A BRIEF INTRODUCTION TO EXPLOSION PROTECTION AND CERTIFICATION

SGS Baseefa often receives requests for basic information on how equipment can be protected in hazardous areas.

Protection is a two part exercise: Equipment intended to be used in a hazardous atmosphere must be designed and manufactured to appropriate standards for a chosen "Type of Protection" and then must be installed, inspected, maintained and repaired taking into account further standards for these activities.

In Europe, all these activities are subject to the requirements of two European Community Directives: ATEX 2014/34/EU (formerly 94/9/EC until April 2016) covers everything related to design and manufacture up to the point of "placing the equipment on the market"; ATEX 1999/92/EC covers the other activities, as the equipment is installed and maintained, as well as other aspects related to the running of a plant where materials are produced or stored that could lead to the formation of an explosive atmosphere.

(Note that the European Directives refer to "Potentially Explosive Atmospheres" whereas the related standards refer to "Explosive Atmospheres". Although there is a minor technical difference, for most purposes the terms can be used interchangeably.)

In the UK, ATEX 1999/92/EC is implemented in a combined set of regulations (along with part of the Chemical Agents Directive), known as the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

In the rest of this document, for convenience, the colloquially accepted expressions are used: ATEX to describe rules concerning the design and manufacture of equipment; DSEAR to describe the other activities.

In parallel with ATEX and DSEAR, there is a voluntary international system of certification, known as IECEx, operated under the International Electrotechnical Commission. It is generally accepted that the IECEx system is more rigorous than the equivalent ATEX or DSEAR procedure so, although a comparatively new system, the various certification schemes within the IECEx System are gaining acceptance throughout the world.

The IECEx Product Certification Scheme relates to ATEX, while the IECEx Service Facility Certification Scheme and the IECEx Personnel Competence Certification Scheme relate to DSEAR. See later in this document how ATEX and IECEx differ in relation to the certification process.

STANDARDS

Although ATEX permits compliance with the Essential Health and Safety Requirements (EHSRs) of the directive without the use of standards, this is a tortuous path to undertake and the use of "Harmonised Standards" (that is those recognised by the European Commission and published as such in the Official Journal of the European Union (OJ)) is normal. To use the EHSRs directly, the manufacturer would have to justify why a harmonised standard could not be applied to the product, and prepare the technical evidence as to how the direct EHSR solution is at least of equivalent safety. IECEx only allows certification to a published international standard.

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Amongst the European Certification Bodies involved in this field, SGS Baseefa has been the most active in helping to develop the standards and has worked hard to ensure that the International Standards (IEC or ISO version) and the European/British Standards (EN or BS EN version) are technically identical.

Therefore, unless stated otherwise, it can be assumed that referring to a standard by its IEC or ISO reference also includes reference to its EN or BS EN version. For example referring to IEC 60079-0 also includes EN 60079-0 and BS EN 60079-0. (Logically, it is the IEC or ISO version that is used for certification within the IECEx Scheme; it is the EN version that is "harmonised" for ATEX; but it is the BS EN version that would be bought in the UK and used for both purposes.)

COMPONENTS

Both ATEX and the standards recognise the need for creating "building blocks" to assist the process of creating some types of complete equipment. For example, the lamp-holder in a luminaire will often be a bought-in component from a specialist manufacturer, and it is convenient for such a component to have its own "Component Certification" issued to the component manufacturer, easing the certification of the complete luminaire. Other common components include terminal blocks, switches and control elements (for example switch spindles) for mounting in the wall of an enclosure.

It is most important to understand that an item with a Component Certificate (whether IECEx or ATEX) is not intended for direct installation in a hazardous atmosphere, but must first be referenced in the certificate for the complete equipment in which the component is incorporated. To reinforce this point, the latest standards require that the marking of Component Certified Empty Enclosures should be on the inside, and not visible from the outside of the enclosure, to avoid any misunderstanding that the equipment is ready for installation.

ASSEMBLIES

Both ATEX and the IECEx Scheme acknowledge the need to provide certification of assemblies of already certified items of equipment. An assembly is a discrete item that can be traded as an entity (such as a motor and pump on a common bedplate), as distinct from an installation, where the discrete items first come together as part of "putting to use". Components cannot be directly incorporated in assemblies, but must first be considered as part of the discrete equipment in which they are incorporated.

TYPES OF PROTECTION – ELECTRICAL EQUIPMENT

There are nine basic types of protection currently recognised for electrical equipment, all of which are supported by the "General Requirements" given in IEC 60079-0. This standard contains requirements that apply to more than one type of protection, including: limitations of light metals to control thermitic sparking; aging effects on non-metallic materials (for example UV exposure and medium term exposure at high humidity and high temperature); minimising electrostatic sparking from highly insulated parts; and limitation of RF output from communications equipment.

Each of the types of protection is also designated by a letter which is included in the marking of the equipment in the way specified in IEC 60079-0. EN 60079-0 also includes a specific European Annex that gives the marking required for ATEX, which supplements the international marking.

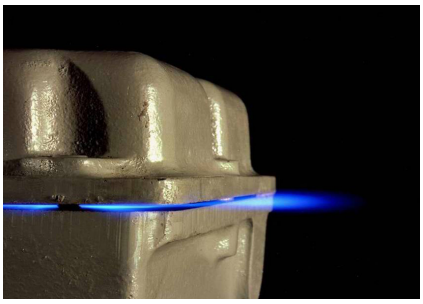
For a list of the major standards and their relevant dates as current and historical harmonised standards, please see the document "Harmonisation Status of Ex Standards" available from the "Technical Guides and Wallcharts" section of www.sgs.co.uk/sgsbaseefa.

Note that there are additional standards covering other aspects of protection which are not described in this document.

LEVELS OF PROTECTION

Although originally each type of protection was only available with one level of protection, over recent years it has become normal to develop different levels at which each type of protection can be employed. The level of protection is designated by the letter "a", "b" or "c" associated with each protection type, with level "a" being the highest level of protection and level "c" being the lowest level of protection. Thus equipment designated "Ex db" has flameproof protection of level "b". In addition to the protection level for each concept, the equipment will be marked with an overall Equipment Protection Level (EPL) indicating the potential use of the equipment in either a gas/vapour or a dust atmosphere, e.g. Ga or Dc. More information is given later in the section on Selection and Installation.

TYPE OF PROTECTION "FLAMEPROOF" Ex d – IEC 60079-1



The concept is simple: put the electrical equipment to be protected in a strong enclosure that is capable of withstanding an internal explosion without bursting or without allowing the escaping hot gasses to ignite an external explosive atmosphere.

Because of the simplicity of the concept, it has occasionally been known as the "dustbin concept" on the grounds that it can contain any old rubbish. This is only partly true and there are many limitations on the contents, particularly on the physical layout as this can change the explosion pressures developed and therefore the ability of the enclosure to withstand the internal explosion. A

particularly inappropriate arrangement of the contents can more than double the explosion pressure. For this reason, although a number of manufacturers place empty enclosures on the market with component certification, the limitations on use are very strict and require separate verification by a certification body before the final arrangement is deemed acceptable.

However, it is acceptable to use normal industrial items within the enclosure, subject to consideration of heat generation and layout. There are specific limitations on batteries which might vent hydrogen and/or oxygen into the enclosure and create even higher pressures.

Component manufacturers can supply component certified items such as push-button actuators and indicator lamps that penetrate the walls of the enclosure.

Component certified flameproof switch blocks are readily available for inclusion within enclosures of other types of protection where sparking contacts would otherwise not be acceptable.

Although most flameproof equipment is built in a metal enclosure, some smaller items can be made from plastic materials but additional tests are required to ensure that "flame erosion" will not defeat the protection.

Flameproof equipment is available marked Ex d (to older editions of the standard), Ex da, Ex db and Ex dc.

TYPE OF PROTECTION "INTRINSIC SAFETY" Ex i – IEC 60079-11

In contrast to flameproof, an intrinsically safe item of equipment will have been studied at the component level on the circuit board to ensure that any possible sparking due to faults on the board is at an energy level below the Minimum Ignition Energy of the explosive atmosphere for which the equipment is designed. It is assumed that the gas has access to all components and that any ignition will lead to a full explosion. Energy is controlled by voltage and current limitation, and by protection of energy storage components such as inductors, capacitors and batteries. Complex circuits may have to be broken down into component parts, with energy limitation applied separately to each part in order to have a design that is safe but is still capable of carrying out its designed function. Temperature of individual components is controlled and some components are specifically de-rated as "safety components".

Typical circuits will operate at design voltages of 24 volts or less and consume no more than 1.3 watts of power. A detailed analysis of both the schematic circuit and its physical layout are required and it is common for circuit boards to require modification after the first analysis. In complex cases, the final acceptable design may have required several iterations. However, in simple cases, the analysis can be very quick.

Unlike the other types of protection, unless battery powered, intrinsically safe equipment requires to be supplied from the "safe" area by a suitably limited power supply. This is often referred to as a "barrier" as its function is to prevent excessive energy getting to the intrinsically safe circuit. Barrier design can be simple or complex, depending on the exact function, and there are a number of manufacturers who specialise in designing and selling barriers for specific purposes.

Intrinsically safe equipment is available marked Ex ia, Ex ib or Ex ic.

TYPE OF PROTECTION "INCREASED SAFETY" Ex e – IEC 60079-7

Increased Safety can only be applied to equipment which has controlled temperatures and a total absence of any sparking in normal operation. Thus the standard can be applied to an induction motor but not to a commutator motor. Luminaires and junction boxes are also commonly designed to meet the requirements of the standard which are concerned with making failure into a condition of high temperature or sparking unlikely.

Typical requirements include: especially secure terminals that won't come loose under conditions of vibration; enhanced electrical segregation; thermal de-rating of insulating materials, as well as many specific requirements for particular types of equipment. Most equipment is housed in a robust dust and water resistant (IP 54) enclosure, to prevent the outside environment contaminating the equipment, but which neither keeps the gas out nor will withstand an internal explosion.

Increased Safety Equipment is available marked Ex e (to older editions of the standard), Ex eb or Ex ec.

TYPE OF PROTECTION "ENCAPSULATION" Ex m – IEC 60079-18

By encapsulating the equipment in potting compound, the explosive atmosphere is kept away from the electric circuits. Some attention has to be given to potential faults in the circuit and most often the simplest way is to include in-built thermal fuses in series with the supply lines that will permanently disconnect the equipment if there is a fault. There are many requirements on the potting compound and the distances through it, both to the outside surface and between parts of the circuit.

In Europe, there is a tendency to minimise the amount of encapsulated equipment as it is not amenable to repair and therefore difficult to justify under the WEEE Directive.

Encapsulated Equipment is available marked Ex m (to older editions of the standard), Ex ma, Ex mb or Ex mc.

TYPE OF PROTECTION "POWDER FILLED" Ex q – IEC 60079-5

This can be compared to the "fire bucket" approach. If the incipient explosion is covered in a pile of sand, it will be snuffed out. The term "powder filled" is a bit of a misnomer as the "powder" is either glass or quartz of a coarseness equivalent to granulated sugar.

This type of protection is similar to encapsulation in many ways, although it does not exclude gas. It has the advantage that equipment can be opened for recycling or repair, but only by the original manufacturer who has the necessary ability to refill the enclosure after the repair is completed.

Powder Filled Equipment is available marked Ex q or Ex qb.

TYPE OF PROTECTION "OIL IMMERSED" Ex o – IEC 60079-6

A rarely used form of protection, where the electrical circuits are submerged in oil to keep the gas away from them, and suitable for items such as power transformers, which would more normally be sited outside the hazardous area and therefore not need specific protection.

Oil Immersed Equipment is available marked Ex o (to earlier editions of the standard), Ex ob or Ex oc.

TYPE OF PROTECTION "PRESSURISATION" Ex p – IEC 60079-2

This type of protection is unique in that it relies on the continued presence of an external agent (the source of the pressurising medium) to remain effective. Therefore the equipment must be accompanied by a suitable control device that supervises the "purging" part of the cycle and will either raise an alarm (Ex pyb or Ex pzc) or shut the equipment down (Ex pxb) if the pressurisation source fails.

The source may be a local supply of "instrument air" or a bottle of an inert gas, such as nitrogen. For large equipment, a significant amount of the purging medium is required to clear out any explosive atmosphere before the equipment can be switched on. This time delay (usually between 5 and 30 minutes but sometimes longer) can mean that pressurisation is not viable for equipment that must be started quickly. Equally, pressurisation is not viable for equipment that must remain operational if the pressurisation source fails. The cost of the controller and the requirement to supply the purging/ pressurisation medium mean that this type of protection is not favoured for smaller equipment where other types of protection can be applied. Specialist control panels (particularly those requiring a gas line to be passed through them) and large electric motors are among the favoured applications.

Although normally sparking equipment is easily accommodated in this type of protection, as sparking ceases immediately the equipment is de-energised, equipment with hot surfaces may be a problem as calculations must be undertaken to show that the surface will have cooled to an acceptable temperature before any gas might get in if pressurisation fails. Thus the internal, rather than the external, temperature is usually taken as the limiting factor.

There are a number of sub-divisions in the standard and Pressurised Equipment is available marked Ex p (to older editions of the standard), Ex px, Ex py, Ex pz, Ex pxb, Ex pyb or Ex pzc.

TYPE OF PROTECTION "NON-SPARKING" Ex n – IEC 60079-15

Ex n has its origin in selecting industrial equipment which is non-sparking and low temperature in normal operation. From being a very thin standard in the late 1960's it has grown in complexity but is currently getting thinner as most of the content is transferred to other standards, to form level of protection "c".

For much of the equipment it can be regarded as "Increased Safety Lite" and is suitable for installation in Zone 2 only (whereas all the other types of protection have versions for use in at least Zone 1, if not other Zones as well). Latterly, this equipment has been marked Ex nA. However this type of equipment is now covered by the Increased Safety standard, marked Ex ec.

The one section of the standard unique in principle to Ex n is "Restricted Breathing". Here the equipment may, within specific limitations, have some sparking and some hot surfaces, but the enclosure is sufficiently well sealed that in the time an explosive gas atmosphere may be present in Zone 2, insufficient quantities of gas can breathe into the enclosure to create an explosion. This equipment is now marked Ex nR.

"Enclosed Break" (Ex nC) is a form of "Flameproof Lite" and has been transferred to IEC 60079-1 as Ex dc, but the section on Sealed Enclosures (also Ex nC) will remain in IEC 60079-15.

Ex n Encapsulation, and Ex n Energy Limitation (Ex nL) were removed from IEC 60079-15 some time ago and have become Ex mc and Ex ic, albeit with a number of technical changes on route.

"PROTECTION BY ENCLOSURE FOR EXPLOSIVE DUST ATMOSPHERES" Ex t – IEC 60079-31

Unlike gas, combustible dust can be considered as not being able to enter an enclosure with adequate Ingress Protection. This standard tabulates different degrees of Ingress Protection and different ways of considering temperature based on the Zone of hazard and the type of dust (conducting or non-conducting). Older standards used the marking Ex tD or DIP.

Currently, Dust Protected Equipment is available marked Ex ta, Ex tb or Ex tc.

Note that the Types of Protection Intrinsic Safety and Encapsulation can also be used to protect against a combustible dust.

"PROTECTION AGAINST OPTICAL IGNITION" EX op – IEC 60079-28

This standard sits alongside the other electrical protection concepts (as light is almost always generated electrically) and indicates three ways in which equipment with a laser or other collimated light source, including high power LEDs used for illumination, can be considered as being protected against becoming an ignition source. Some of the latest high power LEDs can be capable of causing ignition outside the luminaire, even if the LED is mounted inside a flameproof enclosure.

TYPES OF PROTECTION – NON-ELECTRICAL EQUIPMENT

Historically, not nearly so much attention has been paid to prevention of ignition from non-electrical sources as from electrical sources, even though the evidence suggests that, currently, more ignitions result from non-electrical sources, than from electrical sources.

There were very few standards available covering non-electrical ignition sources, until, following the publication of the European ATEX Directive 94/9/EC, the European Commission requested CEN to create a number of appropriate standards. Such standards started to become available in the years shortly after 2000. Although most were available by 2010, others continue to be developed. Unless otherwise specified, the standards cover protection against both gas/vapour hazards and dust hazards.

EN 13463-1 the "General Requirements" for non-electrical equipment has a lot in common with IEC 60079-0 (consideration of light metals, electrostatics, aging of non-metallic enclosures, etc.), but additionally requires an initial "Ignition Hazard Assessment". Electrical equipment can always be assumed to be a source of ignition, but this cannot be said of all mechanical equipment. Based on the results of that assessment, one or more of the specific types of protection may be employed, or it may be decided that no further protection is needed.

A "Flow Restricting Enclosure" "fr" – EN 13463-2 is identical in concept to the electrical "Restricted Breathing" and, similarly, is restricted to use only in Zone 2. It would seem that very little use has been made of this standard.

"Constructional Safety" "c" – EN 13463-5 is based on the principles of the electrical "Increased Safety" and lists the additional things that can be done to make mechanical equipment more reliable.

"Liquid Immersion" "k" – EN 13463-8 is derived from the electrical "Oil Immersed" but is more versatile as it allows splash lubrication of gearboxes, without total immersion.

"Protection by Control of Ignition Sources" "b" – EN 13463-6 details how to provide protective control systems to aspects of mechanical equipment, such as vibration detection or thermal detection to warn of the commencement of a failure condition in a bearing.

For "Flameproof" and "Pressurisation", there is direct reference to the equivalent electrical standards as neither of these types of protection is influenced by the nature of the ignition source.

In 2015 we saw the first publication of international standards covering the same subjects. ISO 80079-36 covers the process of Ignition Hazard Assessment as well as covering a number of generally applicable requirements. As it is in the "79" series (although with an "ISO 8" prefix rather than "IEC 6" prefix), it makes extensive use of cross-referencing IEC 60079-0 for many of the common requirements. It also introduces marking requirements compatible with the rest of the "79" series of standards, using the letter "h" to represent the concept. Although the levels "a", "b" and "c" are also applied, the level is not marked adjacent to the letter "h" but forms part of the consideration for the Equipment Protection Level (EPL) marking Ga, etc.

The concepts of Constructional Safety, Liquid Immersion and Control of Ignition Sources are outlined in ISO 80079-37, although the previous letters "c", "k" and "b" are not used in the marking. Because of little use, there is no international equivalent of the "flow restricted" enclosure. The electrical standards for flameproof, pressurisation and dust protection are directly referenced.

European manufacturers have until 2019 to confirm that their products comply with the international standards, rather than the original European standards, as they will lose their harmonised status at that time.

MARKING

The marking on equipment is defined in either IEC 60079-0 or ISO 80079-36.

In addition to the obvious requirements of Manufacturer's Name (and address in the case of ATEX), Product Type Designation, Supply Connection details, etc., all equipment is marked with a specific hazardous area protection code, containing details of the protection concepts (and their levels), the appropriate equipment Group (in relation to which gasses, vapours or dusts it may be used with) and a Temperature Class (also related to the particular gasses or vapours) or a temperature (relating to which dusts it may be used with), along with the permitted ambient temperature range.

The protection codes for gasses/vapours and dusts are always kept separate, as is the ATEX code, where applied. Older non-electrical equipment will have a single line of code, as the ATEX marking was an integral part of the code requirements of the EN 13463 series of standards.

A typical code for a flameproof motor with an increased safety terminal box, intended for installation where there may be a gas or vapour atmosphere from time to time in normal operation (Zone 1), and also suitable for use in an atmosphere that might very occasionally be subjected to a dust cloud (Zone 22) might be:

- Ex db eb IIB T4 Gb -30C ≤ t_a ≤ 45C
- Ex tc IIIB T 140C Dc -30C ≤ t_a ≤ 50C
- CE 1180 ⟨Ex⟩ II 2G/3D

Note that the ATEX Categories 2G and 3D are directly equivalent to the EPLs Gb and Db. The Notified Body number 1180, after the CE Marking, indicates that SGS Baseefa has been responsible for the production phase. The Notified Body responsible for the Type Examination, or for the IECEx Certification is shown as part of the certificate number.

For more information on the codes and further examples, please refer to the Wall Charts that are available to download from the Technical Guides and Wall Charts area of www.sgs.co.uk/sgsbaseefa.

CERTIFICATION

For IECEx, all equipment and components are certified in an identical manner by an IECEx Certification Body (ExCB): A Type Examination of the documentation and sample, including necessary tests, is followed by either a QA process or a Product Verification process to ensure that any delivered product is identical to the product that was the subject of the Type Examination.

For ATEX, only Category 1 Equipment (that is EPL Ga or Da) legally has to go through the same full certification process required by IECEx.

Category 2 Equipment (EPL Gb or Db) is treated differently according to whether the equipment is electrical or non-electrical. Electrical equipment (and also Internal Combustion Engines) undergo Type Examination and then a QA or Verification process which is mandated at a lower level than that for Category 1 Equipment, although common practice is to actually use the Category 1 process. Category 2 non-electrical equipment (except Internal Combustion Engines) undergoes "Internal Control of Production" but the manufacturer must lodge the completed dossier required by the ATEX Directive with an ATEX Notified Body for retention for a minimum of ten years from the time of last manufacture.

Category 3 Equipment (EPL Gc or Dc) does not need the involvement of a Notified Body as the directive mandates "Internal Control of Production".

To issue IECEx Certificates, the certification body must be an "Accepted Certification Body" within the IECEx System, commonly referenced as an ExCB.

To issue ATEX Documentation, the certification body must be "notified" by a member state to the European Commission, hence the normal recognised term "Notified Body". (Note that Notified Bodies can be nominated by countries that are not part of the European Union, but which have an appropriate relationship with the EU.)

A number of European certification bodies (including SGS Baseefa) are both an ExCB and a Notified Body. Note that the term "Notified Body" has legal significance, as the certification body has been "notified" by a national government to the European Commission to act in respect of specific parts of a specific directive.

For more details on the certification process, and about ATEX Dossiers (often colloquially called Technical Files) please refer to the relevant guides on www.sgs.co.uk/sgsbaseefa.

INSTALLATIONS AND DSEAR

Although DSEAR is specifically a UK regulation, it is based on the European Directive 1999/92/EC and can also be used as shorthand for similar requirements anywhere in the world.

ZONING AND AREA CLASSIFICATION – IEC 60079-10-1 AND IEC 60079-10-2

In order to correctly select the equipment that will be installed in every area that might be endangered by a hazardous gas or vapour (Part 1 of the standard) or by a hazardous dust (Part 2 of the standard), a risk assessment and hazardous area classification exercise must be completed by a competent person. The assessment will include identifying all potential sources of release, the probability of the potential becoming an actual source of release, and the extent of the release in terms of distance from the point of release at which the hazardous atmosphere may occur. The quantity and reliability of both forced and natural ventilation are taken in to account.

Zones 0, 1 and 2 are the gas and vapour areas where the hazard may be present continuously, for shorter periods in normal operation or under unexpected circumstances for a short time only.

Zones 20, 21 and 22 are the equivalent areas for a dust hazard, but additionally take account of layers of dust that may be stirred up to form a dust cloud.

SELECTION AND INSTALLATION – IEC 60079-14

Based on the result of the Area classification, appropriate equipment must be selected, so that the best protected equipment is used in Zone 0 or Zone 20, but the least protected equipment is used only in Zone 2 or Zone 22.

The standard now relies on the defined "Equipment Protection Levels" (EPLs) to match the zones but also allows historical equipment without a defined EPL to be used. An indirect correspondence may be justifiable subject to a detailed risk assessment.

Although historically only Intrinsic Safety had two levels of protection "Ex ia" and Ex ib", more of the types of protection have introduced differing levels, particularly as the requirements from IEC 60079-15 have been transferred into the different standards. The correspondence is given in the following table (with the ATEX Categories added for convenience):

ZONE	EPL	ATEX CATEGORIES	PERMITTED PROTECTION CONCEPTS
0	Ga	1G	Ex ia, Ex ma, Ex da
1	Gb	2G	Ex ib, Ex mb, Ex pxb, Ex pyb, Ex d, Ex db, Ex o, Ex ob, Ex q, Ex qb, Ex e, Ex eb
2	Gc	3G	Ex ic, Ex mc, Ex dc, Ex oc, Ex pzc, Ex nA, Ex nC, Ex nL
20	Da	1D	Ex ia, Ex iaD, Ex ma, Ex ta
21	Db	2D	Ex ib, Ex ibD, Ex mb, Ex tb
22	Dc	3D	Ex ic, Ex icD, Ex mc, Ex tc

Some equipment may show a higher level for the protection concept than indicated by the overall EPL. In such a case (for example Ex ia IIC T4 Gb), the EPL always takes precedence as there may be aspects controlling the EPL not directly related to the protection concept, for example the amount of light metal in an enclosure.

For obvious reasons, equipment suitable to go in Zone 0 may also go in Zone 1 and Zone 2. Equipment suitable to go in Zone 1 may also go in Zone 2 (and the equivalent for dusts).

The standard also includes a lot of details on equipment mounting and cabling as well as the competence criteria for those selecting or installing the equipment.

INSPECTION AND MAINTENANCE – IEC 60079-17

Correctly manufactured, selected and installed equipment must be subjected to an appropriate inspection and maintenance regime to ensure that it remains suitable for use in an explosive atmosphere. The standard details differing inspection regimes and maintenance schedules according to specific circumstances and the appropriate level of competence of the people entrusted with these important tasks.

REPAIR, OVERHAUL AND RECLAMATION – IEC 60079-19

High cost equipment is often repaired or refurbished before being returned to service following failure on inspection or an actual equipment breakdown. This standard provides the level of detail needed to have confidence that the repaired or refurbished item is equivalent to the manufacturer's specification and therefore may be re-installed in the hazardous area.

The IECEx Scheme for Certification of Service Facilities is directed at those operating to this standard whilst the parallel IECEx Scheme for Certification of Personnel Competence has units linked to this standard and also to parts 10, 14 and 17. SGS Baseefa operates in both the IECEx Service Facility Certification Scheme and the IECEx Personnel Competence certification Scheme. More information is available at www.sgs.co.uk/sgsbaseefa.

Safety demands not just equipment built to standards, but that it should be selected, installed, inspected, maintained and repaired throughout its life by individuals having the necessary competence.

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WHEN YOU NEED TO BE SURE

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