

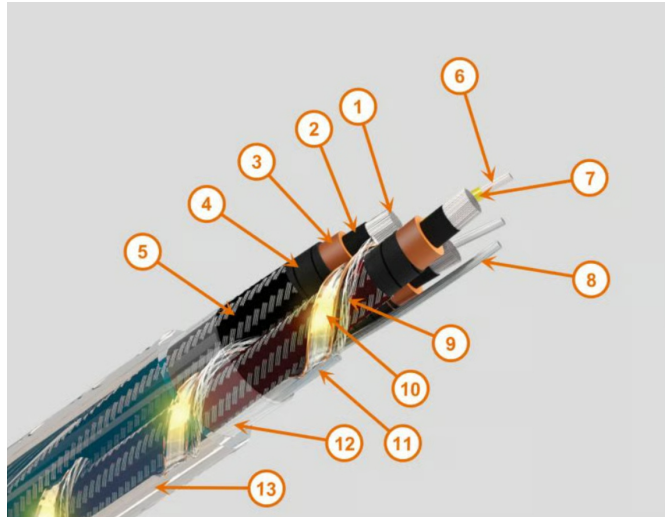
Type 241.1 Mining Cable with Self-Illuminating LED Technology

1.1 kV · 3×50 + 3×16 + 1×1.5 mm²

Configuration:

3 power conductors (50 mm²) +
3 ground conductors (16 mm²) +
1 pilot conductor (1.5 mm²)

Special Feature: Integrated
energy-harvesting LED illumination
system



1. Executive Summary

Feichun Cable's Type 241.1 LED mining cable represents a breakthrough in underground mining safety technology. This innovative cable integrates self-powered LED illumination strips that harvest energy directly from the cable's electromagnetic field, providing continuous visual indication of cable location and energization status without requiring external power sources. Engineered specifically for the demanding conditions of underground mining operations, this cable combines superior mechanical durability with advanced safety features.

2. Construction Details

The cable features an advanced 11-layer construction design optimized for maximum durability and functionality in harsh mining environments:

Cable Construction Layers	
Layer 1: Conductors	Electrolytic tinned copper wire, soft annealed Stranding Class: 5 (Flexible conductor per IEC 60228) Tinning provides superior corrosion resistance in humid environments

Layer 2: Conductor Shield	Semi-conducting tape Ensures uniform electric field distribution Prevents partial discharge and extends cable life
Layer 3: Insulation	Thermoset Ethylene Propylene Rubber (EPR) Temperature rating: 90°C continuous Superior flexibility and electrical properties
Layer 4: LED Strip System	Energy-harvesting LED modules (1200mm length) Spiral wound configuration around phase conductors Self-powered from cable's electromagnetic field No external power source required
Layer 5: Shield	Open weave tinned copper braid Maximum coverage: 10% Primary function: LED module interconnection
Layer 6: Ground Conductors	Electrolytic tinned copper wire, soft annealed Semi-conducting extrusion Stranding Class: 5 (Flexible)
Layer 7: Pilot Conductors	Electrolytic tinned copper wire EPR insulation rated 1.1 kV For control and monitoring circuits
Layer 8: Bedding	Semi-conducting material Provides cushioning and electrical stress control
Layer 9: Inner Sheath	Thermoplastic Polyurethane (TPU) Applied only on 3×50 configuration Additional mechanical protection
Layer 10: Reinforcement	Textile yarn braid High-strength synthetic fibers Enhances tensile strength and flexibility
Layer 11: Outer Sheath	Heavy-duty Thermoplastic Polyurethane (TPU) Specifically formulated for mining applications Outstanding abrasion and chemical resistance

3. Electrical Characteristics

Parameter	Value	Test Standard
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Rated Voltage (U ₀ /U)	0.66/1.1 kV	IEC 60502-1
Test Voltage	4.2 kV AC for 5 minutes	IEC 60502-1
Maximum DC Resistance at 20°C	0.393 Ω/km	IEC 60228
Current Carrying Capacity	221 A	IEC 60364-5-52
Short Circuit Temperature	250°C (max 5 seconds)	IEC 60724
Insulation Resistance at 20°C	≥500 MΩ·km	IEC 60502-1

4. Mechanical Properties

Property	Value	Test Standard
Outer Sheath Diameter	46.30 mm ± 5%	IEC 60811-201
Cable Weight	3,442 kg/km	-
Minimum Bending Radius	6 × OD (278 mm)	ABNT NBR 9511
Tensile Strength (Outer Sheath)	45 MPa	DIN 53504-S2
Tear Strength	70 N/mm	DIN ISO 34-1Bb
Abrasion Resistance	≤150 mm ³	DIN ISO 4649-A
Elongation at Break	≥300%	DIN 53504-S2

5. Environmental Performance

Characteristic	Performance	Test Condition/Standard
Operating Temperature Range	-40°C to +90°C	Continuous operation
Chemical Resistance	Excellent	Per ICEA S-75-381 Table 4-9
Oil Resistance	Excellent	IEC 60811-404
Water Resistance	Excellent hydrolysis resistance	121°C aging test per ICEA 75-381
UV Resistance	Excellent	ASTM G155

6. LED Illumination System Specifications

The revolutionary self-powered LED system provides continuous visual indication without external power requirements:

LED System Parameter	Specification
Module Length	1,200 mm per module
Power Source	Energy harvesting from cable electromagnetic field
Activation Threshold	≥10% of rated current
Light Output	Visible indication along entire cable length
Configuration	Spiral wound around phase conductors
Operating Life	≥50,000 hours
Environmental Rating	IP68 (fully sealed)

Technical Note: The LED system operates through electromagnetic induction, harvesting energy from the cable's own magnetic field. This innovative design ensures that the LEDs illuminate whenever the cable is energized, providing immediate visual confirmation of cable status and location in dark mining environments.

7. Compliance Standards

Feichun Cable's Type 241.1 LED mining cable meets or exceeds the following international standards:

Standard	Description
IEC 60228	Conductors of insulated cables
NBR 9655	Power connection cables for mobile equipment with EPR insulation up to 750V
NBR 6251	Insulated power cables rated 1kV to 35kV - Construction requirements

ICEA S-75-381/NEMA WC-58	Portable and power feeder cables for use in mines
AS/NZS 1802:2018	Electric cables - Reeling and trailing - For underground coal mining
RoHS Directive	Restriction of Hazardous Substances
REACH Regulation	Registration, Evaluation, Authorization and Restriction of Chemicals

8. Application Guidelines

8.1 Primary Applications

- ✓ Underground mining draglines and continuous miners
- ✓ Mobile crushing and screening equipment
- ✓ Shuttle cars and load-haul-dump vehicles
- ✓ Drilling rigs and boring machines
- ✓ Excavators and heavy mining equipment
- ✓ Portal cranes and material handling systems

8.2 Installation Recommendations

To ensure optimal performance and longevity of the Type 241.1 LED mining cable:

- ✓ Maintain minimum bending radius of $6 \times OD$ during installation and operation
- ✓ Use appropriate cable handling equipment to prevent damage
- ✓ Ensure proper cable support at intervals not exceeding 10 meters
- ✓ Implement strain relief at termination points
- ✓ Regular inspection of LED functionality as part of maintenance routine
- ✓ Follow local mining safety regulations for electrical installations

9. Quality Assurance

Feichun Cable maintains rigorous quality control throughout the manufacturing process:

Quality Control Stage	Testing Performed
Raw Material Inspection	Conductor purity, insulation compound properties, LED module verification
In-Process Testing	Dimensional checks, insulation thickness, concentricity
Final Testing	High voltage test, insulation resistance, LED functionality, mechanical properties
Batch Testing	Full electrical and mechanical characterization per relevant standards

10. Ordering Information

Part Number	Description	Minimum Order
01.65.1.0060	Type 241.1 LED Mining Cable 1.1 kV, 3×50 + 3×16 + 1×1.5 mm ²	200 meters

Why Choose Feichun Cable?

- ✓ Industry-leading innovation with patented LED technology
- ✓ Comprehensive testing exceeding international standards
- ✓ Proven performance in harsh mining environments worldwide
- ✓ Technical support from experienced engineering team
- ✓ Customization available for specific application requirements
- ✓ ISO 9001:2015 certified manufacturing facility

Anhui Feichun Special Cable Co., Ltd.

Excellence in Mining Cable Technology | Innovative Safety Solutions

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