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HAZARDOUS Engineering Solutions

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Oceanology International

2026 (Oi26), ExCeL London, 10–12 March



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Audible and Visual Signalling in Hazardous Areas

In hazardous environments such as oil refineries, chemical processing facilities and offshore platforms, effective signalling plays a critical role in protecting people, assets and operations. Clear audible and visual warnings allow personnel to recognise abnormal conditions quickly and respond appropriately to alarms, emergencies and process events before situations escalate.

Audible and visual signalling devices form a core part of modern site safety systems. They provide a direct and immediate means of communication in areas where background noise, poor visibility or complex plant layouts can otherwise prevent warnings from being noticed. At Exloc, a comprehensive range of ATEX certified sounders, beacons and combined units is available to support safe operations in these demanding locations, ensuring that every alert remains effective even in the harshest industrial conditions.

Certified signalling equipment is essential in hazardous areas because it delivers reliable performance while meeting strict regulatory requirements. These devices are commonly used to indicate process faults, warn of gas releases or initiate evacuation procedures, giving workers the vital time needed to act. When audible and visual alerts are combined, the likelihood of a warning being detected increases significantly, regardless of whether personnel are wearing hearing protection or working in low light.

Audible devices such as sirens, horns and sounders provide high output levels capable of covering large or noisy spaces, often with multiple tone options to distinguish between different alarm types. Visual devices, including LED and xenon beacons, offer bright, attention grabbing signals and colour coding to help operators instantly identify the nature of an alert. In many applications, combination units deliver the most effective solution by providing both forms of warning from a single device.

Choosing the right signalling solution requires careful consideration of zone classification, material construction, ingress protection, mounting arrangements and long term maintenance needs. By selecting

equipment that matches the specific conditions of the site, organisations can ensure compliance, reliability and lasting performance.

Effective signalling is more than a regulatory requirement. It is an investment in safer workplaces. With the right products and expertise, dependable warning systems can be built that help protect people and keep hazardous operations running safely.



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Why Vacuum Selection Matters in Hazardous Engineering Environments

Dust is present in almost every industrial environment. It may be created by production processes, released during material handling, or left behind during maintenance activities. In many cases it is removed using an industrial vacuum cleaner chosen for availability rather than suitability.

In hazardous engineering environments, that choice is critical. Many industrial dusts are harmful when inhaled and a significant number are combustible. Inadequately specified vacuum equipment can allow fine dust to become airborne again, fail to contain hazardous material, or introduce ignition risks in areas where explosive atmospheres may be present. Instead of controlling risk, the wrong equipment can increase it.

Effective dust control begins with understanding the hazard. What material is being collected, how fine it is, whether it presents a health risk, and whether it has explosive potential all influence the correct vacuum specification. The operating environment is equally important, particularly where ATEX zoned areas exist. Once these factors are understood, the vacuum system, filtration, materials of construction and accessories can be specified to match the real risk rather than assumptions.

Engineering a machine for the hazard

BVC – British Vacuum Cleaners – is built by Quirepace in Fareham and supplied as industrial vacuum systems engineered to order. Rather than relying on a fixed catalogue, machines are sized and configured around the application they will operate in and the hazards they must control.

Where dust is hazardous to health, M-Class or H-Class machines are required. Where an explosive atmosphere may occur, ATEX-rated equipment is essential. In many industrial environments both condi-

tions apply, meaning a single vacuum system may need certification for hazardous dust collection while also being suitable for use in ATEX Dust Zone 21 or 22. Some applications may also require suitability for ATEX gas zones.

Filtration plays a central role in risk control. Anti-static filter media and multi-stage filtration ensure hazardous material remains contained and exhaust air is kept clean, protecting operators and preventing secondary contamination.

Quirepace also engineers application-specific solutions, including systems with low-pressure blown air to dislodge compacted deposits, high-level cleaning tools for structural steelwork and services, and integration with process controls so equipment operates automatically with production.

Systems, tools and long-term value

Correct hose sizing and tool selection improve conveying efficiency, reduce blockages and make cleaning more effective. Portable ATEX vacuums offer flexibility, while larger or higher-risk sites may benefit from Central Vacuum Cleaning systems that remove equipment from hazardous areas and centralise maintenance.

Industrial vacuum systems operate in demanding conditions and are relied upon daily. For this reason, whole-life value, reliability and support are often more important than initial purchase price. Treating vacuum cleaning as part of the engineered hazard control strategy leads to safer operations and more robust long-term performance. BVC Quirepace offers free on site demonstrations of BVC equipment at food factories in the UK. For more information or to discuss your site, contact Quirepace:

T: 023 9260 3700

E: bvcsales@quirepace.co.uk

W: www.quirepace.co.uk | www.bvc.co.uk

Enerpac Rail Pullers Streamline Track Maintenance

The Enerpac RP70A lightweight rail stressing kit for railway maintenance crews is easier to transport and assemble and up to three times lighter than similar tools. The RP-70A hydraulic rail stressor and Enerpac ZC3-Series battery powered stressing pump provide a cordless, zero emission, rail stressor kit for rail track thermite welding.

Traditional fully assembled rail pullers are too heavy for operators to comfortably transport and deploy safely and quickly. The RP70A stressor uses modular components that can be assembled and installed on site without the need for tools, making preparation for rail stressing easier and safer. Assembly typically takes less than 2 minutes.

National Rail Registration

Registered with UK National Rail under Certificate of Acceptance PA05/06958, the Enerpac rail stressing kit is designed for railway maintenance crews who assemble and install the rail puller directly on site when adjusting the gap between rail ends for rail stressing, rail welding, repairing rail failures and servicing insulators. The durable, easy-to-assemble components, where each component is either a one or two man lift, including ZC3-Series pump and hose set, are up to three times lighter than similar tools. The complete kit can be transported in an optional specially designed steel transport frame.

The Enerpac RP70A stressor has a 70-ton pulling and 35-ton pushing capacity while holding the rail in neutral length during the thermite welding process. It uses aluminium, double-acting hydraulic cylinders enclosed within steel sleeves to protect the cylinder rods from damage, particularly weld splatter. For ease of handling and lifting, the RP70A includes certified lifting eyes.

The stressor is interchangeable with a range of powerpacks and is compatible with the cordless Enerpac ZC3-Series battery powered pump for a complete clean energy solution. This is especially useful when conducting rail stressing in tunnels and other enclosed spaces.

To learn more about the latest Enerpac tools for rail maintenance, visit the [\[www.enerpac.com\]](http://www.enerpac.com) www.enerpac.com.



Industry-defined

Mechanical Integrity Training

Developed and verified 'for industry, by industry', EEMUA 231 Mechanical Integrity courses are for industrial engineers at every career stage – with reality built-in to aid efficient hands-on work with primary containment and prevent loss of hazardous substances, including with pressure systems.

- Open to all to satisfy industry requirements at each competency level – Awareness, Basic application, Practitioner, Leader.
- Courses cover: *Legislative environment *Industry good practice *WSE *Equipment design *Operational considerations *ALARP *Asset condition *Test techniques *Inspection roles, process & reports *Postponement *Responses to findings *Record keeping *Audit *Feedback *User responsibilities & competencies *Operating Limits *Decision Making *More.
- Certificated up to 5 years – CPD-approved. – free or discounted to EEMUA Members and Associates – including:.

Mechanical Integrity Practitioner Certificate (MIPC®) – part-time, blended, live online learning – on-site or on-call – 1:1s and Mentor Support – workbook builds from day-1 for immediate application on-site of EEMUA 177, 231 and 232 guidance, and the PSSR ACOP – certificated for 5 years via exam and portfolio assessment – in-depth learning for 27 weeks, flexible 4 hours per week – CPD of 110 hours. The MIPC course adapts to the engineering needs of each Learner, company and site/s via a 2-hour induction (to fit work schedules ahead of the course) – learning on the next course starts 2 March 2026.

Asset Integrity Leadership Certificate – blended, live online – for new and experienced Leaders – flexible learning 3 hours per week – 55 hours CPD – certificated – next course starts 2 March 2026.

EEMUA 231 Mechanical Integrity Basics – blended, online learning – at Basic application competency level – flexible 4 hours of learning per week for 3 weeks – 12 hours of CPD – certificated via exam – next course starts 2 February 2026.

EEMUA 231 Mechanical Integrity e-learning – set at the Awareness level – with 1 hour of CPD – immediately available – on-demand.

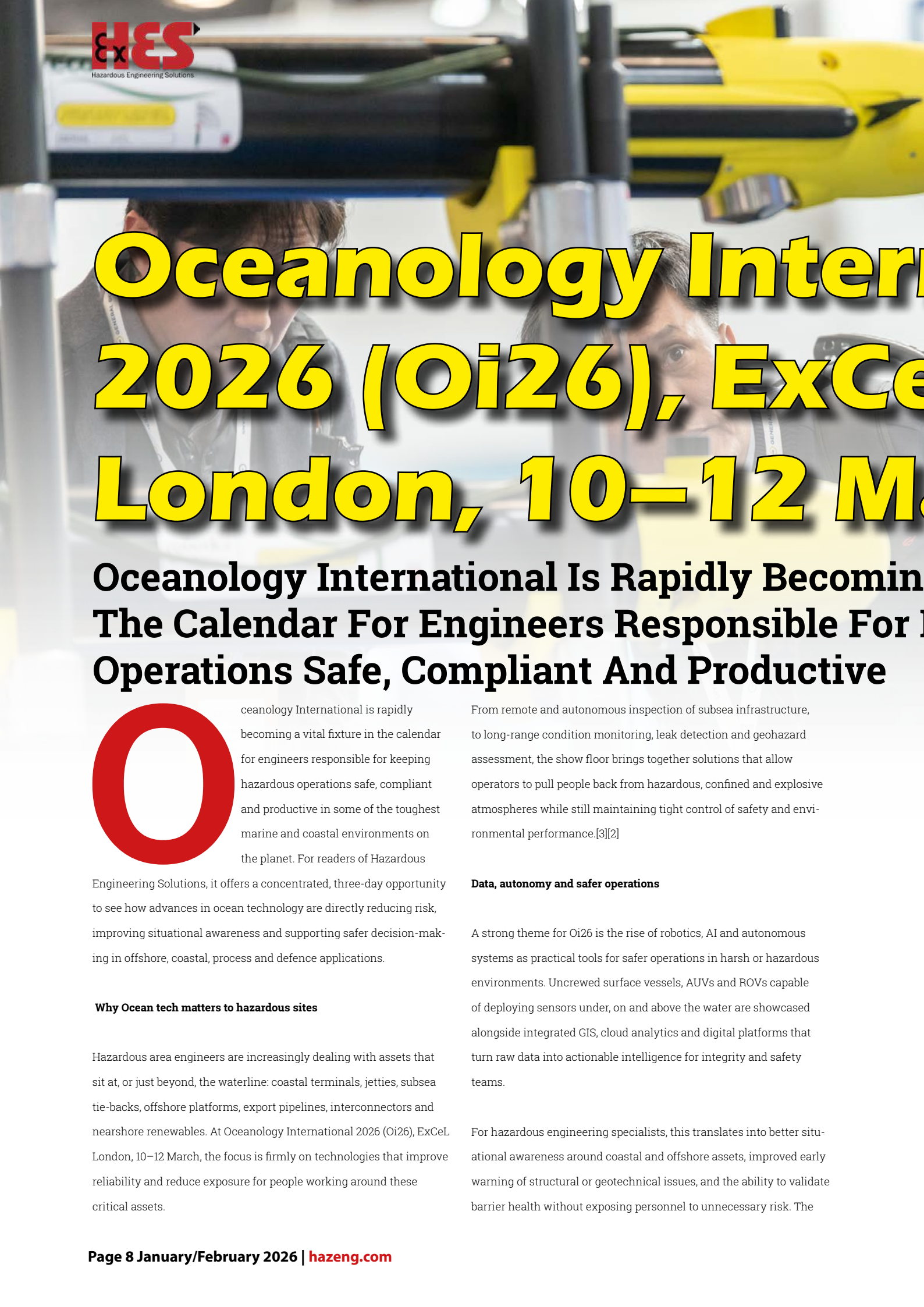
EEMUA Pressure Systems Seminar – Birmingham, UK – 23 April 2026

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Oceanology International 2026 (Oi26), ExCeL London, 10–12 March

Oceanology International Is Rapidly Becoming The Calendar For Engineers Responsible For Operations Safe, Compliant And Productive

Oceanology International is rapidly becoming a vital fixture in the calendar for engineers responsible for keeping hazardous operations safe, compliant and productive in some of the toughest marine and coastal environments on the planet. For readers of Hazardous

Engineering Solutions, it offers a concentrated, three-day opportunity to see how advances in ocean technology are directly reducing risk, improving situational awareness and supporting safer decision-making in offshore, coastal, process and defence applications.

Why Ocean tech matters to hazardous sites

Hazardous area engineers are increasingly dealing with assets that sit at, or just beyond, the waterline: coastal terminals, jetties, subsea tie-backs, offshore platforms, export pipelines, interconnectors and nearshore renewables. At Oceanology International 2026 (Oi26), ExCeL London, 10–12 March, the focus is firmly on technologies that improve reliability and reduce exposure for people working around these critical assets.

From remote and autonomous inspection of subsea infrastructure, to long-range condition monitoring, leak detection and geohazard assessment, the show floor brings together solutions that allow operators to pull people back from hazardous, confined and explosive atmospheres while still maintaining tight control of safety and environmental performance.[3][2]

Data, autonomy and safer operations

A strong theme for Oi26 is the rise of robotics, AI and autonomous systems as practical tools for safer operations in harsh or hazardous environments. Uncrewed surface vessels, AUVs and ROVs capable of deploying sensors under, on and above the water are showcased alongside integrated GIS, cloud analytics and digital platforms that turn raw data into actionable intelligence for integrity and safety teams.

For hazardous engineering specialists, this translates into better situational awareness around coastal and offshore assets, improved early warning of structural or geotechnical issues, and the ability to validate barrier health without exposing personnel to unnecessary risk. The



International Level Arch

g A Vital Fixture In Keeping Hazardous

maritime domain awareness and emergency response sessions, for example, focus on the latest ways to obtain the real-time picture needed when incidents unfold in complex marine environments.

New coastal focus: COAST

New for 2026, the COAST exhibition zone and conference track push coastal resilience, infrastructure and engineering to the foreground. Engineers working on flood defences, terminals, refineries and chemical plants in exposed coastal locations will find technologies addressing erosion control, shoreline stabilisation, sediment transport analysis and climate adaptation in dynamic, high-energy littoral zones.

High-resolution monitoring, real-time data streams and predictive modelling for storm, surge and flooding scenarios are central to this new feature, directly aligning with the risk-based approaches familiar to HES readers managing hazardous sites in vulnerable coastal corridors.

Scale, community and knowledge transfer

The 2024 edition of Oceanology International attracted 7,536 unique attendees from 91 countries and 443 exhibiting companies, with 110 product and service launches – the strongest performance in over a decade. That momentum carries into 2026, with thousands of engineers, surveyors, OEMs, regulators and solution providers expected to converge in London to discuss ocean exploration, environmental monitoring, sustainable marine engineering and the wider ocean enterprise.

For hazardous engineering professionals, it is an opportunity to test technologies hands-on, benchmark approaches with peers from off-shore, marine, defence and process sectors, and bring back ideas that enhance safety, resilience and compliance in their own high-risk environments. With registration now open, Oceanology International 2026 offers a timely, practical forum for anyone responsible for hazardous assets where sea, shore and complex engineering intersect.

<https://www.oceanologyinternational.com/london/en-gb/tickets.html>



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Bridging The Subsea Data Gap

The UK has long been recognised as a global leader in subsea engineering, with deep expertise across inspection, robotics, materials, integrity management and offshore operations. Yet despite this technical strength, a practical constraint continues to limit the pace of innovation: access to real subsea operational data.

Much of today's subsea research is built on small datasets or synthetic information generated in laboratory environments. While these approaches are valuable for early-stage development, they often fail to capture the complexity, variability and unpredictability of real offshore conditions. The result is a persistent gap between technologies that perform well in controlled settings and those that can be trusted to operate reliably on the seabed.

Other offshore nations have demonstrated a more effective model. Norway, the United States and Canada have invested in structured frameworks that allow researchers, developers and operators to access anonymised, well-governed operational data. These systems are designed to protect commercial sensitivities while still enabling engineers to validate algorithms, train autonomous systems and refine inspection tools using real-world evidence.

For the UK, the challenge is not about opening the door to proprietary information. It is about creating a balanced, trusted mechanism that turns decades of offshore experience into a shared national asset. When operational data can be responsibly transformed into training datasets, benchmarks and reference cases, innovation accelerates. Safety improves because systems are tested against real failure modes. Export opportunities grow because technologies are proven in conditions that mirror global offshore environments.

Subsea engineering excellence already exists in the UK. What is missing is the connective tissue between operational reality and technology development. By addressing data access with clear governance and industry collaboration, the UK can close this gap and convert engineering capability into sustained global technology leadership.



EEMUA 194 Subsea Engineering Basics

Materials selection and corrosion control training – with reality built in



Course for all involved in design, specification, commissioning, operation, maintenance, repair, and refurbishing of **ageing and new underwater energy production equipment** – to optimise cost-effective and reliable long-term operation.

Covering structural integrity, wells, pipelines, risers and much more, the EEMUA 194 Subsea Engineering Basics course encompasses the distilled know how of industry captured in the practical, **'how to' guidance of EEMUA Publication 194, Edition 4.**

Course **Tutors** incorporate all this industry know how with **decades** of their own **expert materials corrosion experience** – for effective learning with reality built in.

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- **Certification to industry requirements** by exam.
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Learning starts 2 November 2026.

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Hart's high speed doors should join North East England's Hall of Fame writes Chris Dobson

The immediate question in readers' minds is what 'Hall of Fame'. Even to those who have spent most of their lives in the North East very few can point to any of the inventions that have made this glorious region of Great Britain a renowned centre for invention defined as something that has never been made before.

What can these be? The development of the lifeboat, the steam locomotive, the electric safety lamp for coal mines, the hydraulic crane, the power grid and hydroelectricity. Looking at the last invention, a day out at Rothbury's Cragside estate will reinforce how hydroelectricity was used by William Armstrong in 1880 to power incandescent bulbs.

Combined, these inventions place the North East as a leader in innovation, not stopping at the initial concept stage but complete product development.

This leads me to the high speed door. This is another example of fresh thinking. Clearly industry needs buildings and ways into and out of them. "I had just that industrial building where the principal activity of manufacture of roller shutters was carried out," explains Douglas Hart, chairman of Hart Door Systems. "I noticed on several occasions the doors into the factory were left open, even on a chilly winter's day. Clearly energy costs must have been increased as heated air was effectively blown away. There was just one solution - a door which opened/closed automatically.

"The trusty roller shutter worked extremely well but it was slow, better left open in some people's minds. I had to come up with a solution which I did after consideration and initial product development," says Mr Hart. Welcome to the world of the high-speed door, in the case of Hart, Speedor, now a recognised global brand made by Hart Door Systems in Newcastle upon Tyne.

Hart's Speedor is designed to open and close rapidly to control temperature, airflow, hygiene, and traffic flow in commercial and industrial buildings.

Speedors are widely used in warehouses, factories, cleanrooms, and logistics sites for example. However this Newcastle gem is in use across the globe in 36 countries, a remarkable success story of an

industrial door now promoted as several sub-brands such as Mini, Storm, Smart and Cleanroom.

As an extremely busy company Hart Door Systems has several other brands such as its Firebrand range of fire shutters, Terror Screen security and roller shutters and Typhoon, tropical storm shutters. Its success can be measured by the fact that Hart has thousands of doors and shutters in action in 36 countries.

WWW.HARTDOORS.COM





Asset Integrity Leadership Certificate

To safeguard high-hazard operations, drive reliability and ensure long-term business sustainability, EEMUA's Asset Integrity Leadership Certificate course provides new and established industry leaders with the strategic framework to foster a culture of safety and excellence – from front line staff to the C-suite.

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Next course starts 2 March 2026

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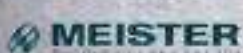
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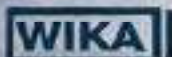


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Pressure Measurement in Extrusion: Where and Why

In extrusion processes, accurate pressure measurement is a fundamental requirement for maintaining safe, stable and efficient production. Whether manufacturing plastics, rubber, food products or specialty compounds, understanding what is happening inside the barrel and die is essential for controlling material flow and protecting both equipment and personnel.

Melt pressure sensors provide real time insight into the conditions within an extrusion system. By measuring pressure at critical points along the process, operators can detect abnormal changes before they develop into serious problems. Sudden pressure spikes may indicate blockages, material degradation or mechanical faults, while gradual pressure drops can signal wear, leakage or inconsistent feed. Without reliable measurement, these issues can go unnoticed until they cause downtime, scrap or safety incidents.

The location of pressure sensors plays a key role in their effectiveness. Sensors installed near the screw tip offer valuable information about how efficiently material is being conveyed and compressed. Additional measurement points close to the die entrance allow operators to monitor resistance and flow consistency as material is shaped into its final form. Together, these readings create a clear picture of overall process health and enable tighter control of operating parameters.

Beyond process stability, pressure measurement directly supports product quality. Consistent pressure helps maintain uniform melt density, temperature distribution and flow rate, all of which influence dimensional accuracy, surface finish and mechanical properties. When pressure is properly controlled, variations between batches are reduced and production becomes more predictable.

Safety is another major benefit. Extrusion systems operate under high temperatures and pressures, and uncontrolled conditions can lead to equipment failure or hazardous material release. Melt pressure sensors provide an early warning system that allows automatic shutdowns or alarms to be triggered when limits are exceeded.

By integrating pressure measurement into extrusion machinery and placing sensors at the right locations, manufacturers gain better visibility, improved control and increased confidence in their process. The result is safer operations, higher quality products and more efficient use of resources.



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Tank Integrity Manager course

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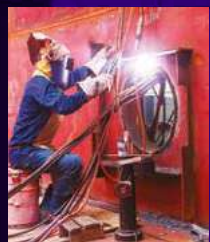


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Another Successful Year Forecast For Hart And Its Leading, Global, Brands

Hart Door Systems, the Newcastle upon Tyne-based manufacturer of several industrial door brands such as Speedor the high-speed door is confident of another successful year writes Chris Dobson.

Despite international uncertainties on the political front and the ever present debate on climate change, the company believes its leading brands such as Speedor and Typhoon will continue to be in demand.

The company has had many successes at home and abroad during 2025 not just through our Speedor range of high-speed doors but through its range of high quality shutters too. Both these leading brands deliver a choice of solutions for industry and commerce. The fundamentals delivered by Hart are quality throughout manufacture to installation as well as service back-up to comply with changing national and international safety standards.

Further, Hart is cognisant of Climate Change and the issues arising and the need to keep both Hart's and our clients' carbon footprints to a minimum by using the latest manufacturing technology to streamline the manufacturing process.

Looking more closely at the Speedor brand, as Britain's original manufacturer of the automatic high speed door, Hart has always led the way with developments in commercial door technology by being aware of issues facing industry. The Speedor high speed door is a good example of a robustly engineered door system for frequent use in high-traffic situations.

defined by DIN EN 12424. There are several options with the Speedor brand namely ECO, Storm, Mini, Conveyor and Cleanroom which together strengthen Hart's overall high-speed door offer.

Speedor Storm is Hart's bestselling door, ideal for challenging applications where reliability is essential. Its increasing success is based on its improved, rugged, design predominately for external use up to 8m x 6m/6m x 8m) often in robust operating conditions with high wind loads.

The company has always had quality as its prime driver. Success is not just in high-speed doors but shutters such as our new Typhoon range, the fundamentals are quality throughout manufacture to installation and service to comply with changing national and international safety standards.

Hart Door Systems is a global business supplying a range of door and shutter systems to sectors such as automotive, agriculture, communications, consumer foods, energy, environment, exports, food, logistics, manufacturing, power, sport, transport and utilities. To underline its global success Hart's doors can be found in nearly 40 international airports, from Newcastle upon Tyne to the Falklands, from Aruba to Vladivostok. This is a remarkable achievement.

www.hartdoors.com



This rapid roll door is robust, requires low maintenance and delivers exceptional wind resistance in exposed areas. While its high-speed opening and closing action improve efficiency, the energy-saving potential of this rapid roll door is high, controlling internal temperatures, escaping dirt, odours and noise.

Special features include; moisture-controlled electrics, mechanical components shielded from dust and dirt, and a unique guide system offering exceptional wind resistance up to class 5 as





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The popular and versatile Grab-O-Matic DLR range of rim grip fork attachment drum handlers are suitable for all types of steel drums, plastic 'L' ring drums and most fibre drums.

The extensive drum handling range includes the SC10 for lifting and rotating drums to dispense the contents, scissor grabs, base gripping units and waist grippers, the whole range can also be fitted to pedestrian stackers for use in confined spaces and places where fork trucks are banned. Bespoke units can be manufactured to suit customer specification.

We also have a range of Drum Cages for off-shore use and fork attachment Whiskey/Wine Barrel Base Grippers for use in the drinks industry.

We have also developed a Quick Attach/Release drum handler fork attachment for use in ATEX hazardous areas.

All Grab-O-Matic models can be Quick Attach/Release units and are securely attached to the forks and released without the need for the truck driver to dismount from his cab, saving time and increasing safety!

The drum handlers can be manufactured completely from stainless steel or part stainless steel to suit customer requirements and the spark proof area the units are operating in.

All Grab-O-Matic fork attachments are issued with Test Certificates, CE marked and manufactured entirely in the UK to ISO 9001:2015 and will be certified for use in ATEX spark proof areas.

For more information on our extensive range of drum and materials handling equipment please contact Andy Bow on 02380 643402 or email sales@stclare-engineering.co.uk



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Documentation: The Hidden Backbone of ATEX and IECEx Certification

For manufacturers of equipment intended for explosive atmospheres, technical documentation is not a formality—it is foundational to ATEX and IECEx certification. Certification bodies primarily assess conformity through the documented evidence provided. If that evidence is unclear, incomplete, or inconsistent, even well-designed equipment may face delays, redesign, or rejection.

Drawings and Schematics Define Safety

General arrangement and assembly drawings define how the equipment is built. These include details such as enclosure construction, joint types, fasteners, sealing methods, and clearances—all vital to verifying the chosen protection concept (e.g. Ex d, Ex e, Ex i, Ex p, or Ex t). Certification assessors use these drawings to confirm that the protection concept has been applied correctly and consistently. Gaps in documentation inevitably trigger technical queries.

Electrical schematics are equally important. They provide visibility into circuit topology, protection devices, segregation of circuits, and interfaces between hazardous and safe areas. In methods like intrinsic safety or increased safety, the schematic is central to assessing energy limitation, fault tolerance, and standard compliance. Poorly structured schematics are a common source of late-stage non-compliances.

BOMs and Datasheets Build Confidence

A clear, version-controlled Bill of Materials (BOM) links the assessed design to what is manufactured. It is essential for demonstrating configuration control, ensuring that each production unit matches the certified design. A generic or uncontrolled BOM undermines the credibility of the entire assessment.

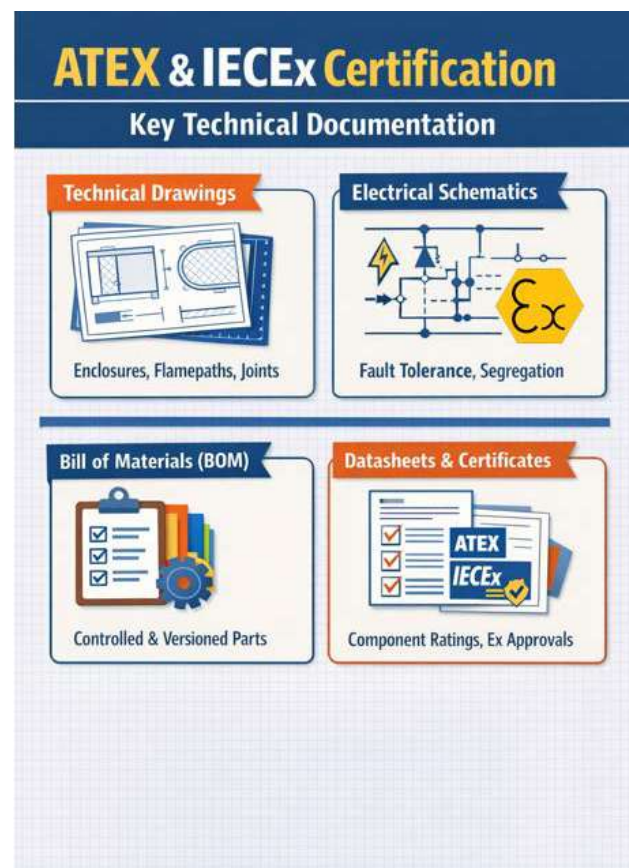
Equally, datasheets for critical components—such as relays, batteries, transformers, and cable glands—are indispensable. These documents provide the rated electrical, thermal, and mechanical limits that underpin compliance. Often, the validity of a protection concept hinges on specific component performance. Missing or ambiguous datasheets can halt the certification process entirely.

Component-level ATEX or IECEx certificates (e.g. for glands, en-

closures, barriers) are also vital. They allow the assessor to rely on third-party evaluations rather than re-assessing internal construction. Their absence can force deeper, more time-consuming evaluations at the equipment level.

Better Documentation, Faster Certification

High-quality documentation reduces lead times, avoids unnecessary technical queries, and supports ongoing quality assurance, change control, and audit readiness. For manufacturers, investing in documentation early in the development process leads to smoother, more predictable certification outcomes—and ultimately safer, more reliable products in the field.



SPM Special Machine is the ATEX explosion-proof medium-voltage junction box

A major innovation for the mining market developed by SPM Special Machine is the ATEX explosion-proof medium-voltage junction box rated at 20 kV.

This flameproof medium-voltage junction box is an enclosure designed for connecting and branching MV cables in hazardous areas (Zones 1, 2, 21, 22) where explosive atmospheres may be present, whether due to flammable gases, vapours, or combustible dusts.

The JBEXs junction box series from SPM Special Machine is ATEX-certified with Ex sb protection according to IEC 60079-33 (Special Protection "sb").

They are built either in stainless steel for marine environments or in carbon steel with special coating for mining environments.

ATEX classification and main technical characteristics of the JBEXs II 2 G Ex sb IIC T6 Gb; I M2 Ex sb I Mb Ambient temperature range: -20 °C to +50 °C

Rated operational voltage: 20 kV

Highest system voltage: 24 kV

Frequency: 50/60 Hz

Rated current: up to 630 A

Unique advantage Unlike traditional medium-voltage junction boxes with Ex eb protection, which are typically limited to 11 kV, the JBEXs can be safely used at higher voltages, up to 20 kV. This capability represents a significant advancement for hazardous-area MV systems. Thanks to these special features, the JBEXs is rapidly gaining popularity among SPM Special Machine customers especially for mining applications (category I M2), where operational voltages of 20 kV are commonly required.



Motor-Driven Cable Reel For Hazardous Areas Is Installed

In the figure, a power supply system with a conductor bar can be seen, where a motor-driven cable reel for hazardous areas is installed for medium-voltage tunnel applications.

The system supplies a tunnel boring machine (TBM) with an approximate power of 3 MW, using explosion-proof junction boxes with Ex db protection.

The EX protection type of the system is Ex h – ATEX category I M2, and the same design can also be developed according to the IECEx scheme.

The special motor-driven cable reel consists of a painted steel drum, on which a robust, flexible medium-voltage cable (12/20 kV) is wound. The drive system is powered by a motor-gearbox assembly and the cable winding and unwinding operations are controlled by a dedicated electrical control panel.

The core component of the motor cable reel is the slip ring, which is housed inside an Ex db flameproof enclosure.

This high-performance slip ring is designed for heavy-duty environments and is significantly more compact than competing products. Its uniqueness lies in the fact that the active parts are not air-insulated,

but instead isolated through a multi-layer insulation system, enabling the slip ring to reliably withstand high voltages up to 24 kV and maximum currents of approximately 680 A.

This high-voltage slip ring with insulated active parts is a patented technology of SPM Special Machine, allowing the company to meet new challenges in markets requiring extreme engineering solutions.



Explosion-Proof Cable Reels

The company SPM Special Machine is an Italian manufacturer rapidly gaining recognition worldwide for its innovative design and engineering of special electrical equipment intended for hazardous areas where flammable gases, vapours or explosive dusts may be present (such as petrochemical plants, refineries, mines, offshore platforms).

In this article, we will present some of the key products developed by SPM Special Machine, ranging from cable reels to slip rings, and finally the products specifically designed for mining applications, such as medium-voltage junction boxes and the ATEX motor-driven cable reel system.

Explosion-proof cable reels can be equipped with either spring-driven or motor-driven systems (electric, hydraulic, or pneumatic). The cable drum is manufactured entirely from stainless steel and is designed to handle flexible power, control, or data cables. A roller guide system or a cable distribution system ensures uniform winding and unwinding of the cable. The slip ring consists of low thermal-resistance sliding contacts housed inside a flameproof enclosure

(certified Ex d, ATEX, IECEx).

The electric motor is a heavy-duty torque motor Ex d, which automatically manages all phases of cable winding and unwinding.

Another area of expertise for SPM Special Machine is spring-driven cable reels. With a construction entirely in AISI 316L stainless steel, these products are suitable for long travel distances and medium-power applications, and can be installed either vertically or horizontally.



Explosion-Proof Slip Rings

Explosion-proof slip rings are electromechanical devices that allow the transmission of power, signals, or data between a fixed part and a rotating part, specifically designed and certified to operate in environments with an explosion risk caused by flammable gases, vapours, or potentially explosive mixtures. They are essential in industries where even the smallest internal spark could trigger an explosion—such as chemical and petrochemical plants, refineries, offshore platforms, and marine cranes.

The company offers a complete range of explosion-proof slip rings, capable of covering a wide variety of requirements in terms of current ratings, number of electrical circuits, and data-transmission performance. Key advantages of SPM Special Machine explosion-proof slip rings compared to competitors

- Low thermal power generated by the sliding electrical contacts;
- Current ratings up to 1200 A per active phase;
- Operating voltage up to 20 kV;
- Modular ring configuration for power, auxiliaries, digital/analog signals, data, and even fiber-optic transmission (FO-Ring), with a total number of rings up to 200 ;
- Very compact Ex db enclosures, treated with dedicated protective coatings. Explosion-proof classification of the SREX series (SREX150 / SREX300 / SREX506 / SREX690);
- Ex d flameproof enclosure (gas)* Gas group: IIB* Temperature classes: T4 / T5;
- Certification schemes: ATEX / IECEx.

The main strength of the SREX explosion-proof slip rings. The excellence of the SREX series lies in the innovative sliding contacts, patented by SPM Special Machine.

These ring-and-brush assemblies are manufactured using high-quality

materials, engineered to withstand harsh environments such as marine and mining applications, and feature very low thermal power dissipation, allowing their integration into extremely compact Ex d enclosures.

All these technical solutions are highly appreciated by SPM Special Machine customers during installation and operation in their plants.



ATEX Instrumentation: Improving Safety and Reliability in Hazardous Areas



Across industries such as oil & gas, chemical processing, petrochemical refining, pharmaceutical manufacturing and bulk storage, hazardous environments are a fact of life. Whenever flammable gases, vapours, mists or combustible dusts are present, operators face a dual challenge: ensuring robust process measurement and control, while also preventing ignition risks that could lead to catastrophic incidents.

This is where ATEX-certified and ATEX-compatible instrumentation becomes essential. PVL (Pressure Vacuum Level) offers a broad selection of products designed specifically for use in hazardous areas, including level switches, pressure switches, temperature monitoring devices, flow switches, electrical safety devices and intrinsic safety barriers – all built to support safe plant operation without sacrificing measurement accuracy or reliability.

Reliable level monitoring in explosive atmospheres

Level sensing is one of the most common requirements in hazardous area process plants, particularly for tanks holding volatile liquids or aggressive chemicals. PVL's ATEX selection includes a strong range of level monitoring equipment, including the S ATEX Custom Level Switch, which is designed to provide flexible liquid level detection in industrial vessels.

What makes this solution stand out is its adaptability. It offers between 1 and 6 switch points, can be manufactured up to 5 metres in length, and supports operating temperatures up to 130°C, with working pressure up to 6 bar. With multiple connection options – including terminal head, flying leads and DIN connector formats – it is well suited for both new installations and retrofits. Importantly, it is certified for hazardous areas with ATEX Ex d compliance, making it suitable for high-risk environments where flameproof protection is essential.

PVL's wider ATEX Level product range also includes devices such as side entry level switches and other robust sensors suitable for demanding plant applications, helping engineers maintain accurate level control in tanks, sumps and process vessels.

Temperature monitoring with flameproof protection

Maintaining temperature within safe limits is a core requirement in hazardous environments. Overheating can increase vapour pressure, accelerate chemical reactions, or degrade seals and gaskets – all of which raise the likelihood of a flammable release.

PVL's ATEX portfolio includes the FC ATEX Temperature Switch, a flameproof temperature switch certified to ATEX and IECEx. It supports adjustable set points in the range of 25°C to 215°C, with maximum temperature capability up to 300°C. The unit offers strong industrial durability with an IP66 rating, a robust housing, and a high electrical rating up to 15A at 250VAC.

For applications where simple but dependable over-temperature protection is required – for example on heating circuits, jacketed vessels, pipework, or thermal oil systems – flameproof temperature switching provides an effective safety layer.

Flow, pressure and process measurement for hazardous areas

Process stability in hazardous locations depends heavily on continuous monitoring of flow and pressure. PVL's ATEX Flow and ATEX

Pressure collections include a variety of measurement and switching devices designed to work safely in these conditions, including paddle flow switches, flowmeters and pressure switches.

These devices provide operators with critical confirmation that flow is present, pumps are operating correctly, filters are not blocked, and process conditions remain within design parameters. In hazardous zones, these measurements are not just about efficiency – they are fundamental to maintaining safe conditions and preventing runaway faults.

Intrinsic safety barriers and operator safety equipment

Measurement devices in ATEX zones must be supported by safe electrical interfacing. PVL supplies the Pulse Isolator 5202B, an intrinsically safe relay required when installing ATEX-certified equipment. Its role is to provide low-voltage supply and protection, reducing ignition risk through safe energy limitation. Features include dual output, cable error detection, and high galvanic isolation.

For operator safety and emergency use, PVL also offers EX-rated signalling products such as the PB150 Explosion Proof Manual Push Button, available with key reset options and accessories including LED indicators, labels and brackets. Built in GRP housing with UV-resistant paint, the PB150 is designed for corrosive hazardous environments and supports integration into PLC, ESD and DCS systems – with SIL2 compliance for functional safety applications.

A practical approach to hazardous area compliance

Ultimately, ATEX compliance is not just a regulatory tick-box: it's a long-term investment in operational uptime, workforce safety and plant integrity. With PVL's range covering sensors, switching, barriers and safety devices, engineers can build a complete hazardous-area measurement and control solution using proven technologies suited to real industrial demands.

www.pvl.co.uk



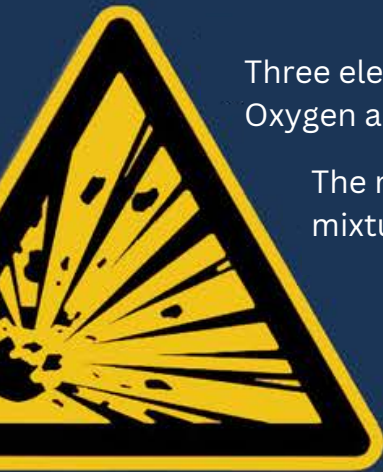
ATEX ZONES

Explosive atmospheres in the workplace can be caused by flammable gases or by combustible dusts.

Explosions can cause loss of life as well as significant damage.



RISK TYPES



Three elements are required to cause an explosion: Fuel (gas or dust), Oxygen and an Ignition source such as electric sparks or a short-circuit.

The risk of an explosion is based on the probability of a fuel and oxygen mixture occurring over time.

CAUSES OF EXPLOSIONS

EXPLOSION PREVENTIVE DEVICES



Model 507
Temperature Switch



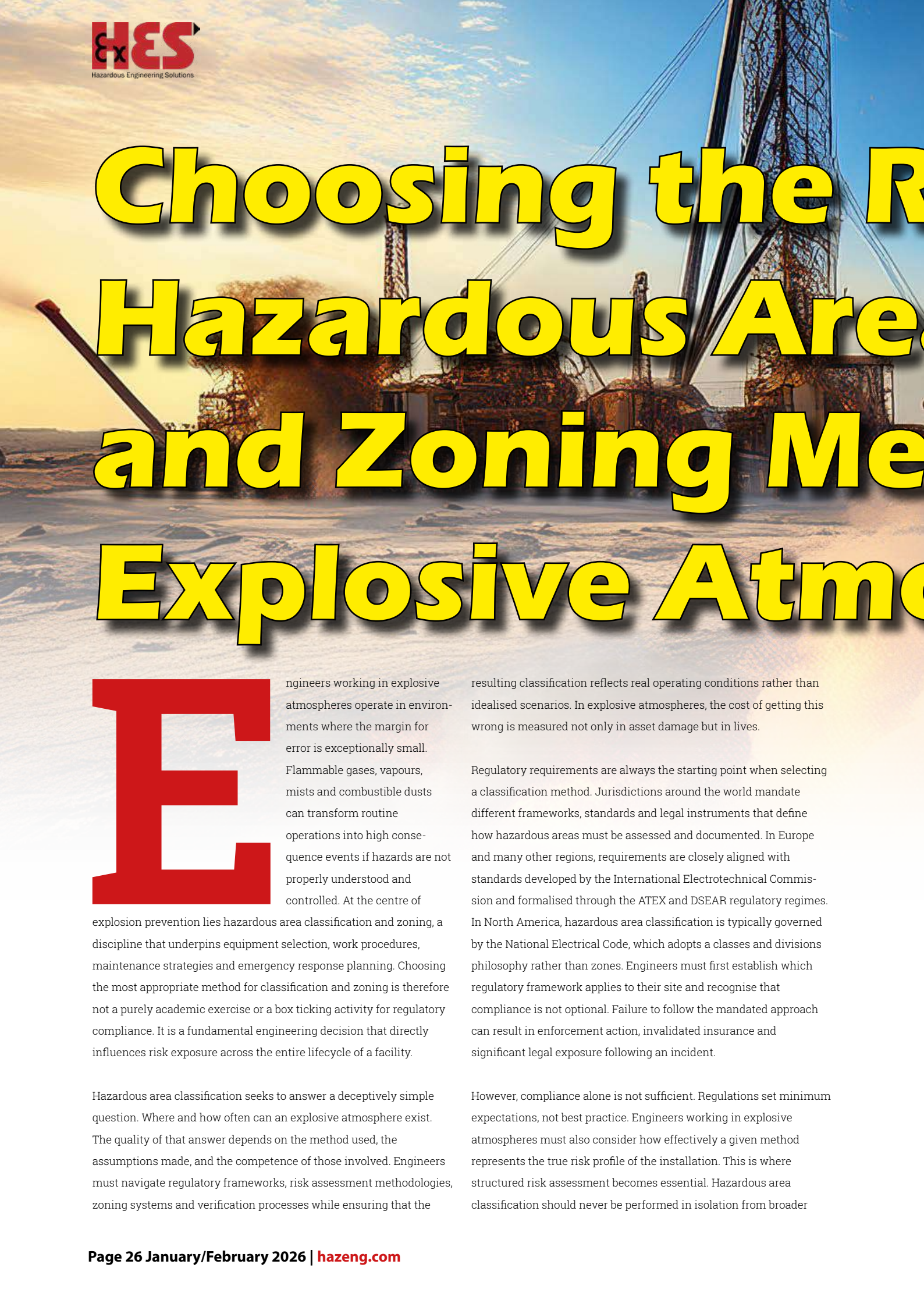
ULM-70 Ultrasonic
Level Meter



FC Series
Temperature Switch



GWG Overfill
Prevention Sensor



Choosing the Right Hazardous Area and Zoning Method for Explosive Atmospheres

Engineers working in explosive atmospheres operate in environments where the margin for error is exceptionally small. Flammable gases, vapours, mists and combustible dusts can transform routine operations into high consequence events if hazards are not properly understood and controlled. At the centre of explosion prevention lies hazardous area classification and zoning, a discipline that underpins equipment selection, work procedures, maintenance strategies and emergency response planning. Choosing the most appropriate method for classification and zoning is therefore not a purely academic exercise or a box ticking activity for regulatory compliance. It is a fundamental engineering decision that directly influences risk exposure across the entire lifecycle of a facility.

Hazardous area classification seeks to answer a deceptively simple question. Where and how often can an explosive atmosphere exist. The quality of that answer depends on the method used, the assumptions made, and the competence of those involved. Engineers must navigate regulatory frameworks, risk assessment methodologies, zoning systems and verification processes while ensuring that the

resulting classification reflects real operating conditions rather than idealised scenarios. In explosive atmospheres, the cost of getting this wrong is measured not only in asset damage but in lives.

Regulatory requirements are always the starting point when selecting a classification method. Jurisdictions around the world mandate different frameworks, standards and legal instruments that define how hazardous areas must be assessed and documented. In Europe and many other regions, requirements are closely aligned with standards developed by the International Electrotechnical Commission and formalised through the ATEX and DSEAR regulatory regimes. In North America, hazardous area classification is typically governed by the National Electrical Code, which adopts a classes and divisions philosophy rather than zones. Engineers must first establish which regulatory framework applies to their site and recognise that compliance is not optional. Failure to follow the mandated approach can result in enforcement action, invalidated insurance and significant legal exposure following an incident.

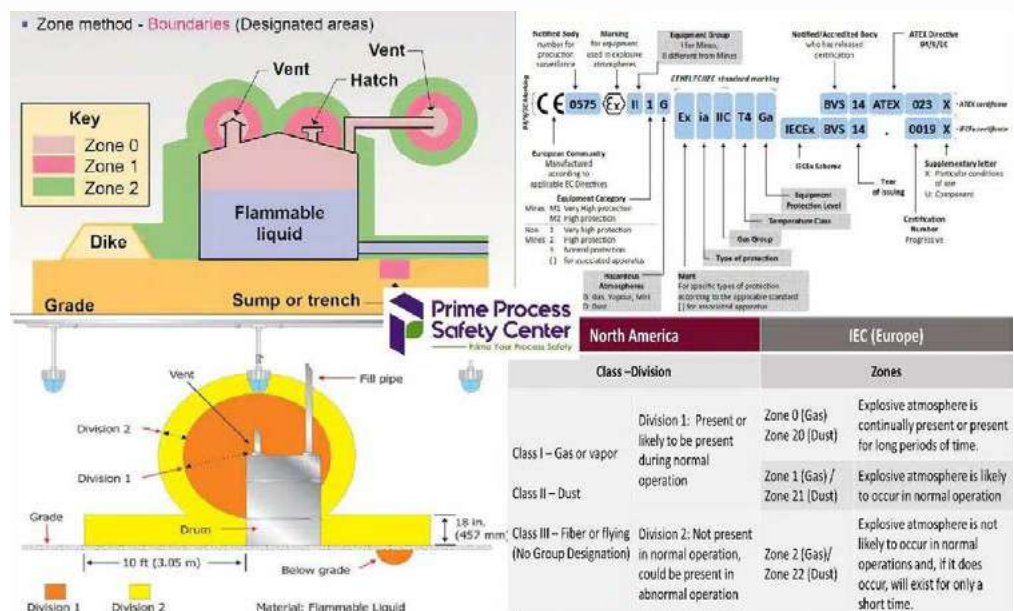
However, compliance alone is not sufficient. Regulations set minimum expectations, not best practice. Engineers working in explosive atmospheres must also consider how effectively a given method represents the true risk profile of the installation. This is where structured risk assessment becomes essential. Hazardous area classification should never be performed in isolation from broader

Right a Classification Method in Explosive Atmospheres

process safety activities. Techniques such as hazard and operability studies, failure modes and effects analysis and layer of protection analysis provide critical insight into how and why flammable releases may occur. These methods allow engineers to consider not only the presence of hazardous substances but also the likelihood, duration and scale of their release under both normal and abnormal conditions.

A robust risk assessment ensures that zoning decisions are grounded in evidence rather than assumption. It forces the engineering team to examine release sources such as flanges, valves, seals, vents and open processes and to understand how mechanical integrity, operating discipline and maintenance practices influence release frequency. In explosive atmospheres, assumptions about ventilation, occupancy and ignition source control can dramatically alter the risk picture. Without a documented and systematic risk assessment, zoning boundaries may be overly conservative, driving unnecessary cost, or dangerously optimistic, leaving equipment and personnel inadequately protected.

The choice between classification methods is one of the most visible decisions engineers must make. The zone system, derived from IEC standards, categorises areas based on the frequency and duration of explosive atmospheres. Zones are defined for gases and vapours as well as for combustible dusts, reflecting the different behaviours of these hazards. This approach is widely adopted in the chemical, petrochemical, pharmaceutical and energy sectors and is particularly well suited to facilities where hazardous substances are present under



a range of operating states. The zone system offers flexibility and nuance, allowing engineers to distinguish between continuous, frequent and infrequent hazards.

By contrast, the classes and divisions system used in North America focuses on whether explosive atmospheres are present under normal operating conditions or only under abnormal circumstances. This approach can be simpler to apply but may lack the granularity needed for complex facilities with multiple interacting hazards. Engineers working on global projects must often reconcile these two philosophies, particularly where equipment is sourced internationally or where corporate standards differ from local regulations. In such cases, the selected method must satisfy regulatory requirements while remaining intelligible and defensible to all stakeholders.

Beyond the choice of system lies the challenge of defining zoning criteria. This is where engineering judgement plays a decisive role. Zoning boundaries are not arbitrary lines on a drawing. They are the product of detailed analysis of substance properties, release characteristics and environmental conditions. The type of hazardous substance, whether gas, vapour or dust, determines how it disperses and accumulates. Properties such as flash point, autoignition temperature, vapour density and flammability limits influence the size and shape of hazardous zones. Release rates, whether continuous, primary or secondary, must be evaluated realistically rather than conservatively by default.

Ventilation is a critical factor that is frequently misunderstood. Natural and forced ventilation can significantly reduce the extent of hazardous zones, but only if it is reliable, effective and maintained. Engineers must consider worst case scenarios, including loss of ventilation, blocked openings or adverse weather conditions. Similarly, ignition source assessment must extend beyond obvious electrical equipment to include hot surfaces, static electricity, mechanical friction and non routine activities such as maintenance and sampling. In explosive atmospheres, zoning criteria must reflect how the facility actually operates, not how it is intended to operate on paper.

Once zones have been defined, documentation becomes the primary means by which classification decisions are communicated and preserved. Hazardous area classification drawings, schedules and reports are living documents that must evolve with the plant. Clear visual representation of zones is essential for engineers, operators, contractors and emergency responders. Symbols, colours and legends must be consistent and unambiguous. The rationale behind each zoning decision should be recorded so that future modifications can be assessed intelligently rather than requiring rework from first principles.

Effective documentation also supports competence development. Engineers and technicians working in explosive atmospheres rely on accurate zoning information to select equipment, plan maintenance activities and apply permit to work systems. When documentation is outdated or inaccessible, unsafe assumptions quickly emerge. Changes to processes, materials or layouts must trigger formal review of hazardous area classification, ensuring that the zoning remains valid throughout the lifecycle of the installation. In this context, documentation is not an administrative burden but a critical safety control.

Verification is the final but often neglected stage of hazardous area classification. Verification involves confirming that the assumptions used in classification remain valid in the real world. This may include gas detection surveys, airflow measurements, temperature monitoring and inspection of containment systems. Verification activities provide confidence that zoning boundaries reflect actual conditions and allow engineers to identify deviations before they lead to incidents. In high hazard installations, periodic verification should be embedded into inspection and audit programmes rather than treated as a one off exercise.

Advances in digital tools are increasingly influencing how engineers approach hazardous area classification. Modelling software, three dimensional plant visualisation and geographic information systems can enhance the accuracy and transparency of zoning decisions,

Relationship between ATEX Zones and required equipment



ATEX Zone			Equipment			
Zone: a place in which an explosive atmosphere is...	Atex Zone		Level of protection is assured in...	Category	Marking	
	Gases	Dusts			Gases	Dusts
Continually present	0	20	The event of two faults occurring independently of each other	1	Ex II 1G	Ex II 1D
Likely to occur in normal operation occasionally	1	21	The event of one equipment fault	2	Ex II 2G	Ex II 2D
Not likely to occur in normal operation and only for very short durations	2	22	Normal operation	3	Ex II 3G	Ex II 3D

particularly in complex facilities. When combined with quantitative risk assessment techniques, these tools allow engineers to explore alternative scenarios, evaluate the impact of design changes and justify zoning decisions with greater confidence. However, digital tools do not replace engineering judgement. They amplify it. The quality of the output remains dependent on the quality of the input data and the competence of the user.

There are additional considerations that experienced engineers recognise as critical to effective zoning. One of these is the concept of area declassification. Eliminating or substantially reducing hazardous zones through process changes, improved containment or substitution of hazardous substances is often the most effective risk reduction strategy. While not always feasible, declassification should be actively explored during design and modification projects rather than accepted as unrealistic. Another consideration is organisational maturity. Hazardous area classification is only as effective as the systems that support it. Training, maintenance, change management and incident reporting all influence whether zoning assumptions remain valid over

time.

Ultimately, choosing the best method for hazardous area classification and zoning is not about selecting a standard from a list. It is about aligning regulatory compliance, risk assessment, engineering design and operational reality into a coherent framework that genuinely reduces explosion risk. For engineers working in explosive atmospheres, hazardous area classification is both a technical discipline and a professional responsibility. When approached systematically and reviewed continuously, it provides a powerful foundation for safe, reliable and compliant operations in some of the most challenging environments in industry.

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Windows 11 IoT Enterprise LTSC for Arm64: The suitable Microsoft® platform for the IS945.1 tablet in the oil and gas industry

The oil and gas industry places the highest demands on its IT infrastructure. Absolute reliability, long life cycles, minimal energy consumption and strict safety standards are essential. The IS945.1 tablet from i.safe MOBILE has been equipped with Windows 11 IoT Enterprise LTSC for Arm64 to meet precisely these demanding conditions.

Windows 11 IoT Enterprise LTSC for Arm64 is far more than a conventional operating system. This industrial long-term version has been specifically designed for devices that need to operate reliably, securely and continuously for years. The LTSC model (Long-Term Servicing Channel) guarantees up to ten years of support through to October 2034, exclusively with security and quality updates, without disruptive feature updates or forced interface changes. For the IS945.1 tablet, this means stable and predictable system behaviour throughout its entire service life - invaluable in an industry where systems often run around the clock at hard-to-reach or remote locations.

Choosing Windows over alternative platforms means bridging mobility with desktop-grade performance and enterprise integration. The IS945.1 provides a familiar environment for operators and IT departments, accelerating deployment whilst maintaining robust features such as BitLocker, Hyper-V and Remote Desktop. Maximum application compatibility ensures seamless integration into existing Windows-based IT and security infrastructures, protecting established investments.

Arm-based processors are characterised by extremely low energy consumption, high efficiency, and minimal heat generation, eliminating the need for large battery packs or extensive cooling systems. This results in a lightweight and compact device with optimal battery runtimes, well suited for shift-based field work.

This design, made possible by high integration of modem, GPU and AI engines in a single system-on-chip, ensures operator friendliness without compromising ruggedness.

Refineries, drilling platforms, and pipeline facilities are classified as hazardous or potentially explosive environments. In these settings, the ATEX and IECEx certifications

of the IS945.1 tablet confirm its suitability for safe operation in accordance with stringent regulatory requirements.

Modern oil and gas facilities generate enormous amounts of data. The IS945.1 enables powerful edge computing - local data processing directly at the point of use. This is particularly valuable for real-time monitoring, rapid response to anomalies, predictive maintenance and SCADA control systems. Local processing reduces dependence on cloud connectivity and enables faster, autonomous decisions in the field. The platform supports local AI inference and secure 5G/4G connectivity directly on-device.

As critical infrastructure, the oil and gas industry is a prime target for cyber attacks. Windows IoT Enterprise LTSC offers comprehensive security features such as Secure Boot, TPM support, BitLocker encryption and long-term security patches throughout the entire lifecycle. The IS945.1 tablet from i.safe MOBILE with Windows 11 IoT Enterprise LTSC for Arm64 combines all features that modern oil and gas operations require: long-term stability, explosion protection, superior energy efficiency, edge computing capabilities and the highest security standards. It represents optimal IT/OT convergence, empowering secure field operations whilst protecting software investments - the ideal solution for digitising critical processes in a future-proof manner.





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**AROUND THE CLOCK,
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Gas Explosion Proof Extruder Motor In Size 1000

Replacing an explosion-proof size 1000 motor at short notice is an ambitious task. For the German family-run company Menzel Elektromotoren, it was a chance to prove once again its extensive expertise in the design, manufacture and certification of explosion-proof motors. A plastics producer had to replace an existing extruder motor with ignition protection type Ex d (flameproof encapsulation) very urgently.

Menzel and the client found that a motor with the ignition protection type Ex ec (increased safety) would satisfy the current hazardous zone requirements. The motor manufacturer selected a suitable three-phase squirrel-cage motor from its extensive stock, individually adapting it for the drive task and the installation site. The project hinged on upgrading the motor for zone 2 hazardous areas with potentially explosive gas atmospheres and getting it the necessary ATEX certification.

Menzel's officially certified in-house experts labeled the motor II 3G Ex ec IIC T4 Gc. The new motor with a lower shaft height at 630 mm was brought up to the center height of the old motor by means of a welded base. Since the new motor has four winding systems instead of the two of the old one, Menzel also made electrical modifications for operation on the existing frequency converter.

The project exposes the existing supply gap for explosion-proof motors in large sizes: the few existing suppliers can only offer building a motor from scratch – with the corresponding months-long delivery times. Menzel stands out from the competition with its large stock

inventory and ability to configure and adapt stock electric motors in-house for hazardous areas and certify them according to the latest ATEX directives. In this instance, only two weeks passed from order placement to installation at the customer's site.

The customer came to Berlin for testing and acceptance and praised Menzel's flexibility.

More about motors with ignition protection type Ex ec (increased safety) for zone 2 or 22 hazardous areas with gas or dust atmospheres:

<https://www.menzel-motors.com/ex-na/>



Fasttrack customization and certification for hazardous areas – the extruder motor is now already in use and the customer is satisfied

Ledlenser and JSP Set New Standard for Helmet and Headtorch Safety Integration

At Ledlenser, we recognise that Personal Protective Equipment (PPE) is more crucial than ever - not only that it is worn consistently, but that it works seamlessly with other essential products on site. Research shows that nearly 80% of headtorch users wear them in conjunction with a helmet. As a global leader in

portable lighting solutions, we have partnered with JSP, the industry leader in industrial head protection, to ensure that our products meet the highest standards of compatibility and safety when used together. With a shared customer base spanning industries such as rail, utilities, and highways, both JSP and Ledlenser understand the challenges faced by those working in some of the harshest and most hazardous environments. From underground confined to nighttime motorway maintenance under heavy traffic, industrial users depend on their PPE to deliver consistent, high-performance protection in every situation. For this reason, we sought independent validation that Ledlenser headtorches would not compromise helmet integrity, performance or compliance.

To achieve this, selected Ledlenser headtorches were put through rigorous testing at JSP's world class UK-based, independently accredited testing facility. They were subjected to both EN12492 helmet impact tests - one of the most stringent performance standards in Europe - and the ANSI Type II tests from the United States. These tests simulate some of the most credible and demanding impact scenarios and were intended to validate that JSP helmets will maintain their protective function even when a headtorch is attached. We are proud to confirm



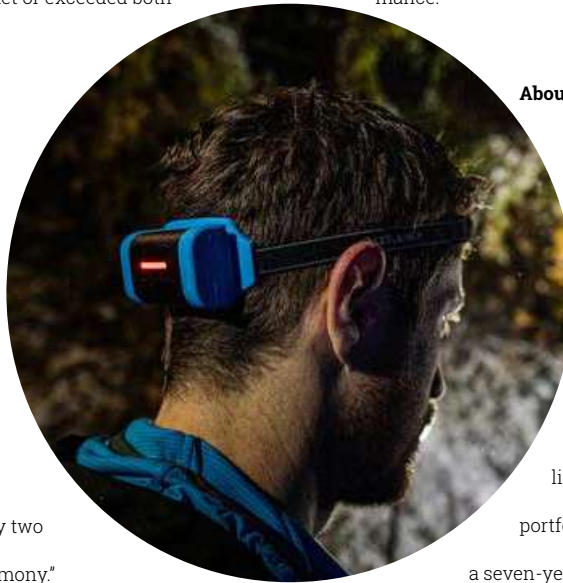
that all tested Ledlenser headtorches met or exceeded both sets of requirements.

Richard Fuller, Head of Sales says "Our sole focus for our industrial users is safety. By working alongside JSP, we've been able to verify that our headtorches integrate with helmets without introducing additional risk. Workers can have complete confidence that when using a Ledlenser headtorch with a JSP helmet, they are protected by two leading safety solutions working in harmony."

This collaboration underscores the shared commitment of both companies to protect those working in high-risk environments from multiple hazards. JSP helmets are trusted worldwide for their impact resistance and innovation in safety, while Ledlenser continues to pioneer in lighting performance and durability. Together, we ensure that workers are equipped not only with the best-performing headtorches, but also the peace of mind that their PPE will stand up to even the toughest conditions.

By setting this benchmark for PPE integration, compatibility and interoperability, Ledlenser and JSP reaffirm their leadership in their respective fields, ensuring that safety never comes second to perfor-

mance.



About Ledlenser

Ledlenser is one of the world market leaders for portable light. The company has made a name for itself as a true LED pioneer and LED torch manufacturer since 2000. Head Torches and torches as well as lanterns and work lights are part of the light specialist's portfolio. German engineering and design, a seven-year warranty upon registration and a

variety of revolutionary technologies make the award winning

Ledlenser products powerful companions – and indispensable in everyday life, for sport or at work.

More information on Ledlenser: www.ledlenser.co.uk



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The VertEx modular booth system. Dust issues solved...

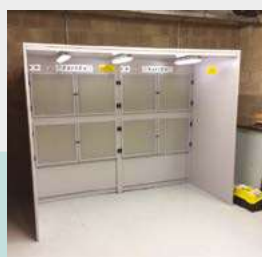
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- **Welding and Grinding** booths also available with HEPA final filter.
- **Rapid Reconfiguration** - standard components mean VertEx booths can be reconfigured on demand.



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- **AirBench** is available in a wide range of sizes and filter types to suit your application
- **AirBench** is plug and go - only needing unwrapping and plugging in to a 13 amp socket
- You get extraction and work bench in one compact unit

...would you be interested?



Doubt it can be that simple? Contact us for an on-site demonstration.



Rethinking Cable Entry Systems in Hazardous Environments: Why Multi-Cable Transit Technology Is Replacing Traditional Cable Glands

Cable entry systems are rarely at the centre of plant design discussions, yet they play a crucial role in safety, reliability and long-term maintainability, particularly in hazardous and harsh industrial environments. For decades, traditional cable glands have been the default solution for routing cables into enclosures, junction boxes and cabinets. While proven and familiar, they present increasing challenges as installations become more compact, more complex and more densely populated with cables.

Modern industrial facilities demand faster installation, improved sealing performance, greater flexibility and future-proof design. Roxtec multi-cable transit technology has emerged as a compelling alternative to conventional cable glands, offering a modular sealing system capable of accommodating multiple cables through a single entry point while maintaining certified protection against a wide range of risks.

For engineers responsible for specification, installation and maintenance in hazardous areas, understanding how this technology differs from traditional approaches is essential.

The Limitations of Traditional Cable Glands

Traditional cable glands are designed to seal around a single cable. In small installations this approach is straightforward, but problems arise as cable counts increase. Each additional cable requires its own gland, its own hole, and its own installation time. Enclosures quickly become crowded with penetrations, leaving little room for expansion and increasing the risk of installation errors.

In hazardous environments, every penetration represents a potential weak point. Improperly installed glands, incorrect tightening torque or incompatible materials can compromise ingress protection, explosion protection integrity and long-term reliability. Retrofitting or adding new cables later often requires drilling additional holes, shutting down equipment and re-certifying enclosures.

Cable glands also struggle when cables are supplied with factory-fitted connectors. These connectors must usually be removed to pass the cable through a gland and then re-terminated, introducing extra labour, additional tools and opportunities for error.

As plants move toward higher automation levels and digitalisation, the number of cables entering cabinets continues to rise. Traditional gland-based approaches simply do not scale efficiently.

A Modular Alternative

Roxtec multi-cable transits use a modular sealing system built around frames and adaptable rubber modules. Instead of sealing one cable per

penetration, a single transit frame can accommodate many cables of varying diameters in one compact opening.

Each cable is sealed individually within the module, while the complete assembly is compressed to create a gas-tight and water-tight seal. The system allows cables to be added or removed without replacing the entire transit or modifying the enclosure.

For hazardous environments, Roxtec systems are tested and certified to relevant standards, including ATEX and IECEx, as well as ingress protection, fire resistance, blast mitigation and electromagnetic shielding where required. This enables a single sealing solution to address multiple risks simultaneously.

Installation Efficiency and Reduced Labour

One of the most immediate benefits of multi-cable transit systems is the reduction in installation time. Instead of drilling multiple holes and fitting individual glands, installers create a single opening for the frame. Cables are routed through modules and compressed using a simple wedge mechanism.

In practice, this can reduce installation time by up to fifty percent compared with traditional gland installations. Fewer holes mean less drilling, less deburring and fewer potential alignment issues. The simplified workflow is especially valuable in retrofit projects or shutdown windows where time is limited.

For hazardous area installations, reduced installation time also translates into reduced exposure of personnel to potentially dangerous conditions.

Supporting High-Density Cable Management

Modern control systems, instrumentation networks and power distribution architectures require large numbers of cables entering relatively small enclosures. Roxtec transits allow significantly higher cable density than gland-based solutions.

By grouping cables within a single frame, engineers can minimise enclosure size and weight. Smaller cabinets are easier to mount, easier to support structurally and often less expensive. Space saved inside the enclosure can be used for additional equipment or improved airflow.

High-density cable management also improves organisation. Cables are arranged systematically within modules, reducing congestion and making future identification and tracing easier.

Routing Cables with Connectors Intact

A major practical advantage of modular transits is the ability to route

cables with connectors already attached. Instead of removing and re-terminating connectors, split modules allow the cable and connector to be placed into the system without modification.

This feature is particularly valuable for fibre optic cables, data cables and pre-assembled harnesses, where maintaining factory termination quality is critical. It reduces labour, eliminates re-termination errors and preserves manufacturer warranties.

For engineers working in hazardous environments, fewer terminations mean fewer potential failure points.

Built-In Flexibility for Future Expansion

Facilities rarely remain static. New instruments, additional sensors and system upgrades are inevitable over the life of a plant. Traditional cable glands provide little flexibility for expansion without mechanical modification of the enclosure.

Roxtec systems allow spare capacity to be built into the original design. Unused module positions can be filled with solid blank modules and later replaced with cable modules when new cables are added. No drilling, welding or hot work is required.

This capability simplifies change management, reduces downtime and avoids the need to re-certify enclosures after modifications.

Protection Against Multiple Risks

In hazardous environments, cable entry systems must do far more than simply hold cables in place. They must protect against ingress of water and dust, gas migration, flame propagation, pressure differentials, vibration and sometimes electromagnetic interference.

Roxtec transits are designed as multi-risk barriers. Depending on configuration and certification, they can provide high IP ratings, gas and water tightness, fire resistance and explosion pressure containment.

Using a single certified solution to address multiple hazards simplifies specification and documentation. It also increases confidence that the overall integrity of the enclosure is maintained.

Application Across Hazardous and Industrial Environments

Multi-cable transit technology is used in a wide range of applications, from terminal boxes and control panels to outdoor junction boxes and large electrical rooms. In hazardous areas, they are commonly applied

in oil and gas facilities, chemical plants, pharmaceutical manufacturing, power generation and bulk handling operations.

Their compact footprint and high sealing performance make them particularly suitable for offshore installations, modular skids and packaged equipment where space and weight are at a premium.

Total Cost of Ownership

While the initial unit cost of a multi-cable transit may be higher than a single cable gland, the overall cost picture tells a different story. Reduced installation time, fewer drilled holes, smaller enclosures, simplified expansion and improved reliability all contribute to lower total cost of ownership.

For asset owners focused on lifecycle performance, these savings are often more significant than upfront component costs.

A Shift in Engineering Mindset

The move from individual cable glands to modular transit systems represents a broader shift in how engineers approach enclosure design. Instead of treating cable entries as an afterthought, they become a strategic element of system architecture.

By adopting multi-cable transits, engineers gain a scalable, flexible and certified solution that aligns with modern plant requirements.

Conclusion

Traditional cable glands have served industry well for many years, but the demands of today's hazardous and high-density installations require a more advanced approach. Roxtec multi-cable transits offer a proven alternative that improves safety, reduces installation time, supports future expansion and provides certified protection against multiple risks in one compact system.

For engineers responsible for designing, specifying and maintaining equipment in hazardous environments, rethinking cable entry technology can deliver tangible benefits across safety, reliability and lifecycle cost.

Discover why engineers worldwide are choosing Roxtec over traditional cable glands at:

<https://lnkd.in/ezbvxsxys>



Engineering Control of Chemical Hazards in High Risk Environments

Engineers working in hazardous environments operate at the intersection of complex processes, high energy systems, and potentially dangerous substances. Among the most persistent and consequential risks on industrial sites are those associated with unsafe chemical handling practices. Whether in chemical processing plants, offshore facilities, laboratories, energy infrastructure, or advanced manufacturing environments, failures in chemical safety can escalate rapidly from minor incidents into serious injuries, environmental damage, or catastrophic events. The challenge is not simply knowing that chemicals are hazardous but ensuring that robust systems are in place to manage those hazards effectively and consistently under real operating conditions.

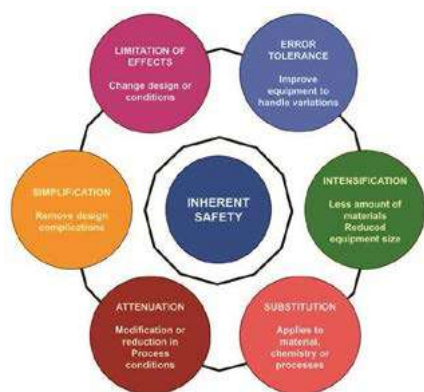
Unsafe chemical handling rarely stems from a single cause. It is usually the result of gaps in training, inadequate procedures, complacency developed over time, poor communication, or equipment that no longer meets operational demands. Engineers are uniquely positioned to influence how these risks are managed because they design systems, specify materials, define operating envelopes, and often set the tone for safety culture on site. Effective mitigation therefore requires a systematic, engineering-led approach that prioritises prevention rather than reaction.

One of the most critical foundations of safe chemical handling is hazard identification and risk evaluation. Engineers must understand not only the intrinsic properties of the chemicals in use but also how those substances behave under different temperatures, pressures, concentrations, and exposure scenarios. This includes understanding reactivity, toxicity, flammability, corrosivity, and the potential for long term health effects. A structured risk assessment process allows these hazards to be evaluated in the context of real tasks rather than theoretical scenarios. When risks are prioritised using a clearly defined risk matrix, resources can be focused where they will have the greatest impact. The objective should always be to reduce risks to a level that is as low as reasonably practicable while recognising that elimination at source is preferable to reliance on procedural controls.

Prevention begins at the design and planning stage. Many unsafe practices emerge because systems were not designed with safe handling in mind. Poorly located chemical stores, inadequate ventilation, incompatible materials of construction, or congested work areas can all increase the likelihood of exposure or accidental release. Engineers should apply inherently safer design principles wherever possible by substituting less hazardous chemicals, reducing inventory volumes, simplifying processes, and designing layouts that minimise manual handling. By addressing hazards before operations begin, the need for complex administrative controls and personal protective equipment is significantly reduced.

CHEMICAL SAFETY	
 UNDERSTAND THE CHEMICAL Read the label and Safety Data Sheet (SDS)	 WEAR APPROPRIATE PPE Use gloves, goggles, and lab coat
 USE PROPER STORAGE AND LABELING Store in a labeled, compatible container	 WORK IN A WELL-VENTILATED AREA Use fume hood for ventilation
 AVOID IGNITION SOURCES Keep away from open flames and sparks	 DO NOT EAT, DRINK, OR SMOKE Prohibited in areas where chemicals are used
 PRACTICE GOOD HYGIENE Wash hands thoroughly after handling	 BE PREPARED FOR EMERGENCIES Know locations of emergency equipment
 DISPOSE OF CHEMICALS SAFELY Follow local regulations for disposal	 GET TRAINED AND STAY INFORMED Attend chemical safety training
 DISPOSE OF CHEMICALS SAFELY Follow local regulations for disposal	 GET TRAINED AND STAY INFORMED Attend chemical safety training





Training remains one of the most visible and frequently discussed aspects of chemical safety, yet its effectiveness depends heavily on quality and relevance. Engineers should ensure that training goes beyond generic safety briefings and is tailored to the specific chemicals, equipment, and tasks encountered on site. Workers need to understand why certain controls are in place, how failures can occur, and what early warning signs indicate a developing problem. Practical training that includes real scenarios, emergency drills, and hands on demonstrations is far more effective than theoretical instruction alone. Regular refresher training is essential, particularly when processes change, new chemicals are introduced, or incident trends indicate emerging risks.

Clear and enforceable safety protocols are another essential layer of protection. These protocols must define how chemicals are received, transferred, stored, used, and disposed of. Proper labelling is critical to prevent misidentification and incompatible mixing, especially in multi contractor environments where familiarity with site specific practices cannot be assumed. Storage conditions should be designed to control temperature, prevent leaks, and segregate incompatible substances. Disposal procedures must comply with regulatory requirements while ensuring that waste chemicals do not introduce new hazards during handling or transport. Engineers play a key role in developing and reviewing these protocols to ensure they remain aligned with current operations and regulatory expectations.

Routine inspections and audits are often underestimated in their ability to prevent incidents. Over time, small deviations from established procedures can become normalised, particularly on sites with high production pressures. Regular inspections of chemical storage areas, transfer systems, containment measures, and safety equipment help identify early signs of deterioration or non compliance. Engineers should treat these inspections as opportunities to learn rather than exercises in fault finding. Engaging operators during inspections often reveals practical issues that may not be apparent from documentation



alone, such as awkward access, unclear labelling, or equipment that is difficult to clean or maintain safely.

An effective chemical safety programme also depends on the correct selection and use of personal protective equipment. While PPE should never be the primary means of risk control, it remains essential in many hazardous environments. Engineers must ensure that PPE is specified based on a thorough understanding of chemical exposure risks and that it is compatible with the substances being handled. Equally important is ensuring that PPE does not introduce new risks by restricting movement, reducing visibility, or causing heat stress. Continuous feedback from users is vital to ensure that PPE is worn correctly and consistently rather than bypassed due to discomfort or impracticality.

Reporting and learning from unsafe practices and near misses is a defining characteristic of mature safety cultures. Engineers should actively encourage the reporting of deviations, spills, and procedural weaknesses without fear of blame. Each report represents an opportunity to identify systemic issues and improve controls before an incident occurs. Root cause analysis should focus on why the system allowed the unsafe practice to develop rather than who was involved. When corrective actions are implemented, they should be communicated clearly so that the workforce understands how their input has led to tangible improvements.

Ultimately, mitigating risks from unsafe chemical handling is not about adding more rules or paperwork. It is about designing systems that make safe behaviour the easiest and most reliable option. Engineers working in hazardous environments have both the technical expertise and the professional responsibility to drive this approach. By integrating hazard prevention into design, maintaining rigorous training and inspection regimes, and fostering a culture of continuous improvement, chemical risks can be effectively controlled before they escalate into serious incidents. The question is not whether chemical hazards can be eliminated entirely, but whether we are prepared to manage them intelligently, systematically, and proactively in the environments where they pose the greatest threat.

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