

Cable Gland Selection Guide — Metric M12 to M85, NPT ¼ 3 to 3 3, PG7 to PG42, Ex/ATEX, IP68 Marine (BW / CW / E1FW / CMP / Wiska / Roxtec)

cBallast Technical Sourcing · Industrial & marine cable glands — brass, stainless steel, nylon, Ex/ATEX · issued 2026-08-29 · cballast.com/documents/cable-gland-selection-guide-metric-npt-pg-ex-atex-marine-ip68

Complete cable gland selection reference: metric thread sizes M12 through M85, NPT ¼ 3 through 3 3, PG7 through PG42 (obsolescent), IP66/IP67/IP68 rating, Ex/ATEX Ex d / Ex e / Ex nR marking, materials (brass, stainless 316L, nickel-plated brass, nylon), for armoured (SWA / BW / CW / E1FW), unarmoured (E1W / A2) and screened cables. Manufacturer references: CMP Cable Glands, Hawke, Prysmian, Wiska, Roxtec, ABB, Weidmüller, Peppers, HKK. Includes gland size selection tables by cable OD and armour type, IP68 water-pressure rating (2 m and 30 m depth), and marine class-society acceptance (DNV, ABS, LR, BV).

Cable gland selection guide — metric, NPT, PG, Ex/ATEX, IP68 marine

Cable glands (also cable connectors, cable stuffing tubes) seal the entry of a cable into an enclosure — providing (a) mechanical strain relief, (b) environmental sealing (IP-rated), and (c) on armoured / screened cables, electrical continuity to the enclosure earth or braid termination. The correct gland depends on five coupled decisions: (1) enclosure thread type — metric, NPT, or legacy PG; (2) cable outside diameter and armour type; (3) IP rating requirement (IP66 typical industrial, IP68 for immersion); (4) hazardous-area classification — standard, Ex e (increased safety), Ex d (flameproof); and (5) material — brass, stainless 316L, nickel-plated brass, or nylon. This reference covers every commonly stocked combination.

Enclosure thread type — when to use each

Thread type | Standard | Typical use |

Metric (M12, M16, M20, M25, M32, M40, M50, M63, M75, M85) | ISO 965 / ISO 261 | European standard, marine, industrial. Default for new-build EU and Asia. |

NPT (¼", ½", ¾", 1", 1¼", 1½", 2", 3") | ASME B1.20.1 | North American standard, oil & gas industry, US-spec marine. |

PG (Panzer-Gewinde: PG7, PG9, PG11, PG13.5, PG16, PG21, PG29, PG36, PG42) | DIN 40430 (superseded) | Legacy German standard, still on many installed enclosures. Superseded by metric M-thread. |

BSP / BSPP (G¼, G½, G¾, G1) | ISO 228-1 | British Standard Pipe Parallel thread; less common on modern glands but used on some legacy hydraulic and marine enclosures. |

Metric gland size selection by cable OD

Match the gland size to the cable's outside diameter (OD, measured with callipers over the cable's outer sheath, not including armour). Every metric gland accepts a range of OD; choose the smallest gland whose OD range brackets your cable.

Metric thread | Cable OD range (mm) | Spanner size (mm) | Enclosure hole (mm) |

M12 x 1.5 | 3 - 7 | 15 | 12.3 (12.5 max) |

M16 x 1.5 | 4.5 - 10 | 19 | 16.3 |

M20 x 1.5 | 6 - 12 (short) / 10 - 14 (long) | 24 | 20.3 |

M25 x 1.5 | 9 - 17 (short) / 13 - 20.5 (long) | 30 | 25.3 |

M32 x 1.5 | 13 - 21 (short) / 17 - 25 (long) | 36 | 32.3 |

M40 x 1.5 | 19 - 28 | 46 | 40.3 |

M50 x 1.5 | 27 - 38 | 55 | 50.5 |

M63 x 1.5 | 34 - 44 | 65 | 63.5 |

M75 x 1.5 | 44 - 54 | 80 | 75.5 |

M85 x 1.5 | 52 - 64 | 90 | 85.5 |

PG (legacy) to metric conversion — when replacing old glands

PG thread | Cable OD range (mm) | Roughly equivalent metric |

PG7 | 3 - 6.5 | M12 or M16 |

PG9 | 4 - 8 | M16 |

PG11 | 5 - 10 | M16 or M20 |

PG13.5 | 6 - 12 | M20 |

PG16 | 10 - 14 | M20 |

PG21 | 13 - 18 | M25 |

PG29 | 18 - 25 | M32 |

PG36 | 22 - 32 | M40 |

PG42 | 30 - 38 | M50 |

PG-to-metric adapters are available where the enclosure has a PG thread but the specification calls for a metric gland (or vice versa). Brass or stainless-steel adapters with an NPT/metric/PG male-female combination cover most conversion needs.

Cable-type selection — unarmoured vs armoured vs screened

Gland type | Cable type | Function |

A2 / E1W (single seal) | Unarmoured cable (H07RN-F, H05RR-F, etc.) | Environmental seal + strain relief; simplest gland |
BW (brass gland with armour cone) | Steel Wire Armour (SWA) | Armour clamped between cone and locknut; single-seal on outer sheath |

CW (dual seal) | SWA, sub-sea or high-humidity | Inner + outer seals; better water exclusion than BW |

E1FW / CX (Ex d + armour clamp) | SWA in Ex d flameproof enclosure | Cable armour clamped, flame path sealed on cable OD |

E1WF (Ex e + armour clamp) | SWA in Ex e increased-safety enclosure | Armour clamped, IP66 seal on cable OD |

Screened-cable gland (SS41, EMC gland) | Screened / braided cable | EMC-continuous braid termination for interference control on VFDs, servo, comms |

Marine specific (E1FW-marine or E1FX) | SWA / MPRXCX marine cable | Salt-spray-resistant nickel-plated brass or 316L stainless; DNV / ABS / LR class approval |

Ex / ATEX cable gland classification

Ex glands carry the same equipment protection type as the enclosure they enter:

Ex d IIC (flameproof) — the flame path is the gland thread engagement + cable seal. Requires threaded engagement to at least 5 pitches (Ex d IIC = 8 threads on M25 and larger) plus a compound (barrier) or barrier-plus-seal design (BX / CX / TX / BXR).

Ex e IIC (increased safety) — no internal ignition source, so no flame path requirement, but IP66 seal on cable + enclosure. Simpler gland construction (single-seal, no barrier).

Ex nR (restricted breathing) — non-sparking with limited internal-atmosphere breathing. Simpler than Ex d, more restrictive than Ex e.

Ex tD (dust ignition proof, Zone 20/21/22) — IP6X dust-tight sealing; typically the same body as an IP66 industrial gland.

Every Ex gland ships with an ATEX / IECEx certificate of conformity; verify the certificate cross-references the enclosure's certification (same equipment group IIB / IIC / IIIA / IIIB / IIIC, matching temperature class T1-T6). Always confirm the gland barrier compound or seal type is compatible with the cable insulation material (some barrier compounds are incompatible with silicone or fluorinated cable insulation).

IP rating — IP66, IP67, IP68

Rating | Meaning | Typical gland |

IP66 | Dust-tight; heavy jets of water from any direction | Standard industrial gland (E1W, BW) |

IP67 | Dust-tight; temporary immersion to 1 m for 30 min | Standard marine gland (E1FW nickel-plated brass) |

IP68 (2 m / 24 h) | Continuous immersion to 2 m depth | Marine gland with double seal (CW, sub-sea rated) |

IP68 (30 m / continuous) | Continuous immersion to 30 m depth | Subsea gland with resin-filled compound (specialised) |

Material selection

Brass (nickel-plated) — the industry default. Nickel plating gives marine salt-spray resistance to 500 h ASTM B117. Suitable for most industrial, commercial and marine applications.

316L stainless steel — for salt-water immersion, offshore, chemical plant, food/pharma. Higher cost but corrosion-proof.

Nylon / polyamide — for weight-critical or non-metallic applications (RF systems, aluminium enclosures where galvanic isolation matters). Not for Ex service.

Aluminium — light, cheap, unsuitable for aggressive marine or chemical environments.

Bronze — for immersion service in seawater; longer life than nickel-plated brass in continuous saltwater exposure.

Manufacturer references & commonly stocked ranges

Manufacturer | Typical range | Notes |

CMP (Cable Management Products) | E1W, E1FW, C2K, TR-CN, BW, CW, TX | UK-manufactured; strong Ex range; Ex d E1FW very common on North Sea offshore |

Hawke International | ADE 4F, ICG 653, 501/421 | UK-manufactured; strong Ex d range; ICG 653 common on hazardous-area lighting |

Prysmian (Draka) | Prysmian-branded barrier gland | Ships with matched Prysmian marine and offshore cable |

Wiska | SPRINT M-series, SPRINT NPT, ESKV/EX | German-manufactured; PG-to-metric transition; good for general industrial |

Peppers Cable Glands | A2, E1W, CX, EX-D | UK-manufactured; strong marine range; DNV / ABS approved variants |

Weidmüller | Klippon® cable gland series | Integrated with Weidmüller enclosure range; standard industrial |

ABB | Kaiser cable gland (part of ABB Installation Products) | Common on ABB drive-cabinet integrations |

Roxtec | Multidiameter modular seal (not a thread gland) | For multi-cable penetrations, marine bulkhead, offshore |

Miltronic | SKINTOP MS-M series | Marine specific |

Common questions

Q: What is the CMP E1FW20S gland kit for? The CMP E1FW20S is a size M20 Ex d flameproof cable gland for SWA (steel-wire armour) cable. The "S" suffix denotes the small version of the M20 seal range. Used on offshore lighting, junction boxes, control cabinets in Zone 1/2 hazardous areas. Ships as a kit with the gland body, armour cone, sealing washer, locknut, and (for Ex d) barrier compound or moulded seal.

Q: What size cable gland do I need for a SWA 4 × 4 mm² cable? The typical OD of 4×4 mm² SWA is 15-18 mm — use an M20 (long or short body depending on the specific manufacturer's OD range) or M25 for extra tolerance. Confirm the actual cable OD with callipers on the specific cable batch (SWA armour thickness varies by manufacturer).

Q: Is a PG gland acceptable in a modern hazardous-area installation? PG-thread glands are no longer permitted for new-build Ex installations in EU jurisdictions; ATEX certifications since ~2010 have been issued for metric-thread only. In-service PG glands may continue in existing installations under the "grandfathered" clause of the local Ex regime. For replacement, convert to metric via a PG-to-metric adapter or replace the enclosure.

Q: Do I need a barrier gland (like CX or BX) or a compound-filled gland? Depends on the Ex classification: Ex d IIB is typically OK with a moulded barrier seal on the cable OD; Ex d IIC (hydrogen zones) usually requires a compound-filled barrier gland with resin poured on-site around the individual conductors. Consult the enclosure's ATEX / IECEx certificate and the gland manufacturer's compatibility matrix.

Related products & references

All cable glands on cBallast

CMP cable glands (E1W, E1FW, BW, CW)

Wiska SPRINT cable glands

Roxtec multidiameter modular seals

SWA steel-wire-armour cable

ATEX / IECEx zoning & equipment marking

IP rating IEC 60529 decoding

Cable sizing IEC 60364 (current-carrying capacity)

Cables & Wiring category

Enclosures category

How to request a cable-gland RFQ from cBallast

Fast-track your RFQ by including: (1) enclosure thread type and size (metric M20, NPT ¾", PG16...); (2) cable type and construction (SWA / unarmoured / screened); (3) cable outside diameter measured over the outer sheath in mm; (4) IP rating required (IP66/67/68); (5) hazardous area classification if applicable (Ex d IIB / IIC, Ex e, Ex nR, dust rating); (6) material (nickel-plated brass, 316L stainless); (7) quantity and ship-to port. cBallast responds within 8 business hours with itemised quote, ATEX certificate references, and shipping options.

Size tables and gland classifications above are compiled from IEC 62444, IEC 60079-1 (Ex d), IEC 60079-7 (Ex e) and manufacturer catalogues. Verify the specific gland part number's certification and dimensional specification against the manufacturer's current datasheet before ordering. Trademarks: CMP, Hawke, Wiska, Peppers, Roxtec are trademarks of their respective owners.

Frequently asked questions

What cable range does an M16 gland clamp? Typically 4.5–10 mm outside diameter, with a 19 mm spanner across the body — the insert range on the specific datasheet governs at the edges. Can PG-threaded enclosures take metric glands? Only via adapters — PG and metric are different thread systems; the guide's tables give the PG-to-metric near-equivalents and the adapter route. Which gland material belongs on a ship's deck? Nickel-plated brass (or stainless where washdown chemistry demands) — polyamide serves interiors; deck exposure, EMC braids and armour clamping push to metal. Does an IP68 gland guarantee an IP68 entry? Only with the locknut tight on a flat or gasketed face and the cable inside the insert's range — an undersized cable is the classic leak.

Part numbers and designations are those of the original manufacturers and are given for identification. cBallast is an independent supplier. © cBallast 2026 · cballast.com