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Hazardous Area Lighting — Ex Luminaires for Zone 1 and 2

cBallast Technical Sourcing · Ex-certified luminaires and spares · issued 2026-11-09 · cballast.com/documents/hazardous-area-lighting-ex-luminaires-zone-1-2

Selecting Ex-certified luminaires for Zone 1, Zone 2 and dust zones: the marking string decoded for lighting (Ex db, Ex eb, Ex tb, temperature class against lamp surface), linear, floodlight, bulkhead and emergency formats, why LED retrofit tubes void certificates, the fluorescent-to-LED transition on ships and plants, emergency luminaires and their battery packs as certificate-bound spares, and the Chalmit, Glamox and CEAG ranges with catalogue examples.

The short version

A luminaire in a classified area is Ex equipment first and a light second. It is selected exactly like any Ex apparatus: zone (0/1/2 gas, 20/21/22 dust), gas group (IIA/IIB/IIC), temperature class (T3/T4 typical for lighting — the hot surface is the lamp), protection concept (Ex db flameproof, Ex eb increased safety, Ex tb for dust), ambient range and IP rating. The marking string logic is in our ATEX/IECEx guide.

The certificate covers the complete luminaire — housing, gear and lamp together. That is why dropping an LED retrofit tube into a certified fluorescent fitting voids the certificate unless the luminaire maker has certified that exact combination: the retrofit changes the thermal and electrical design the notified body assessed.

The installed base is fluorescent, the market is LED. Twin-tube Ex fittings (CEAG eLLK 92, Chalmit Protecta III and PRG class) light most engine rooms, rigs and process plants built before ~2018. They are maintained with certified tubes, guards and ballasts — a real and legitimate spares stream — while new-builds and refits specify LED natives (Chalmit Evolution X class, Glamox EX LED ranges) with 50,000+ h life and no tube stock at all.

Emergency Ex lighting is a battery contract. Self-contained emergency luminaires carry Ni-Cd or LiFePO4 packs with a 4-year-class service life; the pack is a certificate-bound consumable with a scheduled change, exactly like a gas-detector cell. Battery packs and their test regimes (monthly function, annual duration) are what surveys actually check.

Marine adds class approval and salt. Shipboard and offshore fittings need the class society's type approval alongside ATEX/IECEx, marine-grade housings (copper-free aluminium or 316, IP66/67), and vibration ratings. Deck floodlights and navigation-adjacent lighting have their own rules.

1. Reading an Ex luminaire's marking

Element | Example | Meaning for a luminaire |

Protection concept | Ex db eb mb | Flameproof terminal/gear compartments (db), increased-safety lampholders and wiring (eb), encapsulated gear (mb) — combinations are normal |

Gas group | IIC or IIB+H2 | IIC covers hydrogen areas (battery rooms, electrolysers); IIB suffices for most hydrocarbon plants |

Temperature class | T4 | Max surface temperature 135 °C — the binding figure for the hot lamp/driver surface against the gas's ignition temperature |

Equipment protection level | Gb / Gc | Gb = Zone 1 capable; Gc = Zone 2 only (the "Ex ec" generation of Zone 2 fittings) |

Dust marking | Ex tb IIIC T85°C Db | Protection by enclosure for conductive dust, surface limited to 85 °C, Zone 21 |

Ambient | " 25 °C ≤ Ta ≤ +55 °C | Outside this band the certificate does not apply — check cold decks and hot engine-room deckheads |

Zone 2-only fittings are markedly cheaper than Zone 1 fittings of the same light output; the classification drawing, not habit, should decide which areas get which. Over-specifying every fitting to Zone 1 wastes budget; under-specifying one fitting in a Zone 1 pump room fails the survey.

2. Formats and where they belong

Format | Typical duty | Catalogue example |

Linear twin-lamp (fluorescent heritage) | Engine rooms, process modules, walkways — the general-lighting workhorse | Chalmit Protecta PRG 2x18 W, Protecta III 2x36 W |

Linear LED native | Same duties, new-build and refit; 50k h life | Chalmit Evolution X 20L (M25 entries) |

Bulkhead / wellglass | Stairways, tanks tops, low-mounting general light | Glamox and Chalmit marine bulkhead ranges — quoted by zone and lumen package |

Floodlight | Decks, drill floors, loading areas | Fixed Ex floods by zone; portable/temporary work: Peli RALS 9455 Zone 0 rechargeable floodlight |

Emergency (self-contained) | Escape routes, muster stations; integral battery | Emergency variants of the linear ranges; battery packs as spares — Chalmit Protecta emergency battery 4 Ah, Glamox Ni-Cd 7.2 V 4 Ah EX pack |

Portable / inspection | Tank entry, confined spaces | ATEX hand and head lamps (zone-rated); Ledlenser EXC7R ATEX luminaire class |

3. The fluorescent-to-LED transition, handled honestly

Three legitimate paths for the thousands of installed twin-tube Ex fittings. Maintain: certified fluorescent tubes, starters, ballasts, diffusers and guards remain available and compliant — the CEAG eLLK 92 luminaire guard is a stock item precisely

because the installed base is huge; this path keeps certificates intact at the lowest immediate cost. Replace the luminaire: swap the complete fitting for a certified LED native on the existing cable (check gland sizes against the gland chart and the circuit's ballast-to-driver load change); this is the end-state and pays back through tube logistics alone on remote assets. Certified retrofit: only where the luminaire maker certifies an LED insert for that exact housing — rare in Ex. What is never legitimate: a generic LED tube in an Ex fluorescent fitting. The certificate died the moment the tube went in, and both the surveyor and the insurer read it that way.

4. Emergency lighting: batteries, tests, paperwork

Self-contained Ex emergency luminaires hold the escape-route lux for a rated duration (commonly 90 or 180 minutes) from an integral pack. The pack is the maintenance item: Ni-Cd packs typically carry a 4-year-class service life (heat shortens it; engine-room deckheads are the worst case), and the fitting's certificate names the exact pack — replacement is by part number, not by cell shopping. The regime that keeps surveys short: monthly function test, annual full-duration test, results logged per fitting; packs changed on age or failed duration, whichever first. Central-battery systems move the batteries out of the hazardous area at the cost of fire-rated distribution — on vessels, the class rules and SOLAS escape-lighting requirements decide the architecture, and our marine cable guide covers the fire-integrity cabling such circuits ride on.

5. Specifying and buying Ex lighting

A quotable line: zone and gas/dust group, temperature class, format and lumen output (or the fitting it replaces), supply voltage and frequency (120/230/254 V variants exist; emergency variants state their duration), ambient range, IP rating and housing material (copper-free aluminium, GRP, 316), entries (number, size, position — M20/M25), class society approval where marine, and ATEX or IECEx certificate numbers with the quote. For spares on installed fittings: the fitting's full type code from its rating plate photographs — tubes, guards, diffusers, gear trays, batteries are all certificate-bound to it. Mixed refit lists (keep some, replace some) are normal; we quote both paths side by side with the certificate set for each.

How buying works at cballast. We quote Ex luminaires, their certified spares and their emergency batteries from Chalmit, Glamox, CEAG/Eaton and the other certified makers' programmes, with ATEX/IECEx and class certificates attached. Accounts are vetted at onboarding; first order prepaid; established accounts on credit terms with repeat discounts; public bodies and utilities invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

Can I put LED tubes in an existing Ex fluorescent fitting?Not unless the luminaire manufacturer has certified that exact LED insert for that exact housing. The Ex certificate covers the complete luminaire as assessed; a generic retrofit tube changes the thermal and electrical design and voids it. The compliant options are certified fluorescent spares or a complete certified LED luminaire.

What do Ex db and Ex eb mean on a light fitting?Ex db is flameproof protection — an enclosure that contains an internal ignition (gear compartments, often with Ex eb terminal sections); Ex eb is increased safety — no arcs, sparks or hot surfaces in normal operation, used for lampholders and wiring spaces. Modern fittings combine concepts, and the string also carries gas group, temperature class and EPL (Gb for Zone 1, Gc for Zone 2).

Which temperature class does a luminaire need?One whose maximum surface temperature sits below the ignition temperature of the gases present: T3 (200 °C) covers most hydrocarbons, T4 (135 °C) is the common specification and covers almost everything except the exotic low-ignition cases. The lamp and driver surface is the constraint — LED natives reach T4 and better more easily than high-output discharge ever did.

How often do emergency light batteries need replacing?On age or on a failed duration test — typically a 4-year service life for the Ni-Cd packs in self-contained Ex fittings, shorter in hot locations. Test monthly for function and annually for full rated duration, log both, and replace with the pack part number the fitting's certificate names.

Are Zone 2 light fittings acceptable in Zone 1?No. A Gc/Zone 2 fitting (the Ex ec generation) must never be installed in Zone 1; the inverse — Zone 1 fittings in Zone 2 — is compliant but wastes money at scale. The area classification drawing decides fitting by fitting.

Who supplies Chalmit Protecta and CEAG eLLK spares?cballast.com quotes the certified tubes, guards, diffusers, gear and emergency batteries for the installed Chalmit, CEAG and Glamox ranges, and complete LED replacements beside them, with certificates. Photograph the rating plate and write to sales@cballast.com.

References and related guides

Standards referenced: IEC/EN 60079-0, -1 (db), -7 (eb), -18 (mb), -31 (tb); EN 60598 (luminaires); IEC 60079-14 (installation); SOLAS and class society rules for shipboard and escape lighting; ATEX Directive 2014/34/EU; maker documentation for Chalmit, Glamox EX and CEAG/Eaton Crouse-Hinds ranges.

ATEX and IECEx zoning and equipment marking

Fixed gas detection — sensors, siting, calibration

Cable gland selection — metric, NPT, Ex, marine

IP ratings decoded (IEC 60529)

Class society type approval — DNV, ABS, LR, BV, ClassNK

Questions on a fitting, a marking string or a battery pack: write to sales@cballast.com. We answer whether or not you buy from us.

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