EU-TYPE EXAMINATION
CERTIFICATE

Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

1. **EU-Type Examination Certificate Number:** **ITS17ATEX11669X** **Issue 02**
2. **Product:** H_2S and Total Sulfur Analyzers
3. **Manufacturer:** Galvanic Applied Sciences Inc.
4. **Address:** 7000 Fisher Rd SE, Calgary, AB T2H 0W3, Canada
5. This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
6. Intertek Testing and Certification Limited, Notified Body number 0359 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council dated 26 February 2014, certifies that the product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II of the Directive.
7. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-0:2012 + A11:2013, EN 60079-1:2014, EN 60079-11:2012 and EN 60079-28:2015 except in respect of those requirements referred to within item 14 of the Schedule.
8. If the sign "X" is placed after the certificate number, it indicates that the product is subject to the special conditions of use specified in the Schedule to this certificate.
9. This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
10. The marking of the product shall include the following:

II 2 G Ex db [ia] ia op is IIB+H_2 T4 Gb

$0^oC \leq Ta \leq +50^oC$

Certification Officer: P Moss **Date:** 11th October 2019

SCHEDULE:

EU-Type Examination Certificate Number: ITS17ATEX11669X Issue 02

11. Description of Equipment or Protective System

The ProTech903CE H2S Analyzer is a hydrogen sulphide analyzer which is housed in a component approved enclosure (certificate number DEMKO 16ATEX1706U) with dimensions of approximately 254mm x 356mm x 152mm. It has a single glass window providing a view of an LCD screen which is supplied as part of the component approved enclosure. Both internal and external earthing points are provided. This enclosure is also fitted with a 4-channel barrier (ITS 12ATEX27509U) which connects to a Keypad (ITS 17ATEX201662X), Sensor Block, and Tape Encoder.

A second flameproof enclosure is utilized to house a motor which is used to drive a tape reel. This motor housing utilizes a second component approved enclosure (certificate number DEMKO 03ATEX0303070U) and a Flameproof Hub and Shaft Assembly for connecting the drive rod of the motor to the external tape reel. This enclosure is mounted to the main enclosure through the use of various approved conduit unions and stopper boxes (Certificate CESI 03ATEX085X and CESI 99ATEX034U).

The equipment may be provided with optional external parts such as solenoids (LCIE 00ATEX6008X) or pressure switches (DNV 13ATEX3666X). Connection to the solenoids may also use various approved junction boxes (certificate numbers CESI 03ATEX032U, LOM 02ATEX2037, BVS 11ATEX E052U or SIRA 12ATEX1243U).

When these devices are fitted, conduit horizontal stopper boxes are to be used to connect between the devices and the enclosure (CESI 03ATEX085X).

The sensor block SA3005-00 (or SA3005-01, different LD1 used compared to SA3005-00) and tape (PT3007) encoders are housed inside sample handling enclosure located above the approved enclosure specified in paragraph 1. Sensor block is powered by connecting P2 to Terminal TB4 and Terminal TB6 of the 4 channel IS barrier (ITS 12ATEX27509U). P1 of the sensor block is connected to P1 of the PT3007 tape encoder. Tape encoder P2 is connected to TB2 of the IS barrier. Refer to APR-000110 for intrinsically safe wiring control drawing.

Keypad (ITS 17ATEX201662X) is powered by TB8 of the IS barrier. The keypad is connected to a socket located at the right side of the sample handling enclosure. The socket for the keypad is marked “connect intrinsically safe keypad SA2992-zz only”.

The system is available with a Total Sulfur Furnace that converts sulfur compounds to H2S, so that the total sulfur content of a sample gas stream can be determined. With a dual stream setup, it is possible to measure both the H2S and the total sulfur content of the same stream on the same system. When the assembly is equipped with the total sulfur furnace it is known as either a H2S/TS Analyzer or a TS Analyzer. The Total Sulfur furnace is dimensioned approximately 407mm x Ø190.5mm and is constructed from 6061 T6 Aluminium.

The sample gas is mixed with hydrogen in a quartz reaction tube at a temperature of 900°C. At this temperature, the hydrogen reacts with all sulfur components to form H2S, and most hydrocarbons to form methane.

SCHEDULE:

EU-Type Examination Certificate Number: ITS17ATEX11669X Issue 02

The total sulfur furnace operates on AC voltage only. The temperature is controlled by modulating the power output to the furnace from the I/O board in the electronics enclosure. This modulation is set up in the application program.

Ratings: 24Vdc 3A, or 110Vac, 50/60Hz 3A or 230Vac, 50/60Hz 1.5A

12. Report Number

Intertek Report: 103591543EDM-002 Dated: 30th September 2019.

13. Special Conditions of Certification

(a). Special Conditions of Use

1) Only suitably approved Ex db IIB+H2 Gb minimum cable glands or blanking elements with an operating ambient range of 0°C to +50°C shall be used.
2) No modifications to the flamepaths are permitted without consultation with the controlled documentation or notified body.
3) Use only those bolts supplied with the enclosure. No cover bolts are to be omitted. Install and alternate cover bolt pattern when tightening, see recommended torque value table.
4) Certification details, instructions (including any required special conditions for use) for all certified equipment installed shall be conveyed to the user in an appropriate manner.
5) Avoid ignition due to impact or friction.
6) The fittings and adapters SHALL NOT be loosened for alignment purposes.
7) The equipment shall have the static safety warning: “WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS”

(b). Conditions of Manufacture - Routine Tests

- The motor Flameproof hub and shaft assembly part number BA0423 as defined by drawing APR-000119 shall be routinely subjected to an overpressure test at a minimum of 300PSI (20.7bar). The period of application of the pressure shall be at least 10s. The tests are considered satisfactory if the hub and shaft assembly withstands the pressure without suffering permanent deformation of the joints or damage to the assembly. For the routine test, it is sufficient to test the hub and shaft assembly in an empty enclosure. A label bearing a unique number is attached to each BA0423 assembly which is recorded for an analyzer-specific check list.
  NOTE: The Flameproof motor hub and shaft assembly part number SA3032 as defined by drawing APR-000153 does not require routine overpressure testing.
- The Total Sulfur Furnace Housing containment system as defined by drawing APR-000129 shall be routinely subjected to an overpressure test at a minimum of 30psi (2.06bar). The period of application of the pressure shall be at least 120seconds. The tests are considered satisfactory if no permanent deformation occurs and compliance with the applicable leakage test for a containment system with a limited release is verified.
  The containment system shall: 1) be surrounded by helium at a test pressure equal to the maximum rated pressure, but no less than 1000 Pa; or 2) be connected to a helium supply

SCHEDULE:

EU-Type Examination Certificate Number: ITS17ATEX11669X Issue 02

at the maximum rated pressure, but no less than 1000 Pa.
The maximum helium leakage rate shall be less than 10-2 Pa x l/s (10-4 mbar x l/s)..

- Records of routine tests shall be kept and maintained.

14. Essential Health and Safety Requirements (EHSRs)

The relevant Essential Health and Safety Requirements (EHSRs) have been identified and assessed in Intertek Report: 103591543EDM-002 Dated: 30th September 2019.

15. Drawings and Documents

Title:	Drawing No.:	Rev. Level:	Date:
FPA 4000/4100 CPU Board (Pages 1-2 of 2)	APR-000013	1	JAN 14, 2017
Flameproof Control Enclosure Zone 1 ATEX/IECEx Drilling and Tapping EB0544CE	APR-000096	1	AUG 31, 2016
ProTech 903 Tape Analyzer IEC Digital Sensor Boards H2S (Pages 1-2 of 2)	APR-000097	1	OCT 18, 2016
ProTech 903 Tape Analyzer IEC Digital Sensor Boards Arsine\Phosgene (Pages 1-2 of 2)	APR-000098	1	OCT 18, 2016
ProTech 903 Tape Analyzer IEC Tape Encoder	APR-000099	2	JAN 30, 2017
ProTech 903 CE H2S and Total Sulfur Analyzer Installation and Maintenance Manual (Pages 1-59 of 59)	APR-000105	2	FEB 28, 2017
ProTech 903 CE Analyzer Zone 1 Intrinsically Safe Wiring Control Drawing	APR-000110	0	JAN 09, 2016
ProTech 903 CE Zone 1 H2S Analyzer Interconnect Connection Location Diagram (Sheet 1 of 7)	APR-000111	0	JAN 13, 2016
ProTech 903 CE Zone 1 H2S Analyzer Signal Wiring (Sheet 2 of 7)	APR-000111	0	JAN 13, 2016
ProTech 903 CE Zone 1 H2S Analyzer Solenoid Valve Wiring (Sheet 3 of 7)	APR-000111	0	JAN 13, 2016
ProTech 903 CE Zone 1 H2S Analyzer Alarm Relays & Analog Outputs (Sheet 4 of 7)	APR-000111	0	JAN 13, 2016
ProTech 903 CE Zone 1 H2S Analyzer 24 VDC Power (Sheet 5 of 7)	APR-000111	0	JAN 13, 2017
ProTech 903 CE Zone 1 H2S Analyzer AC Power (Sheet 6 of 7)	APR-000111	0	JAN 13, 2016
ProTech 903 CE Zone 1 H2S Analyzer Pressure Switch Connection (Sheet 7 of 7)	APR-000111	0	JAN 13, 2016
Zone 1 Tape Drive Motor Enclosure Machining	APR-000112	1	JAN 20, 2017
Zone 1 Tape Drive Motor Enclosure Assembly	APR-000113	3*	JUN 28, 2018
ProTech 903 IEC Digital Sensor Board (Sheets 1-7 of 7)	APR-000115	1	FEB 02, 2017
Protech 903 IEC Tape Encoder Board (Sheets 1-3 of 3)	APR-000116	0	JAN 12, 2017

SCHEDULE:

EU-Type Examination Certificate Number: ITS17ATEX11669X Issue 02

PT3004 Assembly and Coating (Pages 1-5 of 5)	APR-000117	0	JAN 10, 2017
PT3007 Assembly and Coating (Pages 1-3 of 3)	APR-000118	0	JAN 09, 2017
Hub and Shaft Assembly BA0423	APR-000119	2	JAN 26, 2017
ProTech 903 CE Zone 1 H2S Analyzer Layout (Sheets 1-4 of 5)	APR-000120	7*	JUN 09, 2019
ProTech 903 CE Zone 1 H2S Nameplate Location (Sheet 5 of 5)	APR-000120	7*	JUN 09, 2019
ProTech 903 CE Zone 1 H2S Analyzer Nameplate	APR-000121	3*	FEB 21, 2019
903_H2S_CPU (Sheets 1-7 of 7)	APR-000122	0	JAN 14, 2017
SA2992-zz Connector Label	APR-000124	0	JAN 24, 2017
PU3003 Check Plots (Pages 1-12 of 12)	APR-000127	0	FEB 03, 2017
PU3006 Check Plots (Pages 1-4 of 4)	APR-000128	0	FEB 03, 2017
Flameproof Furnace Enclosure (Sheet 1 of 5)	APR-000129	1	FEB 27, 2017
Flameproof Furnace Enclosure Cap (Sheet 2 of 5)	APR-000129	1	FEB 27, 2017
Flameproof Furnace Enclosure Threaded Bashing (Sheet 3 of 5)	APR-000129	1	FEB 27, 2017
Flameproof Furnace Enclosure Mounting Bracket (Sheet 4 of 5)	APR-000129	1	FEB 27, 2017
Flameproof Furnace Enclosure Assembly (Sheet 5 of 5)	APR-000129	1	FEB 27, 2017
CE Reaction Furnace Assembly (Sheets 1-2 of 2)	APR-000131	2*	JUN 29, 2018
Protech 903 CE Zone 1 H2S/TS Analyzer Layout (Sheets 1-4 of 5)	APR-000132	5*	JUL 11, 2019
Protech 903 CE Zone 1 H2S/TS Nameplate Location (Sheet 5 of 5)	APR-000132	5*	JUL 11, 2019
ProTech 903 CE Zone 1 H2S/TS Analyzer Interconnect Connection Location Diagram (Sheet 1 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer Signal Wiring (Sheet 2 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer Solenoid Valve Wiring (Sheet 3 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer Alarm Relays & Analog Outputs (Sheet 4 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer TS Furness Wiring (Sheet 5 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer TS Furnace Bill of Material (Sheet 6 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 CE Zone 1 H2S/TS Analyzer Power Connection (Sheet 7 of 8)	APR-000133	3*	JUL 03, 2018

SCHEDULE:

EU-Type Examination Certificate Number: ITS17ATEX11669X Issue 02

ProTech 903 CE Zone 1 H2S/TS Analyzer Pressure Switch Connection (Sheet 8 of 8)	APR-000133	3*	JUL 03, 2018
ProTech 903 XP Hub Assembly (Sheet 1 of 4)	APR-000153	0*	JUN 26, 2017
ProTech 903 XP Hub (Sheet 2 of 4)	APR-000153	0*	JUL 06, 2017
ProTech 903 XP Captive Washer (Sheet 3 of 4)	APR-000153	0*	JUL 06, 2017
ProTech 903 XP Shaft (Sheet 4 of 4)	APR-000153	0*	JUN 26, 2017

* Indicates documentation which has been added or amended as per Issue 02.

16. Details of Certificate changes Issue 01

Issue 01 is to cover the following:

- Additional models H2S/TS Analyzer and TS Analyzer;
- Additional drawings for H2S/TS Analyzer and TS Analyzer;
- Correcting typographical errors on original Issue 00 certificate and reports;
- Inclusion of a special condition of safe use.

17. Details of Certificate changes Issue 02

Issue 02 is to cover the following:

- Add an alternate Flameproof hub and shaft assembly model SA3032 (ITS 17ATEX102792U) which does not need the factory routine hydrostatic testing;
- Add an alternate Asco solenoid valve assemblies (valve coil unchanged, LCIE 00ATEX6008X) and an alternate pressure switch (SIRA 08ATEX1046X).
- Revise the equipment's minimum ambient rating from -20°C to 0°C.
- Revise the furnace documentation to show the bimetal thermostat as optional (it does not control the furnace temperature).
- Add two alternate low power transmitters which are located in the flameproof enclosure.
- Correct the certificate numbers that were listed in error for the GUA16 alternate in two drawings.

Note the alternate Killark model GUF-1-EX cable gland (ITS 09ATEX16417U) was accepted under the prior edition with the revision of drawing APR-000120 to edition 5.