

# INTRODUCTION TO NORTH AMERICA CERTIFICATION OF EQUIPMENT FOR HAZARDOUS LOCATIONS



For manufacturers that are more familiar with the ATEX Directive, or with IECEx Certification, tackling North American Certification can be a challenging task. In this guide, we explain the fundamental differences between the North American system and ATEX Directive and answer the typical questions that you may have when considering certifying for this sector.

## WHAT CERTIFICATION DO I NEED FOR HAZARDOUS LOCATIONS IN NORTH AMERICA?

### HAZARDOUS LOCATION

All electrical equipment that is to be installed in a hazardous location for North America and Canada must be certified as such by a Nationally Recognised Testing Laboratory (NRTL) such as SGS. Unlike the ATEX Directive there is no opportunity to self-certify equipment, irrespective of the hazardous area that the equipment is to be placed in.

Certification of non-electrical equipment is a relatively new concept in North America and is not currently mandatory. However, it is slowly being adopted by manufacturers as they want to ensure that their equipment will not be the cause of an explosion when placed in a hazardous area, and as they strive to obtain competitive advantages. The non-electrical standards are closely aligned to those used for ATEX and IECEx certification, thus making the process fairly straight forward for products already compliant.

The certification mark changes from NRTL to NRTL, but one aspect that remains consistent is how each is differentiated by the letters US, C and C US for the US, Canada or both:



### ORDINARY LOCATION

Alongside the hazardous location considerations, compliance to ordinary location standards must also be addressed in order to place your product on the market. Ordinary Location standards are in place to address risks such as shock, fire and personal injury. The 'Hazloc' and the 'Ordloc' requirements are usually assessed and certified at the same time, although in some instances manufacturers certify a product for ordinary locations separately. It is the manufacturer's responsibility to identify any and all necessary Ordinary Location standards that need to be applied, and we suggest that they conduct due diligence before certifying accordingly, particularly as the specific ordinary location standards that may be applicable can vary from jurisdiction to jurisdiction within the US.

### PRODUCTION

As well as the design being assessed against the relevant standards and taken through the necessary test programme, where ongoing manufacture is desired the manufacturer will also receive an Initial Factory Inspection, followed by quarterly periodic inspections, where the products will be inspected and verified for continued compliance.

### IF I AM ONLY PRODUCING A ONE-OFF PRODUCT DO I STILL HAVE TO HAVE THE ONGOING QUARTERLY AUDITS?

If certification is required for a low volume production run then there is the option for a manufacturer to have SGS Limited Production Certification (LPC) of their equipment. This is similar to the Unit Verification process common to the IECEx Scheme and ATEX certification. By using this process, the manufacturer is not required to engage in the ongoing surveillance programme, however the certification is restricted to only the equipment physically verified by serial number.

### HOW ARE HAZARDOUS LOCATIONS CATEGORISED IN NORTH AMERICA?

In the way that the IEC standards classify hazardous areas based upon the type of potentially explosive atmosphere and its presence (reflected through into the ATEX regime), the North American system does the same. However, there are some fundamental differences, most notably that North America identifies the

type of potentially explosive atmosphere by Class (I, II, or III), and its presence which can be categorised by either a Division system (NEC 500) or Zone system (NEC 505).

### WHAT IS THE DEFINITION OF CLASS I, II OR III?

#### CLASS I

A location made hazardous by the presence of flammable gases or vapours that may be present in the air in quantities sufficient to produce an explosive or ignitable mixture. Flammable gases or vapours are grouped into A, B, C or D based upon their ignition properties.

#### CLASS II

A location made hazardous by the presence of combustible or electrically conductive dust. Combustible or electrically conductive dust are grouped into E, F or G based upon their ignition properties.

#### CLASS III

A location made hazardous by the presence of easily ignitable fibres or flyings in the air, but not likely to be in suspension in quantities sufficient to produce ignitable mixtures. Ignitable fibres or flyings are not grouped further than this.

### SHOULD I CERTIFY FOR ZONES, DIVISIONS OR, BOTH?

The principle of Zones and Divisions is the same in that their aim is of achieving safety in hazardous locations by categorising areas where the risk of a potential source of ignition should be eliminated or minimised.

The Division system (NEC 500) was the first to be recognised in North America as a means to assess and differentiate between the levels of risk in hazardous locations. It is based upon a two-tier approach and it focusses on whether the hazard is present under either normal or abnormal conditions, rather than on the duration of the hazard. Hazardous areas are categorised into Division 1 or Division 2, where Division 1 encompasses hazards that are present under normal operating conditions or present frequently during maintenance or repair operations and Division 2 encompasses hazards that can exist under uncommon circumstances.

In other words, under this scheme, an area classified as Class I, Division 1 would represent the most hazardous area within that Class.

The Zone system (NEC 505) is a more recently adopted approach and is designed to closely align to the ATEX and IEC principles, where the area classification is based on how often and for how long the hazard is likely to be present rather than upon normal versus abnormal conditions. The three Zone system can be explained as follows: Zone 0 represents an area in which an explosive gas atmosphere is continuously present or present for a long period of time; Zone 1 represents an area in which an explosive atmosphere is likely to occur in normal operation; and Zone 2 represents an area in which an explosive gas atmosphere does not normally exist. Therefore, under this scheme an area classified as Class I, Zone 0 would represent the most hazardous area within that Class. The standards applied when certifying products for North America Zones are closely aligned to those used during ATEX or IECEx with some national deviations, and so they may feel more familiar to manufacturers than those used specifically for Divisions.

In order to ensure that products can be installed in all plants irrelevant of which system is in place, some manufacturers dual mark their products for both Zone and Division. The obvious advantage to this is mainly a commercial one, as from a safety perspective a product marked for Zones is as suitable for a Zone application as one that is marked for both Divisions and Zones.

Currently, for new installations, the Zone system has a greater preference in Canada, and for offshore use in the US, whereas the Division system is generally preferred for onshore use in the US, but when plants are being extended they will tend to follow the pre-existing installation. Because following the Zone system will generally be more economical than following the Division system, it is anticipated that the popularity of the Zone system will increase.

Therefore, before proceeding with certification, we strongly advise manufacturers to research their market and talk to their customers and distributors to understand their end users' requirements, and to obtain certification accordingly.

### WHAT IF MY DESIGN INCLUDES EX CERTIFIED COMPONENTS?

Many manufacturers Ex designs integrate other Ex certified components; typical examples include a sensor, a flameproof enclosure and cable glands. It is extremely difficult, if not impossible, for an NRTL to certify a piece of equipment for North America that uses Ex components that are not certified appropriately for that region, even if the components are certified for ATEX and IECEx. Therefore, early on in the concept process, you should ensure that any components that will be included in the design have the relevant certification, and you should collate these certificates for submission at the start of the project.

### HOW DO I KNOW WHAT STANDARDS TO CERTIFY TO?

Here at SGS Baseefa we try to keep the process of certifying as straight forward as possible, and therefore we have obtained the following standards in our accreditation that we use when certifying customers products for North America:

	USA	CANADA
<b>GENERAL REQUIREMENTS</b>		
ANSI/ISA/UL 60079-0	YES	NA
CAN/CSA C22.2 No 60079-0	NA	YES
FM3600	YES	NA
C22.2 No 0.10 (Canadian general standard, to go with No. 30 & No. 25)	NA	YES
<b>EXPLOSION PROOF</b>		
FM3615	YES	NA
UL1203	YES	NA
UL674 motors and generators	YES	NA
CAN/CSA C22.2 No. 30	NA	YES
<b>FLAMEPROOF</b>		
ANSI/ISA/UL 60079-1	YES	NA
CAN/CSA C22.2 No. 60079-1	NA	YES
<b>DUST IGNITION PROOF</b>		
ANSI/ISA/UL 60079-31	YES	NA
CAN/CSA C22.2 No. 60079-31	NA	YES
FM3616	YES	NA
UL1203	YES	NA
CAN/CSA C22.2 No. 25	NA	YES
FM3611	YES	NA
<b>INTRINSIC SAFETY</b>		
ANSI/ISA/UL 60079-11	YES	NA
FM3610	YES	NA
UL913	YES	NA
CAN/CSA C22.2 No. 60079-11	NA	YES
<b>NON-INCENDIVE</b>		
ANSI/ISA/UL 60079-15	YES	NA
CAN/CSA C22.2 No. 60079-15	NA	YES
ANSI/ISA 12.12.01	YES	NA
CAN/CSA C22.2 No. 213	NA	YES
<b>PURGED AND PRESSURIZED ENCLOSURES</b>		
ANSI/ISA/UL 60079-2	YES	NA
CAN/CSA C22.2 No. 60079-2	NA	YES
NFPA 496	YES	YES
FM3620	YES	NA

Where the US and Canadian standards are both based on the IEC 60079 series, the national differences may vary slightly, but the standards are sufficiently close that certification to both versions should be easily achievable.

Some niche products call for additional Hazardous Location and Ordinary Location standards to be applied. Manufacturers should research their market to ensure that they capture the relevant Hazloc and Ordloc standards to certify to, whilst avoiding capturing unnecessary standards which can build in needless cost, time and complexity to a certification project.

### IS IT POSSIBLE TO USE AN ATEX OR IECEX CERTIFICATION REPORT TO CERTIFY A PRODUCT FOR NORTH AMERICAN?

For Class and Zone certification, in theory yes. How much direct reference to the original report can be made would depend on the version of the standards that had been originally applied. This can be discussed specifically at the application stage.

For Class and Division certification, the ATEX or IECEX test data and assessment becomes less transferable, but where possible we will use the information to support your application.

### IF MY PRODUCT IS ALREADY IECEX/ATEX CERTIFIED TO IEC/EN 60079-1, WILL IT BE STRAIGHT FORWARD TO CERTIFY MY EQUIPMENT FOR CLASS I DIVISION 1?

In regard to the IEC/EN 60079-1 assessment already performed, then no this is not directly applicable for Class I Division 1. Due to the fact that Division 1 is the equivalent to a Zone 0 and Zone 1, 'flameproof' equipment (IEC/EN 60079-1) does not fulfil the requirements. The equipment will need to be further assessed and tested against the 'explosion proof' requirements, the standards for which are detailed above.

#### NEXT STEPS?

If you are considering certifying your product for North America we strongly advise involving your Certification Body from an early stage. This will ensure that the requirements can be discussed and fully understood, and that your project can be planned accordingly.

SGS Baseefa, in the UK, takes a collaborative approach with the SGS laboratory at Suwanee in Georgia to certifying for North America, and we pride ourselves upon providing support throughout the certification process. If you are interested in discussing your project please contact and she and the team who will be happy to assist.

#### General Enquiries

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#### WHY SGS?

SGS is the world's leading inspection, verification, testing and certification company. SGS is recognised as the global benchmark for quality and integrity. With more than 94,000 employees, SGS operates a network of over 2,600 offices and laboratories around the world.

Enhancing processes, systems and skills is fundamental to your ongoing success and sustained growth. We enable you to continuously improve,

transforming your services and value chain by increasing performance, managing risks, better meeting stakeholder requirements and managing sustainability.

With a global presence, we have a history of successfully executing large-scale, complex international projects. Our people speak the language and understand the culture of the local market and operate in a consistent, reliable and effective manner.

**TO LEARN HOW SGS CAN HELP YOU EXCEED CUSTOMER EXPECTATIONS, VISIT [WWW.SGS.CO.UK](http://WWW.SGS.CO.UK) OR CONTACT [UK.NOWISTHETIME@SGS.COM](mailto:UK.NOWISTHETIME@SGS.COM) FOR MORE INFORMATION.**