EU Type Examination Certificate CML 14ATEX1091X Issue 2

1 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

2 Equipment **Air Demand Analyzer**

3 Manufacturer **Galvanic Applied Sciences Inc.**

4 Address 7000 Fisher Road South East,
Calgary,
Alberta,
T2H 0W3,
Canada

5 The equipment is specified in the schedule of this certificate and the documents to which it refers.

6 Certification Management Limited, Unit 1 Newport Business Park, New Port Road, Ellesmere Port CH65 4LZ, UK, Notified Body Number 2503, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to conditions of safe use (affecting correct installation or safe use). These are specified in Section 14.

8 This EU Type Examination certificate relates only to the design and construction of the specified equipment or component. Further requirements of Directive 2014/34/EU Article 13 apply to the manufacture of the equipment or component and are separately certified.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN 60079-0:2012 :A11 :2013	EN 60079-1:2007	EN 60079-2:2007
EN 60079-7:2007	EN 60079-11:2012	EN 60079-18:2009

10 The equipment shall be marked with the following:

II 2 G

Ex d e ia mb px IIC T3 Gb

Ta= -20°C to +60°C

D R Stubbings MIET
Technical Director

11 Description

The Model 943-TGX-CE Air Demand Analyzer is a multi-component ultraviolet (UV) absorption photometric analyzer packaged in two frame mounted cabinets, the Oven Cabinet and the Control

Cabinet. The connection between the cabinets is by electrical and fibre optic cabling. This connection method isolates the Control Cabinet from the Oven Cabinet and virtually eliminates the possibility of corrosion damage to components in the Control Cabinet due to a leak in the sample handling and conditioning system.

The main item in the Oven Cabinet is a temperature controlled oven. The measuring (sample) cell block with and integrated aspirator to transport sample using instrument air or nitrogen as the aspirator drive gas is located in the oven. A sample of the tail gas stream is drawn from near the centre of the process duct through the sampling probe and measuring cell then returned to the process duct along with the aspirator drive gas. The oven is heated using electric heaters (6 pcs) and controlled at a nominal operating temperature of 150 °C to maintain the sample handling components above the sulphur dew point temperature. The temperature of the cell block and the gas exiting the sample probe are measured by RTDs. Pressure of the gas in the cell is measured using a pressure transmitter. Solenoid valves are used for switching the instrument air or nitrogen.

The control cabinet is fitted with a purge system and contains the UV source lamp and power supply, spectrometer, I/O board, controller and display, and keypad. The controller performs all of the normal operational procedures including oven temperature control, sample flow initiation, analysis, periodic zeroing, fault detection and fail safe back purge in case of a fault. Ultraviolet radiation from the source lamp is collected by a fibre optic cable and transmitted to the measuring cell. The radiation passes through the sample of tail gas in the measuring cell and is collected by a second fibre optic cable and transmitted to the spectrometer.

Variation 1

This variation introduces the following modifications:

i. To update the certificate reference to the 2014/34/EU Directive.
ii. To allow the maximum ambient to increase from+50°C to +60°C.
iii. To include the option of an additional heater and change the current location of the heaters.
iv. To include an alternative resistance isolator and smart power supply.
v. To include a lower minimum protective gas supply pressure and lower routine leakage test pressure test requirement.
vi. The allowable terminal arrangements were modified to accommodate the above modifications.
vii. The description was updated to include the modifications above.

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	30 Oct 2014	R323A/00	Issue of the prime certificate
1	04 Nov 2014	R323A/01	Issue of revised report
2	24 Aug 2016	R1236A/00	To introduce variation 1

Note: Drawings that describe the equipment or component are listed in the Annex.

13 Conditions of manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

13.1 Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate. A copy of the appropriate separately approved certificates and instructions shall be provided with the document pack.

13.2 The manufacturer shall perform following routine tests on every unit of Air Demand Analyzer model : 943-TGX-CE:

a) EN 60079-2: 2010, Clause 17.1 Functional test:

Acceptance criteria:

- The minimum overpressure safety device action: under the condition of overpressure below p_{min}= 0.62 mbar the controller shall disconnect the power to the analyser.
- The maximum overpressure safety device action: under the condition of overpressure above p_{max}= 9.96 mbar the safety valve shall open.
- The flow rate of the protective gas through the spring loaded manual valve in duration of 5 min after disconnecting the whole assembly from power supply and under the minimum pressure of air of 3.8 bar shall maintain the minimum overpressure inside the purge cabinet over the atmosphere pressure.

b) EN 60079-2: 2010, Clause 17.2 Leakage test:
Acceptance criteria:

- The leakage rate cannot exceed 2 l/min under the maximum enclosure pressure of 9.96 mbar.

14 Special Conditions for Safe Use (Conditions of Certification)

The following conditions relate to safe installation and/or use of the equipment.

14.1. Do not open when an explosive (hazardous) atmosphere is present or unless all devices within the enclosure have been de-energized for a period of five (5) minutes.

14.2. A holder for the RTC battery is installed on the controller board, do not install a battery in the holder or connect a battery to the controller.

14.3. Do not connect, remove or operate the keypad unless the area is known to be non-hazardous.

14.4. The system bypass shall not be enabled unless the area around the analyzer is known to be non-hazardous.

14.5. The analyzer shall not be operated with system bypass enabled unless personnel are continuously in attendance at the analyzer and the area around the analyzer remains non-hazardous.

14.6. Should the area around the analyzer become hazardous when the system bypass is enabled, immediately disconnect the mains power to the analyzer or disable the system bypass. The analyzer may then be powered up by following the 'Analyzer Power Up' procedure.

14.7. The end user shall provide and install the power cable taking into account the special conditions for safe use from the Purge and Pressurization System (Pepperl+Fuchs, model: 6000-DV-S2-UN-XD-AC).

- Cable entries are to be used only in places where they are protected against the influence of mechanical danger, to be fitted in the correct location and in accordance with their instructions.
- Conduit seals shall be certified in type of explosion protection flameproof "d", suitable for the conditions of use and correctly installed.
- Conduit seals shall be installed within 18" of the flameproof "d" enclosure.

Certificate Annex

Certificate Number CML 14ATEX1091X

Equipment Air Demand Analyzer

Manufacturer Galvanic Applied Sciences Inc.

The following documents describe the equipment or component defined in this certificate:

Issue 0

Drawing No	Sheets	Rev	Approved date	**Title**
APR-000027	1 to 2	2	30 Oct 2014	202-SPX-CE, 943-TGX-CE, 962-AGX-CE Control Cabinet – Bill of Material
APR-000028	1 of 1	1	30 Oct 2014	202-SPX-CE, 943-TGX-CE Oven Cabinet – Bill of Material
APR-000035	1 to 9	4	30 Oct 2014	943-TGX-CE AIR DEMAND ANALYZER (Controlled Drawings)
APR-000047	1 of 1	0	30 Oct 2014	943-TGX-CE NAMEPLATE TYPE APPROVAL
APR-000038	1 of 1	0	30 Oct 2014	ZONE 1 ANALYZER POWER UP LABEL
APR-000039	1 of 1	0	30 Oct 2014	943-TGX-CE CABINET EXTERNAL EARTHING CONNECTION
APR-000040	1 to 9	1	30 Oct 2014	943-TGX-CE Certified Components
APR-000042	1 of 1	0	30 Oct 2014	CONTROLLER BOARD BATTERY WARNING LABEL

Issue 1

Drawing No	Sheets	Rev	Approved date	**Title**
APR-000047	1 of 1	1	04 Nov 2014	943-TGX-CE NAMEPLATE TYPE APPROVAL

Issue 2

Drawing No	Sheets	Rev	Approved date	**Title**
APR-000027	1 to 2	3	24 Aug 2016	202-SPX-CE, 943-TGX-CE, 962-AGX-CE Control Cabinet – Bill of Material
APR-000028	1 of 1	2	24 Aug 2016	202-SPX-CE, 943-TGX-CE Oven Cabinet – Bill of Material
APR-000035	1 to 9	6	24 Aug 2016	943-TGX-CE AIR DEMAND ANALYZER (Controlled Drawings)
APR-000038	1 of 1	1	24 Aug 2016	ZONE 1 ANALYZER POWER UP LABEL
APR-000040	1 to 11	2	24 Aug 2016	943-TGX-CE Certified Components
APR-000047	1 of 1	3	24 Aug 2016	943-TGX-CE NAMEPLATE TYPE APPROVAL