designation	Main Conductors	Ground Conductors	Pilot Conductor	Approx. Diameter	Approx. Weight
EPN 79 3x70+2x25+1x16mm ²	3 × 70 mm ²	2 × 25 mm ²	1 × 16 mm ²	54-58 mm	5,200 kg/km
EPN 79 3x50+2x25+1x16mm ²	3 × 50 mm ²	2 × 25 mm ²	1 × 16 mm ²	48-52 mm	4,100 kg/km
EPN 79 3x35+2x25+1x16mm ²	3 × 35 mm ²	2 × 25 mm ²	1 × 16 mm ²	43-47 mm	3,500 kg/km
EPN 79 3x25+2x10+1x10mm ²	3 × 25 mm ²	2 × 10 mm ²	1 × 10 mm ²	38-42 mm	2,600 kg/km

Configuration Selection Guide:

70mm² Configuration: Designed for large excavators (2500-4000 kW), heavy-duty crushers, and high-capacity conveyor systems requiring maximum current carrying capacity.

50mm² Configuration: Ideal for medium-large excavators (1500-3000 kW), dump trucks, and standard crushing operations with moderate power demands.

35mm² Configuration: Suitable for medium excavators (1000-2000 kW), mobile loaders, and auxiliary mining equipment with standard power requirements.

25mm² Configuration: Optimized for smaller mobile equipment (500-1200 kW), auxiliary systems, and applications where weight and flexibility are critical considerations.

Detailed Technical Specifications

Conductor Construction

All EPN 79 cables feature Class 5 extra-flexible stranded conductors manufactured from tinned copper, providing superior flexibility and enhanced corrosion resistance compared to bare copper alternatives. The Class 5 designation indicates a fine-stranded construction with individual wire diameters typically ranging from 0.1 to 0.3 mm, significantly enhancing the cable's bend radius performance and fatigue resistance critical for continuous movement applications.

Conductor Material

Tinned copper to IEC 60228 Class 5
Enhanced oxidation and moisture resistance
Optimal for corrosive mining environments

Stranding Configuration

Extra-flexible Class 5
Fine wire diameter: 0.1-0.3 mm
Superior flexibility and fatigue resistance

Ground Conductor Design

Dual protective earth conductors
Enhanced safety for mobile equipment
Redundant grounding protection

Pilot Conductor Function

Control and monitoring circuit
Equipment status feedback
Safety interlock capabilities

Insulation System Architecture

The EPN 79 series employs an advanced three-layer insulation system incorporating inner semiconductor, EPR (Ethylene Propylene Rubber) primary insulation, and outer semiconductor layers. This engineered stress control system, commonly referred to by electrical engineers as a "stress grading system," manages electric

field concentrations at the conductor-insulation interface that could otherwise lead to partial discharge phenomena and premature insulation degradation.

Insulation Layer	Material Specification	Typical Thickness	Primary Function
Inner Semiconductor	EPR Semiconductor Compound	0.5 - 1.0 mm	Electric field stress control at conductor interface
Primary Insulation	EPR 3GI3 Compound	2.5 - 3.5 mm	Dielectric strength and voltage withstand capability
Outer Semiconductor	NBR Semiconductor Compound	0.5 - 1.0 mm	Electric field stress grading and smoothing
Inner Sheath	EPR GM1b Compound	1.5 - 2.0 mm	Mechanical protection for insulation system
Outer Sheath	CPE 5GM5 Compound	2.0 - 3.0 mm	Environmental protection and chemical resistance

Electrical Performance Parameters

Parameter	Specification	Engineering Significance
Rated Voltage U ₀ /U	3.6/6 kV	Phase-to-ground / phase-to-phase voltage ratings for system compatibility
Maximum Equipment Voltage (Um)	7.2 kV	System overvoltage tolerance and equipment compatibility specification
AC Test Voltage (Power Cores)	11 kV for 5 minutes	Manufacturing quality verification and insulation integrity testing
AC Test Voltage (Pilot Core)	2 kV for 5 minutes	Control circuit insulation verification and safety assurance
Continuous Conductor Temperature	90°C	Normal operating thermal loading capacity under rated conditions
Short-Circuit Conductor Temperature	250°C (5 seconds maximum)	Fault current thermal withstand capability for protective device coordination
Insulation Resistance (minimum)	100 MΩ·km at 20°C	Electrical integrity verification for new installations

Mechanical Performance Characteristics

Parameter	Specification	Application Impact
Permanent Tensile Strength	15 N/mm²	Installation and operational pulling force capability without damage
Minimum Bending Radius (Fixed Installation)	12 × cable diameter	Static installation routing without mechanical stress damage
Minimum Bending Radius (Mobile Application)	15 × cable diameter	Dynamic movement capability while maintaining cable integrity
Ambient Temperature Range (Fixed)	-40°C to +80°C	Global climate compatibility for stationary installations
Ambient Temperature Range (Flexible)	-25°C to +60°C	Mobile equipment operational temperature capability
Flame Propagation	Self-extinguishing per IEC 60332-1-2	Fire safety compliance for industrial mining environments

Current Carrying Capacity

The following current ratings are calculated for continuous operation under standard installation conditions. Actual current carrying capacity may vary based on ambient temperature, installation method, grouping factors, and operational duty cycle. For specific application requirements, detailed thermal analysis should be performed considering actual site conditions.

Cable Configuration	Conductor Cross-Section	Current Rating (A)	Voltage Drop (V/A·km)	Typical Power Rating
EPN 79 3x70+2x25+1x16mm ²	70 mm ²	245 A	0.44	2,500 - 4,000 kW at 6 kV
EPN 79 3x50+2x25+1x16mm ²	50 mm ²	195 A	0.62	1,800 - 3,000 kW at 6 kV
EPN 79 3x35+2x25+1x16mm ²	35 mm ²	155 A	0.88	1,200 - 2,000 kW at 6 kV
EPN 79 3x25+2x10+1x10mm ²	25 mm ²	125 A	1.24	800 - 1,500 kW at 6 kV

Important Note on Current Ratings:

The current ratings provided assume: (1) Ambient temperature of 30°C, (2) Ground burial at 1.0 meter depth, (3) Ground thermal resistivity of 1.0 K·m/W, (4) No adjacent cables within thermal influence zone. For installations deviating from these conditions, derating factors must be applied according to relevant standards. Consult with our engineering department for specific application guidance.

Primary Applications

Mining Industry Applications

The EPN 79 series cables serve as the primary power distribution solution for mobile equipment in open-pit mining operations where continuous power supply and equipment mobility are essential requirements. These applications present unique engineering challenges that standard industrial cables cannot adequately address, including severe mechanical stress from equipment movement, exposure to abrasive mineral dusts, chemical contamination from mining processes, and extreme temperature variations.

Electric Mining Excavators Large-scale excavators (2,000-4,000 kW) requiring continuous power for digging, lifting, and swinging operations	Mobile Crushing Plants Primary and secondary crushers (1,000-2,500 kW) processing thousands of tons of material daily	Heavy Dump Trucks Electric drive haul trucks (1,500-3,000 kW) operating on rough terrain with severe vibration
Belt Conveyor Systems Long-distance material transport (500-1,500 kW) requiring continuous operation in all weather	Bucket Wheel Excavators Continuous mining equipment (800-2,000 kW) with extensive cable movement requirements	Mobile Drilling Rigs Electric rotary drills requiring flexible power connections during repositioning operations

Heavy Industrial Applications

Beyond mining operations, the EPN 79 series cables serve critical roles in heavy industrial processes where traditional cables cannot meet the demanding requirements. These applications benefit from the cable's

superior mechanical flexibility, chemical resistance, and thermal stability.

Steel Production Facilities

Mobile ladle handling, continuous casting, and material transport systems in extreme temperature environments

Cement Manufacturing

Stacker-reclaimers, mobile crushers in highly alkaline and dusty cement plant environments

Port Operations

Ship-to-shore cranes, mobile harbor cranes, bulk material handling with marine environment exposure

Quarrying Operations

Stone cutting equipment, mobile screening plants, aggregate processing in abrasive conditions

International Standards Compliance

The EPN 79 series demonstrates comprehensive compliance with international electrical and safety standards, ensuring global acceptance and regulatory approval. This compliance framework represents years of testing, verification, and certification processes ensuring the cable meets established industry benchmarks for safety, performance, and reliability.

IEC 60228
Conductor Specifications

IEC 60332-1-2
Flame Propagation Test

IEC 60811-404
Insulation Testing Methods

DIN VDE 0250-813
German Electrical Standards

EN 60228
European Conductor Standard

EN 60332-1-2
European Fire Safety

Standard	Scope	Compliance Aspects
IEC 60228 / EN 60228	Conductor Specifications	Class 5 stranding requirements, conductor dimensions, resistance values, material specifications
IEC 60332-1-2 / EN 60332-1-2	Fire Safety Performance	Single cable flame propagation testing, self-extinguishing properties, limited flame spread characteristics
IEC 60811-404	Testing Methodology	Insulation resistance measurement, dielectric strength verification, quality assurance protocols
DIN VDE 0250-813	National Standards Compliance	German electrical installation requirements, voltage ratings, construction specifications
DIN VDE 0298-3	Installation Parameters	Bending radius specifications, installation methods, current carrying capacity calculations

Installation Guidelines

Pre-Installation Requirements

Successful installation of EPN 79 cables requires comprehensive site assessment and installation planning to address the specific challenges of mobile equipment applications. The planning phase must consider equipment movement patterns, cable routing requirements, environmental conditions, and maintenance accessibility. Site surveys should document geological conditions, potential cable paths, environmental hazards, and possible interference with mining operations.

Cable Handling

Minimum bending radius: 15 × cable diameter during installation

Maximum pulling tension: 50 N/mm² of conductor cross-section

Avoid dragging cable across sharp edges or abrasive surfaces

Storage Requirements

Store on drums or reels in covered area

Protect from direct sunlight and moisture

Temperature range: -25°C to +55°C

Maximum storage duration: 12 months

Environmental Considerations

Assess chemical exposure risks

Evaluate mechanical hazard zones

Consider drainage patterns

Plan for equipment traffic clearances

Support Systems

Cable festoon systems for traveling equipment

Cable reeling drums for continuous movement

Guided cable management for controlled routing

Protective cable trays in high-traffic areas

Installation Procedures

Proper installation techniques are critical for achieving specified cable performance and service life. Installation protocols should address cable handling, routing, support system implementation, and termination requirements specific to mobile equipment applications. Cable laying operations require specialized equipment to manage the pulling loads and bending radii associated with flexible medium voltage cables.

Critical Installation Parameters:

Maximum Pulling Tension: Must not exceed 50 N/mm² of total conductor cross-section. For 70mm² configuration, maximum pulling force is 10,500 N (approximately 1,070 kg).

Minimum Bending Radius: During installation, maintain 15 times the cable outer diameter. For 58mm diameter cable, minimum bend radius is 870mm.

Temperature Limitations: Do not install cables when ambient temperature is below -5°C without pre-warming to prevent insulation damage.

Termination Requirements: All medium voltage terminations must be performed by qualified personnel using appropriate stress cone or cold-shrink termination kits designed for 6kV applications.

Testing and Commissioning

Comprehensive testing protocols verify installation integrity and confirm compliance with electrical performance specifications. These tests typically include insulation resistance measurements, high-voltage withstand testing, continuity verification, and phase sequence confirmation. Testing must be performed using calibrated equipment and following safety protocols to protect personnel and equipment from high voltage hazards.

Test Type	Test Parameters	Acceptance Criteria
Insulation Resistance	5 kV DC test voltage for 1 minute	$\geq 100\text{ M}\Omega\cdot\text{km}$ at 20°C, $\geq 50\text{ M}\Omega\cdot\text{km}$ at operating temperature
High Voltage Withstand	80% of factory test voltage (8.8 kV AC) for 5 minutes	No breakdown or tracking, stable leakage current
Conductor Continuity	Low resistance measurement of all conductors	Within $\pm 5\%$ of calculated DC resistance values
Phase Sequence	Phase rotation verification with equipment de-energized	Correct phase sequence for motor rotation direction
Ground Continuity	Ground conductor resistance measurement	$\leq 1\text{ }\Omega$ total ground loop resistance

Maintenance and Service Life

Preventive Maintenance Schedule

Regular inspection and maintenance protocols are essential for maximizing cable service life and preventing unexpected failures in critical mining operations. The maintenance program should be tailored to specific application conditions, equipment duty cycles, and environmental exposure factors.

Inspection Interval	Inspection Activities	Action Required
Daily Visual Inspection	Cable routing, visible damage, connection integrity, support system condition	Remove cable from service if damage observed, report abnormalities
Weekly Detailed Inspection	Sheath condition, termination tightness, strain relief, cable movement patterns	Tighten connections, adjust support systems, document wear patterns
Monthly Comprehensive Check	Mechanical wear assessment, thermal imaging, connection resistance, insulation spot-checks	Plan repairs, order replacement components, schedule maintenance windows
Annual Testing	Insulation resistance, partial discharge, ground continuity, complete documentation review	Update maintenance records, plan cable replacements, assess system performance

Service Life Expectations

Under normal operating conditions with proper installation and maintenance, EPN 79 cables typically achieve service lives of 5 to 8 years in demanding mobile mining applications, significantly exceeding the 2 to 3 year typical lifespan of standard industrial cables in similar conditions. Factors affecting service life include mechanical stress severity, environmental exposure, maintenance quality, and operational duty cycle.

Ordering Information

Product Designation Format

When placing orders, please use the following designation format to ensure accurate product specification:

EPN 79 3.6/6kV - [Main Conductor] + [Ground Conductor] + [Pilot Conductor] - [Length]

Example: EPN 79 3.6/6kV - 3x50+2x25+1x16mm² - 500m

Standard Supply Lengths

Cable Configuration	Standard Drum Length	Maximum Continuous Length	Typical Delivery Time
3x25+2x10+1x10mm ²	500 - 1,000 meters	2,000 meters	4-6 weeks
3x35+2x25+1x16mm ²	500 - 800 meters	1,500 meters	4-6 weeks
3x50+2x25+1x16mm ²	400 - 600 meters	1,200 meters	5-7 weeks
3x70+2x25+1x16mm ²	300 - 500 meters	1,000 meters	5-7 weeks

Custom Manufacturing:

Anhui Feichun Special Cable Co., Ltd. offers custom cable configurations to meet specific application requirements. Custom specifications may include modified conductor sizes, alternative insulation materials, special sheath compounds, or unique cable constructions. Please contact our engineering department with detailed specifications for custom product development. Minimum order quantities and extended delivery times apply to custom configurations.

Quality Assurance and Certification

Every meter of EPN 79 cable manufactured by Anhui Feichun Special Cable Co., Ltd. undergoes rigorous quality control testing throughout the production process. Our quality management system is certified to ISO 9001:2015 standards, ensuring consistent product quality and manufacturing excellence.

Manufacturing Quality Control

Raw Material Inspection

- 100% incoming material verification
- Certified material test reports
- Traceability documentation
- Supplier quality audits

In-Process Testing

- Conductor resistance verification
- Insulation thickness measurements
- Dimensional tolerance checks
- Process parameter monitoring

Final Product Testing

- High voltage withstand test (100%)
- Insulation resistance (100%)
- Conductor continuity (100%)
- Dimensional verification (sampling)

Documentation

- Test certificates for every production lot
- Material traceability records
- Manufacturing process documentation
- Compliance certifications

Warranty and Technical Support

Anhui Feichun Special Cable Co., Ltd. provides comprehensive warranty coverage and technical support for all EPN 79 series cables. Standard warranty terms include 24 months from date of delivery against manufacturing defects when installed and operated according to specifications. Extended warranty programs are available for high-value installations.

Our technical support team provides application engineering assistance, installation guidance, troubleshooting support, and maintenance training. Field service engineers are available for on-site

commissioning support and periodic inspection services to ensure optimal cable performance throughout its service life.