



# Mining And Surface Certification (Pty) Ltd

2015/021934/07



**Certificate Number:** MASC MS/16-0229X  
**Issue:** 23 February 2016  
**Expire:** 23 February 2019  
**Page:** 1 of 4

## IA – CERTIFICATE

(Review required by MASC as per ARP 0108)

IN TERMS OF REGULATION 21.17.2 OF THE MINERALS ACT (INCORPORATION THE MINE HEALTH AND SAFETY ACT) AND REGULATION 9 (1) OF THE ELECTRICAL MACHINERY REGULATIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT

Ex – Type Examination

Certificate number:

**MASC MS/16-0229X**

Equipment:

HS-420 Series Accelerometer

Serial No:

(See “Conditions of Certification”)

Applicant:

Hansford Sensors SA

Address:

Unit 31-32  
Buena Vista Office Park  
Durbanville  
7560

Manufacturer:

Hansford Sensors Limited

Address:

Artisan  
Hillbottom Road  
Sands Industrial Estate  
Bucks  
HP12 4HJ  
United Kingdom

### DESCRIPTION:

The HS-420 Series Accelerometers are designed to measure velocity or acceleration by converting the signal generated by the compression of a piezo electric crystal by a given seismic mass and output a 4 to 20mA signal proportional to velocity or acceleration to the monitoring equipment.

The accelerometer comprises a piezo electric crystal connected to a signal conditioning board all contained within a stainless steel enclosure of various shapes measuring approximately 33cm<sup>3</sup>. The enclosure is a fully welded construction.

Electrical connections are made to the apparatus either via an IP65 rated connector or via an integral cable which is encapsulated in the end of the apparatus.

The Group II version of the apparatus (excluding cable) has the following terminal parameters:

U<sub>i</sub> = 28V  
I<sub>i</sub> = 115mA  
P<sub>i</sub> = 0.65W

/. The HS-420IT...

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**IA CERTIFICATE NUMBER: MASC MS/16-0229X**  
**HS-420 Series Accelerometer**

The HS-420IT or HS-422IT Accelerometer, with an integral temperature sensor and 25m of cable has the following terminal parameters for all four electrical connections considered as a single intrinsically safe circuit:

$U_i = 44V$   
 $I_i = 117mA$   
 $P_i = 0.722W$   
 $C_i = 3nF$   
 $L_i/R_i = 13nH/\Omega$

The Group I version of the apparatus (excluding cable) has the following terminal parameters:

$U_i = 16.5V$   
 $P_i = 1.74W$

The apparatus must be powered from a power limited source such as an appropriately certified fuse assembly containing a  $\leq 62mA$  fuse, 1.74W (16.5V x 62mA x 1.7).

The Group I version of the apparatus (excluding cable) has the following alternative terminal parameters:

$U_i = 28V$   
 $I_i = 115mA$   
 $P_i = 0.65W$

The capacitance and inductance to resistance ratio of the different versions have the following parameters:

	<b>Integral Cable OR 2-Pin Mill Spec Connector with cable</b>				<b>4-Pin M12 Connector</b>
	Polyurethane Cable	Silicone Cable	Armoured Cable	PUR Cable	Polyurethane Cable
$C_i$	= 160pF/m	= 370pF/m	= 290pF/m	= 884pF/m	= 120pF/m
$L_i/R_i$	= 8.32 $\mu$ H/ $\Omega$	= 15.4 $\mu$ H/ $\Omega$	= 15.4 $\mu$ H/ $\Omega$	= 6.1 $\mu$ H/ $\Omega$	= 11.7 $\mu$ H/ $\Omega$

Details of Certificate Changes (for issues 1 and above):

**Variation 9.1**

- To permit the use of an alternative PUR cable.
- To permit the use of an alternative 2-Pin connector.
- The Certificate Annex (now Issue 2) was updated with the parameters for the alternative PUR cable and 2-Pin connector. For completeness, the parameters for the HS-420IT & HS-422IT Accelerometers listed on Issue 2 of the certificate were also added to the Annex.

**MARKING:**

SGS Baseefa marking remains applicable. The following MASC Certificate number (IA number) must be additionally applied to the equipment.

IA No: MASC MS/16-0229X

**/ . COMPLIANCE...**

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**COMPLIANCE:**

The equipment as described above and in MASC letter 16-0229 is hereby certified "Explosion Protected" Ex ia I Ma (-40°C ≤ Ta ≤ +60°C), Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C), Ex ia IIIC T80°C IP65 Da (-40°C ≤ Ta ≤ +60°C) and is suitable for use in hazardous locations as stated below and as tested, assessed and inspected in accordance with the relevant requirements of SANS / IEC Standards:

**The evaluation was conducted according to the requirements of:**

- i) SANS (IEC) 60079-0 : 2012 "Explosive atmospheres – Part 0: Equipment — General requirements"
- ii) SANS (IEC) 60079-11 : 2012 "Explosive atmospheres – Part 11: Equipment protection by intrinsic safety 'i'"

Location	Zone 0, 1 & 2 Zone 20, 21 & 22	Gas Surface / Mining (As Applicable) Dust (As Applicable)
Hazard Frequency	---	Continuous as could occur under normal operating conditions in hazardous area
Environment	Group I/IIIC Group IIIC	Methane (Coal dust)/ Propane to Hydrogen/Acetylene Dust (Conductive Dust) (As Applicable)
Surface Temperature	T6	T80°C
Service/Ambient Temperature	-40°C to +60°C	

***The use of apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:***

- i. SANS 10086 requirements;
- ii. Any conditions mentioned in the above document;
- iii. Codes of Practice enforced in terms of Regulations 21.17.2 of Minerals Act, by Chief Inspector of Mines;
- iv. Any restrictions and conditions enforced by Chief Inspectors of Mines, Principal Inspector (Group I equipment) of Chief Inspector of Factories (Group II equipment);
- v. Any relevant requirements of the MHS Act or the OHS Act.

**CONDITIONS OF MANUFACTURE:**

- None

**SPECIAL CONDITIONS OF USE (X):**

- The free end of the cable on the integral cable version of the apparatus must be terminated in an appropriately certified dust proof enclosure.

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**CONDITIONS OF CERTIFICATION:**

1. This Certificate remains valid based on a three yearly review covered by an official MASC letter.
2. The apparatus must be additionally marked with the MASC marking details above.
3. This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date.
4. The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by SGS Baseefa and in this approval.
5. The SGS Baseefa certification must remain valid.
6. The extent of the requirements in the ARP 0108 (or regulations) and SANS 10108 on the certification of the equipment must remain unchanged.
7. The Ex quality assurance notification/report for the equipment must remain valid.



**A. Koekemoer**  
**TECHNICAL OFFICER**



**F du Toit**  
**TECHNICAL SPECIALIST**

**Mining And Surface Certification**

*This document is issued based on Mining And Surface Certification's Standard Contract terms and conditions available on request.*

*While every endeavor is made to ensure that a test / assessment is representative and accurately performed, and that a report is accurate in the quoted results and conclusions drawn from the test / assessment, MASC or its members/employees shall in no way be liable for any error made in carrying out the test / assessment or for any erroneous statement, whether in fact or in opinion, contained in a report issued pursuant to a test / assessment.*

*MASC takes no responsibility for any non-conformances, exclusions or any results / assessments not in compliance with the standards. By marking the equipment in accordance with the documentation / standard, the manufacturer attests on his own responsibility that the equipment has been constructed in accordance with the applicable requirements of the relevant standards and that the routine verifications and routine tests have been successfully completed and the product complies with the documentation and standard(s).*

*This document is only for use and application in South Africa. It is issued based on National interpretations and accepted practices.*

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# Mining And Surface Certification (Pty) Ltd

2015/021934/07



Our ref: 16-0229  
Enquiries: F du Toit  
Tel: (012) 653 2959  
Fax: 086 605 8568  
Date: 23 February 2016

Hansford Sensors SA  
Unit 31-32  
Buena Vista Office Park  
Durbanville  
7560

Page 1 of 4

## HS-420 Series Accelerometer

This letter is based on the IECEx BAS 08.0034X certificate.

Further to your request, we have evaluated the supplied documentation. The following is applicable:

Description	Detail
Requested By :	Hansford Sensors SA Unit 31-32, Buena Vista Office Park, Durbanville, 7560
Equipment :	Accelerometer
Manufacturer :	Hansford Sensors Limited
Model(s) / Type(s) :	HS-420 Series
Rating :	Ex ia I Ma (-40°C ≤ Ta ≤ +60°C) Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C) Ex ia IIIC T80°C IP65 Da (-40°C ≤ Ta ≤ +60°C)
Certification body :	SGS Baseefa Limited (SGS Baseefa)
Type Certificate No :	IECEx BAS 08.0034X
Variations/Issue/Amendment :	9
Assessment Report No :	GB/BAS/ExTR08.0059/00 GB/BAS/ExTR08.0181/00 GB/BAS/ExTR11.0013/00 GB/BAS/ExTR12.0254/00 GB/BAS/ExTR15.0175/00
Quality Assurance report (QAR) / Notification (QAN) :	GB/BAS/QAR07.0040/06

Standards:	- IEC 60079-0 (2011) "Explosive atmospheres – Part 0: Equipment — General requirements"
	- IEC 60079-11 (2011) "Explosive atmospheres – Part 11: Equipment protection by intrinsic safety 'i'"

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MASC Letter: 16-0229

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The evaluation was conducted according to the requirements of:

- SANS (IEC) 60079-0 : 2012 “Explosive atmospheres – Part 0: Equipment — General requirements”
- SANS (IEC) 60079-11 : 2012 “Explosive atmospheres – Part 11: Equipment protection by intrinsic safety ‘i’”

#### DESCRIPTION OF EQUIPMENT (According to SGS Baseefa Certificate):

The HS-420 Series Accelerometers are designed to measure velocity or acceleration by converting the signal generated by the compression of a piezo electric crystal by a given seismic mass and output a 4 to 20mA signal proportional to velocity or acceleration to the monitoring equipment.

The accelerometer comprises a piezo electric crystal connected to a signal conditioning board all contained within a stainless steel enclosure of various shapes measuring approximately 33cm<sup>3</sup>. The enclosure is a fully welded construction.

Electrical connections are made to the apparatus either via an IP65 rated connector or via an integral cable which is encapsulated in the end of the apparatus.

The Group II version of the apparatus (excluding cable) has the following terminal parameters:

$$\begin{aligned} U_i &= 28V \\ I_i &= 115mA \\ P_i &= 0.65W \end{aligned}$$

The HS-420IT or HS-422IT Accelerometer, with an integral temperature sensor and 25m of cable has the following terminal parameters for all four electrical connections considered as a single intrinsically safe circuit:

$$\begin{aligned} U_i &= 44V \\ I_i &= 117mA \\ P_i &= 0.722W \\ C_i &= 3nF \\ L_i/R_i &= 13nH/\Omega \end{aligned}$$

The Group I version of the apparatus (excluding cable) has the following terminal parameters:

$$\begin{aligned} U_i &= 16.5V \\ P_i &= 1.74W \end{aligned}$$

The apparatus must be powered from a power limited source such as an appropriately certified fuse assembly containing a  $\leq 62mA$  fuse, 1.74W (16.5V x 62mA x 1.7).

The Group I version of the apparatus (excluding cable) has the following alternative terminal parameters:

$$\begin{aligned} U_i &= 28V \\ I_i &= 115mA \\ P_i &= 0.65W \end{aligned}$$

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The capacitance and inductance to resistance ratio of the different versions have the following parameters:

	Integral Cable <i>OR</i> 2-Pin Mill Spec Connector with cable				4-Pin M12 Connector
	Polyurethane Cable	Silicone Cable	Armoured Cable	PUR Cable	Polyurethane Cable
C <sub>i</sub>	= 160pF/m	= 370pF/m	= 290pF/m	= 884pF/m	= 120pF/m
L <sub>i</sub> /R <sub>i</sub>	= 8.32μH/Ω	= 15.4μH/Ω	= 15.4μH/Ω	= 6.1μH/Ω	= 11.7μH/Ω

Details of Certificate Changes (for issues 1 and above):

#### **Variation 9.1**

- To permit the use of an alternative PUR cable.
- To permit the use of an alternative 2-Pin connector.
- The Certificate Annex (now Issue 2) was updated with the parameters for the alternative PUR cable and 2-Pin connector. For completeness, the parameters for the HS-420IT & HS-422IT Accelerometers listed on Issue 2 of the certificate were also added to the Annex.

#### **MASC MARKING:**

SGS Baseefa marking remains applicable. The following MASC Certificate number (IA number) must be additionally applied to the equipment.

IA No: MASC MS/16-0229X

#### **PROCESS / ASSESSMENT:**

The SGS Baseefa documentation was selectively evaluated for technical content and was studied for authenticity.

SGS Baseefa is an EXTL and ACB under the IECEx system. South Africa is a member of the IECEx scheme. The Certificate's validity and acceptability is acknowledged. An IA certificate is issued for the product.

#### **CONDITIONS OF MANUFACTURE:**

- None

#### **SPECIAL CONDITIONS OF USE (X):**

- The free end of the cable on the integral cable version of the apparatus must be terminated in an appropriately certified dust proof enclosure.

**/ . CONDITIONS...**

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MASC Letter: 16-0229

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**CONDITIONS OF CERTIFICATION:**

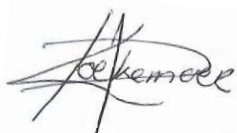
1. This letter covers all units sold from the date of this letter to 23 February 2019.
2. The apparatus must be additionally marked with the MASC marking details above.
3. This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date.
4. The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by SGS Baseefa and in this approval.
5. The SGS Baseefa certification must remain valid.
6. The extent of the requirements in the ARP 0108 (or regulations) and SANS 10108 on the certification of the equipment must remain unchanged.
7. The Ex quality assurance notification/report for the equipment must remain valid.

**CONCLUSION:**


From the above and the selective examination of the documentation, nothing contrary to the requirements of the applicable standards was found, provided that the equipment/component is used as described in the above document/certificate and according to the MASC conditions below. A MASC IA certificate is issued based on the work done by SGS Baseefa.

The routine tests for production units according to the SGS Baseefa Certificate must be complied with (if applicable).

Yours faithfully



**A. Koekemoer**  
**TECHNICAL OFFICER**



**F du Toit**  
**TECHNICAL SPECIALIST**

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*MASC takes no responsibility for any non-conformances, exclusions or any results / assessments not in compliance with the standards. By marking the equipment in accordance with the documentation / standard, the manufacturer attests on his own responsibility that the equipment has been constructed in accordance with the applicable requirements of the relevant standards and that the routine verifications and routine tests have been successfully completed and the product complies with the documentation and standard(s).*

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