

# Out with the old: ATEX Directive keeps Notified Bodies and partners busy

Trig Smith, Manager, Certification Business Development, CSA International, Toronto, ON

*Here's a first step towards understanding the ATEX Directive.*

**M**anufacturers of electrical and nonelectrical equipment, protective systems, components and safety devices for sale in the European Union (EU) that are intended for use in potentially explosive atmospheres have spent a lot of time talking about the ATEX (ATmosphères EXplosibles) Directive. All of this talk was sparked by a crucial concern: Failure to comply with

the ATEX Directive means exclusion from European markets.

The conversations started in 1 March 1996 when the directive (formally known as European Union directive 94/9/EC) was first initiated as a voluntary measure. It became mandatory on 1 July 2003, and this means that manufacturers of applicable products must now "walk the talk."

In the following, we'll give you a feel for key ATEX Directive requirements. We'll also look at some resources available to help North American manufacturers achieve compliance.

#### **ATEX: A "New Approach"**

ATEX is one of the "New Approach" directives applicable in the EU. These do

not reference specific standards, but rather contain a list of Essential Health and Safety Requirements (EHSRs) with which a product must comply. Typically, harmonized European Norm (EN) standards are used to show compliance. The use of harmonized EN standards carries the presumption of conformity to the EHSRs as the harmonized EN standards were written considering the EHSRs. For the ATEX Directive, the standards would include the EN50000 series of standards for explosion protection.

The ATEX Directive replaces the old directives applying to equipment used in potentially explosive atmospheres—including the Framework directive (76/117/EEC), the First Specific

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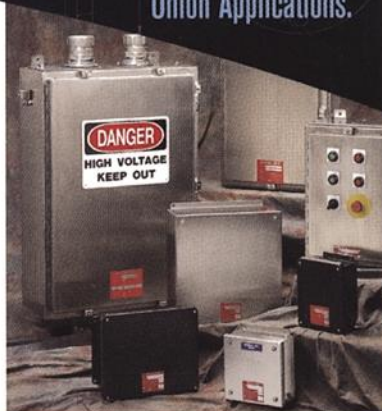
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Directive (79/196/EEC), and the Gassy Mines Directive (82/130/EEC).

## Conformity assessment

The equipment must be designated as Category 1, 2 or 3, depending on the conditions of operation and level of protection provided for the equipment (Table 1).

The ATEX Directive provides conformity assessment procedures that specify technical and quality assurance requirements based upon the Category of equipment. Typical conformity assessment paths are noted in Table 2.

## Technical file

The manufacturer assembles a technical file containing appropriate documentation to show compliance to the EHSRs of

## What's a Notified Body?

A Notified Body is an EU agency that has been notified to the EU commission by a member state as being qualified to evaluate to specific directives. It can determine compliance and issue type approval. There are more than 20 bodies notified under the ATEX Directive. (A list of Notified Bodies is published by the European Commission in the Official Journal of the European Communities. It's also available at <http://www.europa.eu.int/comm/enterprise/atex/>).

the directive (e.g., standards used, checklists, drawings, test data).

## EC Type Examination Certificate

For Category 1 and 2 equipment, a Notified Body (the sole source of the EC Type Examination Certificate and Quality Assurance Notifications for ATEX and other EU directives), examines a dossier (technical file) of information supplied by the manufacturer. In addition, it conducts tests as necessary to show that the product type complies with the requirements stated by the manufacturer.

The issuance of an EC Type

Examination Certificate by a Notified Body (see sidebar above) means that the equipment meets the relevant applicable provisions of the directive. For Category 3 equipment, issuance of an EC Type Examination certificate is not required.

## Ongoing production control

Depending on the conformity assessment route used as defined in the directive, an initial assessment audit and ongoing surveillance audits by a Notified Body may be required. If so, an accredited ISO 9000 quality system is helpful but not mandatory.



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## ATEX DIRECTIVE 94/9/EC

Equipment Group	Equipment Category and Level of Protection	Presence of Explosive Atmosphere	Flammable Substances	Correlation With Hazardous Areas
I-Mines	M1 - very high level protection	Presence	Methane, Dust	—
	M2 - high level of protection	Risk of Presence		—
II - Surface	1 - very high level of protection	Continuous Presence	G-Gas, Vapours Mist; D-Dust	Zone 0 (Gas etc) Zone 20 (Dust)
	2 - high level of protection	Likely to Occur		Zone 1 (Gas etc) Zone 21 (Dust)
	3 - normal level of protection	Unlikely to Occur		Zone 2 (Gas etc) Zone 22 (Dust)

## PROTECTION METHODS FOR POTENTIALLY EXPLOSIVE GAS/VAPOUR ATMOSPHERES

Protection Method	CENELEC (EU) IEC (International)	NEC (US) and CEC (Canada) – Class I
Intrinsic Safety – ia	Zone 0	Zone 0 Division 1
Intrinsic Safety – ib	Zone 1	Zone 1 Division 2
Flameproof – d	Zone 1	Zone 1 Division 2
Explosion-proof	—	Zone 1 Division 1
Pressurization – p	Zone 1	Zone 1 Division 1
Increased Safety – e	Zone 1	Zone 1 Division 2
Encapsulation – m	Zone 1	Zone 1 Division 2
Oil immersed – o	Zone 1	Zone 1 Division 2
Powder Filled – q	Zone 1	Zone 1 Division 2
Non-sparking – n	Zone 2	Zone 2 Division 2
Non-incendive	—	Zone 2 Division 2

## AREA CLASSIFICATION – DIVISION VERSUS ZONE

Type of Area	NEC and CEC (North America)	CENELEC and IEC
Continuous Hazard	Division 1 or Zone 0	Zone 0
Intermittent Hazard	Division 1 or Zone 1	Zone 1
Hazard Under Abnormal Conditions	Division 2 or Zone 2	Zone 2

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## CE Marking and Declaration of Conformity (Annex X of the ATEX Directive)

Once the manufacturer has complied with the ATEX Directive and all other applicable directives, the manufacturer may affix the CE Marking to the product in accordance with the directive, and compile a written EC Declaration of Conformity in accordance with the directive. An exception is components as defined by the ATEX Directive. Components do not have the CE Marking and have a written Attestation of Conformity in lieu of a Declaration of Conformity (D of C), detailing how the components are to be incorporated into equipment or protective systems to ensure the finished equipment meets the EHSRs of the ATEX Directive.

**Table 1: Equipment Categories**

Category	Level of Protection	Performance of Protection	Conditions of Operation
1	Very High	Two independent means of protection or safe even when 2 faults occur independently of each other.	Equipment remains energized and functioning in Zones 0, 1, 2(G) and/or 20, 21, 22 (D)
2	High	Suitable for normal operation and frequently occurring disturbances or equipment where fault are normally taken into account	Equipment remains energized and functioning in Zones 1, 2 (G) and/or 21, 22 (D)
3	Normal	Suitable for normal operation	Equipment remains energized and functioning in Zone 2 (G) and/or 22 (D)

Notes:  
 G - Gas  
 D - Dust  
 Zone 0 -- an area where an explosive gas atmosphere is continually present  
 Zone 1 -- an area where an explosive gas atmosphere will be present in normal operation, but not continually  
 Zone 2 -- an area where an explosive gas atmosphere will be present only under abnormal conditions for short periods  
 Zone 20 -- an area where a combustible dust atmosphere is continually present  
 Zone 21 -- an area where a combustible dust atmosphere will be present in normal operation, but not continually  
 Zone 22 -- an area where a combustible dust atmosphere will be present only under abnormal conditions for short periods

### North American testing laboratories can help

By virtue of partner relationships with

European Notified Bodies, certain North American testing organizations, such as CSA International, can evaluate products

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# ATEX-Compliant Products

## ATEX certified enclosures

ATEX-certified XCEX series enclosures, Increased Safety Terminal Enclosures, XIH/XDH instrument housings, XHPB pushbuttons, XHSS selector switches, and XJ series screw cover enclosures are used in the installation of electrical/electronic components for control, measurement or monitoring applications in hazardous environments.



—Adalet, [www.adalet.com](http://www.adalet.com)

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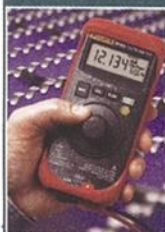
## Flame-proof hollow shaft encoder

The 12 series hollow shaft incremental encoder is certified to CENELEC standards with classifications for EEx d IIC T6 and EEx d I. It is also ATEX compliant (SIRA 01ATEX1181) for use in areas where explosive gases/powders may be present, and offers ingress protection to IP66. Available in shaft sizes up to 30mm, it provides an extended 5-24 V output.



—Hohner Corp., [www.hohner.com](http://www.hohner.com)

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## ATEX certified process calibrator

The 707Ex Loop Calibrator is the first in a new line of test tools developed specifically for use in hazardous environments such as petrochemical plants, oil platforms and refineries, and other locations subject to risk of explosion. The 707Ex meets FM certification and complies with ATEX directives.

—Fluke Corporation, [www.fluke.com](http://www.fluke.com)

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## ATEX-compliant explosion-proof products

Commonly used in North America, the BX, CX-E (larger, weather-sealed limit switches), and 14CE100 (smaller, enclosed limit switches) can now see expanded use in countries governed by the ATEX directive. Typical applications include fixed offshore platforms, petrochemical plants, mines, flour mills and other areas.

—Honeywell, [www.honeywell.com/sensing](http://www.honeywell.com/sensing)

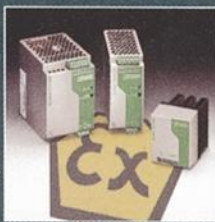
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## ATEX-rated power supplies

QUINT G2 power supplies are approved for use in the Class I, Div 2 hazardous areas. In addition, two of the company's power supplies and a diode redundancy model are also approved for ATEX, Zone 2 hazardous areas. The power supplies provide universal 24 V power with output currents of 2.5, 5, 10, 20, 30 and 40 A.

—Phoenix Contact, [www.phoenixcon.com](http://www.phoenixcon.com)

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## In-line mass flow transmitter

Compliant with European ATEX directives, the Series 504FT flow transmitters feature an all-welded thermal sensor and handle flow ranges from 0.05 to 2,000 scfm at process temperatures from -40 to 200°C. They have a process pressure rating of 300 psig.

—Kurz Instruments Inc., [www.kurz-instruments.com](http://www.kurz-instruments.com)

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## IS isolators are ATEX certified

The Switching Repeater Type 9170 (shown) and other IS isolators meet ATEX directives. The 9170 is designed for NAMUR proximity switches and contacts, and is available in one and two channels with galvanic isolation between input, output, and power supply.

—R Stahl, [www.rstahl.com](http://www.rstahl.com)

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## ATEX-compatible indicator

Meeting ATEX directives, the Model 752 Remote Indicator provides an operator with a useful multifunction display on a FOUNDATION

fieldbus segment. The device is a local indicator capable of sequentially displaying up to eight function block values from any node on the H1 segment.

—Emerson Process Management, [www.EmersonProcess.com](http://www.EmersonProcess.com)

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## Flow switch is ATEX compliant

Fluid Components Intl has received approval for its FlexSwitch® FLT93 Flow/Level/Temperature Series Switch with Dual Port Enclosure from the EC's KEMA organization for use in potentially explosive environments classified as Ex II 2G Eexd IIC T4. The thermal mass unit can perform flow or level sensing, along with temperature measurement, simultaneously.

—www.fluidcomponents.com

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## ATEX-compliant controller

ATEX compliant, the MOST logic controller features IEC61131-3 language support, redundancy with bumpless transfer, dual redundant high-speed Ethernet connections, HART pass-through of process and status variables, on-line configuration and reconfiguration, and peer-to-peer communications.

—MTL Open Systems Technologies, [www.mtl-inst.com](http://www.mtl-inst.com)

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## Process weighing system

The ATEX-compliant Model ST Weighing Terminal, NOVA WEIGH is available in several versions and can provide an optimal solution for application. All ST versions have dosing and filling options and offer Profibus and Ethernet connectivity, allowing their use in sophisticated networked applications. There is a choice of instruments for gas hazards Zones 1 and 2 as well as dust hazard Zone 21 and 22.

—Nova Weigh Ltd, [www.novaweigh.co.uk](http://www.novaweigh.co.uk)

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## ATEX-compliant motion/gearboxes

G-motion helical-bevel, bevel, helical, shaft mounted helical and helical-worm gearboxes now comply with ATEX Category 2 conditions. The G-motion range has a power range up to 45 kW and output torques up to 12,000 Nm with finely stepped output speeds and high gearing quality.

—Lenze, [www.lenze.de/LenzeE/lf06.html](http://www.lenze.de/LenzeE/lf06.html)

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## ATEX industrial weighing system

Meeting ATEX standards, the Combs series is a new family of weighing equipment for use in industry. The modular design of Combs equipment means users can select the weighing capacities and resolutions they need. Weighing platforms are available in a broad range of sizes, and scale operators can choose whether the equipment is used to weigh, count, fill, batch, checkweigh, formulate or classify materials.

—Sartorius, [www.sartorius.com](http://www.sartorius.com)

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in accordance with the directive's conformity assessment procedure under the direction of a Notified Body. For example, CSA has been qualified by KEMA to test and evaluate hazardous locations equipment for ATEX compliance, and arrange for KEMA to issue the required EC-Type Examination Certificate. CSA has also been qualified by KEMA to conduct quality assurance system audits, as necessary, and have KEMA issue the Quality Assurance Notification.

Under the direction of a Notified Body, North American testing labs may conduct product evaluations and quality notification audits. This can result in more convenient and expeditious testing of products made in North America for export to Europe. The familiarity with the EU Directive and technical requirements

**Table 2: Conformity Assessment Procedures**

Equipment Category	1	2	3
EC Type Examination Certificate	Required (Annex III)	Required (Annex III)	Not applicable
Quality Assurance (Ongoing production control)	Production QA (Annex IV)	Product QA (Annex VII)	Internal Control of Production (Annex VIII)

**Notes:**  
 1. Equipment Categories 1 and 2 require the involvement of a Notified Body  
 2. The Annex refers to the Annex in the ATEX Directive  
 Production Verification (Annex V), Conformity to Type (Annex VI) and Unit Verification (Annex IX) may also be an option depending upon the route of compliance chosen. These options however require routine examination and tests of each piece of equipment manufactured.

that organizations such as CSA have enables North American manufacturers to work with North American testing labs regarding ATEX requirements during the product design phase (when necessary changes can be made relatively easily), or when products are tested and certified for use in the North America market.

Even manufacturers of Cat 3 products (use of Notified Body not mandatory) will find testing lab assistance invaluable. A qualified third-party testing and certifi-

cation agency can help the manufacturer prepare the proper documentation that makes up the Technical File.

Certainly, there's a big advantage for manufacturers in being able to work with one test organization in North America to provide certification services for both North America and Europe.

**Just enough to get you started**

The information presented here is intended as an introduction, for manufac-



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urers of electrical equipment, to the general process and requirements of the ATEX Directive. The full text of the Directive 94/9/EC and any official interpretations by the EU must be consulted for exact legal requirements.

With so much riding on compliance, manufacturers can ill afford to misunderstand what is required of them. As discussed earlier, qualified third parties including some North American testing laboratories, can provide significant help when it comes to determining what you must do to achieve compliance.

Even when working with a third party, however, manufacturers may wish to familiarize themselves with the ATEX Directives by reviewing *The ATEX Guidelines*, published by the EU. It's available in pdf format at <http://europa.eu.int/comm/enterprise/atex/guide/>, and covers application of the directive, conformity assessment procedures, and marking requirements, plus a full text of directive 94/9/EC, a list of Notified Bodies, a list of Harmonized Standards, FAQs, and more. More information is available in the NIST Special Publication 951 *A Guide to EU Standards and Conformity Assessment* (<http://ts.nist.gov/ts/htdocs/210/gsig/eu-guides/sp951/text-sp951.htm#20-2>), and on the CSA International website at [www.csa-international.org](http://www.csa-international.org). ■■■

### About the author

Trig Smith P. Eng. is a graduate of the University of Manitoba with a bachelor of science degree in electrical engineering. He has over 28 years experience at CSA International as



certification engineer, team coordinator and presently as a business development manager for a number of product areas including electrical equipment for hazardous locations. He can be reached at [trig.smith@csa-international.org](mailto:trig.smith@csa-international.org).

## Comparison of Directive 76/117/EEC and ATEX Directive

*Intertek, ETL SEMKO division*

The following is not meant to be a comprehensive comparison of the "Old Approach" Directive 76/117/EEC and the "New Approach" ATEX Directive 94/9/EC. Rather, it identifies the significant changes that manufacturers must be aware of when preparing to send to market in the European Union those products intended for use in potentially explosive atmospheres.

However, before we go any further, we need to define a potentially explosive atmosphere. This is an environment that, because of mixture of atmospheric air and flammable substances, such as gases, vapor, mist or dust, has the potential to be an explosive one if an ignition source is present. Examples include: underground mines, off-shore platforms, petrochemical plants, utility/power plants, and process manufacturing sites.

Let's now look at some of the key characteristics of both the "Old Approach" Directive 76/117/EEC and the "New Approach" ATEX Directive 94/9/EC. As you'll see by comparing each, there are significant differences between the two directives.

### Directive 76/117/EEC

- Voluntary
- Covers electrical products only
- Does not require CE Marking
- Standard was limited to mining and surface industries classifications
- Quality management system certification not required
- Made up of several different standards, constantly amended and often interpreted differently throughout the EU member states

### ATEX Directive 94/9/EC

- Mandatory
- Potentially explosive atmosphere containing a mixture of atmospheric air and flammable substances—Gas, Vapor, Mist and Dust
- Products covered include electrical and non-electrical (mechanical) products that contain or constitute a potential ignition source and require special measures to be incorporated into its design and/or installation to prevent the initiation of an explosion. In addition, safety or control devices installed outside hazardous areas that have an explosion protection function must also demonstrate compliance.
- CE Marking is required
- Equipment is categorized by type of potentially explosive atmosphere. First, by group:

Group I - underground part of mines & surface installations of mines endangered by firedamp or combustible dust;

M1 - Very high level of protection

M2 - High level of protection

Group II - above ground (non-mining) applications

Cat. 1 - Very high level of protection

Cat. 2 - High level of protection

Cat. 3 - Normal level of protection

- Manufacturers are required to demonstrate compliance to a quality management system and an annual review is required to maintain compliance.
- Made up of harmonized safety objectives through a set of generally worded essential health and safety requirements (EHSRs). Manufacturers must demonstrate and provide documentation that shows compliance to the EHSRs and describe how equipment should be installed, operated and maintained to ensure safe operation and maintains explosion safety through the foreseeable life of the product.

Intertek is a Notified Body for ATEX Directive to conduct EC Type Examinations for all protection concepts and Quality Module audits through its Leatherhead office in the UK and to conduct evaluations for product certification at its Cortland, NY labs. For a free consultation on the ATEX Directive requirements and your products, contact Ann Ruggles or Don Card at 1-800-345-3851.