

Session Eight: It's Not Rocket Science Unless You Do It Wrong

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Abstract

The certification of hazardous locations electrical equipment is changing, and will continue to change, for some time. There has never been a more confusing time for manufacturers, end-users, and certification agencies alike.

This paper does not really have a point, or maybe it has several. While it provides answers, it will also raise new questions. It is really just a strung-together collection of miscellaneous observations, ramblings, and rants, garnered from 18 years in the business of certifying hazardous locations equipment. This is the stuff we talk about when we get together for a beer!

In the “good old days” the certification of HazLoc equipment while time-consuming and expensive, was at least relatively straight forward. If you wanted to sell your equipment in a particular country, you designed your equipment to comply with the applicable National Standards, made an application to a Certification Agency in that country, provided a test sample(s), paid whatever they asked, and waited. If you were lucky, in a few months you would receive a letter telling you that your equipment failed, try again! Monopolies can get away with that. Eventually, if you followed the Certification Agencies’ instructions and made the appropriate changes and modifications, you would receive a Certification Report. The Certification Report would spell out exactly how the equipment must be constructed and marked in order to bear the Certification Mark.

If that is how you think of certification, turn off the 8-track and listen up! This is the 21st century and that mean options! Options for the manufacturer, options for the end-users, options for certification agencies. But, with options comes confusion: What is necessary? What is required? Which Agency? Which Standard? Which Mark?

More than any other product area, Hazardous Locations electrical equipment is now global business. End-users have facilities located all over the world, and ideally, would like to use the same equipment in each facility. Until recently, this meant a manufacturer would have to design equipment to meet the National Standards of each country in which the customer operates facilities, and have that equipment approved by each country’s Certification Agency. Of course, the end-user complained to the manufacturer about the high costs and time delays this caused. The manufacturers complained to the Certification Agency and funny enough, the Certification Agency didn’t really see a big problem. Eventually, the manufacturers figured out the right people to complain to, and things began to change. Slowly at first, Free Trade, the European Union, then more quickly, adoption of “3-Zone”

area classification, adoption of IEC Standards, partnership agreements, ATEX and IECEx. To the point we are at today, where a manufacturer can go to almost any Certification Agency and receive a Certification Mark (or Marks) which will be accepted in almost any country in the world.

We are closer than ever to the ideal, One Standard, One Test, One Mark, for the world! While we are close, there are some subtle (and not so subtle) differences which do have effects.

A number of years ago, both Canada and the US revised their installation codes to recognize the “3-Zone” area classification system, and also began the process of adopting the IEC Standards as their National Standards. The process in each country is slightly different, and at slightly different points, but the effect will be the same in both countries – it will bring the installation codes in line with the rest of the world. Other than in North America, the 3-Zone system and the IEC 60079 Series Standards (or slight variations) are used worldwide.

Two Main Area Classification Systems - Comparison

DIVISIONS	ZONES
1	0
	1
2	2

For Haz Loc equipment, IEC Standards mean the 60079 Series of Standards; which in the very near future will include all Haz Loc related IEC Standards. At the present time, the IEC is in the process of incorporating all Haz Loc Standards under the 60079 numbering system. Standards such as the 61241 and 61779 Series have been (or will be) re-issued as 60079 Series Standards. Additionally, the European Union Standards, or CENELEC Standards, are now exact duplicates of the IEC 60079 series Standards, and an agreement is in place to keep them identical.

Another big difference between the “old” North American certification standards and the IEC60079 series is; the IEC standards require the manufacturer to have a higher understanding of the standard(s) and hazardous locations in general, in order to use and apply them properly. As a matter of fact, IEC60079-0, General Requirements, contains the following clauses;

“The manufacturer shall prepare documents that give a full and correct specification of the explosion safety aspects of the electrical apparatus”

And,

“By marking the electrical apparatus in accordance with clause 29, the manufacturer attests on his own responsibility that:

- *The electrical apparatus has been constructed in accordance with the applicable requirements of the relevant standards in safety matters, and;*
- *The routine verifications and tests in Clause 27 have been successfully completed and that the product complies with the documentation.”*

This makes sense, as the IEC equipment standards are, in general, assumed to be used by manufacturers with appropriate Quality Assurance programs. However, it is a significant difference from what North American manufacturers are used to.

The difference between North America and the rest of the world certification philosophies are mainly to blame. In North America, a manufacturer must submit a sample, have it evaluated, and if it complies, the Certification Agency will issue a Certificate. In order to maintain that certification, the manufacturer must submit to at least bi-annual un-announced factory inspections. In the rest of the world (ROTW), the manufacturer goes through a similar process to obtain a Certificate for the equipment from a Notified Body, but must also obtain a Quality Assurance Notification (QAN) for the facility(s) that build that equipment. In order to maintain the Certificate, he must submit to a Quality Audit once every 12 to 18 months.

In parental terms, in North America, the manufacturers are treated like children – you can make it, but you have to show us first and we'll make sure it's ok. And every so often we will make a surprise visit to make sure you are still doing what you said you are doing. If you are not, we can shut things down immediately! In the ROTW, manufacturers are more like a teenager – they are assumed to have some basic knowledge and once we know you are operating more or less responsibly, you have a little more freedom to do your thing. Every once in a while, we will come over and review the whole operation to make sure things are still running smooth. If they are not we'll give you a chance to explain. But if you do not or cannot explain, or the same issues keep coming up, we will eventually take away the keys to the car! Why the difference?? I don't know, but I blame the lawyers!

I started to get into the EU certification system, so now I'll give you a quick summary of the basics. The EU system, or CE – Conformance European, is based on a number of different Directives which cover various different types of equipment and products. These Directives are based on the various EN (CENELEC) Standards. In order to sell equipment in the EU, it must bear the CE marking, including any markings required by the applicable Directives. The overall responsibility for ensuring that the equipment complies with all applicable Directives and is therefore eligible to bear the CE marking is the manufacturers - the manufacturer must prepare a written declaration stating this! Many of the Directives are “self-declared” by the manufacturer, others require the use of a Notified Body (a body or agency “notified” or recognized by the member state as being the accredited agency for that Directive)

For Hazardous Locations equipment, the main Directive is the ATEX (ATmosphere EXplosive) Directive. It is applicable to all Hazardous Locations electrical equipment, as well as some non-electrical equipment (but that is a topic for another day). It is a two-part process;

- First, the equipment must be evaluated, which if successful, will result in the Notified Body issuing an EC-Type Examination Certificate; and,

- Second, the facility(s) producing this equipment must undergo a Quality Assessment (EN13980, which is basically ISO9000 plus additional elements to tie the QA program to the ATEX Certification), which if successful, will result in the Notified Body issuing the Quality Assurance Notification (QAN).

With these two documents in place, the manufacturer may now “self declare” compliance with the ATEX Directive.

The mechanics of the IECEx Scheme are virtually the same as for the ATEX Directive.

- Your equipment is examined by an IECEx Scheme-accredited Certification Body (ExCB), which if successful, will result in the ExCB issuing an IECEx Test Report (ExTR);
- The facility(s) producing this equipment must undergo a Quality Assessment (IECEx Scheme Operation Document OD009, which is basically ISO9000 plus additional elements to tie the QA program to the IECEx Scheme), which if successful, will result in the ExCB issuing the Quality Assurance Report (QAR).

With these two documents in place, a manufacturer may request an IECEx Scheme Certificate. While the IECEx Certificate is not yet widely accepted, the IECEx Test Report is accepted by all ExCB's within member countries as a basis for issuing National Certification for that member country.

This is the main operational difference between ATEX and the IECEx Scheme. At the present time, the IECEx Scheme Certificate is only accepted in three countries; Australia, New Zealand, and Singapore. However, the IECEx Test Report (ExTR) is be used as a “fast track” to National Certification; it is fully recognized and accepted by all member countries. The disadvantage is that you still may have go to an ExCB in each member country (or for each Certificate you require) to obtain the National Certificate. The advantage is that the testing/evaluation does not have to be repeated, and you receive the National Certificate – it is already used, recognized and accepted in the particular marketplace.

Other notable differences between ATEX and the IECEx Scheme are;

- ATEX is a regional scheme (EU only); IECEx is a global scheme.
- ATEX is mandatory, it is required by the EU and you must be in the EU to fully participate; The IECEx Scheme is voluntary and open to all countries and certification agencies.
- In order to comply with ATEX, both the EC Certificate and QAN are required; It is possible, acceptable and useful (depending on what is required by the specific jurisdiction) to only obtain an IECEx Test Report.

The notable similarities between ATEX and the IECEx Scheme are;

- The standards used to evaluate the equipment are all virtually identical. There is an agreement to harmonize all EN and IEC Standards, so eventually they will be all be identical.
- The Standard used to evaluate the facility's QA program are identical – where EN13980 says “ATEX”; OD009 says “IECEx Scheme”.

- Both Schemes enjoy some un-official acceptance in non-member countries.

So now what? With almost every country in the world using the IEC 60079 series standards, things should be easy. But, while every country uses IEC Standards, each country only recognizes specific Certification Marks (or Certificates). So now you need to figure out which Certification Mark is acceptable for which country! ATEX will get us into the EU, but is it acceptable in Australia? (Answer:- Absolutely NOT)...what about the Far East? (Answer:- maybe, sometimes, depends)... CSA Certification used to be accepted in most places in the USA, but now they are asking for CSAus? (Answer:- It's true). With free trade agreements, international partnership arrangements, regional and international certification schemes, most Certification Agencies can offer Marks for specific countries or regions. However, in most cases, the Certification Agency cannot guarantee exactly which mark you need for a specific situation – it is up to you, the manufacturer, to tell the Certification Agency which Mark(s) are required.

Ok, ok, I'll tell you! If you have not already figured it out; unless you sell your product to one specific market, and only that market, and never intend to sell it anywhere else, the best bang for your buck is the IECEx Scheme! Shhh, don't tell my boss I told you that – I'm supposed to say "CSA Certification". It may not give you everything, but it is an excellent place to start.

The IECEx Schemes' growth has been exponential in the past few years. The first meeting was held in 1996 when five or six certification agencies at a meeting in CSA Toronto. Last year, almost two hundred attendees, ranging from certification bodies, manufacturers, regulators, etc., from thirty-one member countries (plus a number of observers), representing thirty-six certification agencies met in Paris. And of course, it is a snowball effect; as more countries and certification agencies join the scheme, more want to join the scheme, and so on, and so on.....

One Standard, One Test, One Mark, for the world!

The End?