सीएसआईआर-केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान
CSIR - Central Institute of Mining and Fuel Research

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद) / (Council of Scientific & Industrial Research)
बरवा रोड, धनबाद–826015, झारखण्ड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY
परीक्षण प्रमाण पत्र / TEST CERTIFICATE

परीक्षण प्रमाण-पत्र/ TYPE EXAMINATION CERTIFICATE

प्रारूप सं./FORMAT NO.: (CIMFR: DQM: FLP02: F-01: REV-01)

(ज्वाला-सह एवं उपकरण सुरक्षा/Flameproof & Equipment Safety)

Certificate No.: CMF 22 INEx 0404 Dated: 06/12/2022

ULR No.: TC22000000487F (Issue No. 0)

1. आवेदक/ Applicant	:	M/S. INDUSTRIES SYNDICATE 7, CHITTARANJAN AVENUE, LAHA PAINT HOUSE, POST BOX 13324, KOLKATA-700 072 (INDIA)
2. विनिर्माता/ Manufacturer	:	Same as above
3. उपकरण/ Equipment	:	Flameproof enclosure of Electro Hydraulic Thrustor.
4. नामित Designated by	:	Type No.: 'TTF33250'
5. सुरक्षा का प्रकार Type of Protection & EPL:	:	Ex db Gas Group I, EPL Mb.
6. मार्किंग Marking	:	(Ex db I Mb)

उक्त प्रमाणपत्र को इस सत्यापन के रूप में जारी किया जाता है कि नमूना/ प्रलेखन का मूल्यांकन किया गया एवं यह पाया गया कि यह निम्न आईएस/ आईईसी मानक सूची के अनुरूप है। यह प्रमाण-पत्र केवल उपकरणों के डिजाइन तथा निर्माण से ही संबंधित है। इसमें विनिर्माण प्रक्रिया और उपयोग/प्रयोग से संबंधित अपेक्षा/ आवश्यकता शामिल नहीं है।

This certificate is issued as verification that a sample/documentation was assessed and found to comply with the IS/IEC Standard list below. This certificate relates to only design and construction of the equipment. It does not cover requirement related to manufacturing process and usage.

7. मानक Standard: इस प्रमाण-पत्र एवं संबंधित दस्तावेजों की अनुसूची में विनिर्दिष्ट किए गए उपकरण और इसके लिए स्वीकार्य कोई भी भिन्नता निम्नलिखित मानकों का अनुपालन करते हुए पाए गए: The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IS/IEC 60079-0:2017	Explosive atmospheres – Part 0: General requirements.
IS/IEC 60079-1:2014	Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d".

इस प्रकार के परीक्षण प्रमाण-पत्र उपरोक्त सूचीबद्ध मानकों में विशेष रूप से शामिल की गई अपेक्षाओं के अलावा विद्युत सुरक्षा एवं निष्पादन संबंधी अपेक्षाओं के अनुपालन को नहीं दर्शाते हैं। This type test certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the standards listed above.

6. 8. इंग्रेस सुरक्षा की मात्रा/ Degree of ingress protection: IP-65 (Ref. test report no.: CIMFR/TC/P/H327 Dated: 25/07/2008) as per IS IEC 60529:2001(Reaffirmed 2014).

9. परीक्षण एवं मूल्यांकन रिपोर्ट / Test & Assessment Reports: A sample(s)/documents of the equipment listed have successfully meet the examination and test requirements as recorded in IN/CIMFR/TR22/R/2635 Dated: 08 December, 2022.

परीक्षण प्रमाण-पत्र/ TYPE EXAMINATION CERTIFICATE

Certificate No.: CMF 22 INEx 0404 Dated: 06/12/2022
ULR No.: TC22000000487F (Issue No. 0)

SCHEDULE

11. उपकरण का विवरण/ Description of equipment: The Flameproof enclosure of Electro Hydraulic Thrustor. designated by Type No.: 'TTF33250', Rate at 1130V, 3phase, 50Hz max. thrust 150kg. max. stroke 100mm.. material of construction Cast Aluminium Alloy LM-6.

Description	Volume (in Ltrs.)		Rating	T-class at 40°C amb.
	Gross	Net		
Main Enclosure	8.2	3.28	Rate at 1130V, 3phase, 50Hz max. thrust 150kg. max. stroke 100mm.	Refer separate test report
Terminal Enclosure	1.8	1.4		

12. आरेखण एवं प्रलेखन Drawing and documents:

Sl. No.	Drg. No.	Sheet	Rev.	Date	Title
1.	M730002/A2	1 of 1	3	10/10/2021	Assembly & Flamepath details of electro hydraulic thrustor type TTF33250 for Gas Group – I ..

13. नियमित परीक्षण Routine Testing: A routine overpressure test in accordance with IS IEC 60079-1:2014 clause 16 shall be carried out at a pressure of 10kg/cm^2 for a period of at least 10 seconds and test results must be recorded. The overpressure test shall be considered satisfactory, if no permanent deformation or damage invalidating type of protection is observed. The joints shall in no place have been permanently enlarged.

14. उपयोग के लिए विनिर्दिष्ट अवस्था/ स्थिति/शर्त Specific conditions of use: Not Applicable

15. प्रमाण-पत्र परिवर्तन (मद 1 एवं उपर्युक्त के लिए) का विवरण/ Details of certificate changes (for issue 1 and above): Not Applicable.

16. अतिरिक्त सूचना/ Additional Information: Equipment may be used - 20 °C to +40°C amb temperature

17. इतिहास/ History: The above equipment has been earlier tested and certified by CIMFR Vide Test Report No.: CIMFR/TC/SR/H377 Dated: 17/08/2012 as per IS/IEC 60079-1: 2007. This certificate (CMF 22 INEx 0404, Issue No. 0, Dated: 06/12/2022) supersedes the above mentioned test reports.

Approved for issued on behalf of CIMFR
Position

(Dr. A. K. Singh) 06/XII/2022
Chief Scientist & HORG

This Institute reserves the right to review, amend or withdraw this Type Examination certificate at any time if considered necessary in the interest of safety.

सीएसआईआर - केंद्रीय खनन एवं ईंधन अनुसंधान संस्थान
CSIR - Central Institute of Mining and Fuel Research
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद् (Council of Scientific & Industrial Research)
(अंतर्गत वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग, विज्ञान और प्रौद्योगिकी मंत्रालय, भारत सरकार)
(Under the Department of Scientific & Industrial Research, Ministry of Science & Technology, Govt)
बरवा रोड, धनबाद - 826015, झारखंड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India

स्पीड पोस्ट/ SPEED POST/ कूरियर सेवा /COURIER SERVICE

परीक्षण एवं मूल्यांकन रिपोर्ट सं.
Test & Assessment Report No. IN/CIMFR/TR22/R/2636

दिनांक/Dated: 08 December,2022

यूएलआर सं./ULR No.: TC22000000487F

टीसी कोड सं./TC CODE NO. FES/139/22-23

मूल प्रति
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सेवा में/To,
M/S. INDUSTRIES SYNDICATE
7, CHITTARANJAN AVENUE, LAHA PAINT HOUSE,
POST BOX 13324, KOLKATA-700 072 (INDIA)

विषय/Subject: Type Examination Certificate along with test assessment report of Flameproof enclosure of Electro Hydraulic Thrustor, in Grey cast iron Grade FG-200 construction designated by Type No.: 'TTF33250, as per IS/IEC 60079-1:2014 for use in Gas Group: I, EPL Mb atmosphere.

- (परीक्षण रिपोर्ट/Test Report)

आपका संदर्भ आवेदन सं./ Your Ref. Appl. No.: IS/CIMFR/22-23/01 दिनांक/Dated: 14/11/2022

प्रिय महोदय/Dear Sir,

आग्रह है कि कृपया आपके द्वारा भेजे गए उपरोक्त दस्तावेजों के परीक्षण मूल्यांकन रिपोर्ट के साथ संलग्न किया गया इसका टाइप परीक्षा प्रमाण-पत्र भी प्राप्त करें। Please find the enclosed Type Examination Certificate along with test assessment report of the above documents submitted by you.

इस संस्थान को सुरक्षा की दृष्टि से आवश्यकता होने पर किसी भी समय उक्त 'परीक्षण रिपोर्ट' की समीक्षा, संशोधन करने या उसे वापस लेने का अधिकारप्राप्त है। This Institute reserves the right to review, amend or withdraw this 'Test Report' at any time, if considered necessary in the interest of safety.

इस परीक्षण कार्य के लिए लागू सेवा कर सहित रू. 27,742/- के शुल्क को आपके द्वारा किए गए अग्रिम जमा के साथ समायोजित किया गया है। Charges of Rs. 27,742/- (Rupees Twenty Seven Thousand Seven Hundred Forty Two Only) including applicable GST involved towards the testing have been adjusted against the advance deposit made by you.

कृपया प्राप्ति सूचना भेजें। Kindly acknowledge receipt.

सधन्यवाद/Thanking you.

भवदीय/Yours faithfully,
शिशिर कुमार मंडल
07/12/2022

(एस. के. मंडल/ **S. K. MONDAL**)
अनुभाग प्रमुख, परीक्षण प्रकोष्ठ
HOS, TESTING CELL

संलग्न/Encl: 1. परीक्षण मूल्यांकन रिपोर्ट/Test & assessment report in Triplicate
2. टाइप परीक्षा प्रमाण-पत्र/Type examination certificate

प्रति/Copy to:
1. प्रमुख, ज्वाला-सह एवं उपस्कर सुरक्षा/Head, Flameproof & equipment Safety
2. बिल अनुभाग/Bill section

सीएसआईआर-केन्द्रीय खनन एवं इंधन अनुसंधान संस्थान
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बरवा रोड, धनबाद–826015, झारखण्ड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY
परीक्षण रिपोर्ट / TEST REPORT

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FORMAT NO.: (CIMFR: DQM: FLP02: F-01:REV-01)
(Flameproof & Equipment Safety)

Code No.: FES/139/22-23

ULR No. TC22000000487F

Test & Assessment Report No.: IN/CIMFR/TR22/R/2636 Dated: 08 December, 2022

Application Ref. No.: IS/CIMFR/22-23/01 Dated: 14/11/2022

1. Applicant : M/S. INDUSTRIES SYNDICATE
7, CHITTARANJAN AVENUE, LAHA PAINT HOUSE,
POST BOX 13324, KOLKATA-700 072 (INDIA)
2. Manufacturer : Same as above
3. Equipment : Flameproof enclosure of Electro Hydraulic Thrustor.
4. Designated by : Type No.: 'TTF33250'.
5. Gas Group & EPL : Ex db for Gas Group: I, EPL Mb.
6. Electrical ratings : Rate at 1130V, 3phase, 50Hz max. thrust 150kg. max. stroke 100mm.
7. Temperature Class : Refer Separate test/project report.
8. Degree of Ingress Protection : IP-65 (Ref. test report no.: CIMFR/TC/P/H327 Dated: 25/07/2008)
9. Material of Construction : Grey cast iron Grade FG-200 construction. Refer drawing for material thickness as different location of the enclosure.
10. Description of the equipment : Flameproof enclosure of Electro Hydraulic Thrustor.

A.

Description	Volume (in ltrs.)		Min. Wall Thickness	Nos. & Size of Bolts/Fasteners
	Gross	Net		
Main Enclosure	8.2	3.28	10mm	As per drawing
Terminal Enclosure	1.8	1.4		As per drawing

B.

Glass details	Max no. of aperture on cover
Nil	Nil

Note: For further details refer drawings.

11. Nature of Flameproof Joint: Type of joints and gaps (Flange joint, Cylindrical joint, Spigot joint & Threaded joint for Gas Gr. I)

Sr. No.	Location of flamepath	Type joint	Min. length of flamepath (in mm)		Max. gap (in mm)	
			Req.	Spec.	Req.	Spec.
1.	Between stator body & top end shield	Spigot	25	28	0.20	Press fitted
2.	Between Top end shield & shaft	Spigot	25	28	0.20	0.15
3.	Between stator body & end cover	Spigot	25	38	0.20	Press fitted
4.	Between end cover & sleeve	Flange	l=8, L=12.5	l=8, L=24	0.15	0.15
5.	Between sleeve & shaft	Spigot	25	25	0.50	0.20
6.	Between end cover & terminal chamber	Flange	l=9, L=25	l=10, L=25	0.50	0.10
7.	Between terminal chamber & its cover	Flange	l=9, L=25	l=10, L=25	0.50	0.10
8.	Between terminal chamber & DMC bush	Cylindrical	25	32	0.50	0.10
9.	Between DMC bush & terminal stud	Cylindrical	25	32	0.50	0.10
10.	Between terminal chamber & cable sealing	Flange	l=9, L=25	l=10, L=31	0.50	0.10

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(Flameproof & Equipment Safety)

ULR No. TC22000000487F Code No.: FES/139/22-23

Max. No. & sizes of cable entries: Max. 1 no. of cable entry is provided through cable sealing box on the terminal enclosures body of size M20x1.5P maintaining 27mm threaded flamepath. Cable box is fitted on the body of terminal chamber maintaining 21mm flamepath and 0.10mm diametrical clearance. Sealing box should be sealed with bitumen compound COT: -20^{0}C +180^{0}C.

12. Name plate and warning inscription: The name-cum-warning inscription plate and rating plate made of Brass/SS is permanently fixed on the cover of enclosure by hammer driven rivets leaving min. 3mm material thickness below the rivets. The warning inscription shall read as "DO NOT OPEN UNLESS CIRCUIT IS ISOLATED ELSEWHERE".

13. Drawings: The unit is designed and constructed as flameproof and weatherproof in accordance with the following drawing conforming to the requirements of IS/IEC 60079-0: 2004, IS/IEC 60079-1: 2007 and IS/IEC 60529:2001.

Sl. No.	Drg. No.	Sheet	Rev.	Date	Title
1.	M730002/A2	1 of 1	3	10/10/2021	Assembly & Flamepath details of electro hydraulic thrustor type TTF33250 for Gas Group – I.

13. Any other relevant information:

1) The material of construction may be CS instead of Grey cast iron Grade FG-200 construction.
2) The above equipment has been tested and certified by CIMFR vide test report no.: CIMFR/TC/SR/H377 Dated: 17/08/2012 as per IS/IEC 60079-1: 2007.
3) Equal and equivalent medium class fit NPT threads of medium class fit conforming to requirements of ANSI/ASME B1.20.1 may be used instead of metric threads conforming to ISO 965-1 & 965-3 as per Clause No. 5.3 & 13 of IS/IEC 60079-1:2014.
4) Hydraulic Thrustor may be used for maximum Thrust 200Kg. and upto 100mm strokes. In this case, the type designation shall be type 'TTF33400'.
5) Also suitable for use on-
   (i) Single Phase system upto 660Volts, besides 3 phase.
   (ii) Frequency range 45Hz. to 65Hz. or 660Volts DC.

14. Declaration by the Applicant/Manufacturer:
(A) As to standards with which the equipment complies in respect of:
   a) Electrical equipment for Potentially Explosive atmosphere – General requirements: IS/IEC 60079-0: 2017
   b) As to flameproof protection IS/IEC 60079-1: 2014
   c) Ingress protection as per IS/IEC 60529: 2001 (Reaffirmed 2014)

Note: *no sample of material of construction was drawn from the prototype enclosure for verifying its chemical composition declared by the manufacturer.*

15. Documents/Samples Submitted : (i) Application form (ii) Drawings

Note: CIMFR has however not checked and tested the compliance of the equipment to any standard other than the above standards.

SCOPE OF THE TEST CERTIFICATE

The Revalidation Certificate issued by CIMFR certifies that the equipment has been found to comply with the definition of Flameproof-Weatherproof equipment contained in the relevant Standard specifications as per the drawings submitted. They do not vouch for the quality of the equipment in any other respect.

This Institute reserves the right to review, amend or withdraw this Test Report at any time if considered necessary in the interest of safety.

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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण रिपोर्ट / TEST REPORT

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FORMAT NO.: (CIMFR: DQM: FLP02: F-01:REV-01)
(Flameproof & Equipment Safety)

ULR No. TC220000009487F

Code No.: FES/139/22-23

REPORT OF TEST

Result #A: Tests as per IS/IEC 60079-0: 2017:

Type Tests			
Clause	Tests	Remarks	Results (Complies, P- Pass, NA-Not Applicable, F-Fail) References
1	Scope		Complies
2	Normative references		Complies
3	Terms and definitions		Complies
4	Equipment grouping	Gas Group: I, EPL Mb.	Complies
5	Temperatures		
5.1.1	Ambient Temperatures	- 20 °C to +40 °C Amb.	Complies
6	Requirements for all electrical equipment		Complies
6.6	Electromagnetic and ultrasonic energy radiating equipment.		NA
7	Non-metallic enclosures and non-metallic parts of enclosures		NA
7.2	Thermal Endurance		NA
8	Metallic Enclosures and metallic parts of Enclosures	Grey cast iron Grade FG-200 construction	Complies
9	Fasteners		Complies
10	Interlocking devices		NA
11	Bushings	As declared by manufacturer	Complies
12	Reserved for future use		NA
13	Ex components		NA
14	Connection facilities		Complies
15	Connection facilities for earthing and bonding conductors		Complies
16	Entries into enclosures		Complies
17	Supplementary requirements for electric machines		NA
18	Supplementary requirements for switchgear		NA
19	Supplementary requirements for fuses		NA
20	Supplementary requirements for plugs and socket outlets and connectors for field wiring connection		NA
21	Supplementary requirements for luminaries		NA
22	Supplementary requirements for cap lights and hand lights		NA
23	Equipment incorporating cells and batteries		NA
24	Documentation		Complies
25	Compliance of prototype or sample with documents	Revalidation	Complies
26	Type tests		Complies
26.3	Tests in explosive test mixtures		
26.3	Tests for Flameproof (Ex 'd') protection	Verification for Compliance to Ex 'd' requirements as per IS/IEC 60079-1: 2014	Complies

सीएसआईआर– केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान
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Code No.: FES/139/22-23

26.4	Test of enclosures		
26.4.2	Resistance to Impact	Ref. test report no.: CIMFR/TC/P/H327 Dated: 25/07/2008	Complies
26.4.3/ 26.4.4	Drop test	(not a handheld equipment or portable device) NA	
26.4.5	Degree of protection (IP) by Enclosures		
26.4.5	Test of IP of equipment	IP-65 (with gasket) Ref. test report no.: CIMFR/TC/P/H327 Dated: 25/07/2008)	Complies
26.5	Thermal tests		NA
26.5.1	Temperature measurement		NA
26.5.2	Thermal shock test		NA
26.6	Torque test for bushings		NA
26.7	Non- metallic enclosures or non-metallic parts of enclosures	Tested DMC bush shall be used COT: -20^{0}C to 160^{0}C	Complies
26.8	Thermal endurance to heat		NA
26.9	Thermal endurance to cold		NA
26.10	Resistance to U.V light	----------	NA
26.11	Resistance to chemical agents for Group I Equipment		NA
26.12	Earth continuity test in non-metallic enclosure	----------	NA
26.13	Surface resistance test of parts of enclosures of Non metallic materials		NA
26.14	Measurement of capacitance		NA
26.15	Verification of ratings of ventilating fans		NA
26.16	Alternative qualification of elastomeric sealing O-rings		NA
27	Routine tests	Manufacturer's responsibility: Compliance to prototype of the product and physical measurement of gap and flamepath and overpressure at the pressure 10kg/cm^2 for every sample.	
28	Manufacturer's responsibility	Conformity of the equipment to the applicable standards	Complies
29	Marking	(Ex db I Mb)	
30	Instructions	*Instruction related to use, installation, maintenance, adjustment to be provided by the manufacturer along with the equipment.*	

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CSIR-Central Institute of Mining and Fuel Research

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद) / (Council of Scientific & Industrial Research)
बरवा रोड, धनबाद – 826015, झारखण्ड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

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FORMAT NO.: (CIMFR: DQM: FLP02: F-01:REV-01)
(Flameproof & Equipment Safety)

ULR No. TC220000004871F

Code No.: FES/139/22-23

Result #B: Tests in explosive mixtures: Tests for type of protection Ex 'd' as per IS/IEC 60079-1:2014.

Type Tests

Clause No.	Description and relevant tests	Remarks	Results (Complies,P- Pass,NA-Not Applicable, F-Fail) References
			Complies
1	Scope		Complies
2	Normative references		Complies
3	Terms and definitions		Complies
4	Level of protection (Equipment Protection Level, EPL)	Gas Group I, EPL Mb	Complies
5	Flameproof joints	Spigot, Flange & Cylindrical joint	Complies
6	Sealed joints		NA
6.1	Cemented joints		Complies
6.1.2	Mechanical strength		NA
7	Operating rods		NA
8	Supplementary requirements for shafts and bearings		NA
9	Light transmitting parts		NA
10	Breathing and draining devices which form part of a flameproof enclosure		Complies
11	Fasteners and openings		Complies
12	Materials	Grey cast iron Grade FG-200 construction	Complies
13	Entries for flameproof enclosures		Complies
14	Verification and tests		Complies
15	Type Tests		Complies
15.1	General		Complies
15.2	Tests of ability of the enclosure to withstand pressure		Complies
15.2.1	General		Complies
15.2.2	Determination of Explosion Pressure (Reference Pressure)		Complies
15.2.3	Overpressure Test		Complies
15.3	Test for non-transmission of an internal ignition		Complies
15.3.1	General		Complies
15.3.2	Electrical equipment of Group I		NA
15.3.3	Electrical equipment of Group IIC		NA
15.4	Tests of flameproof enclosures with breathing and draining devices		NA
15.4.1	General	To be conducted by the manufacturer as per earlier test report at pressure (10kg/cm^2) for every sample.	NA
16	Routine tests		NA
17	Switchgear for Group I		NA
18	Lamp holders and lamp caps		NA
19	Non-metallic enclosures and non-metallic parts of enclosures		NA
19.1	General		NA
19.2	Resistance to tracking and creepage distances on internal surfaces of the enclosure walls		NA
19.3	Requirements for type test		

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19.4	Test of erosion by flame	Complies
20	Marking	(Ex db I Mb)
20.2	Caution and warning markings	"DO NOT OPEN UNLESS CIRCUIT IS ISOLATED ELSEWHERE"
21	Instruction	The manufacturer shall supply instruction regarding flamepath etc. as per required by IS/IEC 60079-0:2017, IS/IEC 60079-1:2014

CONCLUSION: The Flameproof enclosure of Electro Hydraulic Thrustor, in Grey cast iron Grade FG-200construction designated by Type No.: 'TTF33250', meets the requirement for flameproofness as per IS/IEC 60079-1:2014 and general requirements as per IS/IEC 60079-0:2017 and is deemed to be suitable for use in Gas Group: I, EPL Mb atmosphere.

Reported By

06/12/2022

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