



CE





Assessment Report

Title: Variation to Sira 14ATEX1214X Applicant: Measurement Specialties, Inc. Report No. R70192965A Date and place of issue: November, 2018 Sira Certification, Unit 6, Hawarden Industrial Park, Hawarden, Deeside, CH5 3US, United Kingdom



1 Report Summary

1.1 Certification Overview

This report is to introduce a variation to certificate number Sira 14ATEX1214X to assess the following modifications:

- i. Following appropriate re-assessment, EN 60079-0:2012 (Edition 6), EN 60079-1:2007 (Edition 6), and EN 60079-31:2009 (Edition 1) were replaced by EN IEC 60079-0:2018 (Edition 7), EN 60079-1:2014 (Edition 7), and EN 60079-31:2014 (Edition 2).
- ii. Recognition of minor drawings amendments, none of which affect compliance with the standards.
- iii. Recognition of drawings that have become obsolete.
- iv. Change to the Manufacturer's name and address.

1.2 Applicant's Name & Address

The applicant's name and address are unchanged but are reproduced below for reference:

Measurement Specialties, Inc. A TE Connectivity Company 6801 Kaiser Drive Fremont, California 94555 USA

1.3 Manufacturer's Name & Address

The manufacturer's name and address is amended as follows (*bold italics*):

From:

American Sensor Technologies, Inc. 450 Clark Dr., Mount Olive New Jersey 07828 USA

To: *Measurement Specialties Inc. A TE Connectivity Company Avenido Senora Mundial #9 Hermosillo, Senora CP83174 Mexico*

1.4 Product Name/Model Number

Product model numbers are unchanged but are reproduced below for reference:

Models AST4600, AST46HA, AST46PT and 46SW Series Pressure Transducers.



1.5 Ratings

The ratings are unchanged but are reproduced below for reference:

Model	Input Rated	Output Rated
AST4600*****X****-7	5 Vdc	1: 0 5-4 5 V Ratiometric
Where $X = output$	10-28 Vdc	2: 0-5 V
1, 2, 3, 4, 5, 6, 8, 9, A, B, F, G, 1, M, P	10-28 Vdc	3: 1-5 V
$-7 = CRN_{s}S_{s}$ or other non-performance related	10-28 Vdc	4: 4-20 mΔ
	15-28 Vdc	5: 0-10 V
	10-28 Vdc	6: 1-6 V
	10-28 Vdc	8: 0 5-5 5 V
	10-28 Vdc	0: 0.25-5 V
	5 Vdc	A: 10 mV/V
	5 Vdc	B: 20 mV/V
	5 Vdc	E: 5 mV/V
	15-28 Vdc	G: 1-10 V
	10-28 Vdc	1: 0 1-5 1 V
	5 Vdc	M: 0.25-4.75 V Patiometric
	10-28 Vdc	$P: 0.5_{-4} = V$
ACT/6HA*****Y*****-7	5 Vdc	1: 0 5-4 5 V Patiometric
	10-28 Vdc	2. 0-5 V
	10-28 Vdc	2: 0-5 V
-7 = CRN SS or other non-nerformance related	10-28 Vdc	4: 4-20 mA
	10-28 Vdc	4. 4-20 IIIA 5: 0-10 V
	10-28 Vdc	5. 0-10 V
	10-28 Vdc	0. 1-0 V 8: 0 5-5 5 V
	10-28 Vdc	0: 0.25 5.3 V
	10-20 Vuc	9. 0.23-3 V
	10-28 Vdc	1.0151V
	10-26 Vuc	$\begin{array}{c} J. 0.1 - 5.1 V \\ K. 0 \in V Awiro \end{array}$
	10-20 VUC	
		L: U-10 V 4WIFE
ACT/CDT***************		P: 0.5-4.5 V
ASI40PI ANALY ANALY -Z		1. 0.5-4.5 V Radometric
1 2 2 4 5 6 9 0 C 1 M D	10-28 VUC	2: 0-5 V
1, 2, 3, 4, 3, 0, 0, 9, 0, 1, M, P		3: 1-5 V
-2 = CRN, 55, 61 other non-performance related		4: 4-20 MA
	10-28 Vuc	5: 0-10 V
	10-28 VdC	6: 1-6 V
	10-28 Vdc	8: 0.5-5.5 V
	10-28 VdC	9: 0.25-5 V
	15-28 VOC	G: 1-10 V
AFRINY 444444444		P: U.5-4.5 V
7 - CDN SC or other per performance related	10-28 Vac	IA
-2 - CR(N, 33, 0) other non-denominative feldled	1	



1.6 Assessment Standards

The standards are amended as follows (**bold italics**):

Original	New
EN 60079-0:2012	EN IEC 60079-0:2018
EN 60079-1:2007	EN 60079-1:2014
EN 60079-31:2009	EN 60079-31:2014

This report may be issued against standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation. Sira's flexible scope is available on request.

1.7 Marking

The marking is amended as follows (**bold italics**):

Detail	ATEX
Certificate number:	Sira 14ATEX1214X
Certification code:	Ex d b IIC T5 Gb
	Ex tb IIIC T100°C Db
Additional marking for ATEX only:	$\mathbf{CE}_{0518} \qquad \mathbf{Ex}_{II \ 2GD}$
Additional Marking:	N/A
Model Number(s):	AST4600, AST46HA, AST46PT and 46SW Series' pressure transducers
Manufacturer's name:	Measurement Specialties, Inc.
	A TE Connectivity Company
Manufacturer's address:	6801 Kaiser Drive
	Fremont, California 94555
	USA
Electrical Ratings:	Refer to section 1.5.
Ambient range and temperature	$-40 \text{ °C} \leq T_{amb} \leq +85 \text{ °C}$
codes:	
Serial Number:	Printed with date code
Month and Year of Manufacture:	Printed with serial number
Warning(s):	Potential electrostatic charging hazard – see instructions
	Risque potentiel de charge electrostatique – voir instructions

A copy of one of the nameplates is shown below:

Measurement Specialties, In	ic.
6801 Kaiser Drive, Fremont, CA, 94555	<i>cc</i>
MODEL # (MODEL FIELD) www.te.com	
SERIAL # (SERIAL & DATECODE)	0518
PRESSURE: (MPA PRESSURE FIELD)	
TEMPERATURE OUTPUT: (TEMP FIELD)	(SЕ
Ex db IIC T5 Gb; Ex tb IIIC T100°C Db; Explosionproof	c Us
Sira 14ATEX1214X IECEX CSA 14.0062X	CSA15CA1393892
CI I, Div 1, Grp A.B.C.D; Type 4	
Ta: -40 to 85°C; Process Temp: -40 to 125 °C	VCX/
Factory Sealed Single Seal MADE IN	II 2 GD
Advertissment: risque potentiel de charge electrostatique - voir	instructions



1.8 Product Description

The product description is unchanged but is reproduced below for reference:

The AST46XX Series' Pressure Transducers utilize a mechanical diaphragm to convert a mechanical pressure measurement into an electrical signal for use in the measurement of gases and liquids compatible with stainless steel. The transducers are manufactured as stainless steel sealed assemblies containing up to 2 PCBs.

The transducers consist of 3 parts:

- i. the sensing element;
- ii. the housing tube and;
- iii. a conduit entry connection(adapter) 1/2" MNPT made from stainless steel.

A green ground (earth) conductor in both construction types (3, 4 or 5 lead wires sensors) is connected to the metallic housing.

The transmitters range in Maximum Working Pressure (MWP) rating up to 20000 psi. The physical construction of the Sensing Element varies in accordance with the pressure range. A representative list of sensing element part numbers appears in the table below:

Transmitter Maximum Working Pressure (psi)	Sensing Element Part Number
50	A09745
100	A09746
200	A09747
300	A09748
500	A09749
1000	A09750
3000	A09752
5000	A09753
7500	A09754
10000	A09755
20000	A03972 (1" housings)
20000	A10834 & A01704 (7/8 " housings)

The part numbers of the range of pressure transducers are as follows:

AST4600*bcdefghijklmnpqr* (-Z = CRN, SS, or other non performance related) AST46HA*bcdefghijklmnopqr* (-Z = CRN, SS, or other non performance related) AST46PT*abcdefghijklmnopqr* (-Z = CRN, SS, or other non performance related)

a (temperature output)		
1 : -40 to 85C	3 : 0 to 70C	5 : 0 to 200F
2 : -40 to 125C	4 : -55 to 125C	
b (port information)		
A : 1/4" NPT male	I:1/4"NPT female	R : 7/16-20UNF female
B : 1/8" NPT male	J: 1/8FNP	S:1/2"NPT female
C : 1/4"BSP male	K : 7/16-20UNF female	T: G1/2 MALE
D : G1/4 male	L: Frontend Cone	U: 1/8BSP male
E : 9/16-18UNF male	M: 3/8-24UNF male	V: 1/8BSP female
F : 7/16-20UNF male	N: VCR male	W: F250C female
G : M14x1.5 male	P:1/2"NPT male	Z : 1/2-20UNF male
H : M20x1.5 male	-	-

Where:



c (most significant pressure range in PSI and pressure reference) A: Absolute V: Compound **C**: Compound, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, G = Gauge *d* (2nd significant pressure range in PSI (0 for Bar)) X e (3rd significant pressure range in PSI (most significant for Bar)) $f(4^{\text{th}} \text{ significant pressure range in PSI (2 nd significant for Bar))}$ Х *j* (lowest digit for pressure range in PSI (and Bar)) Х k (pressure units) P: PSI K: kg/cm² M: mBar H: inH₂O B: Bar *l* (electrical outputs) 1: 0.5-4.5 V Ratiometric A: 10 mV/V 2: 0-5 V B: 20 mV/V 3: 1-5 V F: 5 mV/V 4: 4-20 mA G: 1-10 V 5: 0-10 V J: 0.1-5.1 V 6: 1-6 V K: 0-5 V 4wire 8: 0.5-5.5 V L: 0-10 V 4wire 9: 0.25-5 V M: 0.25-4.75 V Ratiometric **P**: 0.5-4.5 V *m* (electrical interface) T: 2 feet of 18 AWG wires W: 2 metres **U**: 4 feet X: Special lengths 18 inches minimum *n* (wetted material) 0: 17-4PH stainless steel 3: Titanium 4: Hastelloy 1: 316L 2: Inconel 718 6: Waspaloy o (diagnostic output AST46HA & AST46PT Only) N: Not Specified H: Fail High L: Fail Low pgr (special calibration) eg: tolerances

46SWabcdefghijklm (-Z = CRN, SS, or other non performance related)

a (port information)		
A: 1/4" NPT male	I:1/4"NPT female	R: 7/16-20UNF female
B : 1/8" NPT male	J : 1/8FNP	S:1/2"NPT female
C: 1/4"BSP male	K: 7/16-20UNF female	T: G1/2 MALE
D : G1/4 male	L: Frontend Cone	U: 1/8BSP male
E : 9/16-18UNF male	M: 3/8-24UNF male	V: 1/8BSP female
F : 7/16-20UNF male	N: VCR male	W: F250C female
G : M14x1.5 male	P:1/2"NPT male	Z : 1/2-20UNF male
H : M20x1.5 male		
b (max working pressure in PSI)		
01 : 50PSI	05 : 1000PSI	09 : 10000PSI
02 : 100PSI	06 : 3000PSI	10 : 15000PSI
03 : 250PSI	07 : 5000PSI	11 : 20000PSI
04 : 500PSI	08 : 7500PSI	
<i>c</i> (pressure unit)		

P: PSI

Where:



d (switch)	
E: SPDT (FORM C)	
e (electrical connection)	
T: 2 feet of 18 AWG wires	W: 2 metres
U: 4 feet	X: Special lengths 18 inches minimum
f (header material)	
0: 17-4PH stainless steel	3 : Titanium
1: 316L	4: Hastelloy
2: Inconel 718	6: Waspaloy
g (pressure reference)	
0, 1, 2, A, C, G, V (Models with suffix G or	r V not suitable for Zone 21(Dust) atmosphere)
h (switching pressure)	
5 digits: 0 to 20000	
i (switching direction)	
F: Falling switchpoint specified	R: Rising switchpoint specified
j (hysteresis)	
XX; hysteresis as a % of max working pr	essure between falling and rising switchpoints
k, l, m (special options)	

eg: tolerances

Model Similarities and Differences:

AST4600 & AST46HA: Provide pressure measurement only. AST46PT: Provide pressure and temperature measurement. 46SW: Provide pressure set point switched output.

1.9 Manufacturer's Documents

The modifications assessed in this report are detailed in the following drawings.

_		_		
Drawing	Sheets	Rev.	Date (Sira stamp)	Title
11112063	1 of 1	В	02 Nov 18	Final Assembly, 1/4" MNPT, 17-4, 1-xV
A03281	1 of 1	С	02 Nov 18	Epoxy, Potting, Explosion-Proof
A04231	1 of 1	R	02 Nov 18	Label, CSA Explosionproof
A10818	1 of 1	F	02 Nov 18	Subassembly, Detail, AST46xx, Conduit End
A11240	1 of 1	D	02 Nov 18	Subassembly (PCB Layouts and Parts List)
A11452	1 of 1	J	02 Nov 18	Layout, Label, CSA, Explosion-Proof, AST46PT, Sealed
A11472	1 of 1	С	02 Nov 18	PCB, PGA309 1-xV
A11473	1 of 1	D	02 Nov 18	Sub-Assembly, PCB, 1-x Voltage, PGA309 (PCB
				Layouts and Parts List)
A11475	1 of 1	D	02 Nov 18	Sub-Assembly, PCB, 0-x Voltage, PGA309 (PCB
				Layouts and Parts List)
A11637	1 of 1	J	02 Nov 18	Layout, Label, CSA Explosion Proof
A11638	1 of 1	G	02 Nov 18	Layout, Label, CSA, Explosion-Proof, AST46PT,
				Sealed
A13949	1 of 1	С	02 Nov 18	Final Assembly, 1/4" MNPT, 4-20mA, Low
A14248	1 of 1	С	02 Nov 18	Final Assembly, 1/4" MNPT, 4-20mA, High
A15925	1 of 1	С	02 Nov 18	Final Assembly, 1/2" MNPT, 17-4, 1-xV
A15987	1 of 1	С	02 Nov 18	Label, CSA Explosion Proof, Vented
A15988	1 of 1	С	02 Nov 18	Label, CSA Explosion Proof, AST46PT, Vented
A15989	1 of 1	С	02 Nov 18	Label, CSA Explosion Proof, Sealed
A15990	1 of 1	С	02 Nov 18	Label, CSA Explosion Proof, AST46PT, Sealed
S01210	1 of 1	S	02 Nov 18	Schematic Ratiometric
S11240	1 of 1	D	02 Nov 18	PGA308 0-xV PCB (Schematic Diagram)



1.10 Specific Conditions of Use

The specific conditions of use are unchanged but are reproduced below for reference:

- i. The product label indicates that the process temperature range is -40°C to +125°C, taking this into account, the user/installer shall take precautions that ensure that the operating service temperature of the overall pressure transducer assembly is between -40°C to 92°C.
- ii. Under certain extreme circumstances, exposed plastic and unearthed metal parts of the enclosure may store an ignition-capable level of electrostatic charge. Therefore, the user/installer shall implement precautions to prevent the build up of electrostatic charge, e.g. locate the equipment where a charge-generating mechanism (such as wind-blown dust) is unlikely to be present and clean with a damp cloth.
- iii. The integral conductors shall be suitably mechanically protected and terminated in a suitable terminal or junction facility.
- iv. It is the user's responsibility to ensure that the earth continuity of the equipment is maintained via the mounting arrangement.
- v. The enclosure is manufactured from light metal. In rare cases, ignition sources due to impact and friction sparks could occur and that shall be considered during installation.
- vi. The external pressure on potted flying leads shall not exceed 30 bar maximum.

1.11 Conditions Of Manufacture

The specific conditions of manufacture are unchanged but are reproduced below for reference:

- i. The equipment at the conclusion of manufacture and before shipment shall be checked for continuity between the enclosure and green ground conductor.
- ii. The weld quality of each sensor is tested using helium mass spectrometry method to assure that leaks through the welded joints do not exceed the rate of 5e-8 cc/sec.

1.12 Conclusion

The modifications assessed in this report allow the equipment to maintain compliance with the listed standards, the certification code being changed from 'd' to 'db'.

1.13 Signatories

Compiled by + signature:

Steven Simkevitz Certifier

Reviewed by + signature:

Ezio Migliozi Senior Certification Engineer

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2 Relevant Clauses Affected by the Modifications

IEC 60079-0:2017 Edition 7.0			
Clause	Requirement – Test	Result – Remark	Verdict
All	All	Refer to section 3.1.1.	Pass

IEC 60079-1:2014 Edition 7.0			
Clause	Requirement – Test	Result – Remark	Verdict
All	All	Refer to section 3.1.2.	Pass

IEC 60079-31:2013 Edition 2.0				
Clause	Requirement – Test	Result – Remark	Verdict	
All	All	Refer to section 3.1.3.	Pass	

Note: IEC standard is referenced but is considered technically equivalent to the EN standards.



3 Relevant Clauses Affected and Assessment of Modifications

3.1 Assessment of Modification i

3.1.1 Comparison of IEC 60079-0:2011 (Edition 6) with IEC 60079-0:2017 (Edition 7)

The requirements of IEC 60079-0:2011 (Edition 6) are compared to IEC 60079-0:2017 (Edition 7) in the following assessment (there are no relevant differences between the requirements of IEC 60079-0:2017 Ed 7 and those of IEC/EN 60079-0:2018).

The following table lists the major changes and added requirements between IEC 60079-0:2011 (Edition 6) and IEC 60079-0:2017 (Edition 7).

	Gap Analysis between IEC 60079-0:2011 Ed. 6 and IEC 60079-0:2017 Ed. 7					
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict		
	Multiple	Throughout document, "electrical equipment" replaced by "equipment" where appropriate.	Minor and editorial changes; does not affect compliance of the equipment.	N/A		
	1	Scope List of "Type of "Protection" and "Product" standards combined into one list.	Minor and editorial changes; does not affect compliance of the equipment.	N/A		
	3	Definitions used in multiple sub- parts added. Definitions harmonized across sub- parts and added to 60079-0 where appropriate. Battery definitions updated	Minor and editorial changes; does not affect compliance of the equipment.	N/A		
	5.1.2	<i>External source of heating or cooling</i> Clarification of the way that information on process temperature influences can be expressed.	Minor and editorial change; process temperature already assessed and a Special Conditions For Safe Use is listed.	Pass		
	5.2	Service temperature Clarification regarding the determination of service temperatures when dust layers are present	Maximum surface temperature determined without dust layer for Equipment Protection Level Db.	N/A		
	5.2	<i>Service temperature</i> Clarification on the need to provide service temperature information for Ex Components in the Schedule of Limitations	Equipment is not an Ex Component.	N/A		
	5.3.2.3.1	Maximum surface temperature for EPL Da Relocation of EPL Da dust layer requirements from IEC 60079-18 & IEC 60079-31	Equipment is not for EPL Da.	N/A		



	Gap Analysis	between IEC 60079-0:2011 Ed. 6	and IEC 60079-0:2017 Ed. 7	
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict
changes	b)	Clarified that for EPL Db, a maximum specified dust layer of greater than 200 mm is not permitted as thicker layers have no additional effect on maximum surface temperature.	Maximum surface temperature determined without dust layer for Equipment Protection Level Db.	N/A
	c)	Added for EPL Db, a dust layer in a specified orientation, marked as TL	Maximum surface temperature determine without dust layer for Equipment Protection Layer Db.	N/A
	5.3.2.3.3	Maximum surface temperature determined without a layer of dust for EPL Dc Clarified that for EPL Dc, no dust layer tests are required.	Equipment is for EPL Db not Dc.	N/A
	5.3.3	Small component temperature for Group I or Group II electrical equipment Clarified that the "temperature" is the temperature of the air surrounding the component	Temperature assessment according to component size was not applied.	N/A
	5.3.4	<i>Component temperature of smooth</i> <i>surfaces for Group I or Group II</i> <i>electrical equipment</i> Subdivided section dealing with higher permitted surface temperatures for "smooth" surfaces. Corrected area from 1 000 mm ² to 10 000 mm ² .	Temperature assessment according to component size was not applied.	N/A
	6.1	<i>General, Requirements for all</i> <i>equipment</i> Clarified that the "Ex" requirements of IEC 60079 supplement those of the relevant industrial standards.	Minor and editorial change; does not affect compliance of the equipment.	N/A
C1	6.5	<i>Gasket retention</i> Added requirement that where an adhesive is used to secure a gasket, it shall be used within its COT and shall comply with the requirements for cements.	Equipment does not contain gaskets.	N/A
	Former 6.6.2	Requirements relocated to IEC 60079-28	Equipment does not contain lasers or other continuous wave sources.	N/A
	6.6.3	<i>Ultrasonic sources</i> Ultrasonic requirements updated based on latest research work	Equipment does not contain ultrasonic sources.	N/A
	6.6.4	Lasers, luminaires, and other non- divergent continuous wave optical sources Added reference to IEC 60079-28	Equipment does contain lasers or other non-divergent continuous was optical sources.	N/A



	Gap Analysis between IEC 60079-0:2011 Ed. 6 and IEC 60079-0:2017 Ed. 7			
Major	Clause	Clause title and description of	Compliance	Verdict
technical	affected	change		
changes				
	7.1.2.2	Plastic materials	Removable of the requirement	N/A
		Material identification parameters	for the type and percentage of	'
		have been revised to reflect	fillers or other additives if used	
		reasonably obtainable information	does not affect compliance of	
			the equipment.	
	7.1.2.2	Plastic materials	Allowance to use RTI	N/A
	, , , , , , , , , , , , , , , , , , , ,	"RTI-mechanical" has been	mechanical strength or RTI	,,,
		clarified to include "RTI-	mechanical impact does not	
		mechanical strength" and "RTI-	affect the compliance of the	
		mechanical impact"	equipment	
	7123	Elastomers	Removable of the requirement	N/A
	7111215	Material identification parameters	for the type and percentage of	11/1
		have been revised to reflect	fillers or other additives if used	
		reasonably obtainable information	doos not affect compliance of	
			the equipment	
	7124	Materials used for comenting	Minor and editorial change	NI/A
	7.1.2.4	Relocated information on		N/A
		"cements" from Clause 12		
	7 7 7	Material selection	Allowance to use PTI	NI/A
	1.2.2	"PTI-mechanical" has been	mochanical strength or PTI	N/A
		clarified to include "PTI-	mechanical sureligui or KII	
		mechanical strength" and "PTI-	affect the compliance of the	
		mechanical impact"		
		Requirements for coments aligned	equipment.	
		with the requirements for		
		elastomors		
	7 7 7	Polocation of 10 K margin for EDI	Equipment protection level is	
	1.2.2	Coor Do from IEC 60070 15 IEC	Ch and Dh	N/A
		60070 19 % IEC 60070 21		
	73	Added clarification with respect to	Equipment doos not contain	NI/A
	7.5	Added Clarification with respect to	coals or assists	N/A
		gaskets and seals where only the	seals of gaskets.	
		to light		
	740	Clarification added that one or	Equipment contains a warning	Dage
	7.4.2	more of the described techniques	on the label	Pass
		more of the described techniques		
	7126	Added additional relayation for the	Increase of the curface area	NI/A
	7.4.2 D)	Added additional relaxation for the	allowance does not affect the	IN/A
		with an earthed surface on only	compliance does not affect the	
		two of four sides	compliance of the equipment.	
62	7420	Added reference to IEC 60242.1	Compliance of the equipment	
CZ	7.4.2 C)	Added reference to IEC 60243-1	does not depend on the	N/A
		to require a 4 kV DC test	thickness limitation	
	7420	LO require a 4 KV DC lest.	Additional guidance with	
	7.4.2 e)	Additional guidance added with	Additional guidance with	N/A
		respect to the possible Specific	respect to the Specific	
		Conditions of Use	Conditions of Use does not	
			arrect the compliance of the	
	7420		product.	N1/A
	/.4.2 t)	New option added for portable,	Equipment is not portable.	N/A
		mains-powered equipment with		
		earth-connected guard		
	7.4.2 g)	Added option for determination of	Testing was not conducted.	N/A
	Table 10	maximum transferred charge.		



	Gap Analysis between IEC 60079-0:2011 Ed. 6 and IEC 60079-0:2017 Ed. 7					
Major	Clause	Clause title and description of	Compliance	Verdict		
technical	affected	change				
changes						
	7.4.3 a)	Added missing limits (same as 7.4.2)	Equipment complies with 7.4.3 d) and is marked with an X.	N/A		
	7.4.3 b)	Clarified that it is a dc test that is	Equipment complies with 7.4.3	N/A		
	75	Clarified that this requirement is	Equipment is marked with an X	N/A		
	,13	not applied to personal or portable	in accordance with item e) of	,,,		
	82	Clarified Group I limits	Equipment is not for Group I	N/A		
	8.3	Clarified Group II, EPL Ga limits	Equipment Protection Level is Gb not Ga.	N/A		
C3	8.5	Added limitation for external surfaces of >65% copper	Enclosure is fabricated from stainless steel 304, which is not copper or considered a copper alloy.	N/A		
	9.1	<i>General, Fasteners</i> Added clarification as to what is considered a tool	Equipment does not rely on fasteners.	N/A		
	9.4	Hexagon socket set screws Clarified that the tolerance class of the set screw is not critical, only that it not protrude from the threaded hole after tightening.	Equipment does not contain hexagon socket set screws to secure threaded covers.	N/A		
	12	Information on cements transferred to Clause 7	Minor and editorial change; does not affect compliance of the equipment.	N/A		
	13.5	<i>Ex Component certificate</i> Required that Ex Component Certificates require a Schedule of Limitations in all cases	Equipment is not an Ex Component.	N/A		
	14	<i>Connection facilities</i> Revised to clarified that all connection facilities may not be a "Compartment".	Minor and editorial change; does not affect compliance of the equipment.	N/A		
	15.3 15.4	Size of protective earthing conductor connection Size of equipotential bonding conductor connection Sub-clause split to separate the requirements for protective earthing and equipotential bonding into separate sections	Minor and editorial change; does not affect compliance of the equipment.	N/A		
	15.6 15.7	Secureness of electrical connections Internal earth continuity plate Section split to separate secureness of electrical connections from the internal earth continuity plate.	Minor and editorial change; does not affect compliance of the equipment.	N/A		
	16.3	Cable glands Non-threaded Group I cable glands are no longer required to be Ex Components.	Equipment is not for Group I and does not contain cable glands.	N/A		



	Gap Analysis	between IEC 60079-0:2011 Ed. 6	and IEC 60079-0:2017 Ed. 7	
Major	Clause	Clause title and description of	Compliance	Verdict
technical	affected	change		
changes				
	16.4	Blanking elements	Equipment is not for Group I	N/A
		Non-threaded Group I blanking	and does not contain blanking	
		elements are no longer required to	elements.	
	17	De Ex Components.	Equipment is not a rotating	NI/A
	17	Supplementary requirements for	electric machine	N/A
		Scope of Clause 17 clarified to		
		define applicability		
	17.3	Bearings	Equipment is not a rotating	N/A
	1,10	Additional guidance notes added to	electric machine.	,,,
		address bearings		
	18.2	Disconnectors	Equipment is not a switchgear.	N/A
		Clarified applicability to		
		disconnectors, interlocks, and		
		maintenance switches.		
	19	Fuse requirements deleted as they	Equipment does not contain	N/A
		are addressed in the individual	fuse(s).	
<u>C</u> 4	20.1	Sub-parts	Equipment deep not contain	NI/A
C4	20.1	General, Supplementary requirements for external plugs	equipment does not contain	IN/A
		socket outlets and connectors for	or connectors for field wiring	
		field wiring connection	or connectors for neid wiring.	
		Added requirements for EPL Gc and		
		Dc		
	20.2	Explosive gas atmospheres	The compliance has been	N/A
		The test circuit requirements for a	updated to the latest edition of	
		flameproof connection have been	IEC 60079-1 (2014, Edition 7).	
		removed as they are more		
		completely specified in IEC 600/9-		
	21.1	1. Commente Source and sources	Equipment is not a luminaire	
	21.1 Table 15	General, Supplementary	Equipment is not a luminaire.	IN/A
		The impact test requirements for		
		luminaires are relocated to Table		
		15		
	21.2	Covers for luminaires of EPL Mb,	Equipment is not a luminaire.	N/A
		EPL Gb, or EPL Db		
		Clarified interlock switch operation		
		for flameproof luminaires		
	23.2	General, Equipment	Equipment does not	N/A
		incorporating cells and batteries	incorporate cells or batteries.	
		Clarified that some Types of		
		Protection permit connection of		
	Table 12	Cells In parallel	Equipment door not	NI/A
		New cell types and data added	Equipment does not	IN/A
		hased on latest available data		
C5	Table 14	Secondary cells	Equipment does not	N/A
		New cell types and data added	incorporate cells or batteries.	
		based on latest available data	•	



	Gap Analysis between IEC 60079-0:2011 Ed. 6 and IEC 60079-0:2017 Ed. 7					
Major	Clause	Clause title and description of	Compliance	Verdict		
technical	affected	change				
changes						
	24	Documentation	Minor and editorial change;	N/A		
		Clarification of what	does not affect compliance of			
		documentation is to be prepared	the equipment.			
		regarding the explosion safety				
		aspects of the equipment				
	26.2	Test configuration	Minor and editorial change;	N/A		
		Clarification that the type tests are	does not affect compliance of			
		to take into consideration the	the equipment.			
	26.4.4.4	Installation Instructions				
	26.4.1.1	Metallic enclosures, metallic parts of	Equipment does not contain	N/A		
		enclosures and glass or ceramic parts	glass or ceramic parts.			
		of enclosures				
		requirements also apply to				
		"coramic" parts				
	264122	Non-metallic enclosures or non-	Changing the order of the	N/A		
	26.4.1.2.2	metallic parts of enclosures	tests should is a relaxation of			
	20.1.1.2.5	Group II and Group III equipment	the clause and does not affect			
		Added a permission to interchange	compliance of the equipment			
		the order of tests at the "lower	compliance of the equipment			
		test temperature" and the "upper				
		test temperature".				
	26.4.2	Resistance to impact	Clarification of the construction	N/A		
		Clarified the construction of the	of impact test fixture does not			
		impact test fixture	affect compliance of the			
			equipment.			
	26.4.2	Resistance to impact	Equipment does not contain	N/A		
		Clarified the impact tests for glass	glass parts.			
		parts		N1/A		
	26.4.5.1	<i>Lest procedure, Degree of protection</i>	Clarification to deal with the	N/A		
		Added clarification to deal with the	new IPX9 ratings does not			
		new IPX9 ratings	arrect equipment's compliance.			
	26513	Maximum surface temperature	Minor and editorial change:	N/A		
	20.3.1.3	Clarified the test voltage for	does not affect compliance of			
		maximum surface temperature	the equipment			
	26513	Maximum surface temperature	Minor and editorial change:	N/A		
	20.5.1.5	Relocation of EPL Da dust laver	does not affect compliance of			
		requirements from IFC 60079-18	the equipment			
		& IEC 60079-31				
	26.5.1.3	Maximum surface temperature	Minor and editorial change;	N/A		
		Relocation of EPL Db specified	does not affect compliance of			
		dust layer requirements from IEC	the equipment.			
		60079-31				
	26.5.1.3	Maximum surface temperature	Minor and editorial change;	N/A		
		Added for EPL Db, a dust layer in	does not affect compliance of			
		a specified orientation, marked as	the equipment			
		TL				
	26.5.1.3	Maximum surface temperature	Minor and editorial change;	N/A		
		Clarified that for EPL Dc, the	does not affect compliance of			
		testing is conducted without a dust	the equipment.			
		layer.				



	Gap Analysis between IEC 60079-0:2011 Ed. 6 and IEC 60079-0:2017 Ed. 7				
Major technical	Clause affected	Clause title and description of change	Compliance	Verdict	
changes					
	Table 17	<i>Thermal endurance test</i> Relocation of thermal endurance to heat 10K relaxation for Gc equipment from IEC 60079-15, IEC 60079-18, & IEC 60079-31	Minor and editorial change; does not affect compliance of the equipment.	N/A	
	26.10	<i>Resistance to UV light</i> Clarification of a consistent way to address elastomeric materials exposed to ultraviolet light	Equipment does not contain elastomeric materials exposed to ultraviolet light.	N/A	
	26.11	Resistance to chemical agents for Group I equipment Replacement of "oil No. 2" with the revised designation of "oil IRM 902".	Equipment is not for Group I.	N/A	
	26.13	Surface resistance test of parts of enclosures of non-metallic materials Option added for testing at lower voltages when low resistance materials are encountered	Equipment is metallic.	N/A	
	26.17	<i>Transferred charge test</i> Transferred charge test added based on IEC TS 60079-32-2	Equipment has a condition of safe use and a warning on the label, so this clause was not used to satisfy clause 7.4.2.	N/A	
	29.3 e)	<i>General, Marking</i> The reference to a specific instruction document instead of an "X" condition relocated to e) instead of a note giving a permission	Minor and editorial change; does not affect compliance of the equipment.	N/A	
	29.4 b)	<i>General, Marking</i> Updated to reflect the additional levels of protection already shown in the sub-parts: "da", "dc", "eb", "ec", "oc", "op is", "op pr", "op sh", "pxb", "pyb", "pzc", "qb", "sa", "sb", and "sc".	Type of protection is "db" and is noted on the labels.	Pass	
	29.4	<i>General, Marking</i> Text added to address marking of "Ex associated equipment"	Equipment is not "Ex associated equipment"	N/A	
	29.5 b)	<i>General, Marking</i> Updated to reflect the additional levels of protection already shown in the sub-parts: "ic", "op is", "op pr", "op sh", "pxb", "pyb", "pzc", "sa", "sb", and "sc".	Minor and editorial change; does not affect compliance of the equipment.	N/A	
	29.5 d)	<i>General, Marking</i> Clarified marking of EPL Da, EPL Db with no dust layer, EPL Db with a specified dust layer, and EPL Dc.	Minor and editorial change; does not affect compliance of the equipment.	N/A	
	29.5 d)	<i>General, Marking</i> Introduced marking for EPL Db with a dust layer in a specified orientation	Minor and editorial change; does not affect compliance of the equipment.	N/A	



Major technical changesClause changeClause title and description of changeComplianceVerdict29.5Éx marking for explosive dust atmospheres Text added to address marking of "Ex associated equipment"Equipment is not "Ex associated equipment"N/A29.9Boundary wall rext added to address marking of equipment intended to be installed in a boundary wall.Equipment not intended to be installed in a boundary wall.N/A29.10Ex Component The marking of Ex Component enclosure was aligned with e marking requirements of IEC 60079-1 and IEC 60079-7Equipment is not an Ex component enclosure.N/A26Former 29.15The alternate marking of EPL has been deleted.Alternate marking was not used.N/A29.10Effective machines operated with a converter clarified clarifiedEquipment is not a rotating electric machine.N/A29.15Effective machines, Instructions Additional instruction material for eclerci machines. AddedEquipment is not a rotating electric machine.N/A2630.5Cable glandsEquipment does not contain cable glands.N/AC630.5Cable glandsEquipment does not contain cable glands.N/AC730.3Effective machines for cable glands.Equipment does not contain cable glands.N/AC830.5Cable glands added carified th cable glands.Equipment does not contain cable glands.N/AC8A.1General, Supplementary requirements for cable glands.Equipment does not contain cab		Gap Analysis	between IEC 60079-0:2011 Ed. 6	and IEC 60079-0:2017 Ed. 7	
technical changes affected 29.5 <i>Ex marking for explosive dust atmospheres</i> Text added to address marking of "Ex associated equipment" Equipment is not "Ex associated equipment" N/A 29.9 <i>Boundary wall</i> Text added to address marking of equipment intended to be installed in a boundary wall. Equipment not intended to be installed in a boundary wall. N/A 29.10 <i>Ex Components</i> The marking of Ex Component enclosure was aligned with the marking requirements of IEC 60079-1 and IEC 60079-7 Equipment is not an Ex component enclosure. N/A 29.15 <i>Electric machines operated with a</i> <i>converter</i> Marking for electric machines operated with a converter clarified Alternate marking was not used. N/A 29.15 <i>Electric machines operated with a</i> <i>converter</i> Marking for electric machines operated with a converter clarified Equipment is not a rotating electric machine. N/A 20.1 <i>Centerti machines instructions</i> Additional instruction material for clarified Equipment is not a rotating electric machine. N/A C7 30.3 <i>Clarified machines if or cable glands</i> A.5 Equipment for not a rotating electric machine. N/A C8 30.5 <i>Cable glands</i> Clarified with scaller glands. Equipment does not contain cable glands. N/A C8 30.5 <i>Calif glands</i> Clarify testing with s	Major	Clause	Clause title and description of	Compliance	Verdict
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29.9 Boundary wall Text added to address marking of equipment intended to be installed in a boundary wall. Equipment not intended to be installed in a boundary wall. N/A 29.10 Ex Components The marking of Ex Component enclosure was aligned with the marking requirements of IEC 60079-1 and IEC 60079-7 Equipment is not an Ex component enclosure. N/A 29.15 Electric machines operated with a converter Marking for electric machines operated with a converter clarified Alternate marking was not used. N/A 30.1 General, Instructions Instruction material guidance clarified Equipment is not a rotating electric machine. N/A C7 30.3 Electric machines, Instructions Instruction material for electric machines, Instructions Additional instruction material for electric machines, Structions Additional instruction material for electric machines, Structions Allow ISO 10807 hose assemblies to be used with cable glands. N/A A.1 General, Supplementary requirements for cable glands. Clarify testing with stainless steel mandrels Equipment does not contain cable glands. N/A A.3.1.1 Type tests, Cable glands with clarify testing ring eduction of the time / slippage permitted Equipment does not contain cable glands. N/A			atmospheres	associated equipment"	
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			Aligned Figure with text	the equipment.	



	Gap Analysis	between IEC 60079-0:2011 Ed. 6	and IEC 60079-0:2017 Ed. 7	
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict
	Annex D (informative)	<i>Electric machines connected to converters</i> Clarified operation of electric machines from Converters	Equipment is not a rotating electric machine.	N/A
	Annex E (informative)	<i>Temperature evaluation of electric</i> <i>machines</i> Clarified temperature testing of electric machines	Equipment is not a rotating electric machine.	N/A
	Annex G (informative)	<i>Guidance flowchart for tests of cable glands</i> Flowchart for Cable Gland testing	Equipment does not contain cable glands.	N/A
	Annex H (informative)	Shaft voltages resulting in motor bearing or shaft brush sparking Discharge energy calculation Guidance of electric machine shaft voltages	Equipment is not a rotating electric machine.	N/A

3.1.2 Comparison of IEC 60079-1:2007 (Edition 6) with IEC 60079-1:2014 (Edition 7)

The requirements of IEC 60079-1:2007 (Edition 6) are compared to IEC 60079-1:2014 (Edition 7) in the following assessment (there are no relevant differences between the requirements of IEC 60079-1:2014 Ed 7 and those of EN 60079-1:2014).

The following table lists the major changes and added requirements between IEC 60079-1:2007 (Edition 6) and IEC 60079-1:2014 (Edition 7).

	Gap Analy	ysis between IEC 60079-1:2007 Ed	. 6 and IEC 60079-1:2014 Ed. 7	
Major technical	Clause affected	Clause title and description of change	Compliance	Verdict
changes				
	2	Normative references Removal of the edition date from the reference for IEC 60079-0	Minor and editorial change; does not affect compliance of the equipment.	N/A
	4.2	Requirements for level of protection "da" Catalytic sensors of portable combustible gas detectors	Equipment is not a catalytic sensor or portable combustible gas detector and not for level of protection "da".	N/A
	4.4, 15.5	Requirements for level of protection "dc" "Enclosed break" devices from IEC 60079-15	Equipment does not contain electrical switching contacts and is not for level of protection "dc".	N/A
	5.1	Flameproof joints, General requirements Documentation clarification and examples of corrosion inhibiting grease	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure. No corrosion inhibiting grease is used.	N/A



	Gap Analy	sis between IEC 60079-1:2007 Ed	. 6 and IEC 60079-1:2014 Ed. 7	
Major	Clause	Clause title and description of	Compliance	Verdict
technical	affected	change		
changes				
	5.1	Flameproof joints, General requirements Specific Conditions of Use that joints are not intended to be repaired	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure. No corrosion inhibiting grease is used.	N/A
	5.1	<i>Flameproof joints, General</i> <i>requirements</i> Electroplating more than 0,008 mm thick	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal enclosure.	N/A
	5.2.2	Non-threaded joints, Gap (i) Intentional gaps between surface for flanged joints	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure.	N/A
	5.2.8	Serrated joints Use and test requirements	Equipment does not contain serrated joints.	N/A
	5.2.9	<i>Multi-step joints</i> Not less than 3 adjacent segments and two path changes	Equipment does not contain multi-step joints.	N/A
	Table 2	Minimum width of joint and maximum gap for enclosures of groups IIA and IIB Maximum gaps for flanged, cylindrical or spigot joints of 9,5 mm minimum width and volume greater than 2 000 cm ³	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure. Equipment does not contain this type of joint.	N/A
	Table 2 Table 3	Minimum width of joint and maximum gap for enclosures of groups I, IIA, IIB and IIC ISO 80000-1 for constructional value rounding	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure. Equipment does not contain this type of joint.	N/A
	Table 4	<i>Cylindrical threaded joints</i> ISO 965-1 standard in respect of thread form or quality of fit	Equipment has a metal enclosure that has welded joints and one cemented joint created by the sealant compound within the interior of the metal conduit fitting of the enclosure. Equipment does not contain this type of joint.	N/A



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7					
Major	Clause	Clause title and description of	Compliance	Verdict		
technical	affected	change				
changes						
	Table 5	Taper threaded joints	Equipment has a metal	N/A		
		External and internal thread	enclosure that has welded joints			
		construction	and one cemented joint created			
			by the sealant compound within			
			the interior of the metal conduit			
			fitting of the enclosure.			
			Equipment does not contain this			
			type of joint.			
C1	6.1.2	Cemented joints	Equipment does not contain	Pass		
		Supplemental mechanical means of	doors or covers that could defeat			
		securement	any supplemental mechanical			
			means of securement.			
	6.1.2	Cemented joints	The thermally conditioned and	Pass		
		Evaluation criteria if there is leakage	impacted sample was subjected			
			to the exemption overpressure			
			of 21.8 bars (4×5.45) for 1			
			minute on the interior surface of			
			the Stycast sealing compound			
			from the NPT entry pressure			
			connection. The sample had a			
			Flame Arrestor. The result was:			
			Pass, no apparent damage, the			
			potting material did not leak.			
			The test was carried out as part			
			of CSA Project 2672643 (Master			
			Contract: 212120).			
	6.2	Fused glass joints	Equipment does not contain	N/A		
		Glass-to-metal joints	glass joints.			
	10.9.3.2	Thermal tests of breathing and	Equipment is not a draining or	N/A		
		draining devices	breathing device to be used as			
		Temperature class based on external	an Ex Component.			
		surface temperature after the 10				
	10.0.2.4	The st period	Equipment is not a designing or	NI / A		
	10.9.3.4	lest of the ability of the	Equipment is not a uralining or	N/A		
		to withstand pressure	an Ex Component			
		Pelocated from before thermal tests	an Ex component.			
		to after the nontransmission test				
	10 9 4	Ex component certificate	Equipment is not a draining or	Ν/Δ		
	10.9.4	Service temperature range for non-	breathing device to be used as	11/7		
		metallic enclosures per IFC 60070-0	an Ex Component			
	11	Fasteners and openings	Minor and editorial change	N/A		
		Relocation of blanking element		••//		
		content to 13.8 and C.2.3				
	11.3	Fasteners and openings.	Equipment does not contain	N/A		
		Property class or vield stress	special fasteners.	,,,		
		Certificate specific condition of use				
	11.8	Fasteners and openings	No optional openings in the wall	N/A		
		(Openings in the wall of the	of the enclosure for devices such			
		enclosure)	as push buttons.			
	1	/	Let the second sec	1		



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7				
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict	
C2	12.8	<i>Materials</i> (Material limitation in acetylene atmospheres)	Equipment is designed for gas Group IIC and has metallic enclosure made of stainless steel 304. Stainless steel may contain copper but is not considered to be copper or a copper alloy.	Pass	
	13.1	<i>Entries for flameproof</i> <i>enclosures, General</i> Metric and NPT threaded entries	Equipment is a metallic enclosure consisting of welded or cemented joints. Enclosure does not contain any threaded entries as connection is through flying leads.	N/A	
	13.1	Entries for flameproof enclosures, General Group I non-threaded joints	Equipment is not for Group I.	N/A	
	13.3	Entries for flameproof enclosures, Non-threaded holes Group I application	Equipment is not for Group I.	N/A	
	13.4	Entries for flameproof enclosures, Cable glands Group I application	Equipment does not contain cable glands.	N/A	
	13.4 13.5	<i>Cable glands, Conduit sealing devices</i> Documentation to facilitate mounting	Conduit seal is integral to the enclosure and addressed as a cemented joint. Therefore, documentation on the installation of a conduit sealing device is not required.	N/A	
C3	13.6.4	<i>Plugs and sockets and cable couplers</i> Load requirement for arc-quenching test	Equipment does not contain plugs, sockets or cable couplers.	N/A	
	13.7	Bushings Documentation to facilitate mounting	Equipment does not contain bushings.	N/A	
	13.8	Blanking elements Relocated from Clause 11	Minor and editorial change.	N/A	
	Table 6	Verification and tests Maximum surface temperature conditions	Changes to Table 6 do not affect compliance of the equipment.	N/A	
	15	<i>Type tests</i> Sequence and number of samples for tests	The test sequence carried out as part of CSA Project 2672643 (Master Contract: 212120) complies.	Pass	
	15.2.2.2	Determination of explosion pressure, General Devices that can cause turbulence	Equipment does not contain rotating devices inside the enclosure.	N/A	



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7					
Major	Clause	Clause title and description of	Compliance	Verdict		
technical	affected	change				
changes		5				
	15.2.2.2	Determination of explosion pressure, General	Equipment was tested with the Gr. IIC gas mixtures:	Pass		
		Number of tests for Group IIC	[±1.0%] 5 times with 31.0 % Hydrogen [±1.0%] 5 times with 14% Acetylene [±1.0%] at room temperature (17.9 °C) and 126 kPa increased pressure, with ignition directly at the enclosure. Note: The sample did not have a			
			flame arrestor. Result: 5.45 bar (79.1 psi). This test was part of CSA Project 2672643 (Master Contract: 212120).			
	15.2.2.4	Determination of explosion pressure, General Pressure pilling for Group IIB	Equipment designed for Gas Group IIC.	N/A		
	15.2.2.5	Determination of explosion pressure, General Equipment marked for a single gas	Equipment not marked for a single gas.	N/A		
	15.2.3	Overpressure test, General Low ambient overpressure tests not required	This is a relaxation of the clause.	N/A		
	15.2.3.2	Overpressure test – First method (static) 3 times option when routine batch testing	Equipment tested to 4 times.	N/A		
	15.2.3.2	Overpressure test – First method (static) Adjustment for low ambient due to small size of equipment	The thermally conditioned and impacted sample was subjected to the exemption overpressure of 21.8 bars (4×5.45) for 1 minute on the interior surface of the Stycast sealing compound from the NPT entry pressure connection. The sample had a Flame Arrestor. The result was: Pass, no apparent damage, the potting material did not leak. The test was carried out as part of CSA Project 2672643 (Master Contract: 212120).	N/A		
	15.2.3.3	Overpressure test – Second method (dynamic) Number of tests to be made	Equipment tested according to First method.	N/A		
	15.3	<i>Test for non-transmission of an</i> <i>internal ignition</i> Clarification regarding grease	Equipment does not contain grease.	N/A		
	Table 9	Reduction in length of a threaded joint for non- transmission test ISO 965-1 and 965-3 standards in respect of thread form and quality of fit)	Equipment does not contain threaded joints.	N/A		



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7				
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict	
	Table 10	Test factors to increase pressure or test gap Group IIC adjustments for elevated ambients	Equipment is for gas Group IIC, however, the changes to the Table indicate a reduction in the requirements.	N/A	
	15.3.2.3	Test for non-transmission of an internal ignition, Groups I, IIA and IIB Number of tests to be made	Equipment is for Group II and Group III.	N/A	
	15.3.3.2	Test for non-transmission of an internal ignition, Group IIC testing by increased gap Number of tests to be made	Equipment was tested according to the Second Method – Testing by increased pressure for the non-transmission of an internal ignition.	N/A	
	15.3.3.4	Test for non-transmission of an internal ignition, Group IIC Oxygen enrichment of test gases	Equipment was tested according to the Second Method – Testing by increased pressure for the non-transmission of an internal ignition.	N/A	
	15.4.3.1	Thermal tests of enclosures with breathing and draining devices Temperature class based on external surface temperature after the 10 min test period	The previously Overpressure Tested sample with breather was Thermal tested with the Propane (4.2%) followed by Acetylene (7.5%) gas mixtures, at ambient temperature 18.8°C and 116 kPa gas pressure. (which represents the increased pressure to compensate the 92°C service temperature due to the process temperature as per table 7 of IEC 60079-1) Results: Propane Temp rise: 1.1K Acetylene Temp rise: 1.3K $\Delta T = 1.3K$ So (1.3*1.2)+92 = 93.6°C The test was carried out as part of CSA Project 2672643 (Master Contract: 212120).	Pass	
	15.5	<i>Tests for "dc" devices</i> "Enclosed break" devices from IEC 60079-15	Equipment is for Type of Protection "db".	N/A	
	16.1.2	Routine tests, General Adjustment for low ambient due to small size of equipment	Routine test uses a helium mass spectrometry to detect any issues with the welds.	N/A	
	16.1.3	Routine tests, General Options when second method is chosen	Routine test uses a helium mass spectrometry to detect any issues with the welds.	N/A	



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7				
Major	Clause	Clause title and description of	Compliance	Verdict	
technical	affected	change			
changes					
	16.3	<i>Routine tests, General</i> Welded joint inspection options	Routine test uses a helium mass spectrometry to detect any issues with the welds. The condition of manufacturer listed the following: The weld quality of each sensor is tested using helium mass spectrometry method to assure that leaks through the welded joints do not exceed the rate of 5e-8 cc/sec. This still remains valid as previously assessed and certified, with reliance placed on the original certification	N/A	
	16.6	<i>Routine tests, General</i> Allowance for batch testing	Equipment is not subjected to batch testing according to the criteria of ISO 2859-1.	N/A	
	17.2.2 17.2.3	<i>Switchgear for Group I</i> Clarifying need for compliance with EPL Mb types of protection	Equipment is not for Group I.	N/A	
	19.1	<i>Non-metallic enclosures and</i> <i>non-metallic parts of</i> <i>enclosures, General</i> Exception for cemented joints	Equipment has a cemented joint for which Clause 6 applies so this Clause continues to not apply due to exception b).	N/A	
	19.2	Non-metallic enclosures and non-metallic parts of enclosures, Resistance to tracking and creepage distances Reference to both IEC 60079-7 and or IEC 60079-15	See Clause 19.1.	N/A	
	19.3	Non-metallic enclosures and non-metallic parts of enclosures, Requirements for type tests Clarification of test sequence)	See Clause 19.1.	N/A	
	21	Instructions Indication that repair of flamepaths is not intended	Equipment contains welded or cemented joints and is considered completely sealed. Therefore, there is no need to indicate the repair of flamepaths is not intended.	N/A	
	C.2.1.4	Bushings Documentation regarding numbers of cores	Equipment does not contain bushings.	N/A	
	C.2.1.4	Bushings (Criteria for non-transmission test)	Equipment does not contain bushings.	N/A	
	C.2.1.4	Bushings (Evaluation criteria if there is leakage)	Equipment does not contain bushings.	N/A	



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7				
Major	Clause	Clause title and description of	Compliance	Verdict	
technical	affected	change	•		
changes					
	C.2.2.1	Flameproof joints, Threaded	Equipment does not contain	N/A	
		ioints	threaded joints.	,	
		Requirement options			
	C 2 2 2	Elamenroof joints Non-	Fauinment is not for Group I	N/A	
	0121212	threaded joints		,,,	
		Group Lapplication			
	C 2 3 1	Constructional requirements for	Minor and editorial change	N/A	
	0.2.3.1	Ex blanking elements	Finor and catoria change.	N/A	
		Relocated from Clause 11			
	C 2 3 2	Constructional requirements for	Equipment does not contain	N/A	
	C 2 3 3	Ex blanking elements	blanking requirements	N/A	
	0.2.5.5	(Metric and NPT Ex blanking	blanking requirements.		
		elements)			
	C 2 3 4	Constructional requirements for	Equipment doos not contain		
	C.2.J.7	Ex blanking alaments	blanking requirements	N/A	
		Croup I pon-threaded construction	bianking requirements.		
	C 2 1 1	Scaling test Construction	Equipment door not contain		
	C.3.1.1	Allowance for re-tightening	narts that can be re-tightened	N/A	
	C 2 1 2	Cable glands and conduit	Equipment doos not contain		
	C.J.1.Z	cable gianus and conduit	coble globals or conduit cooling	N/A	
		ring	dovices with soaling ring		
		Mandrol to be correction resistant	devices with sealing ring.		
		matulei to be conosion-resistant			
	0331	Type tests for Ex blanking	Equipment does not contain Ex	N/A	
	0.5.5.1	aloments Torque test	blanking elements	N/A	
		Test-block to be steel	blanking elements.		
	Table	Tightening torque values	Equipment does not contain Ex	N/A	
		Addition of < 16 mm thread size	thread adapters	11/7	
	Table	Tightening torque values	Fauinment does not contain Ex	N/A	
	C.2	Addition of NPT thread sizes	thread adapters.	,,,,	
C4	D.3.8	Ex component enclosure	Equipment is not an empty	N/A	
•••	2.010	requirements	flameproof enclosure as an Ex	,	
		Markings content	component.		
	D.3.10	Ex component enclosure	Equipment is not an empty	N/A	
		requirements	flameproof enclosure as an Ex	,	
		Certificate content	component.		
	D.4.1	Utilization of an Ex component	Equipment is not an empty	N/A	
		enclosure certificate to prepare	flameproof enclosure as an Ex		
		an equipment certificate,	component.		
		Procedure			
		Devices that can create significant			
		turbulence			
	Table	Acceptable primary cells	Equipment does not contain cells	N/A	
	E.1	Addition of Type B cells	or batteries.	-	
C5	Table	Acceptable primary cells	Equipment does not contain cells	N/A	
	E.1	Removal of Type T cells	or batteries.		
	Table	Acceptable secondary cells	Equipment does not contain cells	N/A	
	E.2	Addition of Lithium type cells	or batteries.		
	E.4.1.2	Prevention of excessive	Equipment does not contain cells	N/A	
		temperature and cell damage	or batteries.		
		Application of IEC 60079-11			
		requirement			



	Gap Analysis between IEC 60079-1:2007 Ed. 6 and IEC 60079-1:2014 Ed. 7				
Major technical	Clause affected	Clause title and description of change	Compliance	Verdict	
Changes	E.4.3	Prevention of inadvertent charging of a battery by other	Equipment does not contain cells or batteries.	N/A	
		voltage sources in the enclosure Construction not requiring additional protection			
	E.5.1	Recharging of secondary cells inside flameproof enclosures Additional battery options	Equipment does not contain cells or batteries.	N/A	
	Annex G	Introduction of an alternative risk assessment method encompassing equipment protection levels' for Ex equipment Removal of previous Informative Annex	Equipment does not contain a containment system.	N/A	
	Annex G	Additional requirements for Flameproof enclosures with an internal source of release (containment system) Addition of new Normative Annex	Equipment does not contain a containment system.	N/A	
	Annex H	Requirements for machines with flameproof "d" enclosures fed from converters Addition of new Normative Annex	Equipment is not a rotating electrical machine fed by a converter.	N/A	



3.1.3 Comparison of IEC 60079-31:2008 (Edition 1) with IEC 60079-31:2013 (Edition 2)

The requirements of IEC 60079-31:2008 (Edition 1) are compared to IEC 60079-31:2013 (Edition 2) in the following assessment (there are no relevant differences between the requirements of IEC 60079-31:2013 Ed 2 and those of EN 60079-31:2014).

The following table lists the major changes and added requirements between IEC 60079-31:2008 (Edition 1) and IEC 60079-31:2013 (Edition 2).

G	Gap Analysis between IEC 60079-31:2008 Ed. 1 and IEC 60079-31:2013 Ed. 2						
Major technical changes	Clause affected	Clause title and description of change	Compliance	Verdict			
	Numerous	Document has been restructured from the first edition	Minor and editorial changes.	N/A			
C1	4.3.2	<i>Maximum surface temperature</i> The marked maximum surface temperature shall be measured on the external surfaces of the enclosure and the surfaces of the internal components for equipment with types of protection "ta"	Equipment is for Type of Protection "tb" not "ta".	N/A			
C2	4.3.6	Protection for arcing 4.3.6 and sparking parts Additional protection for arcing and sparking parts for "ta"	Equipment is for Type of Protection "tb" not "ta".	N/A			
	4.4.2	<i>Over pressure</i> Limiting the internal pressure test to enclosures where the seal is not physically constrained from moving.	Equipment is filled with epoxy without voids and does not contain any gaskets.	N/A			
	5.1.2	<i>Threaded joints</i> Requirements for tapered threaded joints without an additional seal or gasket added.	Equipment only contains joints which are cemented or welded.	N/A			
	5.2	<i>Cable glands</i> Requirements for cable gland aligned for all levels and Groups the only difference is now the required IP protection	Equipment does not contain cable glands.	N/A			
	5.3.1	<i>Plain entries</i> Requirements for plain entries added	Equipment does not contain entries – flying leads are used.	N/A			
	5.3.2	<i>Threaded entries</i> 5 threads for parallel threads only required when no seal is used	Equipment does not contain entries – flying leads are used.	N/A			
C3	6.1.1.2	Impact test for supplementary enclosures Test for internal enclosure for level "ta" added.	Equipment is for Type of Protection "tb" not "ta".	N/A			
	6.1.2	<i>Thermal tests</i> Eliminating of the "fault" table and reduction of the dust layer depth for the thermal test for type of protection "ta".	Equipment is for Type of Protection "tb" so thermal test for Type of Protection "ta" is not applicable.	N/A			



3.2 Assessment of Modification ii

Minor drawings amendments, none of which affect compliance with the standards listed

The following drawings have editorial or insignificant changes which have no effect on compliance of the equipment with the associated types of protection:

Drawing #	Old	New	Drawing Title	Description of change and Assessment
	Rev	Rev		
11112063	N/A	В	Final Assembly, 1/4" MNPT, 17-4, 1-xV	Drawing added to show assembly with the PCB, 1-XV, PGA309 sub-assembly and replaces A07086 that is now obsolete.
				Assessment:
				There is no change to the flameproof characteristics or methods of protections.
A15925	N/A	С	Final Assembly, ¹ /2" MNPT, 17-4, 1-xV	Drawing added to show assembly with the PCB, 1-XV, PGA309 sub-assembly and replaces A07085 that is now obsolete.
				Assessment:
				There is no change to the flameproof
				characteristics or methods of protections.
A03281	N/A	C	Epoxy, Potting Explosion-Proof	Drawing added to comply with IEC 60079- 1:2014, Edition 7, Clause 6.1.1
				Assessment
				Drawing contains the necessary details
				regarding curing conditions such as time and
				temperature for the two-part epoxy.
A04231	N	R	Label, CSA Explosionproof	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name.
				Assessment
				Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A10818	E	F	Subassembly, Detail, AST46xx, Conduit End	Change in length of the green 24 AWG wire from 2" (A01856) to 2.25" (11111907-03).
				Assessment: Change is insignificant and has no affect on the compliance of the equipment.
A11240	С	D	Subassembly (PCB	Resistance value changed to go from a voltage
			Layouts and Parts List)	divider to a pull-up only.
				Assessment:
				Changes are insignificant and lead to decrease
				compliance of the equipment.



Drawing #	Old Rev	New Rev	Drawing Title	Description of change and Assessment
A11452	G	J	Layout, Label, CSA, Explosion-Proof, AST46PT, Sealed	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A11472	В	С	PCB, PGA309 1-xV	Added a note regarding RoHS compliance and a silkscreen for J3 was changed to J1. Assessment: Changes are insignificant and have no effect on the compliance of the equipment.
A11473	C	D	Sub-Assembly, PCB, 1-x Voltage, PGA309 (PCB Layouts and Parts List)	Change from A00757 (LP2951) to A08383 (MIC2951). Assessment: Components have the same voltage range in/out and temperature specifications, therefore the change should have no effect on the compliance of the equipment.
A11475	С	D	Sub-Assembly, PCB, 0-x Voltage, PGA309 (PCB Layouts and Parts List)	Change from A00757 (LP2951) to A08383 (MIC2951). Assessment: Components have the same voltage range in/out and temperature specifications, therefore the change should have no effect on the compliance of the equipment.
A11637	F	J	Layout, Label, CSA Explosion Proof	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A11638	E	G	Layout, Label, CSA, Explosion-Proof, AST46PT, Sealed	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A13949	В	С	Final Assembly, ¹ /4" MNPT, 4-20mA, Low	Drawing revised to add a note to confirm standard applied for NPT threading. Assessment: No change to form or function.



Drawing #	Old Rev	New Rev	Drawing Title	Description of change and Assessment
A14248	В	С	Final Assembly, 14" MNPT, 4-20mA, High	Drawing revised to add a note to confirm standard applied for NPT threading.
				Assessment: No change to form or function.
A15987	A	C	Label, CSA Explosion Proof, Vented	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name.
				Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A15988	A	С	Label, CSA Explosion Proof, AST46PT, Vented	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are
415000	•	6	Label CCA Fundacian	administrative.
A12989	A		Proof, Sealed	 Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are administrative.
A15990	A	С	Label, CSA Explosion Proof, AST46PT, Sealed	Revision of the label to change from "d" to "db", to include warnings (electrostatic hazard), to include the Ta/Tamb symbol and update logos, address and company name. Assessment: Changes to the label are to comply the latest versions of the applicable standards or are administrative.
S01210	Q	S	Schematic Ratiometric	Redrawn in a newer schematic program for improved readability. Assessment: Change is insignificant and has no effect on the compliance of the equipment.
S11240	С	D	PGA308 0-xV PCB (Schematic Diagram)	Resistance value changed to go from a voltage divider to a pull-up only.
				Changes are insignificant and lead to decrease resistance and should have no effect on the compliance of the equipment.



3.3 Assessment of Modification iii

The following drawings have become obsolete and have no effect on compliance of the equipment with the associated types of protection as they have been replaced:

Drawing #	Old Rev	New Rev	Drawing Title	Description of change and Assessment
A07085		N/A	Final Assembly, ¼" MNPT, 1-5V , Low	Drawing A07085 is replaced by A15925 to reflect the PGA309 construction.
A07086		N/A	Final Assembly, ¼" MNPT, 1-5V , High	Drawing A07086 is replaced by 11112063 to reflect the PGA309 construction.
A03536		N/A	Subassembly, Detail, ST- 46xx, Conduit End	Drawing A03536 is replaced by A10818 due to the position of the termination of the PCB.

3.4 Modification iv

The manufacturing name and location have both changed per the table below:

	From	То
Manufacturer	American Sensor Technologies, Inc.	Measurement Specialties Inc.
	450 Clark Dr., Mount Olive	A TE Connectivity Company
	New Jersey 07828	Avenido Senora Mundial #9
	USA	Hermosillo, Senora CP83174
		Mexico

4 Tests

None.

5 Assessment Against the ATEX Directive 2014/34/EU

All relevant Essential Health and Safety Requirements (EHSRs) in Annex II of the Directive are addressed by the listed standards.