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Test & Assessment Report No.: IN/CIMFR/TR19/H175

Dated: 15 October, 2019

Equipment ID No.: 127/19

ULR No.: TC596219000000108F CODE NO. FES/81A/19-20

To

M/s. AKHSHAR BRASS INDUSTRIES
PLOT NO. 46, 47 & 50, 51, SURVEY NO. 246, 245 & 238
AT LAKHABAVAL, NAGHEDI GIDIC,
JAMNAGAR - 361 004

Subject: Prototype Test Report of "CABTEK" BRAND FLP-WP CONDUIT ACCESSORIES, Type No. A xx xx x, R xx, xx x, AN xx xx x, AC xx xx x, HSP xx xx x, & ASP xx xx x Series in Brass construction as per IS/IEC 60079-1:2014 for use in Gas Group: IIC, EPL Gb atmosphere.

- (Prototype Test Report)

Your Ref. Appli. No.: ABI/CIMFR/19-20/02

Dated: 16/07/2019

Dear Sir,

Please find enclosed the Prototype test report of the above samples submitted by you.

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

Charges of Rs. 1,97,037/- (Rupees One Lakh Ninety Seven Thousand Thirty Seven Only) including applicable service tax involved towards the testing have been adjusted against the advance deposit made by you.

Kindly arrange to collect the sample within 90 days from the date of receipt of this letter failing which CIMFR would dispose off the samples by public auction without any further NOTICE to you.

Kindly acknowledge the receipt.

Thanking you.

Yours faithfully,

S. K. Mondal
15/10/2019

Encl: As above.

1. Prototype Test Report in **Four Copies**
2. Type Test Report

Copy to:

1. Head, Flameproof & Equipment Safety
2. Bill Section.

(S. K. MONDAL)
HOS
TESTING CELL



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

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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

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NABL, Certificate No.: TC-5962

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

(Flameproof & Equipment Safety)

Equipment ID No.: 127/19

ULR No.: TC596219000000108F

Code No.: FES/81A/19-20

Test & Assessment Report No.: IN/CIMFR/TR19/ H175

Dated: 13 October, 2019

Application Ref. No.: ABI/CIMFR/19-20/02

Dated: 16/07/2019

1. Applicant : M/s. AKHSHAR BRASS INDUSTRIES
PLOT NO. 46, 47 & 50, 51, SURVEY NO. 246, 245 & 238
AT LAKHABAVAL, NAGHEDI GIDIC,
JAMNAGAR - 361 004
2. Manufacturer : M/s. AKHSHAR BRASS INDUSTRIES
SHED NO. 4027, GIDC, PHASE - III,
DARED, JAMNAGAR - 361 004
GUJARAT.
3. Equipment : "CABTEK" BRAND FLP-WP CONDUIT ACCESSORIES
Type No. A xx xx x, R xx, xx x,
AN xx xx x, AC xx xx x,
HSP xx xx x, & ASP xx xx x Series.
4. Gas Group & EPL : Gas Group: IIC, EPL Gb.
5. Electrical ratings : NA.
6. Temperature Class : NA
7. Degree of Ingress Protection: IP-67 (Refer Test Result #A2).
8. Material of Construction : Brass construction.

9. Description of the equipment: "CABTEK" BRAND FLP-WP CONDUIT ACCESSORIES
The conduit accessories basically consist of Adaptor, Reducer, Nipple, Coupling & Stopper plugs with min. 8 threads engaged. for attachment with equivalent threaded entry hole of a certified FLP/WP enclosure and cable gland. The alternate size of FLP/WP Coupling Conduit, may be constructed in equivalent NPT threads sizes:

ADAPTOR, REDUCER, NIPPLE & COUPLING			
Sl. Nos.	Metric Thread Size	Threaded length L1 in mm	Threaded length L2 in mm
1.	M16X1.5P	15	15

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2.	M20X1.5P	15	15
3.	M25X1.5P	15	15
4.	M32X1.5P	15	15
5.	M40X1.5P	15	15
6.	M50X1.5P	15	15
7.	M63X1.5P	15	15
8.	M75X1.5P	15	15
9.	M90x2P	20	20

STOPPER PLUG HEXAGONAL/ALLEN TYPE		
Sl. Nos.	Metric Thread Size	Threaded length L1 in mm
1.	M16X1.5P	15
2.	M20X1.5P	15
3.	M25X1.5P	15
4.	M32X1.5P	15
5.	M40X1.5P	15
6.	M50X1.5P	15
7.	M63X1.5P	20
8.	M75X1.5P	20
9.	M90x2P	20

For further details refer drawings.

Product code for conduit accessories:

	X	XX	XX	X
	↑	↑	↑	↑
Adaptor = A		Thd size	Thd Size	Material
Reducer = R		Metric	(Optional)	Brass = 1
Nipple = AN		NPT	Metric = M	SS = 2
Coupling = AC		or	NPT = N	Nickel plate brass = 3
Hex Stop Plug = HSP		First entry	or	
Allen Stop Plug = ASP		Threads	Second entry	
			Threads	

11. Name plate and warning inscription: The Type Nos., Size and Type of threads and Gas Gr. IIC for each Adaptor, reducer should be permanently marked on the Adaptor/Reducer/Nipple & Coupling body, Hex stop plug & allen stop plug.

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12. Drawings: The unit is designed and constructed as flameproof and weatherproof in accordance with the following drawing conforming to the requirements of IS/IEC 60079-0:2011, IS/IEC 60079-1: 2014 AND IS/IEC 60529-2001 (Reaffirmed 2014).

Sl. No.	Drg. No.	Title	Rev.	Sheet	Date
1.	Ex=ACC-CMRI	FLP-WP Conduit Accessories	0	1 of 1	09/07/2019
2.	Ex=CASP-CMRI	Allen Stop Plug/Blanking Element	0	1 of 1	09/07/2019
3.	Ex=CHSP-CMRI	Hexagonal Stop Plug/Blanking Element	0	1 of 1	09/07/2019

13. Any other relevant information:

- 1) As per clause 4.2 Note-2 of IS/IEC 60079-0-2011 Equipment marked IIC is suitable for applications requiring Group IIA or Group IIB equipment.
- 2) The conduit accessories may be used individually as FLP/WP Coupling Conduit, FLP/WP Nipple Conduit, FLP/WP Adaptor Conduit and FLP/WP Reducer Conduit or combination of either conduit accessories.

14. Declaration by the Applicant/Manufacturer:

(i) As to standards with which the equipment complies in respect of:

- a) Electrical equipment for Potentially Explosive atmosphere – General requirements: IS/IEC 60079-0: 2011
- b) As to flameproof protection IS/IEC 60079-1: 2014
- c) Ingress protection as per IS/IEC 60529: 2001(Reaffirmed 2014)
- d) The above equipment may also be used in Db & Dc area as per IS/IEC 60079-31: 2013.

However no sample of the alloy was drawn from the prototype enclosure for verifying its chemical composition declared by the manufacturer.

15. Documents/Samples Submitted :

- i) Application form
- ii) Drawings
- iii) Prototype samples

16. Condition of sample received: Good

17. Compliance of prototype or sample with documents: The test sample of electrical equipment submitted for the type tests complies with the manufacturers documents referred above.

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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 Test 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. They do not vouch for the quality of the equipment in any other respect. The present test report pertains to the sample received only.

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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Test & Assessment Report No.: IN/CIMFR/TR19/H175

Dated: 15 October, 2019

REPORT OF TEST

Date of Test: 10/10/2019

Test Equipment Used:

Computer, Kistler Piezo Electric Transducer and Charge Amplifier for conducting Explosion Pressure Tests, Impact Test setup, Weatherproof Test Setup, Overpressure Test Setup,.

Result #A: Tests as per IS/IEC 60079-0: 2011:

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 : IIC, EPL Gb.	Complies
5	Temperature		
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 Enclosure and metallic part of End	Brass construction	Complies
9	Fasteners		NA
10	Interlocking devices		NA
11	Bushings		NA
12	Materials used for cementing		NA
13	Ex components		NA
14	Connection facilities and terminal compartments		NA
15	Connection facilities for earthing and bonding conductors		NA
16	Entries into enclosures		NA
17	Supplementary requirements for rotating machines		NA

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18	Supplementary requirements for switchgear		NA
19	Supplementary requirements for fuses		NA
20	Supplementary requirements for plugs and socket outlets and connectors		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		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
26.4	Test of enclosures		
26.4.2	Resistance to Impact		Complies
26.4.3/2 6.4.4	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-67	Complies
26.5	Thermal tests		
26.5.1	Temperature measurement		NA
26.5.2	Thermal shock test		NA
26.6	Torque Test for bushings		
26.6	Torque test for bushings		NA
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.8	Thermal endurance to heat		NA
26.9	Thermal endurance to cold		
26.10	Resistance to light		NA
26.11	Resistance to chemical agents for Group I Electrical 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

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27	Routine tests	<u>Manufacturer's responsibility:</u> Compliance to prototype of the product and physical measurement of gap and flamepath and hydraulic test at the pressure given in 10kg/cm ² for every sample.	
28	Manufacturer's responsibility	Conformity of the equipment to the applicable standards	Complies
29	Marking	Ex 'db' IIC Gb Ex tb IIIC Db	
30	Instructions	<i>Instruction related to use, installation, maintenance, adjustment to be provided by the manufacturer along with the equipment.</i>	

Result#A1: 1kg mass of hardened steel fallen vertically on the surface of the Ex d component and 3mm (min.) thick to create impact energy for group II equipment.

Result#A2: IP-Protection: Neolon N66GF25 FR Natural and Zytel FR95G25V0NH NC010 Flat gasket (3mm thick X 5mm width) are provided at the end of joint for weatherproof IP-67 degree of protection. Tests have been conducted as per IS/IEC 60529:2001 (Reaffirmed 2014) as tabulated below for IP-67 degree of protection.

Sl. No	Type Tests		Results
1.	Dust Test (First Numeral 6)	Clause 13.4 & 13.6	No dust had accumulated inside the enclosure. Pass
2.	Water Test (Second Numeral 7)	Clause 14.2.7	No water had accumulated inside the enclosure. Pass

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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
1	Scope		Complies
2	Normative references		Complies
3	Terms and definitions		Complies
4	Level of protection (Equipment Protection Level, EPL)	Gas Group: IIC, EPL Gb.	Complies
5	Flameproof joints	Threaded 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		NA
11	Fasteners and openings		NA
12	Materials	Brass construction	Complies
13	Entries for flameproof enclosures		NA
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)		P/as per Result#B1
15.2.3	Overpressure Test		NA
15.3	Test for non-transmission of an internal ignition		Complies
15.3.1	General		Complies
15.3.2	Electrical equipment of Groups I, IIA & IIB		NA
15.3.3	Electrical equipment of Group IIC		P/as per Result#B3
15.4	Tests of flameproof enclosures with breathing and draining devices		NA
15.4.1	General		NA

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16	Routine tests	To be conducted by the manufacturer As per Result #B2
17	Switchgear for Group I	NA
18	Lamp holders and lamp caps	NA
19	Non-metallic enclosures and non-metallic parts of enclosures	
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	NA
19.4	Test of erosion by flame	NA
20	Marking	Ex 'db' IIC Gb Ex tb IIIC Db
20.2	Caution and warning markings	"DO NOT OPEN WHILE ENERGIZED"
21	Instruction	The manufacturer shall supply instruction manual regarding flamepath, installation and maintenance manual as required by as required by IS/IEC 60079-0:2011

Result #B1: Test for Non transmission of internal ignition:

Gas Mixture: Test with 28% Hydrogen & 8% Acetylene in air for Gas Gr. IIC

No. of Tests: 5 nos. tests of each Conduit Accessories fitted with enclosure.

Test Condition: Clause 15.2. Table 6 and 15.2.2.1 (No recompression required)

Five tests for non-transmission of flame were conducted on a Group IIC FLP/WP enclosure fitted with Accessories. The gas mixture used for this test is as given below. In each test the outer explosive mixture of the FLP/WP enclosure in the test chamber was not ignited when an internal explosion occurred inside FLP/WP enclosure.

Size of Conduit Accessories	Test Ref. Nos.	Gas Group	Gas Mixture % in Air	No. of Test	Result
Size M16	EIT/1271901 to EIT/12719105	IIC	28 % Hydrogen	Five	Pass
	EIT/1271906 to EIT/1271910		8 % Acetylene		
Size M25	EIT/12719011 to EIT/12719115	IIC	28 % Hydrogen	Five	Pass
	EIT/1271916 to EIT/1271920		8 % Acetylene		
Size M40	EIT/1271921 to EIT/12719125	IIC	28 % Hydrogen	Five	Pass
	EIT/1271926 to EIT/1271930		8 % Acetylene		
Size M75	EIT/1271931 to EIT/12719135	IIC	28 % Hydrogen	Five	Pass
	EIT/1271936 to EIT/1271940		8 % Acetylene		
Size M90	EIT/1271941 to EIT/1271915	IIC	28 % Hydrogen	Five	Pass
	EIT/1271946 to EIT/1271950		8 % Acetylene		

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ULR No.: TC596219000000108F Code No.: FES/81A/19-20

CONCLUSION: The above "CABTEK" BRAND FLP-WP CONDUIT ACCESSORIES, Type No. A xx xx x, R xx, xx x, AN xx xx x, AC xx xx x, HSP xx xx x, & ASP xx xx x Series, meets the test requirements for flameproofness as per IS/IEC 60079-1:2014 & general requirements as per IS/IEC 60079-0:2011 and for weatherproof (IP-67 degree) as per IS/IEC 60529:2001 (Reaffirmed 2014). Hence, the above mentioned equipment may be used in Gas Group: IIC EPL Gb.

Reported By

M. K. Vishwakarma
14/10/2019

(M. K. VISHWAKARMA)

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Dated: 14/10/2019

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