DIN VDE 0250-814 · HEAVY RUBBER TRAILING CABLE · CRANES AND REELS | 0.66/1.14 kV | 3 sizes | CR rubber | TINNED COPPER | TENSILE SUPPORT BRAID | REELING / FESTOON DUTY

NSHTöu 12G 0.66/1.14 kV

Heavy Rubber Trailing Cable with Tensile Support 0.66/1.14 kV – 12 cores of equal cross-section in concentric layers with a short lay length. Polychloroprene rubber sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, voltage drop and installation guidance for 3 sizes.

Document no. FC-TDS-VDE-2026-0355-EN · Revision 0 · Issued 2 November 2026 · Language: English

01 Application and Product Overview

NSHTöu is the heavy rubber trailing cable for cranes, reels and festoon systems that move under tension. The design follows DIN VDE 0250-814: EPR/HEPR-insulated cores of fine-wire copper are stranded with a short lay length, a rubber inner sheath carries a tensile support element and an oil-resistant polychloroprene outer sheath protects the cable. Compared with a plain NSHTöu cable the tensile support allows a permanent load of 15 N/mm² and a dynamic load of 30 N/mm² on the copper cross-section.

Design

The cores are insulated with rubber of type 3GI3 (HEPR) for 90 °C at the conductor. Cores and protective conductors are stranded in short-lay layers; in the three-core designs with split PE the protective conductors lie in the outer interstices, so that the power cores form a compact, balanced triangle. A rubber inner sheath is extruded over the stranded core; an aramid tensile support braid bedded between the sheaths takes the axial load; the outer sheath is polychloroprene 5GM5. The construction keeps the copper free of tension, which is what extends cable life on reels and cranes.

Typical applications

- Crane, hoist and bridge-crane trailing cables with a cable chain or festoon trolley
- Cable reels of bucket-wheel excavators, stackers, reclaimers and portal cranes
- Mobile harbour and container equipment with repeated winding and unwinding
- Mining machinery, drilling rigs and shuttle systems that carry the cable under tension
- Mobile crushing and screening plants fed from a reel or a drag-cable arrangement
- Industrial hoisting systems with long free-hanging lengths
- Tunnelling machines and transfer cars with tensile and torsional loading
- Test rigs and shiploading equipment that need a cable approved for reeling duty

3 sizes	0.66/1.14 kV	+90 °C	CR rubber
Cross-section 1.5 – 4 mm²	Rated voltage U_0/U	Maximum conductor temperature	Sheath: CR rubber

Key features

- Aramid tensile support braid: permanent load 15 N/mm², dynamic load 30 N/mm² on the copper cross-section
- HEPR insulation, 90 °C at the conductor, short-circuit temperature 250 °C
- Reeling-duty bending radii of 6 × D to 10 × D depending on diameter
- Oil-resistant polychloroprene sheath, flame-retardant to IEC 60332-1-2
- Split PE conductors in the outer interstices (3×+3E designs) for a round, compact core
- Fine-wire class 5 conductors, bare or tinned
- 3 sizes from 1.5 to 4 mm²; weight from 680 to 1,360 kg/km; copper from 173 to 460 kg/km

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Core layout and conductor

12 cores of equal cross-section in concentric layers with a short lay length. Core colours: black with white numbers; one green-yellow core (DIN VDE 0293-308); the green-yellow core is the protective conductor. With 12 cores the cable combines power, brake, heater and signal circuits in one connection. The conductors are tinned: each copper wire carries a thin tin coating. Tinning protects the copper against oxidation and corrosion in damp, salty or sulphurous atmospheres and keeps the conductor solderable, which is an advantage in outdoor, marine and mining installations. The resistance limits of tinned class 5 conductors are marginally higher than for bare copper; the R_{20} column shows the tinned values.

Standard background

DIN VDE 0250-814 describes the NSHTöu rubber trailing cable. The standard adds a tensile-bearing element to the heavy rubber-sheathed design so that the cable can be used as a trailing, reeling or festoon cable under tension. For sizes from 25 mm² the split-PE 3×+3E designs are the usual choice for crane and reel feeds.

The standard sheath compound is flexible down to 25 °C in motion and 40 °C in fixed installation. For regular use below this limit select the low-temperature grade of the same cable.

A braid of aramid yarn between the inner and the outer sheath takes the axial load that would otherwise stretch the copper. It keeps the stranded cores from lengthening, prevents loops (“bird-caging”) when the cable is released from tension on a reel and raises the permissible working load above the copper-based rating. The load must be introduced through a clamp that holds the sheath and the braid, never through the conductors.

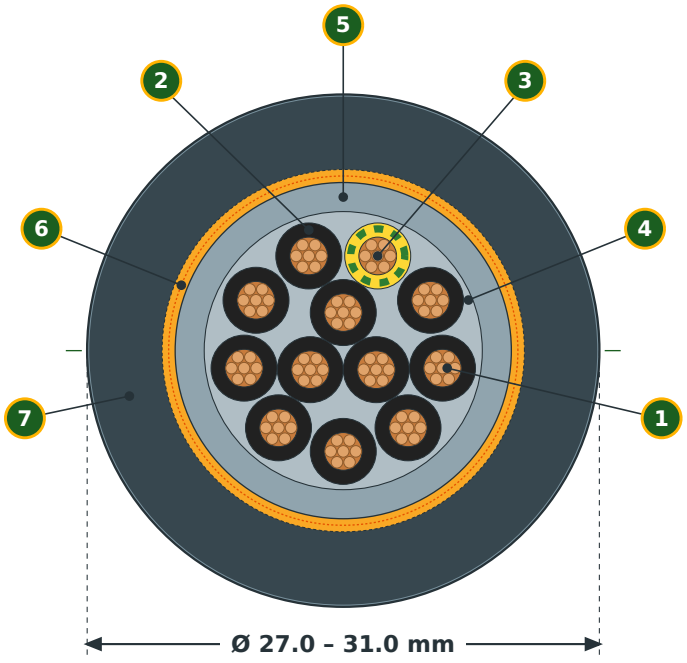
0.66/1.14 kV is the rating for the 1,000 V (1.14 kV) systems used in mining and in heavy industry; it has a slightly thicker insulation than the 0.6/1 kV version. The test voltage is 3 kV.

02 Construction

FEICHUN · CROSS-SECTION A–A · 0.66/1.14 kV

NSHTöu

Sample size 12G2.5 · Rev 0 · Illustrative, not to scale



No.	Component	Material
1	Conductor	Tinned annealed fine-wire copper, class 5 to IEC 60228 / DIN VDE 0295
2	Insulation	HEPR rubber, type 3GI3 (90 °C)
3	Protective (PE) core	Green-yellow insulation, same cross-section as the power cores
4	Filler and binder tape	Rubber or compound filler with polyester binder tape
5	Inner sheath	Rubber compound, extruded over the stranded core
6	Tensile support braid	Aramid yarn braid between inner and outer sheath; carries the axial load
7	Outer sheath	Polychloroprene (CR) rubber, type 5GM5

The drawing shows size 12G2.5. Other sizes have the same construction with scaled dimensions; the layout of every size is checked for non-overlap of all elements.

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Construction details

Conductor	Tinned annealed fine-wire copper, class 5 to DIN VDE 0295 / IEC 60228
Insulation	HEPR rubber, type 3GI3 (90 °C), maximum conductor temperature 90 °C
Core identification	Black with white numbers; one green-yellow core to DIN VDE 0293-308
Stranding	Cores in concentric layers with a short lay length
Inner sheath	Rubber compound; thickness about 1.6 mm at this size
Tensile support braid	Aramid yarn braid, 0.74 mm thick, between inner and outer sheath
Outer sheath	Polychloroprene (CR) rubber, type 5GM5; thickness about 4.2 mm at this size

03 Electrical, Thermal and Mechanical Characteristics

Electrical data

Rated voltage U_0/U	0.66/1.14 kV AC
Test voltage	3 kV AC, 5 min
Maximum operating voltage, three-phase	1.2 kV
Maximum operating voltage, DC (core-earth / core-core)	1.0/1.8 kV
Current-carrying capacity	Design values by the method of DIN VDE 0298-4, free air, 30 °C ambient
Conductor resistance	Maximum at 20 °C, class 5, tinned

Thermal and mechanical data

Maximum conductor temperature	+90 °C
Maximum temperature at short circuit	+250 °C (5 s maximum)
Ambient temperature, fixed installation	−40 °C to +80 °C
Ambient temperature, in motion	−25 °C to +80 °C
Minimum bending radius	Fixed: 3 × D (D ≤ 12 mm), 4 × D (D > 12 mm); moving: 4 × D (≤ 12 mm), 5 × D (≤ 20 mm), 6 × D (> 20 mm); reeling: 6 to 10 × D
Maximum tensile load	Permanent 15 N/mm², dynamic 30 N/mm² on the total copper cross-section of the power cores (including the aramid support braid)
Flame propagation	IEC 60332-1-2 / DIN EN 60332-1-2
Halogen-free	No (CR rubber)
Mineral oil resistance	Resistant, DIN EN 60811-404
UV and ozone resistance	Resistant
Water	Damp and wet areas, spray water

04 Dimensions, Weights and Rated Data – 0.66/1.14 kV (3 sizes)

Type designation cores × mm²	FeiChun article no.	Cond. Ø max mm	Outer Ø min mm	Outer Ø max mm	Bend radius fixed mm	Bend radius moving mm	Weight approx. kg/km	Copper kg/km	Max. pull N	R_{20} max Ω/km	Rated current A	I_k (1 s) kA
12G1.5	FC-NSHT-0355-01	1.7	23.5	26.5	106	159	680	173	2,240	13.7	12	0.214
12G2.5	FC-NSHT-0355-02	2.2	27.0	31.0	124	186	1,000	288	2,740	8.21	16	0.357
12G4	FC-NSHT-0355-03	2.7	31.5	35.5	142	213	1,360	460	3,410	5.09	22	0.572

Current-carrying capacity: design values by the method of DIN VDE 0298-4, free air, 30 °C ambient; for other ambient temperatures use the factors below and the multi-core reduction factor already included in the table. Copper weight = 9.6 kg/(km·mm²) of copper cross-section (VDE copper index). Pull force = 15 N/mm² × total copper cross-section of the power cores plus the permissible load of the aramid braid. Diameters, dimensions and weights are nominal design values calibrated to published type tables; they vary within manufacturing tolerances. Confirm critical dimensions before dimensioning reels, glands or festoon systems. Other sizes and configurations are produced to order.

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Ambient temperature factors (conductor 90 °C)

°C	20	25	30	35	40	45	50	55	60
Factor	1.08	1.04	1.00	0.96	0.91	0.87	0.82	0.76	0.71

Short-circuit current rating

I_k = 0.143 kA/mm² × cross-section of the power core (conductor 90 °C → 250 °C). For another duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$ (0.1 s ≤ t ≤ 5 s).

05 Tensile Load, Reeling and Festoon Data

The values below support reel and festoon design: the permitted pull split into copper and braid parts, the free-hanging length (the length at which the cable's own weight reaches the rated pull, without a safety factor), the minimum reel core diameter and an indicative winding capacity for a reel with 2,500 mm flange diameter and 1,000 mm traverse width at 90 % fill. They are not a substitute for the reel manufacturer's calculation.

Type designation cores × mm²	Pull, copper N	Dynamic pull N	Pull, aramid braid N	Total permitted pull N	Free-hanging length m (vertical)	Min. reel core Ø mm	Winding capacity m (reel 2,500 × 1,000)
12G1.5	270	2,510	1,970	2,240	335	530	5,845
12G2.5	450	3,190	2,290	2,740	279	620	4,205
12G4	720	4,130	2,690	3,410	255	710	3,160

06 Voltage Drop, Losses and Short-Circuit Data

Voltage drop per 100 m of cable at rated current with the conductor at 90 °C, cos φ = 0.8 and reactance 0.08 Ω/km (three-phase). The percentage refers to a system voltage of 690 V. Loss is the total I²R loss of the loaded cores per 100 m. The short-circuit columns give the permitted current for four durations.

Type designation cores × mm²	Rated current A	R at 90 °C Ω/km	Voltage drop V / 100 m	Voltage drop % of 690 V	Loss kW / 100 m	I_k 0.1 s kA	I_k 0.5 s kA	I_k 1 s kA	I_k 3 s kA
12G1.5	12	17.5	29.15	4.22	0.75	0.678	0.303	0.214	0.124
12G2.5	16	10.5	23.34	3.38	0.80	1.13	0.506	0.357	0.206
12G4	22	6.49	19.97	2.89	0.94	1.81	0.809	0.572	0.330

07 Selection Guide and Sizing Aid

NSHTöu 12G covers 3 sizes. The smallest, 12G1.5, has an outer diameter of up to 26.5 mm and weighs about 680 kg/km; the largest, 12G4, has an outer diameter of up to 35.5 mm and weighs about 1,360 kg/km, 2.0 times as much. Across the range the rated current rises from 12 A to 22 A at 30 °C and the fixed bending radius from 106 mm to 142 mm.

Example 1. A circuit draws 11 A continuously at 40 °C ambient temperature, in a group of two cables. Temperature factor 0.91, grouping factor 0.80: required table current = 11 / (0.91 × 0.80) = 16 A. The smallest suitable size is 12G2.5 with 16 A.

Example 2. A circuit draws 19 A continuously at 35 °C ambient temperature, on its own. Temperature factor 0.96: required table current = 19 / (0.96) = 20 A. The smallest suitable size is 12G4 with 22 A.

08 Engineering Profile by Size

Every size of NSHTöu 12G with the dimensions that decide how it behaves in a circuit: layers, weight, copper share, heat, voltage drop, bending, termination and pull.

12G1.5. This size has with a conductor of Ø 1.7 mm under 0.80 mm of insulation (core Ø 3.3 mm) and 1.5 mm inner and 3.4 mm outer sheath; outer diameter 23.5–26.5 mm, weight about 680 kg/km of which copper 173 kg/km (25 %). Rated current 12 A at 30 °C; at that load the voltage drop is 29.15 V per 100 m (4.22 % of 690 V) and the loss 0.75 kW per 100 m. Bending radius 106 mm fixed, 159 mm moving; gland M40, lug bolt M5. Short-circuit rating 0.214 kA for 1 s; permitted pull 2,240 N, free-hanging length 335 m.

12G2.5. This size has with a conductor of Ø 2.1 mm under 0.80 mm of insulation (core Ø 3.7 mm) and 1.6 mm inner and 4.2 mm outer sheath; outer diameter 27.0–31.0 mm, weight about 1,000 kg/km of which copper 288 kg/km (29 %). Rated current 16 A at 30 °C; at that load the voltage drop is 23.34 V per 100 m (3.38 % of 690 V) and the loss 0.80 kW per 100 m. Bending radius 124 mm fixed, 186 mm moving; gland M40, lug bolt M5. Short-circuit rating 0.357 kA for 1 s; permitted pull 2,740 N, free-hanging length 279 m.

12G4. This size has with a conductor of Ø 2.7 mm under 0.80 mm of insulation (core Ø 4.3 mm) and 1.8 mm inner and 5.2 mm outer sheath; outer diameter 31.5–35.5 mm, weight about 1,360 kg/km of which copper 460 kg/km (34

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%). Rated current 22 A at 30 °C; at that load the voltage drop is 19.97 V per 100 m (2.89 % of 690 V) and the loss 0.94 kW per 100 m. Bending radius 142 mm fixed, 213 mm moving; gland M50, lug bolt M5. Short-circuit rating 0.572 kA for 1 s; permitted pull 3,410 N, free-hanging length 255 m.

Averaged over all sizes copper makes up 30 % of the cable weight; the share rises from 25 % at 12G1.5 to 34 % at 12G4, which is why the larger sizes are costed mostly on the copper market price.

09 Construction Dimensions by Size

Wall thicknesses and diameters of the layers at each size, taken from the validated cross-section layout; the overall diameter in section 04 is the sum of these layers within tolerance. The insulation wall follows the voltage class 0.66/1.14 kV.

Type designation cores × mm²	Conductor Ø mm	Core Ø over insulation, mm	Insulation wall mm	Laid-up core Ø mm	Inner sheath mm	Outer sheath mm	Screen + braid mm	Sheath share of Ø, %
12G1.5	1.65	3.25	0.80	13.8	1.51	3.37	0.71	45
12G2.5	2.13	3.73	0.80	15.7	1.64	4.24	0.74	46
12G4	2.70	4.30	0.80	18.0	1.80	5.21	0.77	46

10 Termination Planning (indicative)

Type designation cores × mm²	Outer Ø or W × H mm	Cable gland thread	Lug / ferrule bolt	Strip length mm	Straight length behind gland, mm
12G1.5	26.5	M40	M5	10	55
12G2.5	31.0	M40	M5	10	60
12G4	35.5	M50	M5	10	70

Gland threads, lug bolts and strip lengths are planning guides computed from the dimensions above; confirm them with the accessory manufacturer.

11 Comparison with Related Variants at Size 12G2.5

Variant	Differs in	Outer Ø / H mm	Weight kg/km	Pull N	Current A
This datasheet NSHTöu 12G 0.66/1.14 kV	–	31.0	1,000	2,740	16
NSHTöu 10G 0.66/1.14 kV 10G2.5	core configuration	29.5 (-5%)	960 (-4%)	2,570 (-6%)	18 (+12%)
NSHTöu 14G 0.66/1.14 kV 14G2.5	core configuration	42.0 (+35%)	1,630 (+63%)	4,100 (+50%)	16 (+0%)
NSHTöu 12G 0.66/1.14 kV 12G2.5	tinned vs bare copper	31.0 (+0%)	1,000 (+0%)	2,740 (+0%)	17 (+6%)
NSHTöu 12G 0.66/1.14 kV 12G2.5	low-temperature sheath	31.0 (+0%)	1,000 (+0%)	2,740 (+0%)	16 (+0%)
NSHTöu 12G 0.6/1 kV 12G2.5	voltage class	29.5 (-5%)	930 (-7%)	2,610 (-5%)	16 (+0%)
NSHTöu 8G 0.66/1.14 kV 8G2.5	core configuration	29.0 (-6%)	940 (-6%)	2,440 (-11%)	20 (+25%)
NSHTöu 18G 0.66/1.14 kV 18G2.5	core configuration	41.5 (+34%)	1,680 (+68%)	4,150 (+51%)	14 (-12%)
NSHTöu 7G 0.66/1.14 kV 7G2.5	core configuration	23.8 (-23%)	710 (-29%)	1,920 (-30%)	21 (+31%)

Percentages show the change against this datasheet; where a variant does not offer the exact size, the nearest listed size is used.

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12 Standards and Testing

Standard	Scope
DIN VDE 0250-814	Rubber-insulated flexible cable NSHTöu, 0.6/1 kV
DIN VDE 0295 / IEC 60228	Conductors, class 5
DIN VDE 0207-20 / -21	Rubber insulation and sheath compounds
DIN VDE 0293-308	Core identification
DIN VDE 0298-3 / -4	Application: bending, tensile load; current-carrying capacity
DIN EN 60332-1-2 / IEC 60332-1-2	Flame propagation, single cable

Routine and type tests

- AC voltage test on every drum length (routine test): 3 kV, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors and protective earth
- Flame propagation test (IEC 60332-1-2) and mineral-oil resistance on type-test samples
- Tensile test of the finished cable and inspection of the aramid braid coverage (type test)
- Bending and torsion tests for reeling duty (type test)

Test documentation: every delivery is accompanied by a test certificate from FeiChun's own laboratory. Third-party witnessed tests can be arranged at the buyer's cost.

The design follows DIN VDE 0250-814. This datasheet does not claim the VDE approval mark; mark or approval certificates, where required for a project, are arranged on request and apply only to the type tested.

13 Installation, Marking and Delivery

Installation guidance

- Introduce the pulling or hanging load only through a strain-relief clamp or cable grip that holds the sheath and the aramid braid.
- Respect the dynamic limit of 30 N/mm² on the copper cross-section; the permanent limit is 15 N/mm².
- On a reel use a core diameter of at least 2 × the reel bending radius in the table and guide the cable without cross-over.
- Limit torsion by guiding the cable straight; release twist before re-spooling.
- Fit protective sleeves at the entry to the reel or trolley to avoid sheath wear.
- Terminate the protective conductors at both ends.

Sheath marking

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FEICHUN NSHTöu [cross-section] 0.66/1.14 kV [year] [serial no.] [metre mark]
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Packing and delivery

Drum	Steel or fumigated wooden drums; cable ends sealed with heat-shrink caps
Delivery length	As ordered, in one continuous length without joints
Lead time	2–3 weeks after technical approval
Warranty	At least 3 years against manufacturing defects
Drum label	Type, cross-section, length, gross/net weight, batch no., drum no.

Ordering information

Order example: NSHTöu 12G2.5 0.66/1.14 kV – 500 m on one drum. When requesting a quotation, state the cable type, configuration, cross-section, voltage, conductor (tinned), length per piece, required standards and installation conditions.

14 Certification and Quality

All cable is subject to FeiChun's quality control, with routine testing over 100 % of the delivered length. Declarations of conformity, type-test reports and third-party tests (for example for a mine, a tunnel or a rail project) are provided per project requirement; copies of the records are available on request. FeiChun holds CE, EAC and UKCA documentation for certain product groups. Whether a certificate covers this specific construction must be confirmed with FeiChun before it is quoted in a tender.

VDE, mine-specific (for example coal-mine safety marks, MSHA) and ATEX / IECEx approvals are not implied by this datasheet. They depend on the project, the machine and the country and are arranged with the end user.

15 Related Datasheets and Frequently Asked Questions

Variants of this cable with a different configuration, conductor, temperature grade, screen or voltage. All datasheets are PDF files.

- NSHTöu 10G 0.66/1.14 kV – core configuration, CR rubber, tinned

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- NSHTöu 14G 0.66/1.14 kV – core configuration, CR rubber, tinned
- NSHTöu 12G 0.66/1.14 kV – tinned vs bare copper, CR rubber
- NSHTöu 12G 0.66/1.14 kV – low-temperature sheath, CR rubber, low-temp, tinned
- NSHTöu 12G 0.6/1 kV – voltage class, CR rubber, tinned
- NSHTöu 8G 0.66/1.14 kV – core configuration, CR rubber, tinned
- NSHTöu 18G 0.66/1.14 kV – core configuration, CR rubber, tinned
- NSHTöu 7G 0.66/1.14 kV – core configuration, CR rubber, tinned

Overview of all NSHTöu datasheets: NSHTöu Heavy Rubber Trailing Cables

Frequently asked questions

What does the T in NSHTöu stand for?
The T marks the tensile-bearing element of the trailing cable. In this datasheet it is realised as an aramid support braid between the inner and outer sheath.

What tensile load can the cable carry?
At the largest size, 12G4, the permitted pull is 3,410 N (15 N/mm² of the copper cross-section, plus the aramid braid).

What sizes are available for NSHTöu 12G?
3 sizes from 1.5 to 4 mm². The outer dimension of the largest size, 12G4, is 35.5 mm and the weight is about 1,360 kg/km.

What current can 12G2.5 carry?
16 A in free air at 30 °C ambient, with the conductor at 90 °C. Other temperatures and grouping change the value; use the factors in section 04.

16 Trademark Notice and Intellectual Property

Cable type designations such as NSHTöu are standardised, descriptive designations defined in DIN VDE and EN standards; they are used to state which standard this product is designed to. References to other manufacturers' trade names, where made, serve only for technical comparison; FeiChun Cables is not affiliated with them.

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Document control
Document no. FC-TDS-VDE-2026-0355-EN
Revision 0 — first issue
Date 2 November 2026
Product NSHTöu 0.66/1.14 kV

Prepared — Engineering | Checked — QC | Approved — International Business

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