IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx ETL 17.0020X**

Certificate history:
Issue 1 (2019-06-20)
Issue 0 (2017-07-20)

Status: **Current**

Issue No: 2

Date of Issue: 2019-10-22

Applicant: **Metal Samples Company (a Division of Alabama Specialty Products, inc.)**
152 Metal Samples Rd, Munford, AL 36268, USA
United States of America

Equipment: **Models MS35XXE, MS35XXL, MS36XXE, MS36XXL, MS50XXE, MS50XXL, MS55XXE and MS55XXL corrosion monitors. Model MS5040 and MS5540 repeaters.**

Optional accessory:

Type of Protection: **Intrinsic Safety ' ia'**

Marking: Ex ia [ia] IIC T4 Ga

-40°C ≤ Tamb ≤ +70°C (for use with Tadiran TL5930 cells)

-40°C ≤ Tamb ≤ +50°C (for use with Xeno Energy XL-205F cells)

IP66

IECEx ETL 17.0020X

Approved for issue on behalf of the IECEx Certification Body: **Kevin J. Wolf**

Position: **Certification officer**

Signature:
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
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Certificate issued by:

Intertek
3933 US Route 11 South
Cortland NY 13045-2995
United States of America

IECEx Certificate of Conformity

Certificate No.: **IECEx ETL 17.0020X**

Date of issue: 2019-10-22 Issue No: 2

Manufacturer: **Metal Samples Company (a Division of Alabama Specialty Products, inc.)**
152 Metal Samples Rd, Munford, AL 36268, USA
United States of America

Additional manufacturing locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

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

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

US/ETL/ExTR17.0021/00 US/ETL/ExTR17.0021/01

Quality Assessment Report:

GB/ITS/QAR14.0019/03

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

Refer to Certificate Annex for equipment description.

SPECIFIC CONDITIONS OF USE: YES as shown below:

- Inductance and capacitance values specified for connection to port J2 of board EXCDB_000030 have not been assessed for simultaneous combination. Care shall be taken to ensure that the combination of resistive, inductive and capacitive energies cannot result in an incendive spark. To aid in the connection of simple apparatus the following values have been subjected to spark ignition testing and have been shown to be safe

  Uo: 4.94V
  Io: 2mA
  Po: 2.47mW
  Ci: 0µF
  Li: 0µH

  Co: 50µF
  Lo: 30µH

- External non-metallic materials pose a potential electrostatic charging hazard. Refer to the manufacturer's instruction manual for details on the mitigation of electrostatic charging.

- The models MS36XX and MS50XX may be fitted with metallic end-caps which are produced from aluminum and may pose a potential impact spark ignition hazard when used in EPL Ga installations. When the equipment is to be mounted in an EPL Ga environment the end user shall conduct a risk assessment prior to installation and shall only use the equipment where the risk of impact has been determined to be negligible.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
Refer to Certificate Annex for details of changes.

Annex:

Annex to IECEx ETL 17.0020X - Issue 02.pdf

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Description of Equipment

The MS35XXE/L, MS36XXE/L and MS50XXE/L are remote monitoring equipment which measures the corrosion rate of metallic pipe through resistive probe. Equipment models share the same internal circuitry, with the exception of model specific optional boards. The MS35XXE/L and MS55XXE/L utilize either a rectangular cuboidal stainless steel enclosure with approximate dimensions 23cm x 20cm x 11cm or a variable non-metallic enclosure with minimum dimensions 25cm x 20cm x 10cm. Both enclosures form a base and hinged lid assembly and are retained with bolt secured metallic tabs.

The MS36XXE/L and MS50XXE/L variants utilize the same cylindrical enclosure with approximate diameter of 12cm, and length 20cm. The central section of the enclosure is metallic and has two screw on non-metallic or aluminum end caps which form three compartments. The front end cap includes a transparent window which shows an LCD display, whilst the rear houses is fully opaque and holds the equipment battery. Connection is made to the equipment through three connectors, two on the side of the central housing and the third on a conduit which is welded to the bottom surface of the central housing at a normal angle.

A USB port is provided on each enclosure variant for downloading data in the hazardous area. This port has been assessed for connection to the ET1650 USB stick manufactured by Alabama Specialty Products. The USB stick has been assessed for connection to a maximum Um of 6V. No other USB stick shall be used with the equipment whilst the equipment is in a hazardous area.

Whilst in the non-hazardous area the USB port may be used with a generic USB stick providing the part does not contain a source of power (e.g. a battery).

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The ambient temperature range in which the equipment may be installed is dependent upon the cells used.

Ambient Temperature Range	Cells	Battery Pack Reference
-40°C ≤ Tamb ≤ +70°C	Tadiran TL5930	ET1664 / ET2250
-40°C ≤ Tamb ≤ +50°C	Xeno Energy XL-205F	ET1857 / ET2257

Battery packs contain integral current limiting devices and have been subjected to the applicable tests to be changed in the hazardous area. The battery pack must be removed from the hazardous area, or the area confirmed to be non-hazardous prior to changing individual cells.

All equipment has the facilities for connection to an external corrosion measurement probe and when fitted with board EXCDB_000030 the equipment has the facilities for an additional barrier input (J2) and an intrinsically safe output. The following entity parameters have been assessed for use with the equipment and are marked on the equipment labels as applicable.

Parameters of probe connection on EXCDB-000023 – Single Channel ER Measurement Board

Uo:	4.94V
Io:	0.332A
Po:	0.41W
Co:	1.9µF
Lo:	60µH

Parameters of probe connection on EXCDB-000033 – Four Channel ER Measurement Board
Parameters are defined per probe.

Uo:	4.94V
Io:	0.848A
Po:	1.047W
Co:	0.1µF
Lo:	20µH

Parameters of probe connection on EXCDB-000036 – Single Channel LPR Measurement Board

Uo:	8.61V
Io:	0.305A
Po:	0.377W
Co:	0.1µF
Lo:	60µH

Parameters of probe connection on EXCDB-000039 – Four Channel LPR Measurement Board
Parameters are defined per probe.

Uo:	8.61V
Io:	0.848A
Po:	1.047W
Co:	0.1µF
Lo:	20µH

Barrier Input J3 on board EXCDB-000030 – Remote Datalogger Communication Board

Ui	28V
Ii	93mA
Pi	0.75W
Ci (@28V)	0.054µF
Ci: (@4.94V)	5.59µF
Li:	0H

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Parameters on Junction J2 of EXCDB-000030 – Remote Datalogger Communication Board

Output connects to external intrinsically safe circuitry. The following maximum parameters have been provided for maximum flexibility, however the simultaneous combination of these parameters has not been assessed for spark safety. A reduced set of parameters has been tested for spark safety to permit the connection of simple intrinsically safe apparatus and is summarized within the Special Conditions for Safe Use.

Uo:	4.94V
Io:	2mA
Po:	2.47mW
Ci:	0µF
Li:	0µH
Co:	100µF
Lo:	880µH

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The following drawing list completely replaces that given on the previous certificate revision.

Technical Documents

Title:	Drawing No.:	Rev. Level:	Date:
Circuit Diagram - Remote Data Logger Host Board	EXCDB-000017	A	04/10/2019
Circuit Diagram - Battery Pack protection Module	EXCDB-000018	0	03/16/17
Circuit Diagram - Battery Protection Circuit for wireless devices	EXCDB-000044	0	03/14/2019
Circuit Diagram - Remote Data Logger Bluetooth Module	EXCDB-000019	0	03/17/17
Circuit Diagram ER Measurement Board TypeII	EXCDB-000023	0	03/08/17
Circuit Diagram - Remote Data Logger Display Board	EXCDB-000029	A	'04/03/19
Circuit Diagram - Remote Data Logger RS232 & current loop Module	EXCDB-000030	0	06/23/2017
Circuit Diagram - ER Measurement Board - Multi Channel	EXCDB-000033	0	03/07/2019
Circuit Diagram - LPR Measurement Board with Controller	EXCDB-000036	0	05/17/2019
Circuit Diagram - LPR Measurement Board - Multi Channel	EXCDB-000039	0	05/23/2019
Circuit Diagram - ISA Wireless Board	EXCDB-000024	A	03/16/16
Circuit Diagram -HART Wireless Board	EXCDB-000025	0	03/07/2019
PCB Fabrication Drawing Remote Data Logger Host Board	EXPCB-000017	A	04/10/2019
PCB Fabrication Drawing - Battery Pack protection Module	EXPCB-000018	0	03/16/17
PCB Fabrication Drawing Battery Protection Circuit for wireless devices	EXPCB-000044	0	03/14/2019
PCB Fabrication Drawing - Remote Data Logger Bluetooth Module	EXPCB-000019	0	03/17/17
PCB Fabrication Drawing - ER Measurement Board Type-II	EXPCB-000023	A	05/03/18
PCB Fabrication Drawing Remote Data Logger Display Board	EXPCB-000029	A	04/03/2019
PCB Fabrication Drawing - Remote Data Logger RS232 & Current Loop Board	EXPCB-000030	0	06/23/2017
PCB Fabrication Drawing ER Measurement Board -Multi Channel	EXPCB-000033	0	03/07/2019
PCB Fabrication Drawing LPR Measurement Board with controller	EXPCB-000036	0	05/17/2019
PCB Fabrication Drawing LPR Measurement Board -Multi Channel	EXPCB-000039	0	05/23/2019
PCB Fabrication Drawing - ISA Wireless board	EXPCB-000024	A	03/16/16
PCB Fabrication Drawing HART Wireless board	EXPCB-000025	0	03/07/2019
Assembly Drawing - Remote Data Logger Host Board	EXET2096	A	04/10/2019
Assembly Drawing - Host Board Wireless for MS36XX /MS50XX	EXET2251	0	04/10/2019
Assembly Drawing Host Board - for MS35XX	EXET2254	0	04/10/2019

Technical Documents

Title:	Drawing No.:	Rev. Level:	Date:
Assembly Drawing Host board - Wireless for MS35XX / MS55XX	EXET2255	0	04/10/2019
Assembly Drawing - Battery Pack Protection Module	EXET1663	0	03/16/17
Assembly Drawing Battery Protection Circuit for wireless devices	EXET2249	0	03/14/2019
Assembly Drawing - Remote Data Logger Bluetooth Module	EXET2098	0	03/17/17
Assembly Drawing - ER Measurement Board- Type II	EXET1607	A	05/03/2018
Assembly Drawing Remote Data Logger Display Board	EXET1610	A	04/03/19
Assembly Drawing - Remote Data Logger RS232 & Current Loop Board	EXET2097	0	06/23/2017
Assembly Drawing ER Measurement Board- Multi Channel	EXET1906	0	03/07/2019
Assembly Drawing LPR Measurement Board with controller	EXET1969	0	05/17/2019
Assembly Drawing LPR Measurement Board- Multi Channel	EXET2125	0	05/23/2019
Assembly Drawing - ISA Wireless Board	EXET1605	A	03/16/16
Assembly Drawing - HART Wireless Board	EXET1803	0	03/07/2019
Bill of Materials - Host Board	EXBOM-000017	A	05/14/2019
Bill of Materials - Battery Pack protection Board	EXBOM-000018	0	5/4/2017
Bill of Materials - Battery Protection Circuit for Wireless Devices	EXBOM-000044	0	03/14/2019
Bill of Materials - MS3600E Remote Data Logger Bluetooth Board	EXBOM-000019	A	04/03/2019
Bill of Materials - Measurement Board Type-II	EXBOM-000023	A	05/29/2019
Bill of Materials - Remote Data Logger Display Board	EXBOM-000029	A	04/10/2019
Bill of Materials - MS3600E Remote Data Logger 4-20mA Board	EXBOM-000030	A	8/17/2018
Bill of Materials - ER Measurement Board - Multi channel	EXBOM-000033	0	04/23/2019
Bill of Materials - LPR Measurement Board with controller	EXBOM-000036	0	05/17/2019
Bill of Materials - LPR Measurement Board Multi channel	EXBOM-000039	0	04/23/2019
Bill of Materials - ISA Wireless Board	EXBOM-000024	A	04/23/2019
Bill of Materials - HART Wireless Board	EXBOM-000025	0	05/10/2019
REMOTE DATA LOGGERS / WIRELESS TRASNMITTERS AND REPEATERS MODEL NO: MS35XXE/L / MS55XE/L	EXMDB-011077	0	09/04/2018
REMOTE DATA LOGGERS / WIRELESS TRASNMITTERS AND REPEATERS MODEL No: MS36X0E/L AND MS50X0E/L	EXMDB-011075	0	08/27/2018
Hazardous Area Label Battery Holder assembly- Tadiran	EXET1770	0	06/23/2017
Hazardous Area Label Battery Holder assembly- Xeno	EXET1860	0	06/23/2017
Hazardous Area Label For Battery Pack Assembly ET2250	EXET2295	0	04/10/2019
Hazardous Area Label For Battery Pack Assembly ET2257	EXET2296	0	04/10/2019

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Technical Documents

Title:	Drawing No.:	Rev. Level:	Date:
Hazardous Area Label for MS35XXE /MS55XXE Data Logger / Wireless Transmitter	EXMDB-011082	0	03/08/2019
Hazardous Area Label For MS35XXL /MS55XXL Data Logger / Wireless Transmitter	EXMDB-011084	0	03/25/2019
Hazardous Area Label MS5540 Wireless Repeater	EXMDB-011097	0	05/29/2019
Hazardous Area Label For MS36XXE /MS50XXE Data Logger / Wireless Trasnmitter	EXMDB-011122	0	03/25/2019
Hazardous Area Label For MS36XXL /MS50XXL Data Logger / wireless Transmitter	EXMDB-011080	0	03/25/2019
Hazardous Area Label MS5040-XXX Wireless repeater	EXMDB-011121	0	05/29/2019
Enclsoure Label For MS36XXE / MS50XXE Data Logger / Wireless Trasnmitter	EXMDB-010858	B	03/25/2019
Enclsoure Label for MS36XXL / MS50XXL Data logger / Wireless Transmitter	EXMDB-011079	0	03/25/2019
Enclosure Label MS5040-XXX Wireless Repeater	EXMDB-011095	0	03/25/2019
Control Drawing - MS36XXE Remote Data Logger	EXWDB-000097	A	05/23/2019
Control Drawing - MS35XXE Remote Data Logger	EXWDB-000109	A	05/23/2019
Control Drawing - MS35XXE MultiChannel Remote Data logger	EXWDB-000128	0	05/23/2019
Control Drawing - MS36XXL Remote Data Logger	EXWDB-000129	0	05/23/2019
Control Drawing - MS35XXL Remote Data Logger	EXWDB-000130	0	05/23/2019
Control Drawing - MS35XXL MultiChannel Remote Data logger	EXWDB-000131	0	05/23/2019
Control Drawing - MS5000E Wireless Transmitter	EXWDB-000113	A	05/24/2019
Control Drawing - MS5500E Wireless Transmitter	EXWDB-000133	0	05/24/2019
Control Drawing - MS550XE MultiChannel Wireless Transmitter	EXWDB-000134	0	05/24/2019
Control Drawing - MS5000L Wireless Transmitter	EXWDB-000135	0	05/24/2019
Control Drawing - MS5500L Wireless Transmitter	EXWDB-000136	0	05/24/2019
Control Drawing - MS550XL MultiChannel Wireless Transmitter	EXWDB-000137	0	05/24/2019
MS35XXE & MS36XXE Hazardous Area Certification Details	EXDOC-000012	A	05/23/2019
MS50XXE & MS55XXE Hazardous Area Certification Details	EXDOC-000013	A	05/23/2019
MS35XXL & MS36XXL Hazardous Area Certification Details	EXDOC-000017	0	05/23/2019
MS50XXL & MS55XXL Hazardous Area Certification Details	EXDOC-000018	0	05/23/2019
PCB Fabrication Drawing - ER Measurement Board Type-II	EXPCB-000023	0	03/08/17
Assembly Drawing - ER Measurement Board- Type II	EXET1607	0	03/08/17

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Technical Documents			
Title:	Drawing No.:	Rev. Level:	Date:
Bill of Materials - MS3600E Remote Data Logger Measurement Board Type-II	EXBOM-000023	0	03/08/17
Circuit Diagram - Remote Data Logger Display Module	EXCDB-000029	0	03/16/17
PCB Fabrication Drawing - Remote Data Logger Display Board	EXPCB-000029	0	03/16/17
Assembly Drawing - Remote Data Logger Display Module	EXET1610	0	03/16/17
Bill of Materials - ERDL Display Board	EXBOM-000029	0	5/25/2017

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Details of Change – Variation 01

Free Reference Number: G103520011

The following PCBs have been added under this revision. The installation configuration of the boards has been summarized in the certificate description:

- EXCDB-000044 – Alternate Battery Protection Board
- EXCDB-000025 – HART Wireless Board
- EXCDB-000033 – ER Measurement Board – 4 Channel
- EXCDB-000036 – LPR Measurement Board
- EXCDB-000039 – LPR Measurement Board – 4 Channel

The following schematics have received modification under this revision

- EXCDB-000017 – Remote Datalogger Host Board
    - D2 and D3 may now optionally be fitted with a lower wattage component when used with the ET2250 battery pack. This relates to models MS352X, MS352X and MS50XX of the equipment.
    - R36, D5, D6 and C31 may be optionally removed.
    - The USB and SD card circuitry of this PCB may be optionally removed.
    - PCB layout has been revised to incorporate listed changes
- EXCDB-000023 – ER Measurement Board
    - Resistors R27, R28, R25, R30, R32, R32, R8, R9, R6, R12, R16, R18, R19 and R17 have been relied upon to limit the current available to the probe output.
    - The Lo permitted to be connected to the probe output has been increased from 10µH to 60µH per the manufacturer's request.
    - PCB layout has been revised to ensure separations around new safety components cannot be invalidated.
- EXCDB-000029 – Display Board – Summary and safety components
    - Resistors R15, R16 and R17 have been included to reduce the current available to protective Zener diodes.
    - Zener diodes D7, D8, D9, D10, D11 and D12 have been reduced to 1W or 2W components.
    - Zener diodes D14 and D13 have been reduced to 2W components.
    - PCB layout has been revised to incorporate listed changes
- EXCDB-000030 – Remote Datalogger Communication Board
    - Entity parameters have been revised at J2 due to a typographical error in the previous report. The Io has been reduced from 20mA to 2mA and the Po has been reduced from 24.7mW to 2.47mW. As the resultant values are lower than previously stated this amendment does not result in a dangerous condition.

The following general modifications apply to all PCBs

- Capacitance on all boards may be reduced or omitted

The following reporting changes have been considered under this variation.

- Spark ignition assessment, thermal ignition assessment and where applicable the protective component assessment has been revised to consider the listed changes.
- An alternate non-metallic enclosure has been provided for the MS35XX variants of the equipment. This model is installed in a fixed installation and utilizes an IP66 enclosure and IP66 sealing devices.
- Alternate aluminum end-caps have been specified for the MS36XX and MS50XX models.
- Checklists have been revised to consider the listed changes.
- Standard IEC 60079-0 has been updated from Edition 6 to Edition 7.

Details of Change – Variation 02

Free Reference Number: G103520011

Changes have been made under the same free reference number as the previous project. Amendments to the certificate are to address minor editorial changes which were observed by the client following the grace period in which changes may be made. No changes have been made in any way to the products controlled drawings, circuitry or assembly.

- Amended model numbers to include reference to the model MS5040 and MS5540 repeaters. These repeaters utilize a selection of the previously assessed PCBs and are fitted within the same selection of enclosures but are not fitted with a measurement board.
- Minor changes to description to permit the use of a variable non-metallic enclosure with minimum dimensions 25cm x 20cm x 10cm for use with the MS35XXE/L and MS55XXE
- Typo amended in first line of previously listed changes to EXCDB-00017. The original reason for change relates to flexibility in not populating small areas of non-critical circuitry on certain variants of the equipment. The change considered under this revision is to permit this flexibility in additional model numbers which were accidentally omitted.

  EXCDB-000017 – Remote Datalogger Host Board

  - D2 and D3 may now optionally be fitted with a lower wattage component when used with the ET2250 battery pack. This relates to models MS352XX, MS362XX, MS50XXX and MS55XXX of the equipment.