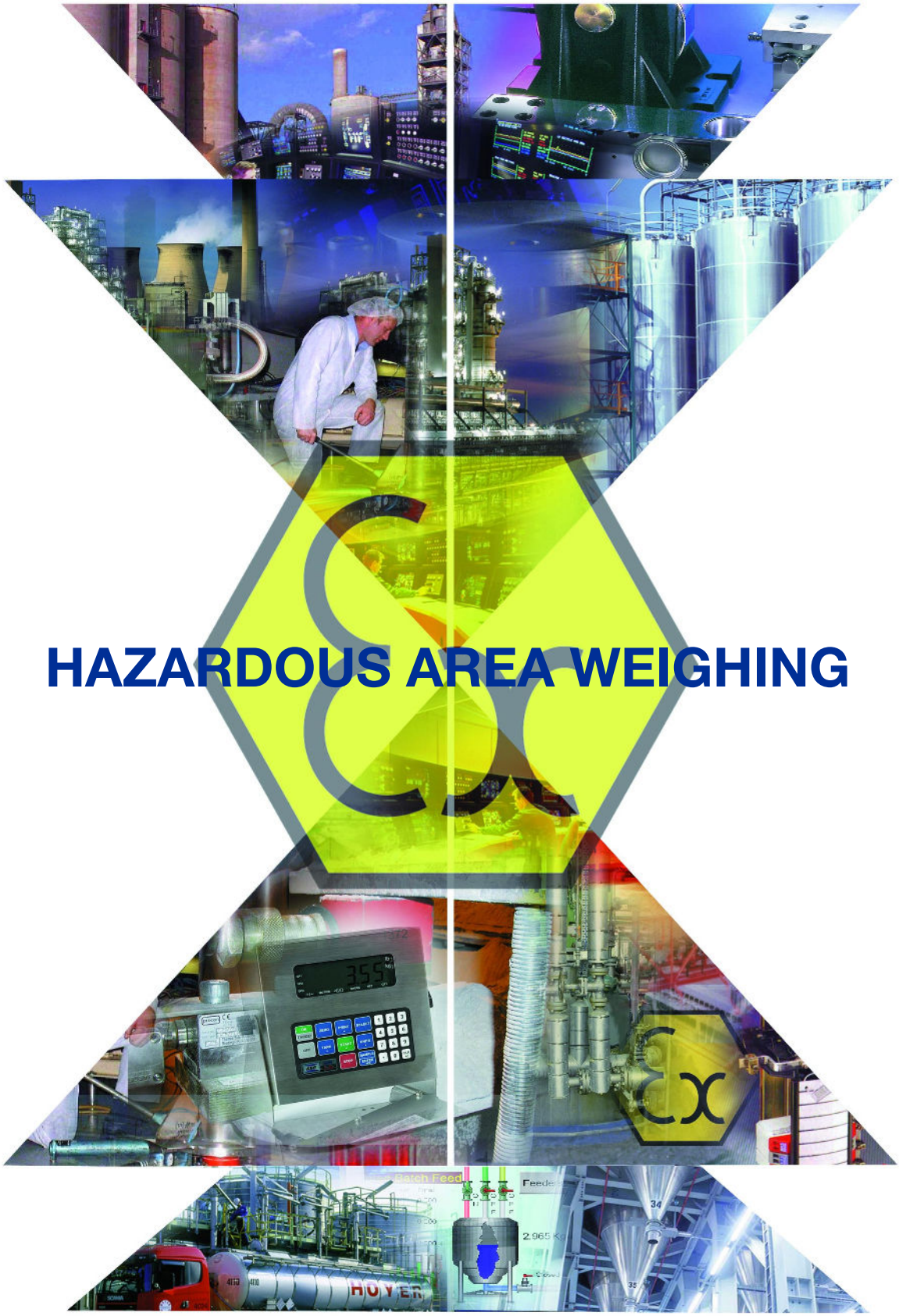
Procon Engineering Ltd

(Incorporating: Defiant - Negretti - Inflo - Lintvalve)



HAZARDOUS AREA WEIGHING

....ATEX compliant weighing and control solutions

Background

Equipment and products operating in hazardous areas are required to meet stringent criteria laid down in the EC New Approach ATEX Directive 94/9/EC. They must be 'protected' to avoid the possibility of them becoming a source of ignition. Weighing systems are an integral part of many process applications where hazardous areas exist and therefore must be designed and installed accordingly. Hazardous areas are essentially designated places where the presence of certain materials such as gases, dusts or fibres make an explosion possible if a source of ignition is introduced.

Three essential elements are required for an explosion to take place:

- Gas, mist or dust in sufficient proportions
- Sufficient supply of air or oxygen
- Source of ignition

Hazardous areas are classified according to their location, type of hazardous material and potential risk factor.

The ATEX Directives

There are in fact two ATEX Directives (**AT**mosphere **EX**plosive), one of which places the burden of responsibility on suppliers and the other on end users.

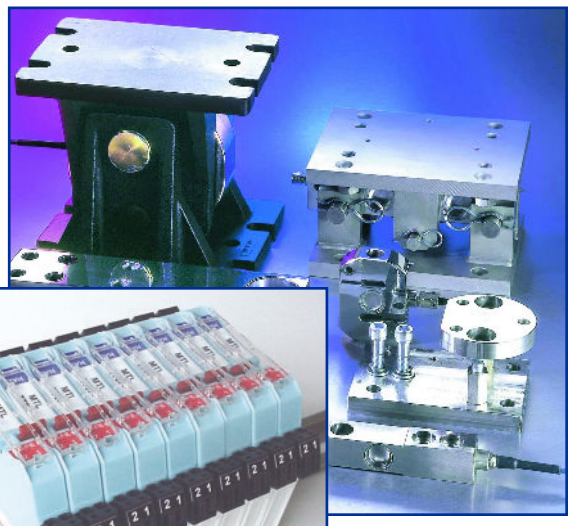
ATEX Directive 94/9/EC (also known as Article 100a and Article 95) outlines the requirements suppliers must meet to achieve compliance for their equipment and protective systems for use in hazardous areas. It applies to both electrical and mechanical equipment and covers potentially explosive areas below ground, on the surface and on offshore fixed facilities. Guidance on the detailed technical requirements are given in the associated European Harmonised Standards (EN).

ATEX Directive 1999/92/EC (also known as Article137) covers the health and safety aspects of workers potentially at risk from exposure to explosive atmospheres. The Directive places the onus on the end user to ensure measures are taken to ensure the safety of employees. **Under the UK regulations (DSEAR), employers have an obligation under law to complete a formal risk assessment of all hazardous areas within their company by 30th June 2006.**

The ATEX Directives now cover hazards relating to both gas and dust environments. In the past, the applications for dust were less well defined but now equipment must be certified and marked accordingly.

Intrinsic Safety

Intrinsic Safety (IS) is one of several techniques for preventing explosions in hazardous areas and is the most popular, efficient and cost effective. Intrinsic safety operates by limiting the electrical energy in circuits and equipment to levels that are too low to cause the ignition of the type of gas or dust that is ever likely to be present.

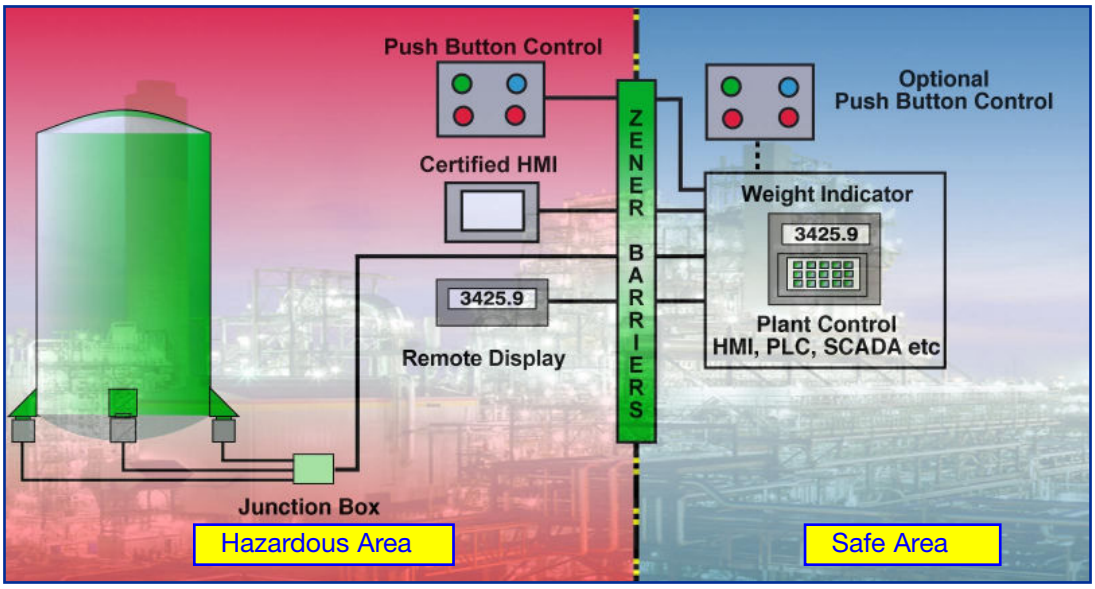


All other methods of protection such as oil immersion, encapsulation, flameproof or explosion proof protection, and pressurisation (purged) rely on the continual maintenance of a physical barrier between the explosive atmosphere and the equipment. Any breach of such barriers renders the protection inoperative. In contrast Intrinsic Safety provides inherent protection by restricting the energy at its source and therefore has both commercial and technical advantages.

Circuits and equipment are designed so that safety is maintained both in normal use and under possible fault conditions. Certification can be given for individual components such as load cells (entity approval) and complete systems.

Solutions in Hazardous Area Weighing

Procon Engineering has extensive experience in the implementation of weighing systems in hazardous areas. Our range of load cells and instrumentation meet the latest ATEX requirements for both gas and dust environments. We can provide systems for a wide range of process applications, an overview of typical system configurations is shown below.

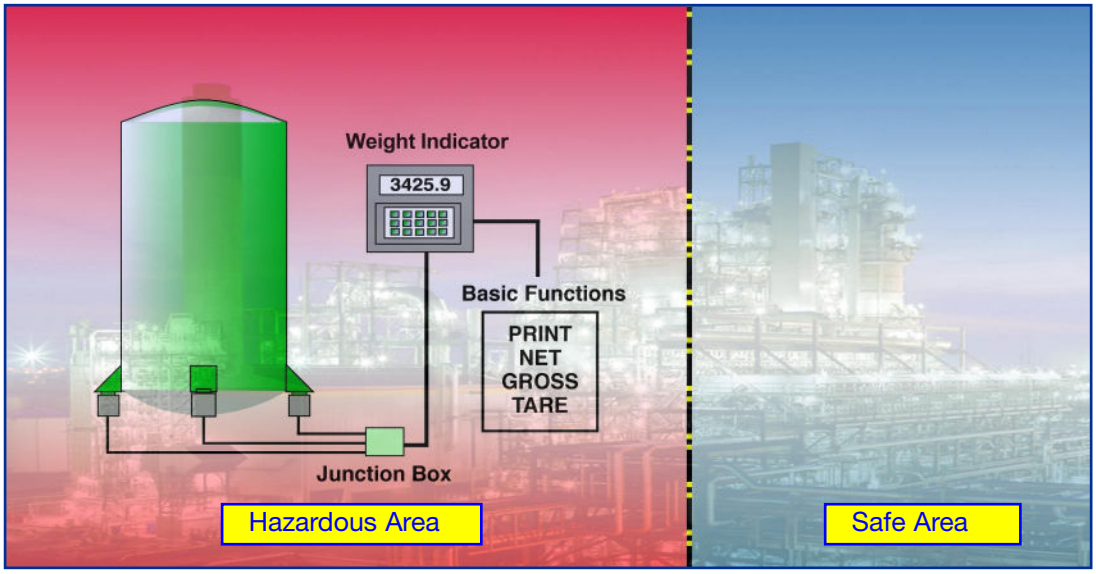


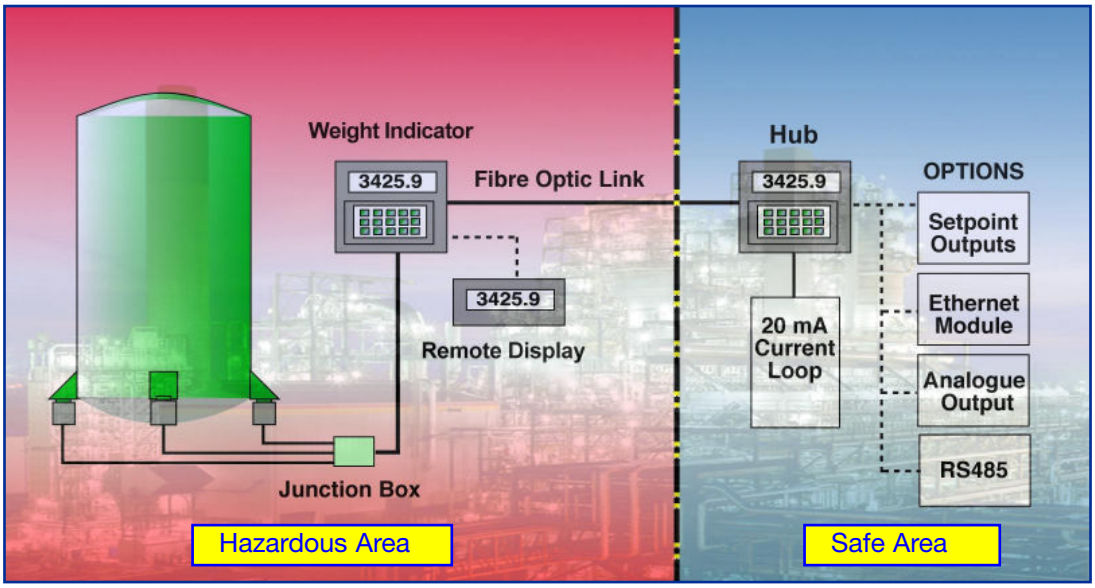
In this conventional hazardous area weighing application, the system integrity is maintained via Zener Barriers. Optional ATEX certified equipment such as remote weight displays or HMIs can be located in the hazardous area, powered from the safe area via the Zener Barriers. Control functions can be carried out in either the safe or hazardous area.

In this example, the complete weighing system is situated in the hazardous area with no link back to the safe area. Power is usually provided from certified battery packs or mains.

Typical applications are:

- raw material storage
- level control
- mixing and blending
- filling systems
- platform scales

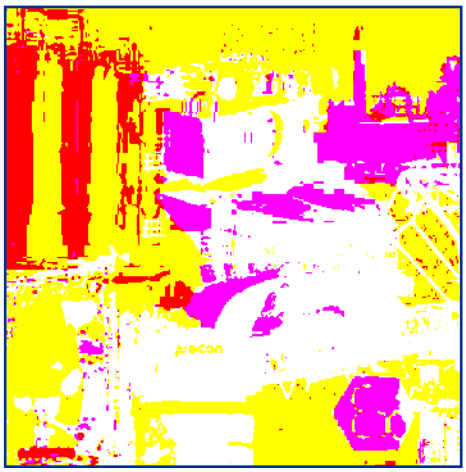




This third example shows a fibre optic link between the hazardous area and the safe area. Full functionality of the ATEX certified Weight Indicator is available via the Hub Terminal in the safe area. An extensive range of control and communication options complete this flexible and versatile installation. Power to the instrumentation in the hazardous area may come from certified batteries or mains supply.

Hazardous Area Classification

Hazard	Hazard continuously present (>1000 hrs per year)	Hazard present under normal operation (10-1000 hrs per year)	Hazard only present infrequently (<10 hrs per year)
Gases	ZONE 0	ZONE 1	ZONE 2
Dusts	ZONE 20	ZONE 21	ZONE 22
Equipment category	1	2	3
ATEX Annexes	III and IV or V	III and VII or VI	VIII
Group	II	II	II



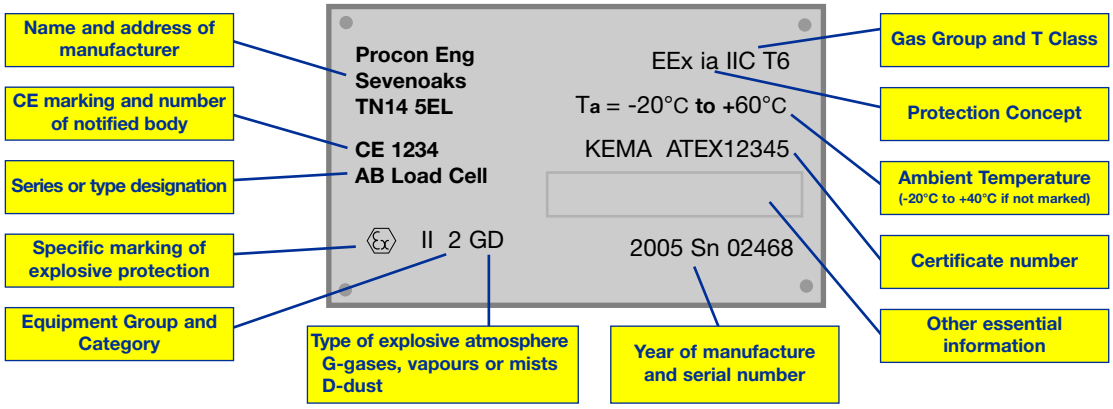
Temperature Classification

This gives the maximum surface temperature allowable for any equipment, assuming an ambient temperature of 40°C.

T Code	T1	T2	T3	T4	T5	T6
Max surface temperature	450°C	300°C	200°C	135°C	100°C	85°C

Marking and ATEX compliance

All equipment and protective systems for use in hazardous areas must be marked legibly and indelibly as shown below.



Engineering Pedigree

Our highly competent service engineers undergo a continual training awareness program relating to a wide range of equipment. They have IOSH accreditation under the IOSH-SPA passport scheme* and are trained in the requirements for specific industry sectors. This means that when our engineers come to site they are ready to start work without delays.

** The IOSH (Institute of Occupational Safety and Health) is Europe's leading body for safety professionals. The Passport Scheme is an industry-led, nationally recognised scheme and holders are trained not only in the basics of health and safety, but also to be ready to face specific safety issues associated with specific industries.*

Other brochures are available on request pertaining to our capabilities in:
Process Control, Process Weighing, Belt Weighing** and **Service & Support

ATEX

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