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EX COMPLIANCE ENGINEERING YEARBOOK

2026

FOREWORD

Ex Compliance as Owner's Engineering Responsibility

Explosion protection is often treated as a technical specialty, a regulatory obligation, or an inspection topic. In reality, it is none of these in isolation. It is an Owner's Engineering responsibility.

Over the past year, this Ex Compliance Engineering series deliberately avoided repeating standard clauses or regulatory text. Instead, it focused on how explosion protection actually succeeds or fails in real industrial environments — across design, installation, operation, inspection, modification, and people.

One conclusion becames unavoidable:

- Explosion protection does not fail because standards are unclear.
- It fails because systems degrade, assumptions replace verification, and responsibilities are fragmented Certificates, markings, inspections, and documentation are necessary.
- They are not sufficient.

From an owner's perspective, Ex compliance is not a one-time achievement at handover. It is a condition that must be continuously maintained, verified, and demonstrable throughout the entire life of the installation. This requires more than technical knowledge. It requires governance.

Owner's Engineering in hazardous areas means:

- understanding where legal responsibility begins and ends
- ensuring design intent survives installation and modification
- demanding competence where decisions affect ignition risk
- controlling change rather than reacting to findings
- and preserving evidence over time — even as people contractors, and equipment change

Many serious Ex incidents are not caused by reckless behaviour or poor intentions. They are the result of good people operating in weak systems. Systems that rely on memory, informal practices, undocumented decisions or assumptions that "this is how it has always worked."

This series was written to challenge those assumptions. The purpose of explosion protection is not to eliminate risk — that is impossible. The purpose is to ensure that ignition is not the mechanism by which risk is discovered.

From an Owner's Engineering perspective, maturity in Ex compliance is reached when:

- deviations are detected early
- decisions are documented
- competence is defined and verified
- and compliance can be demonstrated at any moment — not reconstructed after an incident

That is not bureaucracy.
That is professional control of major accident risk.

This Yearbook is offered as a practical reference for owners, engineers, inspectors, and decision-makers who carry responsibility for hazardous areas — often long after projects are finished and contractors have left. Explosion protection succeeds quietly when systems work. It fails loudly when assumptions go unchallenged.
Our responsibility as owners and engineers is to ensure the system never relies on luck.

TEMPORARY INSTALLATIONS & MOBILE EQUIPMENT
EX COMPLIANCE IS A LIFECYCLE, NOT A CERTIFICATE

The core misunderstanding

Many organisations believe that explosion protection compliance is achieved when:

- ATEX or IECEx certificates exist, and
- Ex equipment are installed

This is fundamentally wrong!
Certificates do not create compliance, but systems, processes and people do.
Explosion protection is a lifecycle obligation, not a one-time procurement activity.

What a certificate is (and what it isn't)

It is a proof of:

- a specific product design
- manufactured at controlled conditions
- complies essential safety requirements

It is not a proof of:

- approrpiate installation
- correct selection for the zone
- maintenance, repair, modification compliance
- operator competence

The Ex compliance lifecycle (simplified)

Must be managed across all phases:

- Design & Hazardous Area Classification
- Equipment selection
- Procurement & purchasing
- Installation & commissioning
- Operation & use
- Inspection, maintenance & repair
- Decommissioning / replacement

Failure at any step breaks compliance.

Where Ex compliance typically fails

Real-world failures happen between stages.

Typical compliance breakpoints:

- Correct equipment, wrong zone / EPL
- Correct certificate, wrong revision
- Incorrect installation
- Non-compliance after repair
- Replaced with non-Ex "equivalent"
- Temporary modifications
- Findings not closed before restart

Certificates remain valid — site compliance does not!

Responsibility does not stop at purchase

Responsibility mapping (simplified):
Design -> Owner / EPC
Equipment design -> Manufacturer
Certification -> Notified Body / ExCB
Selection -> Owner / Engineer
Purchasing -> Procurement
Installation -> Installer
Commissioning & Operation -> Operator
Inspection -> Competent Ex personnel
Maintenance / Repair -> Operator / Repair facility

Why audits and inspections keep finding the same issues

Auditors and inspectors repeatedly see:

- Missing or outdated certificates
- Untraceable Ex equipment history
- Inconsistent marking vs documentation
- Uncontrolled modifications
- No evidence of lifecycle tracking

This is not a technical problem. It is a system problem.

KEY TAKEAWAY:

You don't "have" explosion protection compliance. You maintain it — every day.
It requires digital lifecycle tracking to ensure traceability, version control, and evidence at any time.
Certificates are inputs — continuous lifecycle management is what creates compliance.

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ELECTRICAL VS NON-ELECTRICAL EXPLOSION PROTECTION
THE MISSING HALF OF EX COMPLIANCE

The hidden imbalance in Ex compliance

When explosion protection is discussed, attention often focuses on electrical equipment, even though many real incidents are caused by mechanical ignition sources.

Mechanical ignition sources are underestimated or ignored

Ex compliance fails because only half of the ignition risk is actively managed.

Why non-electrical risks are overlooked

The lack of attention to mechanical ignition sources is not accidental—it is systemic.

- historical focus on electrical ignition control
- non-electrical ATEX/IECEx regulations introduced much later
- ISO 80079-36 / -37 still poorly understood
- false sense of safety when no sparks or electricity are visible

On many sites, "Ex = electrical" is still the prevailing mindset.

What are non-electrical Ex equipment

Any mechanical equipment capable of creating ignition sources through friction, impact, hot surfaces, mechanical failure, static electricity, or adiabatic compression.

Examples include pumps, compressors, mixers, fans, conveyors, gearboxes, brakes, and couplings.

If it moves, rotates, heats up, or can fail mechanically, it can ignite.

Typical mechanical ignition sources

Most mechanical ignition sources are normal degradation modes, not abnormal events.

- bearing failure → hot surface
- shaft misalignment → frictional heating
- dry running pumps → temperature rise
- foreign object ingress → impact sparks
- belt slip or fan blade rubbing
- plastic components → electrostatic discharge

These mechanisms are predictable and manageable, if addressed.

Certification alone doesn't solve the problem

Even certified equipment depends on correct installation, operation within design limits, proper maintenance, and no unauthorized modification.

After installation, risk shifts from design to operation: wear, misalignment, poor lubrication, overload, or improper repairs can turn safe equipment into an ignition source.

Certificates remain valid, site compliance does not.

Electrical + mechanical = one ignition system

Ignition does not distinguish energy forms.
One asset often combines electrical Ex protection (Eg.: Ex d / Ex e motor) with mechanical ignition risks (bearings, seals, couplings).

Common inspection gaps include:

- missing mechanical Ex documentation
- no ignition hazard assessment
- weak link between maintenance and Ex integrity

If one side is controlled and the other is not, Ex compliance fails.

KEY TAKEAWAY:

Ex compliance does not stop with electrical equipment.
When non-electrical Ex risks are not actively managed across the lifecycle, protection is fundamentally incomplete.
In practice, this means that half of the explosion risk remains uncontrolled.

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ATEX VS IECEX
LEGAL COMPLIANCE ≠ TECHNICAL COMPLIANCE

The most common confusion

A widespread belief is that IECEx equipment are ATEX compliant. This is partially true, often false, and frequently dangerous.

- ATEX and IECEx are not interchangeable
- They serve different purposes, and
- operate under different frameworks, despite using similar standards

Treating them as equals creates non-compliance.

"Same standards" ≠ "same compliance"

Both ATEX and IECEx reference the same core standards: IEC 60079 & ISO 80079.

But compliance is more than standards!

- EU Declaration of Conformity
- CE marking
- ATEX-specific marking format
- Manufacturer's legal accountability
- EU market surveillance compliance

An IECEx certificate does not automatically fulfil these legal obligations

What ATEX actually represents

A European legislation. It governs whether equipment may be legally used in the EU.

- Based on EU Directive 2014/34/EU
- Mandatory for EU market access
- Enforced by national authorities
- Legal responsibility lies with the manufacturer and importer

"Is this product legally allowed to be sold and used in the EU?"

Typical incorrect assumptions seen

Inspectors and auditors repeatedly encounter the same misunderstandings:

- IECEx certificate = ATEX certificate
- ATEX marking can be derived from IECEx documents
- CE marking belongs to certificates
- NBs and ExCBs have the same role
- One certificate covers all jurisdictions

Each results in regulatory non-compliance, even if the equipment is technically safe.

What IECEx actually represents

A technical certification system, that focuses on conformity to IEC standards and competence.

- Operates under the IEC framework
- Not legislation
- Voluntary unless required by contract or locally
- Strong focus on technical compliance and transparency

"Does this product or service comply with IEC Ex standards?"

Failure patterns & procurement risk

A common multinational failure scenario:

- IECEx equipment installed in the EU without ATEX DoC or proper CE marking.
- Site assumes technical = legal compliance

Result:

- Equipment may be safe, but illegally placed on the EU market and Legal exposure shifts to the operator

The reverse problem also exists.

Procurement decisions made without engineering input often transfer compliance risk downstream.

KEY TAKEAWAY:

IECEx proves safety and comformity to Ex standards. ATEX provides legality in the EU. One does not replace the other.
Confusing the two often results an equipment that is technically safe but legally indefensible.
Compliance must be demonstrated deliberately — never assumed by certificate similarity

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INSTALLATION
WHERE COMPLIANT BECOMES NON-COMPLIANT

The uncomfortable truth

Most Ex equipment arrive fully compliant. Most Ex non-compliances are created after delivery, not in the factory.

- Explosion protection rarely fails during manufacturing
- **F**ailures occur during installation, assembly, and commissioning

Installation is where certified design meets uncontrolled reality.

Mechanical installation details that create ignition risk

Non-electrical ignition risks are often introduced during installation, increasing friction, heat, and mechanical sparking.

- misalignment of rotating equipment
- inadequate clearances
- incorrect foundation or support
- wrong belt tension
- rigid connections where flexibility required

Mechanical installation quality is part of Ex ignition control.

Why installation is underestimated

Installation is a critical part of the protection concept but often viewed as mechanical, electrical, or construction work, or not recognised as Ex-critical activity.

A single incorrect detail can invalidate the protection concept, change ignition risk or render certification irrelevant.

Installation errors can nullify compliance instantly.

Installation vs certificate scope – where responsibility shifts

Certificates cover product design only. Installation creates interfaces and combined systems.

- most installation conditions are outside certificate scope
- manufacturer responsibility ends at delivery
- site responsibility begins at installation

Compliance shifts from certification to site-controlled execution.

The most common installation failures

Cable glands – the Nr. 1 failure point

- wrong type for protection concept
- incorrect temperature class or IP rating
- mixed Ex d / Ex e systems
- missing stopping plugs, wrong torque or sealing

System mismatches and IP degradation

- protection concept incompatibilities
- IP downgrades -> dust or moisture ingress

These create system-level non-compliance even with certified components.

Commissioning and competence – the missed safeguards

Commissioning is the final opportunity to verify Ex integrity, yet it is often underused.

It should confirm zone and protection concept, correct installation, marking & documentation.

A structural gap remains: installers may be skilled tradespeople, but not necessarily competent in explosion protection.

This creates compliant drawings and non-compliant installations.

KEY TAKEAWAY:

Ex certification confirms design. Compliance is won or lost during installation.
A single incorrect gland, seal, or mechanical alignment can invalidate the entire protection concept.
If Ex requirements are not treated as installation-critical, compliance is lost from day one

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INSPECTION INTERVALS
WHY 36 / 12 / 6 MONTHS ARE MISUNDERSTOOD

Intervals are not calendar rules

On many sites, inspection planning is reduced to choosing between 36, 12, or 6 months. This approach is incorrect:

inspection intervals are risk-based outcomes, not fixed calendar values.

- intervals must reflect real ignition risk
- uniform calendars create false compliance

Time alone does not control explosion risk.

Inspection type matters more than the interval

Visual, close, and detailed inspections serve different safety purposes.

- visual: obvious external defects
- close: detailed external condition checks
- detailed: internal Ex integrity verification

Inspection effectiveness depends on what you inspect, not just how often.

What IEC 60079-17 actually requires

The standard defines inspection principles, not fixed periods. Frequency depends on technical and operational factors.

- equipment type
- environmental conditions
- installation quality & operating duty
- inspection history

The standard expects engineering judgement, not default intervals.

Installation quality & operating severity drive frequency

Inspection intervals must be adjusted when risk increases.

- vibration, corrosion, weather exposure
- frequent start-stop cycles
- mechanical wear
- washdown or temporary installations

Poor installation increases inspection frequency by definition.

Two identical assets can legitimately require different intervals.

Where intervals really come from

These values are commonly used reference scenarios, not compliance rules.

- 36 months: fixed installations, normal duty
- 12 months: mobile or transportable equipment
- 6 months: severe service or high mechanical stress

Applying these without context is a misapplication of the standard.

Inspection is a feedback loop, not a checklist

nspection findings must actively influence future planning.

- findings should shorten or extend intervals
- corrective actions must be verified
- risk assessments must be updated

If inspection results do not change inspection strategy, the system is broken

KEY TAKEAWAY:

You don’t “have” explosion protection compliance. You maintain it — every day.
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Certificates are inputs — continuous lifecycle management is what creates compliance.

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MODIFICATIONS & “EQUIVALENT REPLACEMENTS”
THE SILENT EX COMPLIANCE KILLER

Small changes cause most Ex non-compliances

“It’s only a small change.”
Explosion protection rarely fails due to major redesigns — it fails due to minor, undocumented changes.

- small adjustments are seen as harmless
- documentation and reassessment are skipped

Ex compliance usually fails quietly, not dramatically.

Why equivalence fails under certification logic

Certificates are based on specific parameters.

- defined materials and surface finishes
- tolerances, clearances, and flamepaths
- thermal behaviour under worst-case conditions

Changing any of these can:

- increase surface temperature
- introduce friction or impact risk
- invalidate protection concepts

Certificates do not automatically transfer to replacement parts.

What really counts as an Ex-relevant modification

Any change affecting ignition risk is Ex-relevant.

- “similar” or “equivalent” replacements
- different cable glands, bearings, seals
- changed torque or installation orientation
- software or parameter changes affecting speed or temperature

If ignition risk changes, certification assumptions are affected.

Repair vs modification – the hidden legal boundary

A repair restores the original certified condition. A modification changes the certified design or its assumptions.

- repairs follow approved methods and design intent
- modifications alter ignition control logic

Many sites unintentionally perform modifications under the label of repair.

The myth of “equivalent replacement”

In Ex equipment, equivalent does not mean compliant. A part may function correctly and still break Ex integrity.

- mechanically compatible
- electrically compatible
- operationally acceptable

Ex compliance depends on certified details, not functional similarity.

Why uncontrolled changes surface years later

Ex-relevant changes often leave no visible trace.

- undocumented shutdown changes
- availability-driven substitutions
- verbal justifications (“always done it this way”)

Inspections later reveal:

- mismatch between certificate and reality
- no decision record
- no evidence trail

At inspection time, evidence matters — intent does not.

KEY TAKEAWAY:

Ex compliance usually fails through small, undocumented changes. “Equivalent” is not Ex-compliant, as certification depends on defined details. Any unassessed change breaks the compliance chain. Assumed compliance is not compliance.

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EQUIPMENT SELECTION, ZONING & EPL MISMATCHES
WHEN "ALMOST RIGHT" IS WRONG

Zones are not risk levels

Misleading belief: "Zone 2/22 is not that dangerous."
Zones describe probability of explosive atmosphere presence, not consequences

- zoning defines likelihood and duration
- it does not allow relaxed ignition control

A single ignition in Zone 2/22 can be just as catastrophic as in Zone 1/21.

The "Zone 2 / 22 flexibility" myth

Zone 2/22 allows different protection concepts, not reduced safety intent. Ignition probability still reqiures controll.
Using Zone 2/22 to justify:

- lower equipment quality
- undocumented substitutions
- relaxed installation practices

It creates systematic Ex failure, not flexibility.

What zoning really defines — and what it does not

Hazardous area classification answers where and how often an explosive atmosphere may exist. It does not define acceptable ignition probability or tolerance for deviation.

- no zone allows "acceptable ignition"
- non-compliance is not mitigated by lower probability

Zoning is a design input, not a safety margin.

How EPL mismatches are introduced in real life

Most EPL mismatches are not engineering mistakes — they are lifecycle failures.

- procurement substitutes lower EPL equipment
- maintenance replaces "equivalent" but downgraded parts
- temporary or mobile equipment added without reassessment

Each step silently degrades ignition protection.

EPL is the key ignition control parameter

Equipment Protection Level (EPL) defines how likely equipment is to become an ignition source, including under fault conditions.
Minimum EPL requirements:

- Zone 0 / 20 → Ga / Da
- Zone 1 / 21 → Gb / Db
- Zone 2 / 22 → Gc / Dc

Installing equipment below the required EPL is not a deviation — it is non-compliance.

Why inspectors focus so heavily on EPL

EPL mismatches are critical inspection findings because they are objective and binary.

- EPL is either correct or incorrect
- it directly affects ignition probability
- it cannot be justified after installation

Unlike wear or corrosion, EPL cannot be explained away.

KEY TAKEAWAY:

Zones describe probability, not acceptable risk. EPL defines required equipment safety and is non-negotiable. An EPL mismatch is immediate non-compliance. In hazardous areas, "almost right" is wrong.

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DOCUMENTATION GAPS
WHEN COMPLIANT SITES CANNOT PROVE COMPLIANCE

If compliance cannot be proven, it does not exist

In explosion protection, intent and experience don't replace evidence. If compliance can't be documented, it's treated as non-compliance.

- verbal explanations are not defensible
- assumptions cannot be verified

In Ex compliance, proof overrides explanation.

Withdrawn and outdated certificates create silent risk

One of the most dangerous scenarios is delayed certificate invalidation.

- certificate valid at installation
- later revised or withdrawn
- site unaware
- equipment remains in service

During audits or incidents, this results in immediate findings and loss of legal defensibility.

Documentation is a safety barrier, not paperwork

Documentation is part of ignition risk control. It links technical reality across the entire lifecycle.

- certification scope
- installation reality
- inspection and maintenance history

Without documentation, Ex compliance cannot be verified — even if the equipment is safe in practice.

Why inspectors always start with documentation

Inspectors focus on documentation because it is objective and traceable.
It reflects whether lifecycle control actually exists.

- scope can be verified
- assumptions can be checked
- decisions can be reconstructed

This is not bureaucracy — it is risk management.

The most common documentation failures

Most documentation gaps are basic, repeatable, and systemic.

- missing or lost certificates
- wrong or obsolete certificate revisions
- certificate scope misunderstood (EPL, T-class, gas group, ambient)
- missing EU Declaration of Conformity
- undocumented inspections, findings, or repairs

From a compliance perspective, undocumented work did not happen.

Why documentation gaps grow over time

Documentation loss is rarely intentional; it is a lifecycle failure.

- poor project-to-operation handover
- contractor-driven changes
- equipment replacements without updates
- decentralised storage (emails, PCs, folders)
- staff turnover

Over time, compliance knowledge becomes tribal instead of documented.

KEY TAKEAWAY:

Compliance must be provable. Without documentation, assumptions can't be verified or defended. Certificates, declarations, inspections, and modification records form a safety barrier — not bureaucracy. What can't be documented is treated as non-compliant.

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LIFETIME TRACKING OF EX EQUIPMENT
WHY “INSTALL AND FORGET” = NON-COMPLIANCE

Compliance is not permanent

Many organisations treat Ex compliance as a one-time achievement.
This assumption is wrong: Ex compliance degrades over time.

- equipment ages
- documents change
- people and sites change

Compliance at installation is only the starting point.

The classic “install and forget” failure pattern

A common lifecycle scenario:

- compliant installation
- documents archived
- years of operation
- small changes and maintenance
- inspection findings appear
- compliance status becomes unclear

At this point, confidence and control are lost.

What lifetime tracking really means

Lifetime tracking is continuous visibility of Ex compliance, not asset accounting.
It spans:

- selection and installation
- inspection and maintenance
- repair and modification
- replacement and decommissioning

It is ignition risk management over time.

What must be tracked across the lifecycle

Demonstrable compliance requires linked data.
At minimum:

- equipment ID, zone, required and installed EPL
- certificates and correct revisions
- DoC (where applicable)
- inspection history and findings
- repairs, modifications, current status

Without linkage, compliance is assumed — not proven.

Why Ex equipment cannot be managed like normal assets

Ex compliance depends on external and changeable factors.

- certificates and DoCs may change or be withdrawn
- condition affects ignition risk
- modifications invalidate assumptions

Equipment can work perfectly — and still be Ex-non-compliant.

Why spreadsheets always fail

Manual Ex registers collapse under lifecycle complexity.

- no version control
- history overwritten
- document changes untracked
- person-dependent

The result is not weaker compliance — it is loss of control.

KEY TAKEAWAY:

Ex compliance degrades over time. Conditions change and assumptions expire if not tracked. “Install and forget” leads to uncertain compliance; continuous tracking is the only proof of conformity.

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EX COMPETENCE

WHY JOB TITLES ≠ EX COMPETENCE

Job titles do not create Ex competence

One of the most dangerous Ex assumptions is: “He’s an electrician / mechanic / engineer — he knows Ex.”knows Ex.”

- explosion protection competence is not implicit
- it must be specific, defined, and demonstrable

Many Ex failures are caused by assumed competence, not lack of effort.

Responsibility without competence is a compliance trap

A common structural failure is assigning responsibility by role while assuming competence by title.

- decisions affecting EPL or protection concepts
- approvals made without formal Ex competence

Responsibility without capability creates systemic non-compliance, not accountability.

Why Ex competence is fundamentally different

Explosion protection competence requires understanding how ignition risk is controlled.

- ignition mechanisms
- protection concepts
- certificate limitations
- lifecycle risks
- impact of small deviations

A highly skilled professional can still unintentionally create an ignition source.

Training is not the same as competence

Attending a course does not automatically make someone competent. Competence must be built, maintained, and proven.
Competence requires:

- appropriate training
- relevant practical experience
- site-specific risk understanding
- periodic refreshment
- documented evidence

Without evidence, competence cannot be demonstrated.

Where Ex competence is really required

Ex competence is needed across the entire lifecycle, not only during inspection.
Typical roles requiring Ex competence:

- designers and engineers
- equipment selection and procurement
- installers and contractors
- maintenance and repair personnel
- inspectors, supervisors, managers

If a decision can affect ignition risk, Ex competence is required.

Contractors are the highest-risk competence gap

Contractors often introduce the greatest Ex risk.

- frequent personnel changes
- time pressure
- assumptions that site compliance is “given”

Without explicit competence requirements:

- installation quality drops
- undocumented modifications increase
- inspection findings multiply

Ex competence must be required and verified — never assumed.

KEY TAKEAWAY:

Ex competence doesn’t come from job titles, but from proven understanding and experience. Small decisions can affect ignition risk at every stage. Assigning responsibility without competence creates failure — without evidence, compliance is accidental.

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TEMPORARY INSTALLATIONS & MOBILE EQUIPMENT
SHORT-TERM DOES NOT MEAN LOW-RISK

"Temporary" is the most dangerous justification

The phrase "It's only temporary" explains a disproportionate number of Ex failures.

Short duration does not reduce ignition probability — it often increases it.

What counts as temporary or mobile equipment

Any equipment introduced into a hazardous area becomes part of the Ex system.

- portable pumps, fans, lighting
- mobile compressors
- skid units and rented equipment
- tools and test equipment

Duration does not exempt Ex requirements.

Why temporary equipment carries higher risk

Temporary installations combine:

- time pressure
- unfamiliar equipment
- unfamiliar personnel
- incomplete documentation

These are ideal conditions for Ex failure.

Zones do not change for temporary use

Zoning already accounts for probability.

- temporary equipment does not relax zone rules
- ignition during rare events is still catastrophic

Zone and EPL requirements apply whenever equipment is present.

Typical failures seen on sites

Inspectors commonly find:

- non-Ex portable equipment
- wrong EPL for the zone
- no inspection or documentation

From a compliance view, uncontrolled equipment never existed.

Temporary often becomes permanent

A frequent lifecycle pattern:

- temporary solution introduced
- removal delayed
- reassessment skipped
- non-compliance discovered later

Temporary risk silently becomes permanent exposure.

KEY TAKEAWAY:

Temporary equipment does not mean temporary risk. Time pressure, unfamiliar equipment, and missing documentation increase ignition probability. Hazardous area rules don't change for short-term use. Uncontrolled temporary installations are a common source of Ex non-compliance.

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WHEN EX COMPLIANCE FAILS
LEARNING WITHOUT BLAME

Ex incidents are system failures, not individual mistakes

After an explosion, the instinctive question is often “Who made the mistake?”
This is the wrong starting point.

- Ex failures are rarely caused by a single decision or person
- they result from multiple small weaknesses aligning over time

The visible ignition source is usually the last link, not the root cause.

Learning-based organisations ask different questions

Mature organisations focus on understanding, not assigning fault.
They ask:

- which assumptions failed?
- where did lifecycle control break down?
- why was degradation not detected earlier?

These questions strengthen future control, not past justification.

Incidents are signals — not anomalies

An Ex incident does not indicate bad people or bad intentions.

It indicates:

- gaps in lifecycle control
- weak feedback loops
- misaligned responsibilities

Ignoring the signal ensures repetition — often elsewhere on the site.

The Ex compliance failure chain

Most Ex incidents follow a familiar lifecycle sequence:

- compliant design and certification
- installation deviations
- incomplete documentation
- minor modifications
- assumed competence
- inspection findings not closed
- informal risk acceptance

Breaking the chain at any point prevents the outcome.

Blame-based responses increase future risk

Blame-driven reactions damage Ex compliance instead of improving it.

- defensive behaviour replaces transparency
- deviations are hidden instead of reported
- procedures grow, effectiveness does not

Fear silences signals — and guarantees repeat failures.

Ex incidents follow repeating patterns

Across industries, serious Ex incidents share common characteristics.

- correct equipment selected initially
- compliance gradually degraded
- undocumented changes and competence assumptions
- weak lifecycle control
- verification replaced by trust

Incidents reveal how the system failed, not where it started.

KEY TAKEAWAY:

Explosion incidents are system failures, not individual mistakes. Ignition is usually the result of long-term compliance degradation. Blame suppresses learning and increases risk; learning organisations strengthen systems, not punish people.

DECEMBER 2026

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Across the year, one principle remains constant: Ex compliance is a living system of equipment, people, decisions, and evidence — maintained over time, not achieved once.

ONE YEAR OF EX COMPLIANCE
WHAT REALLY MATTERS

Ex compliance is a system, not a checklist

This year wasn't about standards or rules. It showed that explosion protection is a well-managed system over time, not one-time task.

- certificates, markings, inspections are inputs
- compliance is the outcome of how they are connected

Ex compliance lives in the system, not in documents.

Why most Ex failures are predictable

Nothing discussed this year was unknown to experienced professionals. Most Ex incidents result from known requirements not applied consistently.

- assumptions not verified
- changes not reassessed
- competence not defined
- evidence not preserved

Failures are usually visible long before ignition — if the system looks for them.

The single most important lesson

If one sentence remains after this year:
Ex compliance is not something you have — it is something you continuously demonstrate.

- compliance degrades if not actively maintained
- evidence matters more than intention

Demonstration over time defines compliance, not initial approval.

What separates mature sites from vulnerable ones

After a year of topics, the difference is clear.
Vulnerable sites:

- rely on certificates alone
- assume competence
- tolerate informal deviations

Mature sites:

- manage Ex as a lifecycle
- define and verify competence
- preserve evidence over time

The difference is discipline, not budget.

People are the decisive factor

Throughout the year, one pattern repeated:

- good people made unsafe decisions
- not because they didn't care
- but because the system allowed it

Strong Ex systems protect people from making unsafe decisions under pressure.

The Ex compliance lifecycle, seen as one whole

Across all months, every topic fits into a single lifecycle logic:

- certification confirms intent
- installation defines reality
- inspection reveals degradation
- maintenance and modification change risk
- documentation preserves knowledge
- competence drives decisions

If one element weakens, the whole system degrades — silently.

FINAL TAKEAWAY:

Ex compliance is not a status; it is something that must be continuously demonstrated. Certificates, equipment, and procedures only work when they are connected into a disciplined lifecycle system. The difference between mature and vulnerable sites is not budget, but consistency and control. Explosion protection succeeds quietly when degradation is detected early — and fails loudly when assumptions replace evidence.

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