ATEX INSTALLATION & EQUIPMENT OPTIONS

Technical Guide to Electrical Protection Methods in Hazardous Areas

Choosing the right ATEX solution
There is no single “ATEX installation method”. The appropriate equipment and protection concept depends on the hazardous-area classification, substance, zone, gas or dust group, temperature requirements, equipment characteristics and installation conditions.

1. ATEX equipment and protection concepts

ATEX electrical equipment is designed with specific protection methods intended to prevent the equipment becoming an ignition source in a potentially explosive atmosphere. The protection method must be suitable for the classified area and the equipment's certification and marking must be considered as a complete system.

BS EN IEC 60079 covers the design, selection, installation, inspection and maintenance of electrical equipment for explosive atmospheres. BS EN IEC 60079-14:2024 covers electrical installation design, selection and installation of equipment, including initial inspection, while BS EN IEC 60079-17:2024 covers inspection and maintenance. cite turn0search11 turn0search0

2. Common electrical protection options

Protection method	How it works / typical use
Ex d – Flameproof enclosure	Equipment is contained within an enclosure designed to withstand an internal explosion and prevent flame propagation to the surrounding atmosphere. Commonly used for motors, junction boxes, control equipment and luminaires where suitable.
Ex e – Increased safety	Design measures are used to prevent arcs, sparks and excessive temperatures during normal operation. Common applications include terminals, junction boxes, motors and luminaires.
Ex i – Intrinsic safety	Electrical circuits are designed so that electrical and thermal energy is limited to levels that cannot ignite the specified explosive atmosphere under the defined conditions. Common for instrumentation, sensors and control circuits.
Ex p – Pressurisation	A protective gas or air system maintains an internal pressure that prevents the surrounding explosive atmosphere entering the enclosure. Used for certain control panels and specialist equipment.
Ex t – Protection by enclosure	Equipment is protected by an enclosure to control the ingress of combustible dust and limit surface temperature. Used for dust hazardous areas.
Ex m – Encapsulation	Potential ignition sources are enclosed in compound so the explosive atmosphere cannot contact them. Often used for electronic components, coils and specialist equipment.

Important: These protection methods are not interchangeable. The correct method is determined by the equipment certification, hazardous-area classification and application. Equipment should not be selected solely because it is described as “ATEX rated”.

3. Installation options by application

• ATEX lighting – Ex-rated luminaires can be selected for hazardous gas/vapour or combustible dust environments. Emergency lighting must also be suitable for the identified area where installed.

• Ex distribution boards and enclosures – distribution equipment, junction boxes and control enclosures can be specified using an appropriate protection concept and suitable certified components.

• Ex isolators and switches – local isolation and switching equipment can be selected for the applicable zone, substance and environmental conditions.

• Motors and rotating equipment – motors must be selected against the hazardous-area classification, temperature requirements and duty.

• Instrumentation and sensors – intrinsically safe circuits are commonly used for instrumentation where the system design requires energy limitation.

• Cable glands and entries – glands, stopping plugs, adaptors and cable entries must be compatible with the equipment, protection method and cable construction.

• Earthing and bonding – protective earthing and bonding arrangements must be appropriate to the installation and equipment protection concept.

4. Selecting the right option

Stage	Requirement
1. Confirm the zone	Zone 0, 1 or 2 for gases/vapours/mists; Zone 20, 21 or 22 for combustible dusts.
2. Identify the substance	Establish the relevant gas/dust group and characteristics of the hazardous substance.
3. Confirm temperature requirements	Check the equipment temperature class or maximum surface temperature against the substance.
4. Select protection concept	Select the certified equipment and protection method appropriate to the application.
5. Check installation requirements	Confirm glands, cable entries, wiring, segregation, earthing, mounting and environmental conditions.
6. Verify and document	Installation and initial inspection should be completed by suitably competent personnel with the required records retained.

5. Typical hazardous-area installation packages

Application	Typical package
Zone 1 production area	Ex lighting + Ex emergency lighting + Ex isolators + suitable cable/glands + earthing/bonding + inspection
Zone 2 plant room	Appropriate Zone 2 equipment + local isolation + suitable enclosures/glands + inspection
Zone 21/22 dust environment	Dust-protected luminaires/enclosures + suitable cable entries + surface-temperature control + inspection
ATEX process equipment	Ex-rated motors/actuators + instrumentation + control circuits + local isolation + documentation

6. Inspection, maintenance and ongoing suitability

The protection features of hazardous-area equipment need to remain effective throughout its service life. BS EN IEC 60079-17:2024 is the current UK standard covering inspection and maintenance of electrical installations in explosive atmospheres. It covers equipment such as motors and sensors and includes requirements for inspection and maintenance arrangements. □cite□turn0search0□

• Visual, close and detailed inspections should be selected as appropriate to the installation and equipment.

• Check enclosures, covers, fasteners, cable glands, stopping plugs and entries for damage or deterioration.

• Check for corrosion, contamination, loose connections and other conditions that could compromise the protection method.

• Replacement components should be compatible with the equipment certification and original protection concept.

• Where equipment is repaired, overhauled or reclaimed, the applicable requirements of BS EN IEC 60079-19:2025 should be considered. □cite□turn0search9□

• Changes to plant, processes or hazardous-area classification should trigger a review of the affected installation.

7. QUEST ATEX capability

• ATEX installation works – installation and replacement of electrical equipment in classified hazardous areas.

• ATEX lighting – selection and installation of suitable Ex lighting and emergency lighting.

• Ex equipment and isolation – switches, isolators, enclosures, junction boxes and associated equipment.

• Instrumentation and control – suitable wiring and intrinsically safe applications where specified.

• Cabling and terminations – suitable Ex glands, entries and termination arrangements.

• Inspection and remedials – identification and correction of defects affecting hazardous-area electrical installations.

• Testing and documentation – electrical testing and appropriate installation records.

WHY QUEST?

ATEX/CompEx-qualified engineers • Industrial and commercial hazardous-area experience • Installation and remedial works • Electrical testing and documentation • Support from planned works through to maintenance • Nationwide capability

8. Important project information

QUEST works from the client's hazardous-area classification, DSEAR documentation, drawings, specifications and equipment requirements. Final equipment selection and installation methods must be confirmed against the specific site conditions and applicable standards. QUEST does not represent this guide as a substitute for a site-specific DSEAR assessment or hazardous-area classification.

This guide is intended as general technical information and does not replace the applicable legislation, standards, equipment certificates, manufacturer instructions, project specification or competent engineering assessment.