

Wire Rope Selection for Marine, Crane and Industrial Lifting Applications

cBallast · 2026 edition · Selection and reference guide

Reading a wire-rope specification

Written in a defined order: nominal diameter × construction / core / grade / coating / lay. Example: "16 mm × 6 × 36 WS + IWRC / 1960 / A / RRL" = 16 mm diameter, 6 outer strands of 36 wires in Warrington-Seale, independent wire-rope core, tensile grade 1960 MPa, class A galvanised, right-hand regular lay.

Rope construction

Construction	Wires per strand	Common duty
6 x 7	7	Standing rigging, guy wires
6 x 19 Seale	19	General lifting, mine hoist
6 x 19 Filler wire	25	Elevator, general lifting
6 x 25 Filler wire	25	General crane hoist
6 x 36 Warrington-Seale	36	Crane, deck machinery, offshore
8 x 19 / 8 x 25	19 / 25	Small-diameter drum, elevator
19 x 7 non-rotating	7 per strand	Free-fall crane hook lines
35 x K7 compacted	7 compacted	Heavy lift, tower crane, offshore

Grade — nominal tensile

Grade	Tensile	Typical use
1570 MPa	1570 N/mm2	Legacy elevator, some standing rigging
1770 MPa	1770 N/mm2	General industrial hoist
1960 MPa	1960 N/mm2	Standard for cranes and deck machinery
2160 MPa	2160 N/mm2	Heavy lift, mobile crane boom hoist
2500 MPa	2500 N/mm2	Compacted-strand offshore hoist

MBL — ISO 2408 (6x36 IWRC 1960 MPa)

Nom dia	Metallic area (mm2)	Mass (kg/100m)	MBL (kN)
8 mm	30.7	26.8	52.7
10 mm	47.9	41.9	82.4
12 mm	69.1	60.4	119
14 mm	94.0	82.2	162
16 mm	123	107	211

18 mm	155	136	267
20 mm	192	168	329
22 mm	232	203	398
24 mm	276	242	474
28 mm	375	329	645
32 mm	490	430	842

D/d ratio (ISO 4308-1)

Rope fatigue governed by sheave pitch diameter (D) vs rope diameter (d). M5 crane hoist demands $D/d \geq 16$ for boom head sheave, ≥ 14 for drum. Halving D/d reduces bending fatigue life by an order of magnitude.

Discard criteria (ISO 4309)

Broken wires > 6 per $6d$ or > 14 per $30d$. Diameter reduction $> 7\%$ (running) or $> 3\%$ (standing). Corrosion, kinks, bird-caging, core protrusion, strand nicking, heat damage. Cracked wedge socket, unwound Flemish eye, or slippage past swage witness mark.

End terminations

Termination	Efficiency	Field-installable	Use
Poured socket	100%	Yes (skilled)	Crane hoist, elevator
Swaged mechanical	95%	No (press)	Bridge, offshore
Wedge socket	80%	Yes	Removable, mobile crane
Flemish eye + sleeve	90%	No (press)	Slings, tow lines
Fibre-core tucked splice	85%	Yes (skilled)	Legacy standing rigging

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