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MINE ELECTRICAL
SAFETY ASSOCIATION INC.

MINING ELECTRICAL SAFETY 2017 CONFERENCE

10 – 12 JULY 2017

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Repair and Overhaul of Certified Ex Equipment

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Repair and Overhaul of Certified Ex Equipment

This presentation is about service facilities (Workshops) that are involved with repair and overhaul of Ex Equipment.

The service facility can be categorised as involved with:

- Ex Equipment such as Flameproof enclosures, Substation and DCB’s or

- Ex Equipment such as Motors and Generators

Repair and Overhaul of Certified Ex Equipment

Content:

How is the Ex equipment maintained?

Who should overhaul/repair Ex equipment?

What is the criteria for selecting an Ex workshop?

Repair and Overhaul of Certified Ex Equipment

How is the Ex equipment maintained?

For Coal Mines, there is an established regular inspections of various categories

- External Inspection
- Internal Inspection
- Pre-overhaul audits

For other industries, the inspection regime is not as rigorous and maintenance may only be conducted when something is faulty.

Repair and Overhaul of Certified Ex Equipment

Who should overhaul/repair Ex equipment?

Recognised service facility certified under the:

- ANZEx Scheme – AS/NZS 3800, AS/NZS 2290.1
- IECEx Scheme – IEC 60079-19
- DNRM - Recognised Standard 01 which refers to:
  - AS/NZS 2290.1 (Electrical equipment for coal mines – Introduction, inspection and maintenance – For hazardous areas)
  - AS/NZS 3800 (Electrical equipment for explosive atmospheres – Repair and overhaul)

Repair and Overhaul of Certified Ex Equipment

Who should overhaul/repair Ex equipment?

Petroleum and Gas industry tend to prefer

- IECEx Scheme – IEC 60079-19

Essentially both schemes are very similar
The standards committee are working on version of AS/NZS 60079-19 which will replace AS/NZS 3800 in due course

Repair and Overhaul of Certified Ex Equipment

What is the criteria for selecting an Ex workshop?

Scope of certification of the service facility will include:

- Applicable protection standards
- Any limitation – such as only OEM products or limitation of supply at the facility (voltage and current)
- List of responsible (competent) persons

Repair and Overhaul of Certified Ex Equipment

What is the criteria for selecting an Ex workshop?

- A diligent service facility will ask questions and request for information – copy of last workshop report, drawings, etc
- Site owner must maintain a verification dossier
- Site owner should provide copy of the last overhaul/repair report

Repair and Overhaul of Certified Ex Equipment

There is a need for certification of workshops as the practices observed indicates issues in the following areas:

- Lack of knowledge of documentation requirements
- Current industry practices for Ex Equipment
- What to ask from the hazardous area site owners

Repair and Overhaul of Certified Ex Equipment

Lack of knowledge of documentation requirements:

Service facility does not always ask questions such as

- Copy of last repair/overhaul report
- Need to determine applicable standards
- Conditions of use specified in certificate of conformity
- Define scope of work and agree with client expectations

Repair and Overhaul of Certified Ex Equipment

Lack of knowledge of documentation requirements:

Certificate of conformity

- Example: AUSEx
- Example: ANZEx
- Example: IECEx Annex
- Example: Component certification Annex

Repair and Overhaul of Certified Ex Equipment

Some service facilities are not fully aware of the scheme rules

- ANZEx – MP87.2:2007

  Part 2:Recognised Service Facilities Program- Basic rules and procedure

- IECEx – IECEx OD 314-5 and OD 315-5

  Part 5: Repair, overhaul and reclamation of Ex equipment Quality Management System and additional requirements

Repair and Overhaul of Certified Ex Equipment

Auditors observation and findings:

- contract reviews are not well prepared or done and the scope of work is not well documented
- record keeping in general can be improved
  - who, what, when, why, where and how
  - calibration of test and measuring instruments
  - Define scope of work and agree with client expectations

Repair and Overhaul of Certified Ex Equipment

Auditors observation and findings for Motor Overhaul/Repair:

- For Group I, most workshops will manage to obtain drawings, however for gas Group II, most service facilities struggle to obtain drawings and documentation.
- Again contract reviews are not well prepared and documented
- Poor record keeping in general
  - Motors from gas Group II can be ATEX approved, FM, BASEEFA, AUSEx, CSA, etc…….
  - Generally more time is required to audit service facilities involved with Ex motors

Repair and Overhaul of Certified Ex Equipment

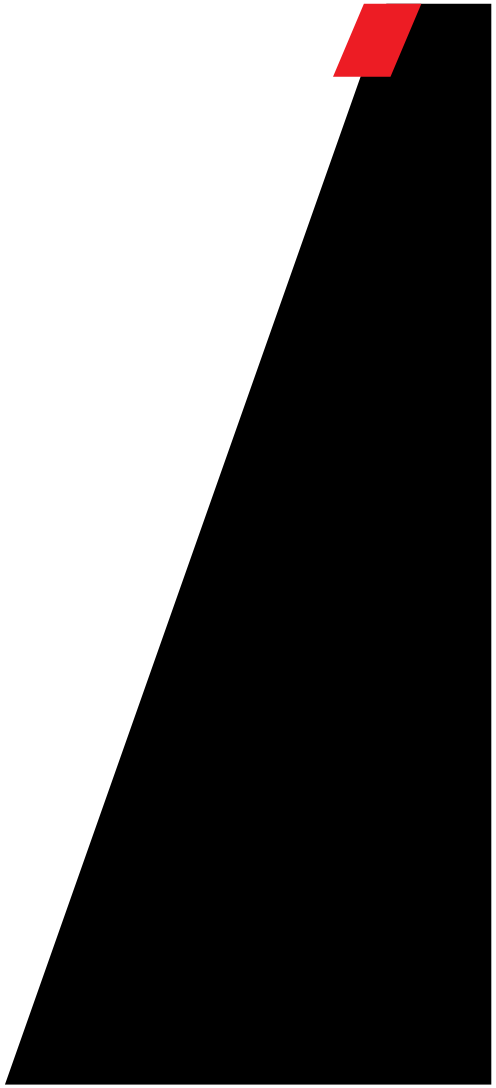
Benefits of certified Ex Service Facilities are:

- The service facility is assessed by an accredited Ex CB
- Service Facility needs to demonstrate before certification:
  - Ex knowledge
  - Workshop capability
  - Facility and essential equipment
  - Training and competency
- Must have established QMS
- On going audits to maintain certification

Repair and Overhaul of Certified Ex Equipment

Benefits to the end user are:

- Repair and overhaul work has been conducted by certified service facility
- There is an ongoing surveillance audit of the Service Facility
- Any issues identified can be also reported to the Ex CB



Certification of

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No. **01.2518X** Issue **0:** **9 July 2001** **Original Issue**

Date of expiry: **9 July 2011**

Certificate Holder: **MSA (Aust.) Pty. Limited**
137 Gilba Road
GIRRAWEEN NSW 2145

Electrical Equipment: **MSA Ultima Gas Monitor**

Type of Protection and Marking Code: **Gunmetal and Stainless Steel Enclosures:***
Ex d I/IIC T6

Aluminium Alloy and Stainless Steel Enclosures:*
Ex d IIC T6

AUS 01.2518X

*** Refer Table 1**

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2 Smith Street, REDBANK, QLD 4301, Australia
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SIMTARS

Quality System Certified to AS/NZS ISO 9001 Certification No 6039

STANDARDS AUSTRALIA

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This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0	2000-06	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1	1990-12	Electrical apparatus for explosive gas atmospheres - Part 1 : Construction and verification test of flameproof enclosures of electrical apparatus (Amdt 1, 1993; Amdt 2, 1998)

This certificate does not ensure compliance with electrical safety and performance requirements other than those included in the standards listed above.

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No: NE01/0005

File Reference: 00/0021 (P80934)

Signed for and on behalf of issuing authority

Manager
Engineering, Testing and Certification Centre

Position

9 July 2001

Date of issue

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Schedule

Equipment:

The Ultima Gas Monitor comprises a flameproof enclosure and a range of gas sensors listed in Table 1 below. The flameproof enclosure has a base and a screwed cover. The cover is available in a high and low version. Threaded entries are provided in the base for the fitting of gas sensors listed in Table 1 and separately certified fittings. The cover has a viewing window which is cemented in and held in place by a retaining ring.

Table 1. Ultima Gas Monitor

Item	Enclosure Material
Flameproof Enclosure (High and low cover)	C83600A (Gunmetal)
	DA601 (Aluminium Alloy)
Gas Sensors - Oxygen Gas Sensor - Toxic Gas Sensor - IR Gas Sensor - Combustible Gas Sensor	Stainless Steel

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Drawings:

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10078 / 07	BASE - ULTIMA	2	6/01
10079 / 07	SCREW COVER - ULTIMA	2	6/01
10080 / 07	LOCK RING - ULTIMA	2	6/01
10081 / 07	WARNING/MARKING LABEL DETAILS - ULTIMA	2	6/01
10084 / 07	CONSTRUCTIONAL ASSY	2	6/01
228987	INSPECTION GLASS	2	6/01
10177/07	ULTIMA-FLAMEPROOF AUSTRALIAN COMPLIANCE REQUIREMENT DIAGRAM	1	05/01
B486482	CUP, POROUS, 60 MICRON	1	5-24-89
B487855	BODY, STAINLESS STEEL, SENSING HEAD	2	6-17-88
D710337	SENSOR ASSEMBLY, I-S WITH PLUG	5	10-14-99
B 711509	EXPLOSION PROOF BODY ASSEMBLY, HCN SENSOR, ULTIMA	2	9-9-98
B813148	BODY, SENSOR, E-CHEM, EXPLOSION PROOF, ULTIMA	2	10-12-99
B814409	LABEL, ULTIMA, COMBUSTIBLE GAS		May 30 1995
10000000654 (P/N 10004030)	CAP, SENSOR, WITH SET SCREW, E-CHEM, EXPLOSION PROOF, ULTIMA		7-13-98
10000000656 (P/N 10004031)	CAP ASSEMBLY, WITH SET SCREW,SENSOR, E-CHEM, EXPLOSION-PROOF, ULTIMA	1	9-04-98
10000000657 (P/N 10004032)	CAP, SENSOR, WITH SET SCREW, OXYGEN, EXPLOSION PROOF, ULTIMA		7-13-98
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Issue: 0

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Conditions of Certification:

Cable selection shall be in accordance with Table 2.

TABLE 2 - CABLE TEMPERATURE RATINGS

Item	Power Dissipation	Cable Temperature Rating
Ultima Flameproof Enclosure - High Case	< 14W	75°C
	≤ 23W	90°C
Ultima Flameproof Enclosure - Low Case	< 15.5W	75°C
	≤ 24W	90°C
O_2 and Toxic/IR Gas Sensor	< 5.9W	75°C
	≤ 7W	90°C
Combustible Gas Sensor	< 10W	75°C
	≤ 11W	90°C

Additional Information:

The reference pressure for the flameproof enclosure is 763kPa.

Routine pressure testing shall be carried out on each glass window at not less than 1145kPa.

Static pressure testing was successfully carried out on the flameproof enclosure and the housing for the gas sensors at four times the reference pressure. A routine pressure test is not required for these enclosures.

The flameproof enclosure achieved degree of protection IP65.

The sensors achieved degree of protection IP65. The sintered metal element was not subjected to this

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