ANHUI FEICHUN SPECIAL CABLE CO., LTD.
安徽飞纯特种电缆有限公司
HEAVY INDUSTRIAL & COMPOSITE REELING CABLE SPECIALIST · CRANE · MINING · PORT · STACKER-RECLAIMER · WWW.FEICHUNCABLES.COM

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CLASS Product Data Sheet | Composite Reeling Cable · Power + Control + Fibre
STANDARDS VDE 0250 | IEC 60228 | IEC 60502 | IEC 60793 (OFE) | DIN VDE 0298-4

✦ FEICHUN COMPOSITE
REELING CABLE DATA SHEET

Composite Reel
Power + Ctrl + OFE

3×50 + 1×25 + 8×2.5 + 12G-Fibre
3/3.3 kV · 192 A Base · OD ≈ 47–54 mm
Armoured · Anti-Torsion · Oil Resistant

Feichun Heavy Cable Division ·
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COMPOSITE REELING & TRAILING CABLE — POWER DISTRIBUTION / CONTROL SIGNALLING / FIBRE-OPTIC DATA

(N)TSKCGEWTOEUS · 3×50+1×25+8×2.5+OFE12G62.5/125 · 3/3.3 kV

Composite heavy-duty flexible reeling cable combining **three 50 mm² main power conductors**, one **25 mm² protective earth**, eight **2.5 mm² control conductors**, and one **12-fibre multimode optical fibre element (OFE12G 62.5/125 µm)**. Oil-resistant, torsion-stable construction with integrated aramid tensile reinforcement for dragline excavator and crane drum-reel duty at travel speeds to 180 m/min. Rated 3/3.3 kV per VDE 0250; conductor maximum operating temperature +90 °C.

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FC PCP/CPE Rubber Sheath | Torsion-Resistant | Oil-Resistant | OFE Integrated | VDE 0250 | 3/3.3 kV

CABLE OVERVIEW & APPLICATION

(N)TSKCGEWTOEUS — COMPOSITE DRUM-REEL CABLE

The **(N)TSKCGEWTOEUS** is a highly integrated composite flexible cable designed for the most demanding mobile industrial deployments: **open-pit mining draglines, bucket-wheel excavators, stacker-reclaimers, and offshore shipyard gantry cranes**. It unifies mains power delivery, protective earthing, process control signalling, and high-bandwidth fibre-optic data communications within a single torsion-engineered cable structure, eliminating the cable bundle management complexity inherent in running separate power and data cables over the same reel drum. The designation "**TOEUS**" encodes oil resistance (O), the polyethylene internal tube protecting the optical fibre (E), and the outer toughened rubber sheath (US — a designation for chlorosulphonated polyethylene/CPE compound). The integrated **OFE** (Optical Fibre Element) enables gigabit-class data links between control cabins and mobile machine PLCs across the full reel cable span with no signal degradation from electrical interference.

3/3.3 kV (U₀/U) | OFE 12G 62.5/125 | VDE 0250



(N)TSKCGEWTOEUS · Schematic Cross-Section (Not to scale)
3× L1/L2/L3 Phase (amber) · 1× PE Earth (green) · 8× Control (blue) · OFE Tube (cyan)

- **L1, L2, L3** — 50 mm² Phase (×3)
- **C1–C8** — 2.5 mm² Control (×8)
- Aramid / Tensile elements
- **PE** — 25 mm² Earth Conductor
- **OFE** — 12G 62.5/125 µm Fibre
- CPE/PCP outer sheath

DESIGNATION DECODE — (N)TSKCGEWTOEUS

(N)	PVC inner sheath / rubber-equivalent compound inner bedding
T	Torsion-resistant stranding — anti-twist lay design

POWER CONDUCTORS — 3×50 MM² + 1×25 MM² PE · 3/3.3 KV

ELECTRICAL & MECHANICAL — CORE DATA

CORE SPECIFICATION SUMMARY	
Rated voltage (U_0/U)	1.8/3 kV → System max 3.3 kV
Power core configuration	3 × 50 mm² (L1, L2, L3)
Earth conductor	1 × 25 mm² (PE, G/Y)
Control conductors	8 × 2.5 mm²
AWG equiv. (50 mm²)	1/0 AWG
AWG equiv. (25 mm²)	4 AWG
AWG equiv. (2.5 mm²)	14 AWG
Conductor class	IEC 60228 Class 5 (fine-stranded)
Conductor material	Bare copper (uncoated)
Insulation compound	Rubber (EPR/EPDM) — individual cores
Individual core screen	Semi-conductive rubber layer (power cores)
Inner bedding	Rubber filler / textile tape separation
Outer sheath compound	CPE / PCP (chlorosulphonated PE)
Outer diameter	≈ 47.0 – 54.0 mm
Copper weight	≈ 1,872 kg/km
Total cable weight	≈ 3,900 – 4,200 kg/km
Max. operating temp.	+90 °C (conductor)
Short-circuit temp.	+250 °C (max. 5 sec duration)
Min. laying temp.	−25 °C (static) / −15 °C (dynamic)
Min. bending radius	≥ 12 × OD ≈ 600–650 mm (dynamic)

OPTICAL FIBRE ELEMENT — OFE 12G 62.5/125 MM MULTIMODE

FIBRE OPTIC ELEMENT (OFE) SPECIFICATION

OFE12G62.5/125 — 12-FIBRE OM1 MULTIMODE, LOOSE-TUBE PROTECTED

The integrated **OFE** (Optical Fibre Element) consists of **twelve multimode graded-index fibres** of 62.5/125 µm profile (OM1 classification per IEC 60793-2-10) contained within a loose polyethylene tube filled with hydrophobic gel to prevent moisture ingress over the cable's operational life. The loose-tube construction provides a critical mechanical advantage: the fibres float within the tube and are not subject to the tensile strain experienced by the surrounding power-core assembly during reeling. This protects fibre integrity at all operating speeds and reel drum diameters within the specified minimum bend radius. The OFE enables **Gigabit Ethernet (1000BASE-SX) and multimode PROFINET IO** communications between the mobile machine PLC/drive control system and the fixed control room infrastructure without susceptibility to the strong electromagnetic fields generated by the 3.3 kV power conductors running in parallel within the same cable body.

OFE PHYSICAL & OPTICAL PARAMETERS	
Fibre type	OM1 Multimode (IEC 60793-2-10)
Core / cladding diameter	62.5 / 125 µm
Fibre count per tube	12 fibres (12G)
Fibre coating diameter	250 µm (acrylate primary coat)
Tube construction	Loose-tube, gel-filled (PE)
Min. bend radius (static)	25 mm
Min. bend radius (dynamic)	As cable overall: ≥ 12 × OD
Numerical aperture (NA)	0.275 ± 0.015
Attenuation @ 850 nm	≤ 3.5 dB/km (nominal)
Attenuation @ 1300 nm	≤ 1.5 dB/km (nominal)
Bandwidth (OFL, 850 nm)	≥ 200 MHz·km
Max. data rate (OM1)	1 Gbps to 275 m (1000BASE-SX)
Colour coding	IEC 60304 / TIA 598-C sequence
Operating temperature	−25 °C to +70 °C

S	Shielded (overall conductive braid or foil screen)
K	Rubber-insulated conductor cores (Kautschuk)
C	Copper conductor material, fine-stranded Class 5/6
G	Earth (Ground) conductor included — PE core
E	Protective inner polyethylene tube for optical fibre element
W	Winding / reel duty — designed for drum-coil operation
T	Tensile reinforcement — aramid/Kevlar braid integrated
O	Oil-resistant outer sheath compound
E	CPE/chlorosulphonated outer sheath (extra weather resistance)
U	Underground / heavy-mechanical-load rated
S	Screened — each power core individually screened

Suffix `OFE12G62.5/125` designates the integrated optical fibre element: 12-fibre multimode OM1 type, 62.5 µm core / 125 µm cladding, loose-tube protected.

CURRENT CARRYING CAPACITY & REEL DE-RATING

BASE AMPACITY — SINGLE-LAYER FREE AIR · DIN VDE 0298-4

Reference ampacity for the 50 mm² conductor at **30 °C ambient, conductor max. 90 °C, single cable in free air** is **192 A**. This is the absolute ceiling for unobstructed overhead or ground-run installation. For all reel-drum and cable drum applications, the mandatory derating factors below must be applied before selecting protective devices or sizing supply transformer secondary circuits.

REEL OPERATING DE-RATING — IEC / VDE REFERENCE (50 MM² CORE, 90 °C MAX)

Free air / single cable (reference)	192 A	× 1.00
Single-layer on reel drum	≈ 146 A	× 0.76
Double-layer on reel drum	≈ 111 A	× 0.58
Multi-layer / fully wound (indicative)	≈ 77 A	× 0.40

⚠ CRITICAL DESIGN REQUIREMENT — REEL WINDING STATE

Protective devices and the drum reel installation must be designed around the **worst-case winding condition**, not the free-air rating. For a fully wound multi-layer reel drum, effective ampacity may fall to **70–80 A per phase** depending on reel geometry, ambient temperature, and ventilation. Over-current relays must trip on thermally computed current, not instantaneous overcurrent alone. Consult the final reel drum drawing for the maximum number of wound layers before confirming cable operating current.

COPPER WEIGHT CALCULATION BASIS

Cu wt = (3 × 50 + 25 + 8 × 2.5) mm² × 9.6 (Cu density conversion factor) = `(150 + 25 + 20) × 9.6 = 195 × 9.6 ≈ 1,872 kg/km`. Optical fibre element and aramid tensile members are excluded from the copper weight figure. Total cable weight of 3,900–4,200 kg/km includes all rubber insulation, inner and outer sheaths, steel wire armour (if specified), fibre tube, and the filler compound between core groups.

CONTROL CONDUCTORS — 8 × 2.5 MM² (14 AWG)

CONTROL CORE ELECTRICAL REFERENCE	
Cross-section	`2.5 mm² each (8 cores total)`
Conductor class	`IEC 60228 Class 5 (flexible)`
DC resistance @ 20 °C	`≤ 7.41 Ω/km per IEC 60228`
Max. operating voltage	`300/500 V (signal / control)`
Max. current (single core)	`≈ 26 A (IEC 60364 free air)`
Core identification	`Numbered (1–8) or colour-coded per IEC`

Control cores within the composite structure are derated further due to proximity heating from the power cores. Feichun recommends a conservative maximum of **10–12 A per control core** under worst-case loaded conditions.

TERMINATION & INSTALLATION NOTES — OFE

Field splicing or connectorisation of the OFE within an installed composite reel cable requires a factory-prepared pigtail assembly. The OFE tube must be cleanly separated from the power core assembly and individually handled; **never bend the fibre tube below the specified dynamic radius during installation**. For reel-drum applications exceeding 500 m, specify pre-tested fibre links with optical loss budget documentation. Connector type (LC, SC, or ST duplex) must be agreed at time of order; standard supply is bare cleaved tube ends for field fusion splicing.

MECHANICAL & APPLICATION PROPERTIES

MECHANICAL REFERENCE DATA	
Reeling duty type	`Continuous drum reel (trailing/reeling)`
Max. travel / reel speed	`120 – 180 m/min`
Tensile reinforcement	`Aramid (Kevlar®) braid integrated`
Torsion resistance	`Anti-twist lay (TS designation)`
Abrasion resistance	`CPE/PCP sheath — Grade M per VDE`
Oil resistance	`Class 2 oil-resistant (designation: O)`
Min. bending radius (dynamic)	`≥ 12 × OD ≈ 600 – 650 mm`
Min. bending radius (static)	`≥ 5 × OD ≈ 240 – 275 mm`
Flammability class	`IEC 60332-1 (single vertical flame)`
Sheath colour	`Black (standard); orange on request`

TYPICAL APPLICATION ENVIRONMENTS

Open-pit mining dragline and bucket-wheel excavator reel systems — where the cable must travel the full radial width of the pit and back under continuous cyclic tension and torsion. **Bulk-terminal stacker-reclaimers and ship loaders** operating on rail with tow-cable drums in aggressive port environments. **Offshore and shipyard gantry cranes** requiring oil resistance and marine-grade sheath durability. The aramid tensile braid permits the cable to suspend its own weight across long overhead spans while the anti-torsion lay counteracts the twisting torques generated during continuous reel winding and unwinding.

APPLICABLE STANDARDS & COMPLIANCE

- `VDE 0250` — Core standard for flexible rubber-insulated cables for heavy industry and mining; governs construction, test requirements, and marking for this cable series
- `IEC 60228` — Conductor construction and resistance for Classes 5/6 fine-stranded copper
- `IEC 60502-1` — Power cables with extruded insulation, voltage rating ≤ 1 kV (control cores)
- `IEC 60793-2-10` — Multimode graded-index optical fibre (OM1, 62.5/125 µm)
- `DIN VDE 0298-4` — Permissible current carrying capacities; derating factors for grouped and reel-wound cables
- `IEC 60332-1` — Single vertical flame propagation test for insulated conductors

ORDERING, LEAD TIMES & TECHNICAL SUPPORT

Specify the full type designation, drum length, and reel geometry at time of order. Example: `(N)TSKCGEWTOEUS 3×50+1×25+8×2.5 OFE12G62.5/125 · 3/3.3 kV · 250 m drum · Black CPE sheath · Bare Cu conductors · LC/APC pigtail both ends (OFE)`

Custom configurations (additional control cores, alternate fibre count, armoured variant with SWA) available on OEM engineering consultation. GOST compliance certificates (for EAEU market) and CE/VDE test reports issued upon request at time of order. Lead time for composite cable: **4–8**

weeks from confirmed drawing approval.
tech@feichuncables.com | **+86 138 5512 3218** | **www.feichuncables.com**

3 × 50 mm² Power	1 × 25 mm² Earth	8 × 2.5 mm² Control
12G OFE 62.5/125	CPE/PCP Sheath	Aramid Tensile
Anti-Torsion Lay	Oil-Resistant	3/3.3 kV · 192 A

All data are nominal. Ampacity per DIN VDE 0298-4 at 30 °C ambient, single cable free air; apply mandatory derating for reel-drum applications (×0.76 single layer, ×0.58 double layer, ×0.40 multi-layer).
Optical fibre specifications per IEC 60793-2-10 OM1. Cable dimensions and weights subject to manufacturing tolerances of ±5%. Feichun reserves the right to modify without prior notice.