

ANHUI FEICHUN SPECIAL CABLE CO., LTD.

安徽飞纯特种电缆有限公司



NSSHöu-O/J SERIES

Heavy Duty Mining Rubber Cable for Blasting and Explosive Applications

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△ CERTIFIED FOR HAZARDOUS ENVIRONMENTS • SUBMERSIBLE TO 100M • EXPLOSION-RESISTANT DESIGN △

Product Overview

The NSSHöu-O series represents the pinnacle of heavy-duty flexible cable engineering designed specifically for mining operations involving blasting activities and explosive material handling. These cables combine exceptional mechanical robustness with comprehensive environmental resistance, delivering reliable electrical power transmission in the most demanding underground and surface mining conditions where standard industrial cables would rapidly fail under the combined stresses of mechanical abuse, chemical exposure, and environmental extremes.

Distinguished by their specialized rubber compound construction incorporating both inner and outer protective layers, these cables provide unparalleled resistance to the aggressive conditions encountered in mining blasting operations. The cable design addresses the unique challenges of environments where cables may be subjected to impact from falling rock, abrasion from rough surfaces, cuts and tears from sharp edges, exposure to oils and mining chemicals, complete water submersion in flooded areas, and the demanding mechanical stresses of mobile equipment operation in confined underground workings.

The designation NSSHöu-O follows German cable nomenclature standards established by VDE specifications. The prefix N indicates compliance with national German standards, SSH designates heavy-duty cable construction suitable for severe mechanical stress applications, the ö suffix confirms oil resistance of the outer sheath compound, while the O designation specifies additional features relevant to mining applications including enhanced abrasion resistance and suitability for hazardous environments. Available variants including NSSHöu-O/J, NSSHöu 3E, and NSSHöu 3E+ST provide graduated levels of protection and functionality addressing diverse mining application requirements from basic power distribution through sophisticated systems requiring individual core screening and integrated control conductors.

✓ VDE APPROVED AND CERTIFIED

All cables in this series undergo rigorous testing and approval by the VDE Testing & Certification Institute, ensuring compliance with the most stringent European standards for cables used in explosive and hazardous mining environments.

Distinguishing Performance Characteristics

The NSSHöu-O cable series incorporates several critical design features that establish its suitability for blasting operations and hazardous mining environments. The multi-layer rubber compound construction utilizing specifically formulated elastomeric materials provides comprehensive protection

against the full spectrum of environmental and mechanical hazards encountered in mining operations. The flame retardant properties meeting IEC 60332-1-2 standards ensure that cables do not contribute to fire propagation in underground confined spaces where fire represents a catastrophic hazard to personnel and operations.

Exceptional abrasion resistance enables these cables to withstand repeated contact with rough mine surfaces, movement across uneven terrain, and the continuous mechanical stress of trailing cable applications where cables are dragged behind mobile equipment through harsh underground environments. The cut, notch, and tear resistant properties address the reality of mining operations where cables encounter sharp rock edges, equipment corners, and other mechanical hazards that would quickly compromise standard cable constructions. Oil and fat resistance ensures cable integrity when exposed to hydraulic fluids, lubricating oils, and petroleum products ubiquitous in mechanized mining operations.

The submersible rating to depths of one hundred meters represents a critical specification for mining applications where cables may be deployed in flooded shafts, sumps, or areas subject to water accumulation. The cable construction maintains electrical integrity when permanently submerged in fresh water, salt water, storm water, oily water, and sewage-contaminated water, addressing the diverse water quality conditions encountered across different mining operations and geographical locations. This submersible capability, combined with the ability to operate across an ambient temperature range from minus forty degrees to positive eighty degrees Celsius, enables deployment in virtually any mining environment from arctic surface operations through deep underground workings where elevated rock temperatures create hostile thermal conditions.

Featured Specification: 2×1.5mm² Configuration for Blasting Applications

The two-core 1.5mm² cross-section configuration represents the optimal cable design for mining blasting circuit applications where reliability, flexibility, and resistance to environmental abuse must be balanced with the specific electrical requirements of blasting equipment connections. This cable size provides adequate current carrying capacity for typical blasting machine circuits while maintaining the mechanical flexibility necessary for deployment across varied terrain and through confined spaces characteristic of mining blasting operations.

Conductor Configuration

Two cores of 1.5mm² cross-sectional area utilizing Class 5 flexible tinned copper conductors with 1.5mm nominal diameter. The fine-stranded flexible conductor construction enables repeated bending and flexing required in mobile blasting equipment connections while the tin coating provides enhanced corrosion resistance in humid underground environments.

Overall Dimensions

Minimum overall diameter of 7.0mm with maximum overall diameter of 7.7mm. The compact cross-section facilitates cable handling and routing through confined spaces while the robust construction provides necessary mechanical protection for the conductors during installation and operation in abrasive mining environments.

Cable Weight

Approximate weight of 75 kilograms per kilometer of cable length. This modest weight per unit length enables manual handling and deployment by operating personnel without requiring specialized cable handling equipment, particularly important for blasting applications where cables must be frequently repositioned.

Maximum Tensile Load

Rated for maximum tensile loading of 150 Newtons, representing the combined

strength of both 1.5mm² conductors. This tensile capacity addresses pulling forces encountered during cable installation through conduits, across rough terrain, and around obstacles in mining environments without risking conductor damage or connection separation.

Electrical Performance Parameters

The electrical characteristics of the 2×1.5mm² configuration have been optimized for blasting circuit applications where reliable current delivery and voltage stability are essential for safe detonator operation. The current carrying capacity calculations account for the specific installation methods and thermal conditions typical of mining blasting operations.

Installation Method	Current Rating (Amperes)	Application Context
Laying on Floor	30 A	Cable laid directly on mine floor surface with good heat dissipation to surrounding rock and air circulation around cable perimeter enabling efficient thermal management during continuous operation
Free in Air	32 A	Cable suspended in open air with unrestricted air circulation providing optimal cooling conditions, typical of overhead cable installations in mine entries and permanent cable routes
Reeled (Single Layer)	24 A	Cable wound on reel or drum in single layer with limited heat dissipation requiring derating to prevent thermal accumulation in cable mass during extended operation
Reeled (Two Layers)	18 A	Multiple cable layers on reel with restricted heat transfer path necessitating substantial derating to maintain conductor temperature within safe operating limits

Current Rating Application Guidance

The current ratings specified above are calculated for an ambient temperature of thirty degrees Celsius representing typical underground mining conditions. These ratings assume continuous current loading and must be adjusted when operating conditions differ from reference parameters. For blasting circuit applications where cable operates intermittently with substantial idle periods between blast sequences, higher short-term currents may be permissible provided total thermal loading remains within conductor temperature limits. The voltage drop characteristics must be considered in circuit design to ensure adequate voltage delivery to detonator systems, particularly important for long cable runs in large-scale blasting operations where circuit resistance can significantly impact detonator reliability.

Voltage Drop Characteristics

Voltage drop calculations for the 2×1.5mm² configuration enable proper circuit design ensuring adequate voltage delivery to connected loads across the full range of power factor conditions encountered in mining electrical systems. The voltage drop values presented represent millivolts per ampere per meter of cable length, enabling straightforward calculation of total circuit voltage drop based on actual current loading and cable length requirements.

Power Factor	Voltage Drop (mV/A·m)	Typical Load Characteristics
1.0 (Unity)	29.32	Purely resistive loads including heating elements, incandescent lighting, and resistive blasting circuits

Power Factor	Voltage Drop (mV/A·m)	Typical Load Characteristics
0.9 (Lagging)	26.47	Lightly inductive loads such as small motors and fluorescent lighting with power factor correction
0.8 (Lagging)	23.56	Standard motor loads and mixed resistive-inductive equipment typical of mining auxiliary systems
0.7 (Lagging)	20.65	Heavily inductive loads including large motors without power factor correction

Complete Product Range and Configuration Options

While the 2×1.5mm² configuration addresses specific blasting circuit requirements, the NSSHöu-O series encompasses a comprehensive range of conductor configurations and cross-sectional areas enabling complete mining electrical system design from control circuits through main power distribution. The modular product architecture allows selection of appropriate cable specifications based on specific application power requirements, installation conditions, and mechanical stress expectations.

Single-Core Configurations

Single-core cables provide maximum flexibility for applications requiring independent conductor routing or where space constraints mandate minimal cable cross-section. These configurations serve specialized applications including individual phase conductors for high-current circuits, grounding conductors, and applications where each conductor requires separate mechanical protection or electromagnetic shielding.

Cross Section	Conductor Diameter	Overall Diameter	Weight	Max Tensile Load	Current Rating (Free Air)
1.5 mm ²	1.5 mm	6.3 - 7.0 mm	60 kg/km	23 N	25 A
2.5 mm ²	1.9 mm	7.0 - 7.7 mm	75 kg/km	38 N	32 A
50 mm ²	8.9 mm	16.2 - 16.9 mm	660 kg/km	750 N	212 A
95 mm ²	12.5 mm	20.5 - 21.7 mm	1,150 kg/km	1,425 N	316 A
185 mm ²	17.7 mm	28.2 - 29.4 mm	2,180 kg/km	2,775 N	484 A
300 mm ²	22.5 mm	34.9 - 36.1 mm	3,510 kg/km	4,500 N	638 A

Three-Core and Four-Core Standard Configurations

Multi-core cables consolidate multiple conductors within a single protective jacket, providing simplified installation and improved mechanical protection compared to separate single-core cables. Three-core configurations address three-phase power distribution requirements while four-core cables accommodate three-phase systems with separate neutral conductor or provide additional circuit capacity within consolidated cable assemblies.

Configuration	Cross Section	Overall Diameter	Weight	Current Rating (3-Phase)
2 × 1.5 mm ²	1.5 mm ²	7.0 - 7.7 mm	75 kg/km	24 A
3 × 1.5 mm ²	1.5 mm ²	11.7 - 12.3 mm	190 kg/km	19 A
3 × 10 mm ²	10 mm ²	20.2 - 21.3 mm	710 kg/km	59 A

Configuration	Cross Section	Overall Diameter	Weight	Current Rating (3-Phase)
3 × 50 mm ²	50 mm ²	35.8 - 37.0 mm	2,500 kg/km	162 A
3 × 95 mm ²	95 mm ²	45.7 - 47.4 mm	4,570 kg/km	241 A
4 × 2.5 mm ²	2.5 mm ²	15.3 - 15.9 mm	350 kg/km	24 A
4 × 16 mm ²	16 mm ²	25.2 - 26.3 mm	1,210 kg/km	79 A
4 × 70 mm ²	70 mm ²	42.8 - 44.5 mm	4,300 kg/km	200 A

Specialized Configurations with Individual Core Screening (3E)

The 3E designation identifies cables incorporating individual protective conductor braiding around each power conductor core, providing enhanced electromagnetic shielding, improved grounding reliability, and superior mechanical protection for individual conductors. This construction methodology proves particularly valuable in mining applications where electromagnetic interference from variable frequency drives, high-current switching, or radio frequency equipment could compromise control system operation or where enhanced grounding paths are required for personnel safety in electrically hazardous environments.

Cable Configuration	Phase Conductor	Earth Screen	Overall Diameter	Weight
3+3 cores (3E)	50 mm ²	25 mm ² braid	36.3 - 37.5 mm	2,790 kg/km
3+3 cores (3E)	95 mm ²	50 mm ² braid	46.3 - 48.0 mm	4,800 kg/km
3+3 cores (3E)	185 mm ²	95 mm ² braid	61.7 - 64.0 mm	9,030 kg/km

Advanced Configurations with Screening and Control Conductors (3E+ST)

The most sophisticated cable variant combines individual core screening with integrated control conductors designated by the ST suffix, providing complete power and control circuit integration within a single cable assembly. These configurations prove invaluable for mining equipment installations requiring simultaneous power delivery and control signal transmission where separate power and control cables would complicate installation, create additional cable management challenges, and potentially compromise system reliability through cable routing errors or mechanical damage to separate cable runs.

Complete Configuration	Phase/Earth/Control	Overall Diameter	Weight	Application Advantages
3+3+3 cores	2.5/2.5/1.5 mm ²	16.2 - 18.1 mm	425 kg/km	Integrated power and control for small equipment, single cable installation simplification
3+3+3 cores	16/16/2.5 mm ²	26.6 - 27.7 mm	1,310 kg/km	Medium power equipment with control circuits, reduced cable count in confined spaces
3+3+3 cores	95/50/2.5 mm ²	50.0 - 51.8 mm	5,520 kg/km	High-power mobile equipment, consolidated cable management, simplified terminations

Detailed Construction Specifications

Conductor System Architecture

The conductor system employs Class 5 flexible construction utilizing tinned copper wire stranding that provides the foundation for cable mechanical flexibility and electrical performance. The Class 5 designation per IEC 60228 and VDE 0295 standards specifies the finest stranding classification for general-purpose conductors, incorporating numerous individual copper wires with diameters typically ranging from 0.15 millimeters to 0.30 millimeters depending on overall conductor cross-section. This fine-wire stranding delivers exceptional flexibility enabling tight-radius bending required for cable routing through confined mining spaces while distributing mechanical stress across multiple wire elements to prevent fatigue failures during repeated flexing cycles.

The tin coating applied to individual copper wires provides critical corrosion protection in the humid, chemically aggressive atmospheres characteristic of underground mining environments. Tinning prevents copper oxidation that would otherwise increase conductor resistance over time and compromise connection reliability at termination points. The coating also facilitates soldering operations when termination methods require soldered connections, ensuring reliable electrical joints that maintain low contact resistance throughout the cable service life even when subjected to vibration, thermal cycling, and mechanical stress typical of mobile mining equipment installations.

Insulation and Sheath System

The multi-layer insulation and sheath architecture represents the core technology enabling this cable series to survive in the harshest mining environments. The system employs three distinct rubber compound layers, each formulated to address specific performance requirements and environmental challenges encountered across the full spectrum of mining operations.

Primary Insulation: Type 3GI3 Rubber Compound The primary insulation layer surrounding each conductor utilizes Type 3GI3 rubber compound conforming to VDE specifications, providing excellent dielectric properties with voltage withstand capability substantially exceeding the rated 0.6/1 kilovolt operating voltage. This elastomeric insulation maintains flexibility across the full operating temperature range from minus forty to positive eighty degrees Celsius, ensuring reliable electrical isolation under all thermal conditions encountered in mining operations. The material formulation incorporates flame retardant additives meeting IEC 60332-1-2 requirements without compromising mechanical properties or electrical performance.	Inner Sheath: Type GM1b Rubber Compound The inner sheath layer manufactured from Type GM1b rubber compound per VDE specifications serves multiple critical functions including mechanical cushioning of insulated conductors, protection against moisture migration between cores, and structural support maintaining cable geometry during handling and installation. This intermediate layer absorbs mechanical forces from external impact and crushing loads before they can damage individual conductor insulation, distributing stress across the cable cross-section. The compound formulation provides resistance to common mining chemicals while maintaining flexibility essential for mobile equipment applications.	Outer Sheath: Type 5GM5 Rubber Compound The outer sheath utilizing Type 5GM5 rubber compound represents the cable's primary defense against environmental and mechanical abuse characteristic of mining operations. This specially formulated elastomer provides exceptional resistance to abrasion from repeated contact with rough mine surfaces, resistance to cuts and tears from sharp edges and equipment, resistance to oils and petroleum products from hydraulic systems and lubricants, and resistance to chemical attack from acids, alkalis, and mining process chemicals. The yellow color specified for power cables provides high visibility enhancing safety in poorly lit underground areas while the compound maintains its properties when continuously submerged in water including contaminated mine water containing dissolved salts, suspended solids, and chemical pollutants.
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Optional Individual Core Screen (3E Configuration)

Cables designated with the 3E suffix incorporate individual protective conductor braiding around each insulated power conductor, typically implemented using braided copper wire for smaller conductor sizes transitioning to multiple copper wires for larger cross-sections where braid flexibility becomes limiting. This screening provides low-impedance grounding paths for each conductor, electromagnetic shielding reducing interference in adjacent control circuits, mechanical reinforcement protecting individual cores from crushing forces, and redundant grounding ensuring personnel safety even if outer cable layers are damaged. The braiding coverage typically exceeds eighty-five percent providing effective shielding while maintaining cable flexibility.

Electrical Performance Characteristics

Electrical Parameter	Specification	Engineering Significance
Rated Voltage (U ₀ /U)	0.6/1 kV	Designates phase-to-ground voltage rating of 600 volts and phase-to-phase voltage rating of 1000 volts, appropriate for standard low-voltage mining distribution systems operating at 380-415 volt three-phase or 220-240 volt single-phase nominal voltages with adequate safety margin for transient overvoltages and voltage regulation variations
Test Voltage	3 kV AC	Factory high-voltage withstand test applied for specified duration verifies insulation system integrity and manufacturing quality, with test voltage representing three times nominal operating voltage ensuring substantial safety margin and identifying potential insulation defects before cables enter service in mining operations where failure could compromise personnel safety
Maximum Conductor Temperature (Continuous)	70°C	Normal service temperature limit established by rubber insulation material thermal rating and long-term aging characteristics, forms basis for current carrying capacity calculations and ensures insulation properties remain stable throughout anticipated cable service life under continuous loading conditions typical of base-load mining equipment operation
Maximum Short-Circuit Temperature	250°C	Fault current thermal withstand capability permits protective devices time to interrupt circuit during short-circuit conditions without permanent cable damage, critical specification for maintaining installation integrity following fault events and enabling continued operation after protective device coordination clears temporary faults in mining electrical distribution systems

Mechanical and Environmental Performance

Performance Characteristic	Specification	Application Impact
Ambient Temperature (Fixed Installation)	-40°C to +80°C	Extraordinary temperature range addresses diverse mining environments from arctic surface operations experiencing extreme cold through deep underground workings where geothermal gradients elevate rock temperatures, ensuring reliable cable operation across global mining locations and depth ranges without requiring specialized cable variants for different thermal conditions

Performance Characteristic	Specification	Application Impact
Ambient Temperature (Flexible/Mobile Use)	-25°C to +80°C	Temperature range for applications involving cable movement and flexing accounts for reduced low-temperature flexibility of rubber compounds when subjected to repeated bending, establishing conservative operating limits for trailing cable applications on mobile equipment where cables experience continuous mechanical working during operation
Minimum Bending Radius (Fixed)	4 × overall diameter	Tight bending radius capability for permanent installations enables routing through confined spaces and around obstacles in underground workings where space limitations often constrain cable path options, with the four-times-diameter specification representing substantial improvement over rigid cable types requiring twelve to fifteen times diameter bending radii
Minimum Bending Radius (Flexible)	5 × overall diameter	Slightly increased bending radius for mobile applications protects cable from accelerated fatigue when subjected to repeated flexing cycles, balancing flexibility requirements for equipment movement against long-term mechanical integrity considerations essential for acceptable service life in trailing cable applications
Submersible Depth Rating	100 meters	Water pressure resistance to one hundred meter depth enables deployment in flooded mine workings, sumps, and areas subject to water accumulation without compromising electrical integrity, addressing reality that many mining operations encounter groundwater inflow requiring equipment operation in partially or fully submerged conditions
Water Compatibility	Fresh, salt, oily, sewage-contaminated	Comprehensive water resistance addressing diverse water quality conditions from clean fresh water through highly contaminated mine drainage containing dissolved salts, suspended solids, petroleum hydrocarbons, and biological contaminants ensures cable reliability regardless of specific mine hydrogeological conditions
Mechanical Resistance	Abrasion, cut, notch, tear resistant	Multi-faceted mechanical protection addresses full spectrum of physical abuse encountered in mining operations including abrasion from dragging across rough surfaces, cuts from sharp rock edges, notch propagation from initial damage, and catastrophic tearing under extreme mechanical stress, substantially extending cable service life compared to standard industrial cables
Chemical Resistance	Oil, fat, mining chemical resistant	Resistance to petroleum products, lubricants, hydraulic fluids, and common mining process chemicals prevents sheath degradation that would otherwise compromise mechanical protection and eventually lead to insulation failure, essential for reliable operation in mechanized mining environments where chemical exposure is unavoidable
Flame Retardancy	IEC/EN 60332-1-2 compliant	Self-extinguishing characteristics with limited flame propagation reduce fire hazard in confined underground spaces where fire represents catastrophic threat to personnel safety and mine ventilation systems, meeting stringent mining safety regulations worldwide for cables installed in underground coal mines and other explosive atmosphere locations

Standards Compliance and Third-Party Certifications

The NSSHöu-O cable series demonstrates comprehensive compliance with German VDE standards and international IEC specifications governing cable construction, performance testing, and safety characteristics for mining applications. This multi-standard certification framework ensures product acceptance across global mining operations while meeting specific regulatory requirements for use in potentially explosive atmospheres and other hazardous mining environments where cable failures could endanger personnel or operations.

VDE 0250 Part 812
Mining Cable Construction

VDE 0295
Conductor Specifications

EN 60228
International Conductor Standard

IEC 60332-1-2
Flame Retardancy Testing

VDE Institute
Third-Party Certification

VDE Certification Process and Significance

The VDE certification mark represents completion of rigorous independent testing and assessment by the VDE Testing and Certification Institute, one of Europe's most respected third-party testing organizations for electrical equipment and cables. This certification process encompasses comprehensive evaluation of cable construction methods, material specifications, manufacturing quality control systems, and performance testing under conditions simulating actual mining application stresses. The VDE approval provides mine operators, electrical contractors, and regulatory authorities with independent verification that cables meet stringent German and European standards for mining cable performance and safety.

The certification process includes destructive testing of cable samples evaluating electrical properties under normal and fault conditions, mechanical performance including tensile strength and flexibility testing, environmental resistance through exposure to chemicals and temperature extremes, and flame propagation characteristics under standardized ignition conditions. Ongoing manufacturing surveillance by VDE inspectors ensures continued compliance with approved specifications throughout production operations, maintaining certification validity and product quality consistency across all delivered cables.

Application Guidelines and Installation Practices

Primary Application Areas in Mining Operations

The NSSHöu-O cable series serves diverse mining applications where the combination of mechanical robustness, environmental resistance, and electrical performance addresses requirements that standard industrial cables cannot adequately meet. The cable design proves particularly valuable in applications involving mobile equipment, exposure to water and chemicals, mechanical abuse from handling and environmental contact, and installation in potentially explosive atmospheres requiring certified explosion-resistant equipment.

Blasting circuit applications represent the quintessential use case for the $2 \times 1.5\text{mm}^2$ configuration highlighted in this specification. These circuits connecting blasting machines to detonator systems require cables that maintain electrical integrity despite repeated deployment across rough terrain, exposure to rock dust and moisture, mechanical stress from equipment movement, and the demanding environmental conditions of active mining faces. The cable flexibility enables rapid deployment and retrieval between blast sequences while the robust construction withstands the physical abuse inevitable when cables are handled by operating personnel focused primarily on blast preparation rather than careful cable management.

Mobile equipment power supply applications utilize larger conductor cross-sections providing current carrying capacity for electric motors, hydraulic systems, and auxiliary equipment on underground mining machinery. Continuous miners, shuttle cars, roof bolters, and other trackless mobile equipment require trailing cables that follow equipment movement while withstanding continuous flexing, abrasion from contact with mine surfaces, exposure to water and drilling fluids, and the vibration and shock loading from equipment operation on rough underground roadways. The submersible rating proves critical for equipment operating in wet mines where water accumulation on roadways and in working faces would compromise standard non-submersible cables.

Pump installations for mine dewatering and drainage systems represent applications where the submersible rating and chemical resistance characteristics prove essential. Submersible pumps deployed in mine sumps, flooded workings, and drainage systems operate continuously in contaminated water while drawing substantial electrical current requiring cables that maintain insulation integrity despite permanent water

immersion. The oil and chemical resistance addresses exposure to petroleum contamination from equipment hydraulic systems and the diverse chemical species present in mine water depending on geological formations being mined.

Installation Requirements and Best Practices

Proper installation techniques prove critical for achieving the service life expectations inherent in the cable design. While the robust construction provides substantial protection against abuse, adherence to proper installation practices maximizes cable longevity and ensures reliable electrical performance throughout the intended service period. Installation planning should address mechanical protection requirements, routing path selection minimizing unnecessary mechanical stress, and termination methods appropriate for the specific conductor construction and application environment.

Critical Installation Considerations

Maximum pulling tension during cable installation must not exceed the specified tensile load values to prevent conductor damage or permanent cable deformation. For the $2 \times 1.5\text{mm}^2$ configuration, the 150 Newton maximum tensile load represents the limit for combined pulling force on both conductors. Installation through conduit or along extended cable routes should incorporate intermediate pulling points distributing mechanical stress and preventing tension limit violations. The use of appropriate pulling lubricants reduces friction during conduit installation operations, further protecting cables from excessive mechanical stress.

Minimum bending radius specifications must be observed during installation and throughout cable service life. Bending cables beyond minimum radius specifications risks damaging conductor stranding, compromising insulation integrity, or creating stress concentrations in the sheath that accelerate mechanical failure. For temporary installations such as blasting circuits where cables are repeatedly deployed and retrieved, maintaining the five-times-diameter minimum bending radius for flexible applications proves essential for achieving acceptable service life despite the demanding duty cycle.

Termination techniques appropriate for Class 5 flexible conductors must be employed to ensure reliable electrical connections. The fine-wire stranding of flexible conductors requires termination methods that compress all wire strands uniformly within connector barrels or terminal lugs. Compression-type connectors using hydraulic or mechanical compression tools provide superior connection reliability compared to set-screw terminals where uneven pressure distribution may result in some wire strands carrying disproportionate current leading to localized heating and eventual connection failure. All terminations must be protected within appropriate enclosures rated for the installation environment, with particular attention to sealing requirements when terminations may be exposed to water or chemical contamination.

Derating Factors for Non-Standard Conditions

The current carrying capacity specifications presented throughout this document assume reference installation conditions representative of typical mining environments. When actual installation conditions deviate from these reference parameters, appropriate derating factors must be applied to prevent conductor temperatures from exceeding safe operating limits. The following derating schedules address common installation variables encountered in mining electrical systems.

Condition Variable	Parameter Value	Derating Factor
Number of Loaded Cores	5 cores	0.75
Number of Loaded Cores	7 cores	0.65
Number of Loaded Cores	10 cores	0.55
Number of Loaded Cores	14 cores	0.50
Number of Loaded Cores	19-24 cores	0.40-0.45
Ambient Temperature	40°C	0.91
Ambient Temperature	50°C	0.82
Ambient Temperature	60°C	0.71
Ambient Temperature	70°C	0.58
Ambient Temperature	80°C	0.41

Application of Multiple Derating Factors

When multiple adverse conditions exist simultaneously, individual derating factors must be multiplied together rather than added to determine the composite derating effect on current carrying capacity. For example, a twelve-core cable operating at fifty degrees Celsius ambient temperature would require application of both the multi-core derating factor of 0.55 and the elevated temperature derating factor of 0.82, resulting in a composite derating factor of 0.45 applied to the base current rating. This multiplicative approach to derating ensures conservative current limits that maintain conductor temperatures within safe operating boundaries even under worst-case combinations of installation conditions.

Quality Assurance and Manufacturing Excellence

Every meter of NSSHöu-O cable manufactured by Anhui Feichun Special Cable Company undergoes comprehensive quality control testing and inspection protocols ensuring compliance with VDE specifications, IEC standards, and customer requirements. The quality management system maintains certification to ISO 9001:2015 standards, implementing documented procedures, systematic verification processes, and continuous improvement methodologies ensuring consistent product quality and manufacturing excellence across all production operations.

Manufacturing Quality Control Program

The multi-stage quality control program encompasses incoming material verification, in-process monitoring throughout production operations, and final product testing before cables are released for delivery. Raw material suppliers undergo periodic auditing ensuring compliance with material specifications, with all copper wire rod and rubber compounds accompanied by material certification documentation establishing traceability to specific production batches. In-process monitoring includes continuous dimensional measurement during conductor stranding and insulation extrusion operations, online resistance verification confirming conductor electrical properties, and visual inspection identifying cosmetic or structural defects requiring correction before subsequent processing steps.

Final product testing protocols verify electrical performance through high-voltage withstand testing, insulation resistance measurement, and conductor continuity verification. Mechanical testing evaluates tensile strength, flexibility characteristics, and dimensional accuracy ensuring finished cables meet specification requirements. Sample testing for flame retardancy, oil resistance, and other environmental performance characteristics is conducted on periodic basis representing each major production run, with test results documented and retained for future reference supporting any field performance investigations. Test certificates documenting compliance with specifications accompany each cable delivery, providing customers with independent verification of product quality and enabling confirmation that installed cables meet project specifications.

Technical Support and Warranty Coverage

Anhui Feichun Special Cable Company provides comprehensive technical support services assisting customers with cable selection, application engineering, installation guidance, and troubleshooting consultation throughout the cable lifecycle from initial specification development through ongoing service in mining operations. Field service engineers are available for on-site support during critical installations or when technical issues require expert assessment and resolution. Training programs addressing proper handling, installation, and maintenance of heavy-duty mining cables can be arranged for customer personnel, ensuring that installation quality and maintenance practices support achievement of anticipated cable service life.

Standard warranty coverage extends twenty-four months from delivery date, protecting customers against manufacturing defects discovered during this period when cables are installed, operated, and maintained according to specifications and applicable standards. The warranty encompasses material and workmanship defects but excludes failures resulting from improper installation, mechanical damage during handling or operation, exposure to conditions exceeding specifications, or normal wear in demanding mobile equipment applications. Warranty claims require documentation of installation practices, operating conditions, and maintenance activities enabling investigation of failure mechanisms and determination of appropriate corrective actions.

