

# THE BULLETIN

## AN UPDATE ON HAZARDOUS ENVIRONMENTS

FEBRUARY 2016



### THIS EDITION CONTAINS:

Welcome to the Bulletin

Protecting Lives and Property

The "New" ATEX Directive

CEC 2015 Update: Explosive Dust Atmospheres

IEC 60029-7:2015 Updates

### WELCOME TO THE BULLETIN: AN UPDATE ON HAZARDOUS ENVIRONMENTS

CSA Group is pleased to introduce *The Bulletin: An update on hazardous environments*, your bi-monthly resource for the information you need to properly manage the safety of products and systems used in hazardous locations and pipeline applications.

Each issue of *The Bulletin* will share valuable news, information and insights from the highly knowledgeable technical staff at CSA Group, a worldwide leader in standards development and testing & certification services.

Our aim is to provide a deeper understanding of pipeline and hazardous locations safety requirements, guide you in achieving and maintaining essential safety certifications, and provide access to the additional resources and support needed to adhere to your vital safety mission.

Our team will keep you abreast of changes in standards, new programs and upcoming industry events. We'll discuss how emerging technologies affect standards development and your certification requirements. And we'll address important topics or issues that impact you and the others worldwide who are responsible for hazardous location and pipeline safety.

CSA Group is deeply committed to supporting your safety efforts. Our integrated standards, testing and certification involvement equips us with unique experience and expertise surrounding the challenges you face and the solutions you require. *The Bulletin* provides us with a new platform to share our knowledge and help keep you fully informed.

We welcome your thoughts for making the information in *The Bulletin* even more relevant and valuable in the future. Please share your article suggestions or other comments with me by email at [newsletters@csagroup.org](mailto:newsletters@csagroup.org).

All of us at CSA Group hope you enjoy this inaugural issue of *The Bulletin*!

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dana'.

Dana Parmenter

Global Business Unit Director  
Hazardous Locations

## PROTECTING LIVES AND PROPERTY IN HAZARDOUS LOCATIONS

### IT STARTS WITH PROPER EQUIPMENT CERTIFICATION

PART 1 IN A 3-PART SERIES

Concern over hazardous locations has become a highly visible public issue. Recent accidents involving industrial plants, railroads, refineries and other facilities have been disastrous, causing personal injury and death, serious environmental damage, and significant property losses. As a result, proposals for new mining projects, oil and gas exploration and new infrastructure to transport goods to market are the source of much debate.

The high visibility of individual incidents can obscure the far larger number of hazardous locations that pose potential risks throughout our communities. Hazardous locations exist anywhere that vapor, liquid or dust create a potentially flammable or explosive atmosphere that could be triggered by an electrical spark or other source of ignition. A wide range of industries – ranging from oil and gas, waste water treatment, food and beverage production and pharmaceuticals, to chemical processing, mining, metals and grain storage – all must take hazardous location safety requirements into consideration in their day-to-day operations.

In order to mitigate the risks associated with hazardous location (or "hazloc") operations, it is important that equipment designers and manufacturers, as well as everyone involved in equipment installation, operation, repair and maintenance, have a thorough understanding of safety requirements.

In this article series, we will explore three important facets of safety in hazardous locations: Equipment Certification; Personnel Certification; and Equipment Inspection, Repair and Maintenance. Let's begin with Equipment Certification.

#### UNDERSTANDING EQUIPMENT CERTIFICATION REQUIREMENTS

The very nature of hazardous locations means there are explosive or flammable elements in the environment. Equipment used in hazardous locations must have specific safety features that help eliminate the potential for ignition so the machinery can be safely used. Such safety features are required by law in most jurisdictions.

Incorporating safety features into the initial equipment design, ensuring proper testing and certification of the product, and defining requirements for training in equipment operation should always be included in the overall product development process.

Recognized safety standards and the product certification process provide an important safeguard to ensure that products made by any manufacturer for use in a hazardous location meet essential requirements. When designing hazloc equipment, it is imperative to understand the safety standards adopted by each jurisdiction where a product might be used. The requirements of the standards must act as the foundation for any design because, not only must the product meet those requirements to achieve certification, but the safety requirements can also effect functionality.

For designers and manufacturers, it is critical to consider the intended use of the product in the initial design phases rather than once the functional design is complete just weeks before production. This includes considering what protection concept will be employed to assure equipment safety, what type of hazards the product will be exposed to and the operating environment.



## HAZLOC PRODUCT TESTING AND CERTIFICATION

In order to demonstrate compliance with standards requirements, testing and approval by a Certification Body or Notified Body accredited to issue a certificate for the designated target region is required. Products are certified for use in very specific locations and conditions. Beyond selecting certified products, purchasers and operators of hazloc equipment are responsible for assuring the equipment's certification actually meets the requirements of the intended installation location.

The global increase in oil and gas production has accelerated demand for equipment for use in hazardous locations. This has led to longer equipment delivery lead times for new products and to an increase in equipment manufacturers, many of whom may be unfamiliar with the many specific requirements for products used in hazardous locations. The availability of recognized industry safety standards and the rigorous product testing and certification process provide a common foundation to assure that products from new as well as established suppliers will conform to important hazloc requirements.

*Coming up in April, Part 2:*

### ***Certify Personnel to Achieve and Maintain Safety Competence***

*Knowledgeable and competent staff members are required to effectively implement and assure proper equipment use in hazardous locations. In the upcoming April issue of The Bulletin, we'll discuss why one of the best ways to assure uniform understanding and compliance with safety requirements is by implementing a thorough and ongoing personnel certification program.*

---

## THE "NEW" ATEX DIRECTIVE TAKES EFFECT IN APRIL – HERE'S HOW IT WILL AFFECT YOUR DOCUMENTATION REQUIREMENTS

With 2016 now upon us, the 20 April 2016 implementation date for ATEX Directive 2014/34/EU is fast approaching. As that date draws near, manufacturers and others impacted by the new Directive have just a few months left to ensure product documentation conforms with applicable requirements on and after 20 April.

To recap what has already transpired, on 29 March 2014, a new "ATEX" Directive was published in the Official Journal. This Directive is known as 2014/34/EU and will replace the existing 94/9/EC. This publication is one of nine new EU Directives published as a result of the New Legislative Framework (NLF), which implements the text of EU Decision 768/2008/EC and makes reference to Regulation 765/2008/EC.

The new Directive applies to equipment and protective systems intended for use in potentially explosive atmospheres that will be placed on the market starting 20 April 2016. Effective on that date manufacturers, importers, authorized representatives and distributors must comply with applicable requirements of the new Directive. The old and new Directives do not overlap; the existing 94/9/EC Directive ceases to be effective after 19 April 2016 and the new Directive becomes effective on the following day.

It is important to note that the NLF does not revise sector-specific elements of existing Directives. Therefore implementation of 2014/34/EU will not change the scope or essential requirements of the ATEX Directive



#### **WHAT WILL BE REQUIRED EFFECTIVE 20 APRIL?**

Perhaps the most urgent concern expressed by manufacturers and others affected by the new Directive is, what must be done to ensure current products can continue to be sold after 19 April? Here is a recap of how implementation of the new Directive affects documentation for current products and what is involved in migrating products to the new Directive:

#### **Existing EC-Type Certificates**

For existing EC-Type Examination Certificates there is no requirement for new documents, Certificate variations or supplements to be issued and there are no additional costs or paperwork involved to migrate to the new Directive. Article 41 (2) of the new ATEX Directive states that Certificates issued under Directive 94/9/EC will remain valid under the new Directive 2014/34/EU and Certificates that still refer to 94/9/EC do not have to be re-issued to reference the new Directive.

The same is true of documentation for new certification projects started during the transition period and completed before 20 April 2016, as well as for certification projects started prior to 20 April but completed after that date.

There is no time limit on the validity of Certificates issued under Directive 94/9/EC as long as the products are not subject to certification updates or variations to existing Certificates are not required.

Certificate updates – If a certification must be updated due to a product change or another reason, a new Certificate to 2014/34/EU will be required and the past EC-Type Examination Certificate will change to an EU-Type Examination Certificate. Because 2014/34/EU does not become effective until 20 April 2016, Notified Bodies, including CSA Group, cannot issue Certificates stating product compliance with the new Directive before that date.

Variations to existing certificates – After the new Directive becomes effective, variations to existing Certificates issued under 94/9/EC can be updated without changing the Certificate number. If a variation is needed after 20 April 2016, the Notified Body will reissue the certificate the same as in the past. Upon reissue, references to 94/9/EC will be replaced with 2014/34/EU and EC-Type Examination Certificates will become EU-Type Examination Certificates.

#### **New EU-Type Certificates**

All new certification projects initiated on or after 20 April 2016 must be performed by Notified Bodies that are "notified" for the new ATEX Directive 2014/34/EU and EU-Type Certificates will be issued stating compliance to the new Directive. The process of notifying bodies to the new Directive is underway and all Notified Bodies, including CSA Group, will become notified on the same date. Manufacturers claiming compliance with the new Directive before their Notified Body becomes officially notified should make it clear that compliance has been verified by self-assessment and not by a Notified Body.

#### **Declarations of Conformity**

Under the requirements of the new NLF Directives, existing Declarations of Conformity will need to be revised to reflect the new ATEX Directive. The identification of applicable

Directives must be included and manufacturers who have multiple Declarations of Conformity for a single product will have to consolidate these into a single document.

There is no requirement for manufacturers to have an EU-Type Examination Certificate to 2014/34/EU in order to make a Declaration of Conformity to 2014/34/EU. While manufacturers and others are not permitted to state compliance with 2014/34/EU before 20 April 2016, they do not have to wait until that date to update their Declarations of Conformance.

The European Commission permits Declarations of Conformity to be revised ahead of time to state compliance with both 94/9/EC and 2014/34/EU alongside the respective dates of application. Therefore, the Declaration may state conformity with 94/9/EC up to, and including, 19 April 2016 and also state conformity with 2014/34/EU on, and after, 20 April 2016.

For products placed on the market on and after 20 April 2016, Declarations of Conformity must declare conformity to 2014/34/EU.

#### **Quality Assurance Notifications**

Quality Assurance Notifications (QANs) are treated the same as other Certificates under the new requirements. This means QANs issued under Directive 94/9/EC remain valid under 2014/34/EU. They do not require immediate updating to state conformance with the new Directive but will be issued to reflect conformance with 2014/34/EU if the next revision or completion of the holder's next scheduled assessment occurs on or after 20 June 2016.

Expired QANs cannot be reissued under the old Directive after 19 June 2016 even if there is no change in the product. New QANs issued on or after 20 April 2016 must be issued to state conformance with the new 2014/34/EU Directive.

#### **NEW ATEX GUIDELINES COMING**

In addition to product documentation requirements, the introduction of ATEX Directive 2014/34/EU will be accompanied by other changes including publication of new ATEX Guidelines. The Guidelines have been completely re-written to address 2014/34/EU and now follow the structure of other Directive guidelines by providing guidance and information on each clause, rather than on topical subjects. Publication date for the expanded Guidelines has not yet been announced.

ARE YOU READY FOR 20 APRIL 2016?

## **CEC 2015 UPDATE SUPPORTS IMPROVED SAFETY IN EXPLOSIVE DUST ATMOSPHERES**

A central goal of the 2015 update of the Canadian Electrical Code (CEC) was to improve safety in explosive dust atmospheres. The resulting new CEC rules seek to achieve that objective by improving and clarifying the rules for Zones 20, 21 and 22 for dust environments as well as solidifying the migration of installations in Canada to the IEC Zone system. The changes to the code make more equipment available to end-users with the addition of new Types of Protection. The changes to rules also give clear direction on which Zone-Certified or Division-Certified equipment is permitted in each Zone classified area. An improved table shows which Zone or Division equipment can be used in each

Zone as well as showing which Zone or Division equipment can be used in the legacy Class/Division classified areas. The changes more closely align Canadian requirements with current international IEC standards.

#### **COMPLIANCE TIMING**

Dates for compliance with the new requirements vary by Province. Some jurisdictions were expected to adopt the updated code into legislation in late 2015 while other Provinces may take up to two years to formalize adoption.

CSA Group provides clients updates on Provincial adoptions to manufacturers via future Certification Informs bulletins. The bulletins will include details of any changes to the requirements that may occur as they are adopted by individual Provinces.

#### **WHAT HAS CHANGED?**

The migration of Canadian dust installations to IEC Zones introduces several new concepts for equipment used in explosive environments, including:

- "t" - Protection by enclosure (CAN/CSA-C22.2 No. 60079-31), Levels of Protection "ta", "tb", and "tc".
- "i" - Intrinsic safety (CAN/CSA-C22.2 No. 60079-11), Levels of Protection "ia", "ib", and "ic".
- "p" - Pressurized enclosure (CAN/CSA-C22.2 No. 60079-2), Levels of Protection "pxb", "pyb", and "pzc".
- "m" - Encapsulation (CAN/CSA-C22.2 No. 60079-18), Levels of Protection "ma", "mb", and "mc".

For equipment in conformance with CAN/CSA-C22.2 No. 60079-31 (Types of Protection "ta" or "tb"), there is no minimum joint requirement, however enclosures are subject to dust ingress testing and must meet the requirements of IEC 60529.

Equipment in conformance with CAN/CSA-C22.2 No. 60079-31 must be tested for maximum surface temperature, either covered in dust until no more will stay on the enclosure (for "tb"), or with one fault applied to the electrical equipment and a >200 mm Dust Layer on all sides (for "ta"). Equipment must also be marked with the maximum surface temperature. For "ta", the temperature is determined with a dust layer (as described above) and reflects the highest measured temperature from the external surfaces of the enclosure or the surfaces of the internal electrical components. For "tb", the maximum surface temperature under the dust layer is used. For "tc", the maximum surface temperature is measured with no dust layer.

Also under the updated CEC, equipment deemed suitable under the previous Class and Division system is compatible as follows: For Zone 20 and Zone 21, equipment previously suitable for Class II, Division 1 locations is permitted. For Zone 22, equipment suitable for Class II, Division 2 locations is permitted.

The 2015 CEC update includes new Types of Protection for installations in Explosive gas atmospheres, including the addition of Ex "ma" and Ex "mb" for Encapsulation. Explosionproof or flameproof "d" seals are now only required for explosionproof or flameproof equipment.

The updated CEC streamlines product marking requirements for Zone system equipment. Going forward new Canadian adoptions of the IEC 60079 series (CAN/CSA-C22.2 No.



60079 series) standards will no longer include requirements for Class and Division marking. Instead, the CEC identifies what Zone equipment is permitted in legacy Division installations and also identifies what Division equipment is permitted in the Zone installations. Table J1.2 in the 2015 CEC details the equipment permitted in Zones and Divisions.

## IEC 60079-7:2015 INCLUDES NEW MARKING AND TECHNICAL CHANGES

International Standard IEC 60079-7, Explosive atmospheres – Part 7: Equipment protection by increased safety "e" was updated with the publication of the 5th edition in June of 2015. IEC 60079-7:2015 specifies requirements for the design, construction, testing and marking of electrical equipment and Ex Components with type of protection increased safety "e" intended for use in explosive gas atmospheres.

The previous IEC 60079-7:2006 (edition 4) standard had not been updated since its publication in 2006 even though the normal IEC stability period is five years. Changes in related standards since 2006 and the need for clarifications to IEC 60079-7:2006 led to publication of technical revision IEC 60079-7:2015.

The fifth edition of IEC 60079-7 cancels and replaces the fourth edition published in 2006, and constitutes a technical revision. The updated Standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this Standard conflicts with a requirement of IEC 60079-0, the requirement of IEC 60079-7 takes precedence.

### KEY CHANGES

The most important changes to IEC 60079-7 include the replacement of Level of Protection "nA" marking with "ec" marking and replacement of Level of Protection "e" marking with "eb". Even if other technical aspects of a product remain unchanged, a change in marking is required to comply with the revised requirements. The requirements of IEC 60079-7 apply to both Levels of Protection unless otherwise stated.

Major technical changes from IEC 60079-7, Edition 4 to IEC 60079-7, Edition 5 include:

#### Level of Protection "e" to Level of Protection "eb":

- terminal insulating materials are now subjected to the same tests as rail-mounted terminals
- ingress protection requirements for Group I have increased from IP20 to IP23
- abnormal tests for discharge lamps have been added
- either the use of cathode power or a reduction in ambient temperature are required to maintain temperature class T4 under end-of-life conditions
- requirements for Ex Component "e" enclosures have been introduced based on those for Ex Component "d" enclosures

#### Level of Protection "nA" to Level of Protection "ec":

- additional requirements have been added for the use of solid insulating materials within the limits of their thermal stability
- requirements for Ex Component "e" enclosures have been introduced based on those



**CONTACT US TODAY FOR  
MORE INFORMATION:**

*Asia*  
+86-21-3368-8282

*Europe*  
+49-69-509-571-555

*North America*  
1-866-797-4272

[www.csagroup.org](http://www.csagroup.org)

for Ex Component "d" enclosures.

**PRODUCTS AFFECTED**

Products governed by the updated requirements include electrical equipment and Ex Components under two Levels of Protection:

**Level of Protection "eb":**

- Equipment or Ex components, including their connections, conductors, windings, lamps, and batteries; but not including semiconductors or electrolytic capacitors. Level of Protection "eb" applies to electrical equipment where the rated voltage does not exceed 11 kV r.m.s., A.C. or D.C.

**Level of Protection "ec":**

- Equipment or Ex Components, including their connections, conductors, windings, lamps, and batteries; and also including semiconductors and electrolytic capacitors. Level of Protection "ec" applies to electrical equipment where the rated voltage does not exceed 15 kV r.m.s., A.C. or D.C.



[SIGN UP FOR EMAIL NEWSLETTERS](#)

**COPYRIGHT © 2016 CSA GROUP, ALL RIGHTS RESERVED.**

**OUR CORPORATE MAILING ADDRESS IS:**

CSA GROUP  
178 REXDALE BLVD.  
TORONTO, ONTARIO M9W 1R3  
CANADA

