

Beamex

Calibration White Paper

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The safest way to calibrate

An introduction to intrinsically safe calibrators

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There are industrial environments where calibrations should not only be made accurately and efficiently, but also safely. When safety becomes a top priority issue in calibration, intrinsically safe calibrators enter into the picture.

What is intrinsically safe calibration?

By definition, intrinsic safety (IS) is a protection technique for safely operating electronic equipment in explosive environments. The concept has been developed for safely operating process control instrumentation in hazardous areas. The idea behind intrinsic safety is to make sure that the available electrical and thermal energy in a system is always low enough that ignition of the hazardous atmosphere cannot occur. A hazardous atmosphere is an area that contains elements that may cause an explosion: source of ignition, a flammable substance and oxygen.

Hazardous area classifications in IEC/European countries are:

- Zone 0:** an explosive gas & air mixture is continuously present or present for a long time.
- Zone 1:** an explosive gas & air mixture is likely to occur in normal operation.
- Zone 2:** an explosive gas & air mixture is not likely to occur in normal operation, and if it occurs it will exist only for a short time.

A hazardous atmosphere is an area that contains elements that may cause an explosion.

An intrinsically safe calibrator is therefore designed to be incapable of causing ignition in the surrounding environment with flammable materials, such as gases, mists, vapors or combustible dust. Intrinsically safe calibrators are also often referred to being “Ex calibrators”, “calibrators for Ex Areas”, or “IS calibrators”. An Ex Area also refers to an explosive environment and an Ex calibrator is a device designed for use in the type of environment in question.

Where is intrinsically safe calibration required?

Many industries require intrinsically safe calibration equipment. Intrinsically safe calibrators are designed for potentially explosive environments, such as oil refineries, rigs and processing plants, gas pipelines and distribution centres, petrochemical and chemical plants, as well as pharmaceutical plants. Basically, any potentially explosive industrial environment can benefit from using intrinsically safe calibrators.

What are the benefits of using intrinsically safe calibrators?

There are clear benefits in using intrinsically safe calibration equipment. First of all, it is the safest possible technique. Secondly, the calibrators provide performance and functionality.

Safest possible technique. Intrinsically safe calibrators are safe for employees, as they can be safely used in environments where the risk of an explosion exists. In addition, intrinsically safe calibrators are the only technique permitted for Zone 0 environments (explosive gas and air mixture is continuously present or present for a long time).

Performance and functionality. Multifunctional intrinsically safe calibrators provide the functionality and performance of regular industrial calibration devices, but in a safe way. They can be used for calibration of pressure, temperature and electrical signals. A documenting intrinsically safe calibrator, such as the Beamex® MC5-IS, provides additional efficiency improvements with its seamless communication with calibration software. This eliminates the need of manual recording of calibration data and improves the quality and productivity of the entire calibration process.

Are intrinsically safe calibrators technically different from regular industrial calibrators?

Intrinsically safe calibrators are different from other industrial calibrators in both design and technical features. In view of safety, there are also some guidelines and constraints for how to use them in hazardous areas. Every intrinsically safe calibrator is delivered with a product safety note, which should be read carefully before using the device. The product safety note lists all the “do’s and don’ts” for safe calibration.

The differences in design and technical features were made with one purpose in mind—to ensure that the device is safe to use and is unable to cause an ignition. The surface of the device is made of conductive material. The battery of an intrinsically safe calibrator is usually slower to charge and it discharges quicker. Many times intrinsically safe equipment operate only with dry batteries, but the Beamex® intrinsically safe calibrators operate with chargeable batteries. When charging the battery, it must be done in a non-Ex area. External pressure modules can be used with IS-calibrators, but they must also be intrinsically safe. There are also usually small differences with electrical ranges compared to regular industrial calibrators (e.g. maximum is lower).

Making a calibrator safe and unable to cause ignition – typical technical differences:

- Surface made of conductive material
- Constraints in using the device (listed in Product Safety Note)
- Small differences with electrical ranges (e.g. maximum is lower)
- Battery slower to charge, quicker to discharge
- Battery must be charged in a non-Ex area
- When using external pressure modules, they must be IS-versions

What are ATEX and IECEx?

ATEX (“ATmosphères EXplosibles”, explosive atmospheres in French) is a standard set in the European Union for explosion protection in the industry. ATEX 95 equipment directive 94/9/EC concerns equipment intended for use in potentially explosive areas. Companies in the EU where the risk of explosion is evident must also use the ATEX guidelines for protecting the employees. In addition, the ATEX rules are obligatory for electronic and electrical equipment that will be used in potentially explosive atmospheres sold in the EU as of July 1, 2003.

IEC (International Electrotechnical Commission) is a non-profit international standards organization that prepares and publishes International Standards for electrical technologies. The IEC TC/31 technical committee deals with the standards related to equipment for explosive atmospheres. IECEx is an international scheme for certifying procedures for equipment designed for use in explosive atmospheres. The objective of the IECEx Scheme is to facilitate international trade in

equipment and services for use in explosive atmospheres, while maintaining the required level of safety.

As Beamex® MC5-IS and the new Beamex® MC2-IS Intrinsically Safe Multifunction Calibrators are certified according to ATEX and the IECEx Scheme, it ensures the calibrators are fit for their intended purpose and that sufficient information is supplied with them to ensure that they can be used safely.

Is service different for intrinsically safe calibrators?

There are certain aspects that need special attention when doing service or repair on an intrinsically safe calibrator. The most important thing to remember is that an intrinsically safe calibrator must maintain its intrinsic safety after the service or repair. The best way to do this is to send it to the manufacturer or to an authorized service company for repair.

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Recalibration can be done by calibration laboratories (still preferably with ISO/IEC 17025 accreditation).

Make it safe with the Beamex® Intrinsically Safe Multifunction Calibrators

Beamex offers two different calibrators for use in potentially explosive environments.

The new ATEX and IECEx certified Beamex® MC2-IS Multifunction Calibrator is a practical tool designed to be used in explosive environments. It has calibration capabilities for pressure, temperature and electrical signals and it connects to almost 20 available Beamex intrinsically safe external pressure modules. It has a compact size and design and it is very user-friendly.

The Beamex® MC5-IS Intrinsically Safe Multifunction Calibrator is a high accuracy, all-in-one calibrator for extreme environments. Being an all-in-one calibrator, the

MC5-IS replaces many individual measurement devices and calibrators. The MC5-IS is also ATEX and IECEx certified. The MC5-IS has calibration capabilities for pressure, temperature, electrical and frequency signals. It is a documenting calibrator, which means that it communicates seamlessly with calibration software. Using documenting calibrators with calibration software can remarkably improve the efficiency and quality of the entire calibration process. The MC5-IS also has HART® communication.

Both the MC5-IS and the MC2-IS are certified in accordance with the IECEx and ATEX directive.



Beamex® MC2-IS Intrinsically Safe Multifunction Calibrator.
The new practical tool for calibration in potentially explosive environments.