

DIFFERENCES BETWEEN EXPLOSION PROTECTED ELECTRICAL EQUIPMENT AND COMPONENTS

White Paper

This document has been prepared to set out the guidelines /rules regarding the differences between 'Ex equipment' and 'Ex component', in regards to the use of empty flameproof Ex d enclosures by third parties to manufacture Ex equipment.

Scenario

It has been noted that certain service facilities have been purchasing empty flameproof enclosures, fitting and wiring the electrical equipment and supplying 'new' explosion protected equipment into the industry.

This practice is in breach of the IEC Ex standards and scheme. Whilst it might not be a safety issue, it is like driving a car on a public road without a license. It is not necessarily going to make the roads unsafe, but it is against the law and a criminal act attracting penalties.

The following scenario can be used to illustrate what is happening in the industry.

1. Company 'A' is a manufacturer, has a QAR and is the holder of an IECEx equipment certificate for an Explosion protected product. (Flameproof Ex d).
2. Company 'B' is a separate company registered as a service facility.
3. Company 'A' manufactures an Ex d. enclosure and sells the empty enclosure to company 'B'.
4. Company 'B' installs the internal electrical components, completes the electrical wiring and conducts functional tests.
5. When complete, company 'B' sells this Ex equipment to the end user using the original company 'A's certificate number and marking label.

References

Below are extracts from standards, Coal Mines Health and Safety Act and Gazette No. 10. Important parts to note from these references are *highlighted* for further consideration.

AS/NZS 60079 PART 0: EQUIPMENT – GENERAL REQUIREMENTS EXPLOSIVE ATMOSPHERES

1 Scope

This part of IEC 60079 specifies the general requirements for construction, testing and marking of *electrical equipment and Ex Components* intended for use in explosive atmospheres.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.8.1

Ex Component Certificate

A certificate prepared for an Ex Component. See 3.28.

3.8.2

Equipment Certificate

A certificate prepared for equipment other than an Ex Component. Such equipment may include Ex Components, but additional evaluation is always required as part of their incorporation into equipment. See 3.7.4, 3.25, 3.27, 3.28, and 3.29.

3.28

Ex Component

Part of electrical equipment or a module, *marked with the symbol "U"*, which is not intended to be used alone *and requires additional consideration when incorporated into electrical equipment* or systems for use in explosive atmospheres.

28.2 Certificate

The manufacturer shall prepare, or have prepared, a certificate confirming that the equipment is in conformity with the requirements of this standard along with its other applicable parts and additional standards mentioned in Clause 1. The certificate can relate to Ex equipment or an Ex Component.

An Ex Component certificate (Identified by the symbol “U” suffix to the certificate number) is prepared for parts of equipment that are incomplete and require further evaluation prior to incorporation in Ex equipment. The Ex Component certificate may include a Schedule of Limitations detailing specific additional evaluation required as part of incorporation into Ex equipment. *An Ex Component certificate shall clarify that it is not an Ex equipment certificate.*

EXTRACTS FROM AS/NZS 60079 PART 1: EQUIPMENT PROTECTED BY FLAMEPROOF ENCLOSURES

3.18

Ex component enclosure

Empty flameproof enclosure provided with an Ex component certificate, *without the internal equipment being defined*, so as to enable the empty enclosure to be made available for incorporation into an equipment certificate *without the need for repetition of type testing*.

AS/NZS 60079 ANNEX D:

(normative) NOTE: The terms ‘normative’ and ‘informative’ are used to define the application of an annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

Empty flameproof enclosures as Ex components

D.1 General

The purpose of an Ex component enclosure certificate for empty enclosures is to enable a manufacturer of flameproof enclosures to obtain a certificate without the internal equipment being defined, *so as to enable the empty enclosure to*

be made available to third parties for incorporation into a full equipment certificate without the need for repetition of all the type tests. When a certificate concerning the full equipment is required, an Ex component enclosure certificate for the empty enclosure is not necessary.

D.2 Introductory remarks

The requirements for an Ex component enclosure certificate for an empty enclosure are contained in this annex. This *does not eliminate the need for a subsequent equipment certificate*, but it is intended to facilitate such a certificate.

The Ex component enclosure manufacturer shall be responsible for ensuring that each and every unit supplied

- is identical in construction with the original design as detailed in the documents mentioned in the Ex component enclosure certificate,
- has been subjected to such routine overpressure testing as is required, and
- meets the requirements of the applicable schedule of limitations imposed by the Ex component enclosure certificate.

D.3.8 The *Ex component enclosures shall be permanently marked internally according* to the applicable requirements. The marking shall be per 20.3(d), Table 10.

The marking shall also include the requirements for marking of Ex components given in IEC 60079-0.

This marking may be omitted if the Ex component enclosure manufacturer is also the holder of the equipment certificate.

D.4 Utilization of an Ex component enclosure certificate to prepare an equipment certificate

D.4.1 Procedure

Enclosures which have an Ex component enclosure certificate may be considered for incorporation in equipment certificates with IEC 60079-0 and this standard, normally without repetition of application of those requirements already applied to the Ex component enclosure, subject to compliance with the schedule of limitations detailed in D.3.10.

Documents shall be prepared for an equipment certificate depicting the specified equipment, any permitted substitutions or omissions, together with the mounting conditions within the Ex component enclosure, so that compliance can be verified with the schedule of limitations of the Ex component enclosure certificate.

Any hole permitted in accordance with the Ex component enclosure certificate may be provided either by the Ex component enclosure manufacturer, or through agreement between the equipment manufacturer and the Ex component enclosure manufacturer.

COAL MINE HEALTH AND SAFETY REGULATION 2006

Part 2 Division 2 subdivision 2 clause 19 titled “Electrical engineering management plan” states;

(1) The electrical engineering management plan for a coal operation must make provision for the following:

(c) the use of electrical plant only of a *Gazetted type* in a hazardous zone,

New South Wales Government Gazette No. 10 titled ‘Types of Electrical Plant Used in Hazardous Zone’

In “Sub clause 1.4 Electrical apparatus:

- for which a valid certificate of conformity exists, which accords with clause 2 of this Schedule, . . .

Clause 2. Valid certificate of conformity”

Subclause 2.2 states “must be an AUS Ex certificate of conformity, or, an ANZEx certificate of conformity, or, an IECEx certificate of conformity, . . . “

And lists the following definitions:

ANZ Ex certificate - A certificate of conformity issued under the Australian/New Zealand Certification Scheme for explosion protected electrical *equipment*

AUS Ex certificate - A certificate of conformity issued under the Australian Certification Scheme for explosion protected electrical *equipment*

IEC Ex certificate - A certificate of conformity issued under the International Electrotechnical Commission Certification Scheme for explosion protected electrical *equipment*

Note; all the above are ‘equipment’ certificates

And in Queensland, Coal Mining Safety and Health Regulation 2001, Chapter 4 Underground mines, Part 5 Electrical equipment and installations 182 ERZ1

(1) The site senior executive must ensure fixed, mobile and transportable electrical equipment installed or operated in an ERZ1 at the mine is—

- (a) suitable for use in an underground mine; and
- (b) certified as having explosion protection.

DIFFERENCES BETWEEN TYPES OF WORKSHOPS

MANUFACTURER

A manufacturer is audited to ISO/ IEC80079-34 Application of quality systems for equipment manufacture and a Quality assessment report (QAR) is issued.

SCOPE (extracted from the standard)

This part of ISO/IEC 80079 specifies particular requirements and information for establishing and maintaining a quality system *to manufacture Ex equipment* including protective systems in accordance with the Ex certificate.

REGISTERED SERVICE FACILITY (RSF)

A service facility is audited to AS/NZS3800 Electrical equipment for explosive atmospheres— Repair and overhaul.

SCOPE (extracted from the standard)

This Standard—

(a) specifies requirements for and gives instructions, principally of a technical nature, *on the repair, overhaul, reclamation and modification of equipment* designed for use in explosive atmospheres;

(b) is not applicable to maintenance, other than when repair and overhaul cannot be disassociated from maintenance, neither does it give advice on cable entry systems which may require a renewal when the equipment is re-installed;

(c) prevents overhaul without manufacturer and certificate documentation to types of protection 'i' and 'm';

and

(d) assumes that good engineering practices are adopted throughout.

Note; the explosion protection techniques which have been assessed in the issuing of the RFS will be listed on the certificate and the RFS must operate within the defined endorsements.

IECEX CERTIFICATES

THE MANUFACTURER(S) AND LOCATION(S) ARE LISTED ON THE CERTIFICATE.

To be listed as a manufacturer on a certificate, the manufacturer must have a QAR.

A list of manufactured Ex products are identified on or with the QAR.

Empty FLP enclosures when supplied to a third party shall have an 'Ex component certificate', not to be confused with an 'Ex equipment certificate'.

If an empty enclosure with a component certificate is supplied to a third party, this does not eliminate the need for an equipment certificate to be obtained by the third party.

SUMMARY

The scenario provided in the example at the beginning of this document is in breach of the IECEx rules due to the following;

- As company 'A' sells an empty enclosure to company 'B', company 'A' is classed as a supplier and the empty enclosure is considered an Ex component.
- Therefore, company 'A' is required to have an Ex component certificate (identified by the suffix 'U') for this enclosure as they are selling an empty enclosure.
 - *The enclosure in question is not certified as an Ex component.*
- Company 'B' is considered to be a manufacturer as it is manufacturing Ex equipment using an Ex component obtained from another manufacturer.
 - *If an empty enclosure with an Ex component certificate is supplied to a third party, this does not eliminate the need for an Ex equipment certificate to be obtained by the third party.*
- As company 'B' is classed as a manufacturer of Ex equipment it must have its own QAR and be the holder of a Certificate of Conformity for the end product, now Ex equipment.
 - *Company 'B' does not have a QAR.*
 - *Company 'B' does not own any Ex certificates for the product supplied.*
 - *Company 'B' is not listed as a manufacturer on the Ex certificate.*
 - *The end product is labelled with the original company 'A's Ex equipment certificate number.*
 - » *This is in contradiction to the standards and the Ex certificate.*

- *The new Ex equipment certificate as required above, will identify the empty enclosure as an Ex component by the Ex component certificate number.*
 - » *There is no Ex component certificate from the original manufacturer and*
 - » *There is no Ex equipment certificate for company 'B'.*
- *NOTE: Company 'B' is a service facility and not a manufacturing facility recognised by the IECEx scheme.*
- As the above indicates the equipment does not have a valid AUSEx, ANZEx or IECEx certificate, therefore *it is in breach of* the Coal Mines Health and Safety Regulations both in NSW and Queensland.