

सीएसआईआर- केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान

(विज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
बरवा रोड, धनबाद - 826015, झारखण्ड, भारत



CSIR-Central Institute of Mining & Fuel Research
(Council of Scientific & Industrial Research)
Barwa Road, Dhanbad - 826015, Jharkhand, India

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Test & Assessment Report No.: IN/CIMFR/TR20/ 191

Dated: 17 January, 2020

ID No. 134/19

ULR No.: TC596270000000197F

TC CODE NO. FES/87/19-20

To
M/S. KESHKAMAT & CO.
9/129, ADARSH NAGAR, PRABHADEVI,
MUMBAI - 400 030

Subject: Type Examination Certificate along with test assessment report of Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens, in cast aluminium alloy LM-6 construction, designated by Model: KH19/IC, Cat. No.: KH601/IC as per IS/IEC 60079-1:2014 for use in Gas Group: IC, EPL Gb & Gb atmosphere.

-(Test Report)

Your Ref. Appli. No.: KK/CIMFR/19/01

Dated: 07/07/2019

Dear Sir,

Please find the enclosed Type Examination Certificate along with test assessment report of the above sample submitted by you.

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

Charges of Rs. 1,14,354/- (Rupees One Lakh Fourteen Thousand Three Hundred Fifty four 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 of the samples by public auction without any further NOTICE to you.

Kindly acknowledge the receipt.

Thanking you.

Yours faithfully,

S. K. Mondal
16/01/2020

(S. K. MONDAL)
HOS
TESTING CELL

Encl: As above.

1. Test assessment report in Triplicate
2. Type Examination Certificate

Copy to: 1. Head, Flameproof & equipment Safety
2. Bill section



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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण प्रमाण पत्र / TEST CERTIFICATE



NABL, Certificate No. | TC-8962

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

(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197P

Code No.: PES/87/19-20

Test & Assessment Report No.: IN/CIMFR/TR20/ 191

Dated: 17 January, 2020

Application Ref. No.: KK/CIMFR/20/01

Dated: 07/07/2019

1. Applicant : M/S. KESHKAMAT & CO.
9/129, ADARSH NAGAR, PRAHHADEVI,
MUMBAI - 400 030
2. Manufacturer : Same as above
3. Equipment : Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens.
4. Designated by : Model: KH19/IIC, Cat. No.: KH601/IIC.
5. Type of protection : Ex d for Gas Group: IIC, EPL Gb.
6. Electrical ratings : rated 12V/2A DC with incoming 240V AC.
7. Temperature Class : T6.
8. Degree of Ingress Protection : IP-66.
9. Material of Construction : Cast Aluminium Alloy LM-6 construction.

10. Description of the equipment: Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens.

A.

Description/ dimension	Volume (in cc).		Min. Wall Thickness (mm)	Nos. & Size of Bolts/Fasteners in (mm)
	Gross	Net		
Single enclosure	4100	750	7mm	08 nos. M6x30mm long Allen head bolts with spring washers

B

Glass details *	Max no. of aperture on cover
Size = Ø90mm, Shape = Circular Type = Toughened Glass, Thickness = 15mm Cemented Path = 25mm, Sealing material = Epoxy Resin+Hardner Make = Araldite, Colour = White (COT: -20°C to +120°C)	

A. K. Kishore

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परीक्षण रिपोर्ट / TEST REPORT

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

(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F Code No.: FES/87/19-20

10. Nature of Flameproof Joint: Type of joints and gaps (Spigot joint, Cylindrical, Flange joint & Threaded joint)

Sl. No.	Description (flamepath and location)	Type of joint	Min. Flamepath in mm		Maximum dia. Clearance/gap & Thd. in mm	
			Req.	Spec.	Req.	Spec.
1.	Between glass cover and body	Threaded	8	20	5T	13 (L.75p)
2.	Between rear cover and body	Threaded	8	20	5T	13 (L.75p)

Max. No. & size of cable entries: cable entries of details

Sr. No.	Max. Size of Cable Entries	Nos. of Cable entries provided in test sample			
		Side - A	Side - B	Side - C	Side - D
1.	M25X1.5P (L = 14mm, T=8nos.)	01	NA	NA	NA
2.	M19X1.5P (L = 20mm, T=13nos.)	01	NA	NA	NA

11. Name plate and warning inscription: The name-cum-warning inscription plate and rating plate made of Brass/SS is permanently fixed on the body of enclosure by hammer driven rivets leaving min. 3mm material thickness below the rivets. The warning inscription shall read as "ISOLATE SUPPLY BEFORE OEPNING".

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.

Sl. No.	Drg. No.	Title	Rev.	Page No.	Date
1.	KK/CCTV/KH19/IC	FLAMEPROOF CUM WEATHERPROOF ENCLOSURE FOR CCTV CAMERA & LENS (FOR GAS GROUP-IC ZONE-1 & ZONE-2)	0	1 of 4 To 4 of 4	25/04/2019

13. Any other relevant information:

- 1) As per Clause 4.2 Note - 2 of IS/IEC 60079-0:2011 the equipment mark IIC is suitable for application requiring IIA & IIB equipment, As per Clause 4.3 Note of IS/IEC 60079-0:2011 the equipment mark IIC is suitable for application requiring IIIA or IIIB equipment.
- 2) The material of construction of the enclosure may be CI/MS/SS/cast aluminium alloy instead of aluminium alloy LM-6 construction.
- 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) The above equipment may also be used in Db & Dc area as per IS/IEC 60079-31: 2013.

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)

B. Anand

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परीक्षण रिपोर्ट / TEST REPORT

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(ii) Composition of the cast aluminum alloy LM-6 declared by the manufacturer: Composition of cast aluminum alloy LM-6 purported to be forming the material of construction of the enclosure has been declared by the manufacturer in the drawing having Mg, 0.1%. If constructed of copper or copper alloy should be less than 60% of copper content.

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.

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.

[Signature]

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परीक्षण रिपोर्ट / TEST REPORT

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FORMAT NO.: (CIMFR: DQM: FLPO2: F-01:REV-01)

(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F

Code No.: FES/87/19-20

Test & Assessment Report No.: IN/CIMFR/TR20/ 191

Dated: 17 January, 2020

REPORT OF TEST

Date of Test: 02/09/2019.

Test Equipment Used:

Computer, Kistler Piezo Electric Transducer and Charge Amplifier for conducting Explosion Pressure Tests, Impact test setup, Ingress protection (IP) test setup, Thermal shock test setup, Temperature class test setup, Overpressure Test Setup.
Result #A: Tests as per IS/IEC 60079-0: 2011:

Type Tests			
Clause	Tests	Remarks	Results (Complies, F- 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	Cast aluminium alloy LM-6 construction	Complies
9	Fasteners		Complies
10	Interlocking devices	Cheese Head Screw	Complies
11	Bushings		NA
12	Materials used for cementing/sealing	Epoxy Resin+Hardner Make = Araldite COT: - 20°C to +120°C	Complies
13	Ex components		NA
14	Connection facilities and terminal compartments		NA
15	Connection facilities for earthing and bonding conductors		Complies
16	Entries into enclosures		Complies
17	Supplementary requirements for rotating machines		NA
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

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(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F

Code No.: FES/87/19-20

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 61 070-1: 2014	Complies
26.4	Test of enclosures		Complies
26.4.2	Resistance to Impact		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-66	Complies
26.5	Thermal tests		
26.5.1	Temperature measurement	T6	Complies
26.5.2	Thermal shock test		Complies
26.6	Torque test for bushings		NA
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.8	Thermal endurance to heat	Annexure-I	Complies
26.9	Thermal endurance to cold		NA
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
27	Routine tests	Manufacturer's responsibility: Compliance to prototype of the product and physical measurement of gap and flamepath and over pressure test at the pressure 10kg/cm ² for every sample without any deformation and result must be recorded.	
28	Manufacturer's responsibility	Conformity of the equipment to the applicable standards	Complies
29	Marking	Ex d IIC T6 Gb Ex tb IIC T85° Db	
30	Instructions	Instruction related to use, installation, maintenance, adjustment to be provided by the manufacturer along with the equipment.	

BAHAR

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(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F Code No.: PES/87/19-20

Result#A1: 1kg mass of hardened steel fallen vertically on the surface of the Ex d enclosure and 15mm thick round toughened glass to create impact energy for group II equipment. No significant damage was observed.

Result#A2: The surface temperature rise classification of the above apparatus has been determined by supplying 110% of rated supply (230V AC) to the terminal mounted inside the enclosure and the surface temperature classification is considered as T6 at maximum ambient temperature of 40°C.

Result#A3: The 15mm thick Toughened glass was subjected to thermal shock test at maximum service temperature. No significant damage was observed.

Result#A4: IP-Protection: Neoprene 'O' ring rubber gasket (3mm thick) is provided at the end of each joint for Weatherproof IP-66 degree of protection.

Tests as per IS/IEC 60529:2001 (Reaffirmed 2014)

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 6)	Clause 14.2.6	No water had accumulated inside the enclosure. Pass

Signature

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Equipment ID No.: 134/19

ULR No.: TC596220000000197F Code No.: FES/87/19-20

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: Gh.	Complies
5	Flameproof joints	Threaded joint	Complies
6	Sealed joints		
6.1	Cemented joints		Complies
6.1.2	Mechanical strength:		Complies
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		Complies
12	Materials	Cast aluminium alloy LM-6 construction	Complies
13	Entries for flameproof enclosures		Complies
14	Verification and tests		Complies
15	Type Tests		
15.1	General		Complies
15.2	Tests of ability of the enclosure to withstand pressure		
15.2.1	General		Complies
15.2.2	Determination of Explosion Pressure (Reference Pressure)		Complies
15.2.3	Overpressure Test	10kg/cm ²	Complies
15.3	Test for non-transmission of an internal ignition		
15.3.1	General		Complies
15.3.2	Electrical equipment of Groups I, IIA & IIB		NA
15.3.3	Electrical equipment of Group IIC		Complies
15.4	Tests of flameproof enclosures with breathing and draining devices		
15.4.1	General		NA
16	Routine tests	To be conducted by the manufacturer at pressure 10kg/cm ² for every sample.	
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

P. H. Arora

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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 d IIC T6 Gb Ex th IIC T85° Db
20.2	Caution and warning markings	"ISOLATE SUPPLY BEFORE OPENING"
21	Instruction	The manufacturer shall supply instruction regarding flamepath etc. As per required by IS/IEC 60079-0:2011

Result # B1: Determination of Explosion pressure (Reference Pressure Test) *:

Gas mixture: Test with 31% Hydrogen in air and 14% Acetylene in air.

No. of tests: 5 nos. test with Single enclosure for each gas.

Test Condition: Enclosure fitted with component and clause 15.2.2.2

Preliminary Pressure (reference pressure) Test

Ignition - spark position	Gauge - sensor Position	Test with 31% Hydrogen in air			Test with 14% Acetylene in air			Remark
		Test Ref. No.	Max. Pressure in Bar	Time of Pressure rise in ms.	Test Ref. No.	Max. Pressure in Bar	Time of Pressure rise in ms.	
Main Enclosure								
Body	Body	PPM/1341901	3.58	30.24	PPM/1341906	5.62	15.90	Satisfactory
Body	Body	PPM/1341902	4.14	15.36	PPM/1341907	6.95	20.34	Satisfactory
Body	Body	PPM/1341903	3.83	14.52	PPM/1341908	5.39	31.14	Satisfactory
Body	Body	PPM/1341904	4.39	13.20	PPM/1341909	6.21	22.56	Satisfactory
Body	Body	PPM/1341905	3.59	16.62	PPM/1341910	6.66	22.26	Satisfactory

*Results shown for the pressure time curve (enclosed) are the highest recorded value obtained in the test.

Result #B2: Overpressure Test (Static Method): Overpressure test is conducted as per Cl. 15.2.3.2 of IS/IEC 60079-1: 2014.

Enclosure	Test reference no. *	Over pressure (kg/cm ²) maintained for 1 min.	Remark
Main Enclosure	OPM/1341911	10 kg/cm ²	No damage or deformation

Signature

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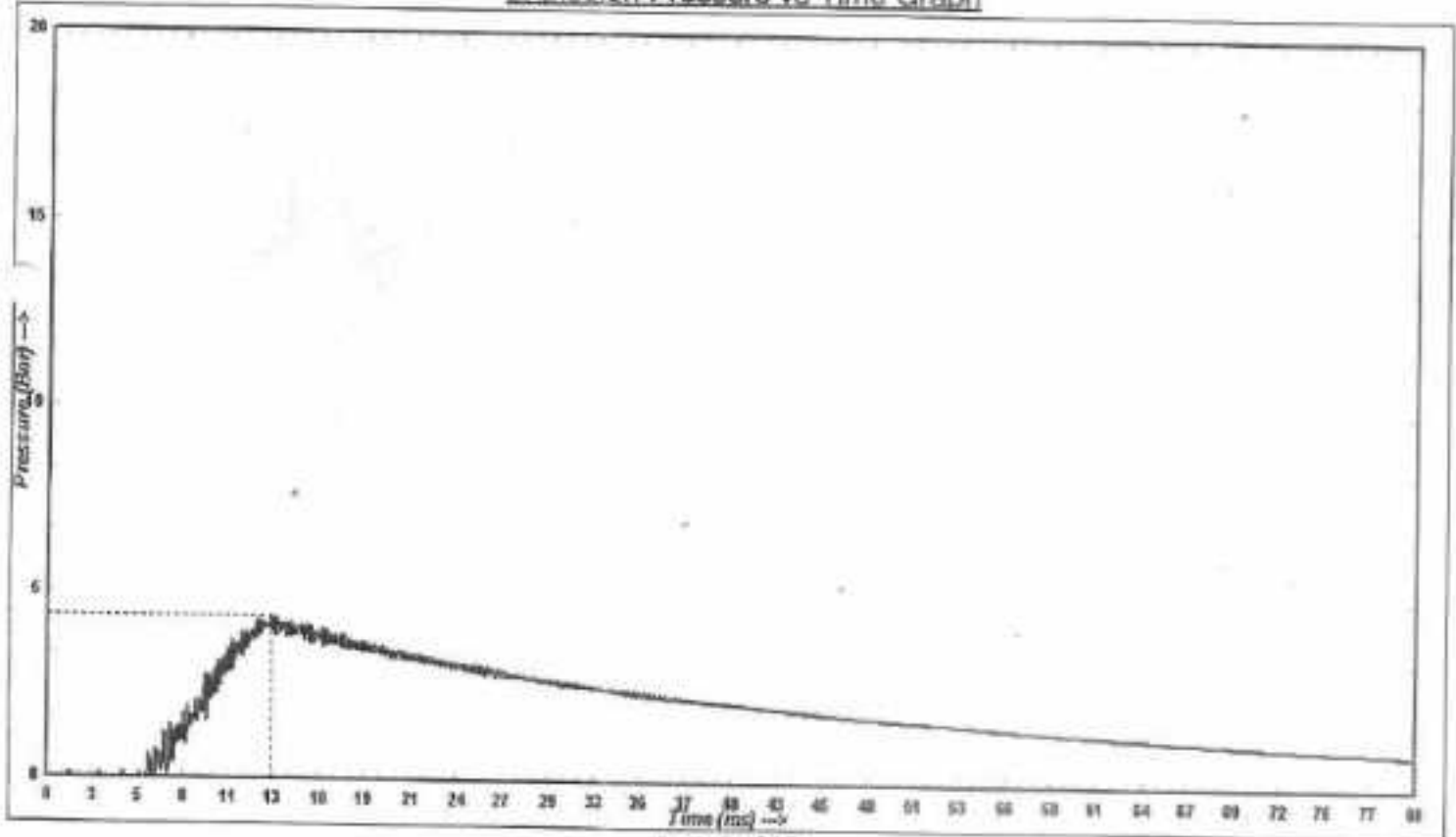
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Barwa Road, Dhanbad - 826015, Jharkhand, India

ID Number: 134/19 Code Number: FES/87/19-
ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY
Test Date: 02/09/2019
परीक्षण प्रमाण पत्र / TEST CERTIFICATE

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Manufacturer Details : M/S KESHKAMAT & COMPANY
Manufacturer Address : MUMBAI - 400 030 .
Model / Type : MODEL NO. : KH19/IC
Category No. : CAT. NO. : KK/010/IC
Gas : HYDROGEN
Gas Group : IIC
Equipment Details : FLPWP ENCL. FOR CCTV CAMERA & LENS
Enclosure Details : SINGLE ENCLOSURE
Serial / Badge No. : NA
Peak Pressure : 4.39 Bar at 13.2 ms

Explosion Pressure vs Time Graph



Bishajit Ghosh
13/01/2020
(Testing Officer)

[Signature]
13/01/2020
(Discipline Head)

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

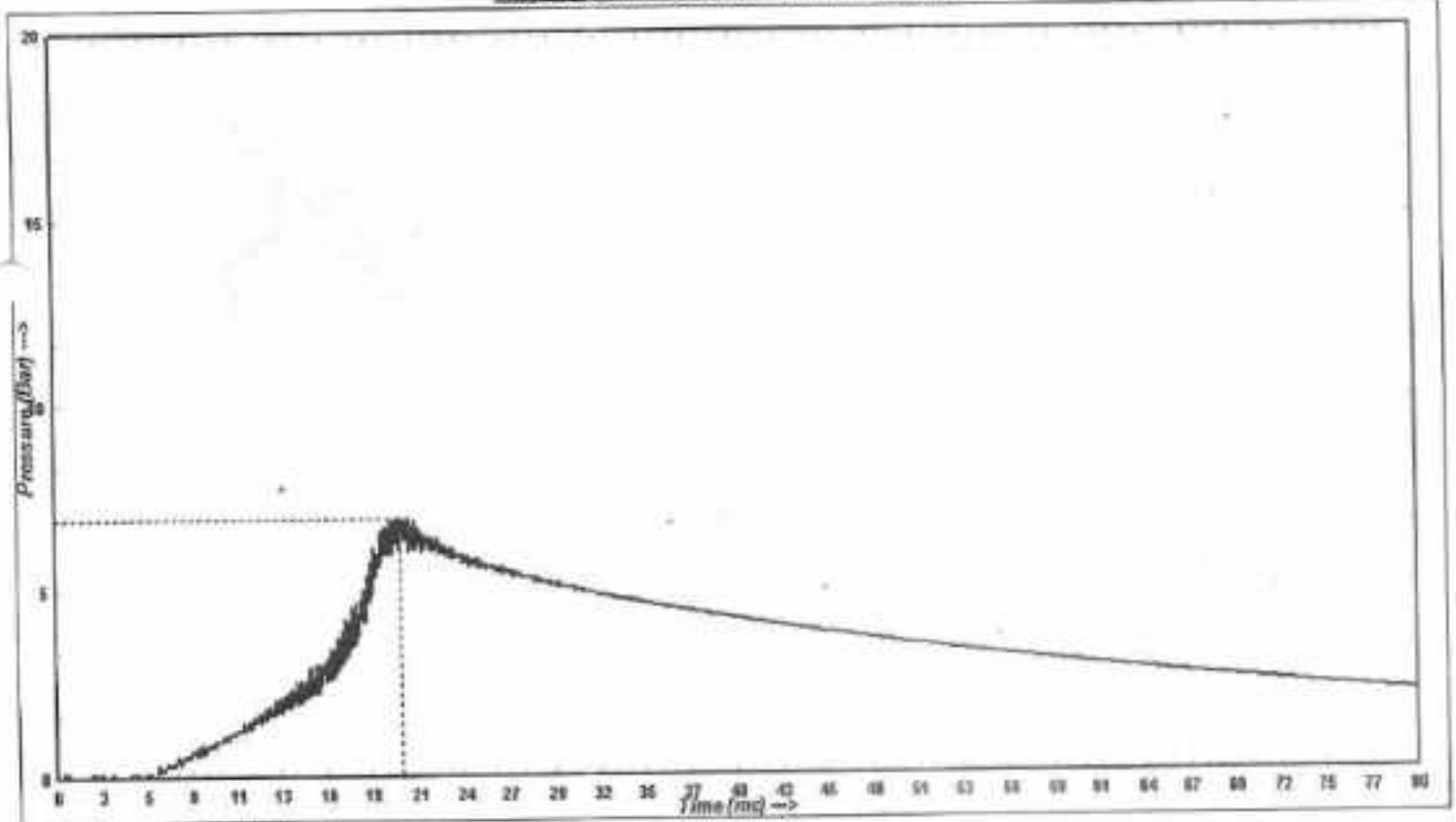


ID Number: 134/19 Code Number: FES/87/19
ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY
Test Date: 08/09/2019
परिक्षण प्रमाण पत्र / TEST CERTIFICATE

मूल प्रति
ORIGINAL COPY

Manufacturer Details: M/S KESHUKAMA & COMPANY
Manufacturer Address: MUMBAI - 400 030
Model / Type: MODEL NO.: KH19/IC
Category No.: CAT. NO.: KK6010/IC
Gas: ACETYLENE
Gas Group: IIC
Equipment Details: FLPWP ENCL. FOR CCTV CAMERA & LENS
Enclosure Details: SINGLE ENCLOSURE
Serial / Badge No.: NA
Peak Pressure: 6.95 Bar at 20.34 ms

Explosion Pressure vs Time Graph



Bishujit Khande
13/01/2020
(Testing Officer)

[Signature]
(Discipline Head)
13/01/2020

सीएसआईआर-केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान

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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण रिपोर्ट / TEST REPORT



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

(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F

Code No.: FES/87/19-20

Result #B3: Test for Non transmission of internal ignition:

Gas Mixture: Test with 28% Hydrogen and 7.5% Acetylene in air for Gas Gr. IIC

No. of Tests: 5 nos. tests with single enclosure for each gas

Test Condition: 15.3.3.2 (No pre compression required)

Enclosure	Test Ref. Nos.	Gas Group	Gas Mixture % In Air	No. of Test	Result
Single Enclosure	EIT/1341912 to EIT/1341916	IIC	28 % Hydrogen	Five	Pass
	EIT/1341917 to EIT/1341921		7.5 % Acetylene		

Table #C: Tests of enclosure for dust ignition protection as per IS/IEC 60079-31: 2013:

Type Tests		Results (Complies, P- Pass, NA-Not Applicable, F-Fail)	References
5.1.1	Nature of joint	Complies	Complies
5.1.2	Gasket and seals	Complies	Complies
5.1.3	Cemented joints	Complies	NA
5.1.4	Operating rods, spindles and shafts	Complies	NA
5.1.5	Windows	Complies	Complies
5.2.1	Cable glands	Use only certified and approved cable gland	Complies
5.2.2	Threaded entries	Min. 5 threads	Complies
6.1.1	Type tests for dust exclusion by enclosures	IP-66	Complies
6.1.2	Thermal test	T6	Complies
6.1.3	Pressure test	10 kg/cm ²	Complies
6.2	Routine test	10kg/cm ²	To be done by manufacturer
7	Marking	(Ex d IIC T6 Gb) (Ex tb IIC T85° C Db)	

CONCLUSION: The Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens, in cast aluminium alloy LM-6 construction, designated by Model: KH19/IIC, Cat. No.: KH601/IIC, meets the test requirements of flameproof as per IS/IEC 60079-1:2014, general requirements as per IS/IEC 60079-0:2011 and Dust ignition protection as per IS/IEC 60079-31:2013 and is deemed to be suitable for use in Gas Group: IIC and EPL Gb & Db atmosphere.

Reported By

Bahajit Modak
(B. MODAK) 13/01/2020

Technical Officer

Dated: 13th January, 2020

Flameproof & Equipment Safety

CSIR - Central Institute of Mining & Fuel Research

Barwa Road, DHANBAD - 826 015,

(JHARKHAND), INDIA

Checked & Approved By

A.K. Singh
(A.K. SINGH) 13/01/2020
Chief Scientist & HOS
Flameproof & Equipment Safety

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 रिपोर्ट / TEST REPORT

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

(Flameproof & Equipment Safety)

Equipment ID No.: 134/19

ULR No.: TC596220000000197F

Code No.: FES/87/19-20

ANNEXURE-I

Thermal endurance to heat & cold.

Cementing Materials:

- Composition : Epoxy Resin and Hardener
- Ratio : 1:1 (by volume)
- Make : Araldite
- Color : White
- COT: -20°C to +120°C

Thermal Endurance to Heat test as per Clause No. 26.8 of IS/IEC 60079-0:2011.

Date & Time of test: 10/10/2019 10.00 Hrs. to 10/11/2019 10.00 Hrs.					
Duration	Specified Temp.	Tested Temp.	Specified RH%	Observed RH%	Remarks
4 weeks	$T_s \leq 70^\circ\text{C}$	$82 \pm 2^\circ\text{C}$	$90 \pm 5\%$	85%	The maximum service temperature (T_s) of the hottest component at the max. ambient temp. of 40°C is less than 70°C . Hence specified test is conducted at $80 \pm 2^\circ\text{C}$ for first 4 weeks.

Thermal Endurance to Cold test as per Clause No. 26.9 IS/IEC 60079-0:2011.

Start Date & Time of test: 11/11/2019 11.00Hrs. to 12/11/2019 11.00 Hrs.		
Duration	Tested Temp.	Remark
24 Hrs	-25°C	The test is conducted at lower temperature, minimum service temperature reduced to -25°C as per 26.7.2.

Visual observations after Endurance to heat and Cold Tests: No change in colour of potting material and development of cracks and no damage or deformation after overpressure test (static method).

Signature
 13/01/2020



सीएसआईआर-केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान

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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण प्रमाण पत्र / TEST CERTIFICATE



NABL Certificate No.: TC-8962

TYPE EXAMINATION CERTIFICATE

FORMAT NO.: (CIMFR: DQM: FLPO2: F-01: REV-01)
(Flameproof & Equipment Safety)

Certificate No.: CMF 20 INEX 0080
ID. NO. 134/19

ULR No.: TC596220000000197F

Dated: 13/01/2020
(Issue No. 0)

1. Applicant : M/S. KESHKAMAT & CO.
9/129, ADARSH NAGAR, PRABHADEVI,
MUMBAI - 400 030.
2. Manufacturer : Same as above.
3. Equipment : Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens.
4. Designated by : Model: KH19/IIIC, Cat. No.: KH601/IIIC.
5. Type of protection : Ex d for Gas Group IIC EPL Gb & Db.
6. Marking : (Ex d IIC T6 Gb) (Ex tb IIC T85°C Db)

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. Standard: 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 60079-0:2011	Explosive atmospheres - Part 0: General requirements.
IS/IEC 60079-1:2014	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d".
IS/IEC 60079-31:2013	Explosive atmospheres - Part 31: Equipment Dust ignition protection by enclosure "d".

This type test certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the standards listed above.

8. Degree of ingress protection: IP-66 as per IS IEC 60529:2001 (Reaffirmed 2014).

9. Test & Assessment Reports: A sample(s)/documents of the equipment listed have successfully meet the examination and test requirements as recorded in INC/CIMFR/TR20/ 191 Dated: 17 January, 2020.



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

KH19/IC 15



NABL, Certificate No.: TC-5962

TYPE EXAMINATION CERTIFICATE

Certificate No.: CMF 20 INEx 0080

Dated: 13/01/2020

SCHEDULE

10. **Description of equipment:** Flameproof cum Weatherproof Enclosure for CCTV Camera & Lens, Model: KH19/IC, Cat. No.: KH601/IC, rated 12V/2A DC with incoming 240V AC, material of construction Cast Aluminium Alloy LM-6.

Enclosure Type	Volume (in cc).		Dimension (mm) LxBxH	Rating	Temp. Class
	Gross	Nett			
Single enclosure	4100	750	Ø113x304mm	12V/2A DC with incoming 240V AC	T6

11. Drawing and documents:

Sl. No.	Drng. No.	Title	Rev.	Sheet	Date
1.	KK/CCTV/KH19/IC	FLAMEPROOF CUM WEATHERPROOF ENCLOSURE FOR CCTV CAMERA & LENS (FOR GAS GROUP-IIC ZONE-1 & ZONE-2)	0	1 of 4 To 4 of 4	25/04/2019

12. **Routine Testing:** A routine overpressure test in accordance with IS IEC 60079-1:2014 clause 16 shall be carried out at a pressure of 10 Kg/cm² 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 and no leakage through the walls of the enclosure is observed.

13. **Specific conditions of use:** Not Applicable

14. **Details of certificate changes (for issue 1 and above):** Not applicable.

15. **Additional Information:** Not Applicable

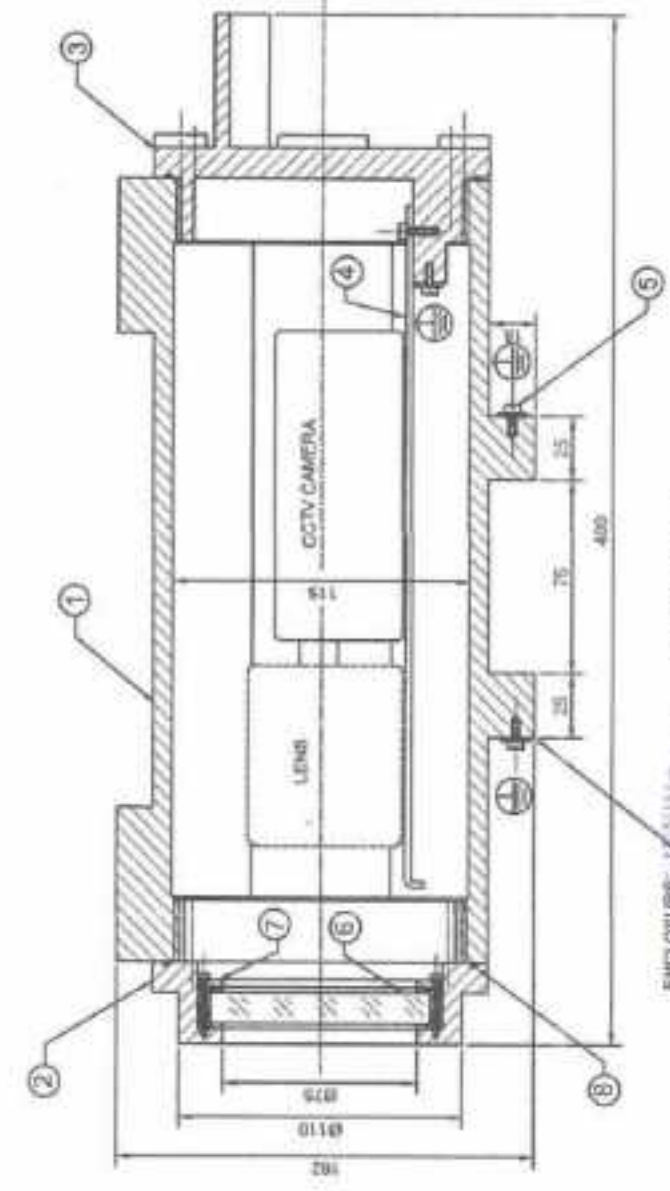
16. **History:** CMF 20 INEx 0080, Issue 0, dated 13/01/2020.

Approved & issued on behalf of CSIR-CIMFR


(Dr. A. K. Singh)
Chief Scientist & HOS

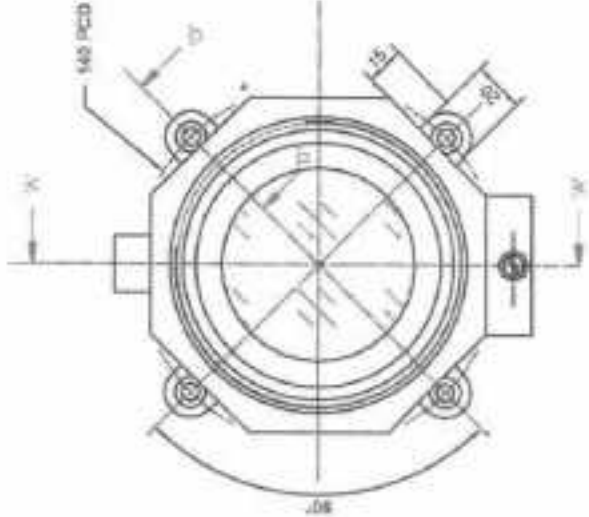
This Institute reserves the right to review, amend or withdraw this Type Examination certificate at any time if considered necessary in the interest of safety.

KH19/IIC (15)

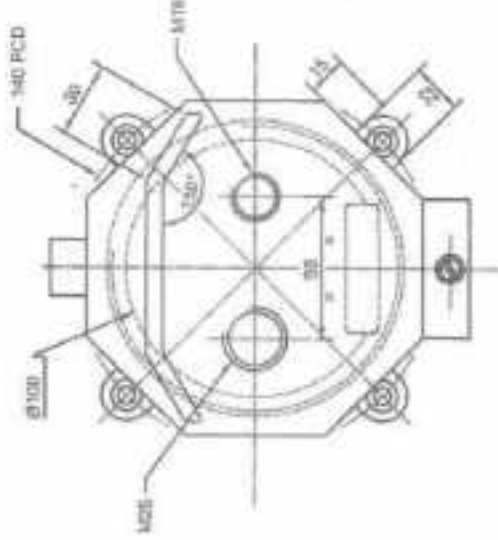


SECTION A-A

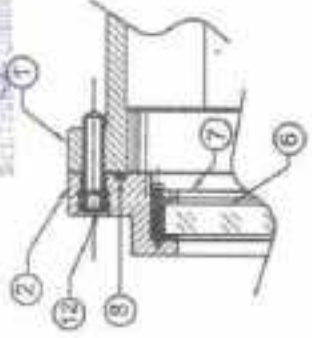
ENCLOSURE MOUNTING PAD
 CHAMBERAD (PARTS)
 CENTRAL INSTITUTION FOR PETROLEUM SAFETY
 NO. IN/MS/17/34 191
 DATED 17/01/2020
 Bishajit Ghosh
 Sr. Trainee Engineer



FRONT VIEW



REAR VIEW



SECTION D-D

ALL DIMENSIONS ARE IN MM.
 TOLERANCE IN OVERALL DIMENSIONS +/- 0.15mm.
 EXCEPT FOR FLAME PATH & GAP

TITLE: FLAMEPROOF CLIM WEATHERPROOF ENCLOSURE FOR CCTV CAMERA & LENS (FOR GAS GROUP - B C ZONE-1 & ZONE-2)

MODEL: KH19/IIC

AS PER: IS/IEC: 60079-1 (2014)
 IS/IEC: 60079-0 (2011)
 IS/IEC: 60529 (2001)

CAT NO. KH601/IIC

DRG. NO. KK/CCTV/KH19/IIC

SHEET 1 OF 4

SIZE B

REV. NO.	REV. DATE	DOC. GA	CHECKED	ENGINEER	APPD.	SCALE
0	25.04.2019				ORIGINAL	N.T.B.
					CHANGE	

DRAWN: *Jayaram*
 CHECKED: *[Signature]*
 ENGINEER: *[Signature]*

Keshkamat & Company
 MUMBAI - 400 006

BILL OF MATERIAL

SIR. NO.	DESCRIPTION	MATERIAL	QTY.	REMARKS
1	ENCLOSURE BODY FOR CAMERA AND LENS	LMB	1	
2	FRONT COVER WITH GLASS	LMB	1	
3	REAR COVER FOR ENCLOSURE	LMB	1	
4	PLATFORM FOR MOUNTING CCTV CAMERA	LMB	1	
5	CHEESE HEAD SCREW WITH SPRING WASHER FOR EARTHING	BRASS	3	M8 x 10 LG
6	TOUGHENED GLASS	GLASS	1	690 x 10 THK
7	GLASS HOLDING RING	LMB	1	
8	O' RING / CORD GASKET	NEOPRENE	2	Ø3 ENDLESS
9	WARNING PLATE	SS	1	
10	NAME PLATE	SS	1	
11	TERMINAL BLOCK	BACKELLITE	1	
12	HARDWARE FOR MOUNTING END	SS	4	M10 x 90 LG
	ALLEN HEAD BOLTS WITH SPRING WASHERS	SS	6	M8 x 30 LG
	CHEESE HEAD SCREW	SS	4	M4 x 10 LG
	PEVETS DIA 3mm / 2.5mm	SS	12	

ALL DIMENSIONS ARE IN MM TOLERANCE IN OVERALL DIMENSIONS +/- 0.1mm EXCEPT FOR FLAME PATH & GAP	
TITLE: FLAMEPROOF CUM WEATHERPROOF ENCLOSURE FOR CCTV CAMERA & LENS (FOR GAS GROUP - II C ZONE-I & ZONE-2)	
MODEL: KH19/IC	
AS PER: IS/IEC: 60079-1 (2014) IS/IEC: 60079-0 (2011) IS/IEC: 60529 (2001)	
CAT NO: KH601/IC	
SHEET 3 OF 4	
SIZE B	

NOTE DETAILS:-
FLAMEPROOF, WEATHERPROOF ENCLOSURE FOR CCTV CAMERA AND LENS IS MADE AS PER SPECIFICATIONS GIVEN BELOW AND AS PER GAS GROUP - II C ZONE-1 & ZONE-2:-

- MATERIAL OF CONSTRUCTION - IS LMB THE COMPOSITION IS AS GIVEN BELOW.
COPPER = 0.1 % MAX., MAGNESIUM = 0.1 %, IRON = 0.5 %, ZINC = 0.1 % MAX., LEAD = 0.1 % MAX., MANGANESE = 0.5 % MAX., NICKEL = 0.1 % MAX., SULPHUR = 10 - 13 % MAX., TITANIUM = 0.2 % MAX., TIN = 0.05 % MAX., ALUMINIUM = 25 TO 40 % MAX., SURFACE FINISH - 6.3 MICRONS.
- 25mm IS MAINTAINED AS FLAME PATH ALONG THE THREADED JOINTS AT FRONT AND REAR COVERS. NEOPRENE GASKET IS PROVIDED ON THE FLANGE PORTIONS FOR WEATHERPROOFING. THESE ARE ONLY SUPPLEMENT AND DO NOT FORM PART OF FLAMEPROOF JOINTS. ANY DISPLACEMENT OF THE GASKET WILL NOT HAMPER FLAMEPROOFNESS OF THE EQUIPMENT. BODY & PITCH OF THREADED COVERS (FRONT & REAR) IS ± 2.1mm.
- THE MATERIAL THICKNESS AT THE BOTTOM AND AROUND THE TAPPED HOLES AND BLIND HOLES IS ± 2.5mm.
- ALL THE STUDS AND SCREWS MADE FROM HIGH TENSILE STRENGTH STEEL OR SS HAVING YIELD STRENGTH 240 N/ Sq. M.
- NAME PLATE AND WARNING PLATE MADE OF S.S. MATERIAL ARE PROVIDED AND ARE FIXED WITH HAMMER DRIVE RIVETS.
- TWO NO. CABLE ENTRY PORTS (M8 x 1.5P) ARE PROVIDED FOR CABLES.
- WALL THICKNESS IS MAINTAINED ± 2mm MIN.
- HYDRO TEST PROCEDURE DETAILS:
STATIC PRESSURE = 10 KG/CM² OR 1.5 TIMES TEST PRESSURE WHICH-EVER IS GREATER.
- INGRESS PROTECTION - IP : 66/7.
- GROSS VOLUME = 4100 CC.
- ACTUAL VOLUME = 285 CC.
- TEMPERATURE CLASS = T6.
- MINIMUM THICKNESS AROUND ALL HOLES FOR BOLT / SCREW = 6mm.
- EARTHING OF THE ENCLOSURE IS DONE AT INSIDE AND OUTSIDE AS SHOWN WITH M8 x 10 LG CHEESE HEAD SCREWS WHICH HAS THREADED AND FIRM NON CORROSIVE BONDING. EARTHING CONDUCTOR USED SHOULD BE 4mm² EXTERNALLY.
- MAXIMUM WIDTH / GAP OF THE FLANGED PORTION OF THE THREADED JOINT ≤ 0.5mm.
- THE TOUGHENED GLASS IS FIXED IN THE FRONT COVER OF THE ENCLOSURE WITH ANALGITE SEALANT COAT 120° C.
- THE TERMINATIONS OF THE CABLES ARE PROVIDED ON THE TERMINAL BLOCK CABLE ENTRY THROUGH 2 FLAMEPROOF CABLE GLANDS.
- NEOPRENE GASKET Ø 3mm O' RING ENDLESS IS USED FOR IP : 66/7 PROTECTION ON THE FRONT AND REAR COVER OF ENCLOSURE, PROVIDED ON THE REAR COVER. O' RING WILL BE RETAINED WITH COVER.
- DEPTH OF THREADS AND BOLT ENGAGEMENT IS MAINTAINED TO 20mm AS PER REQUIREMENTS OF IS/IEC STANDARD.
- PITCH BETWEEN TWO CABLE GLAND ENTRY ≤ 25 mm. AS SHOWN IN THE DRAWING.
- ELECTRICAL RATING : 110 V AC / 240 V AC, 250 WATTS FOR CCTV CAMERA AND LENS.
* 110 V AC / 240 V AC, 25 WATTS FOR HEATER BLOWER UNIT.

DHANSHAD
6017651
INJENIYER/2024/191
DATE: 17/01/2026
DR. H. S. HANU
DESIGNER

REV. NO.	REV. DATE	DESCRIPTION	SCALE
0	18.04.2019	ORIGINAL	N.T.S.
		CHANGE	
		APPD	
		CHECKED	ENGINEER
		DRAWN	

Keshkammat & Company
MUMBAI - 400 030



NAME PLATE
(ITEM NO. 10)



WARNING PLATE
(ITEM NO. 9)

INSTITUTE OF MINING & FUEL RESEARCH
DHANBAD
(JHARKA)
MINING SAFETY
DEPARTMENT
LN/CIMFR/TR30/191
D.D. 17/01/2020
Bidwaj Mohale
Officer
A.L.
NCS

ALL DIMENSIONS ARE IN mm.
TOLERANCE IN OVERALL DIMENSIONS ± 10 mm.
EXCEPT FOR FLAME PATH & GAP

REV. NO.	REV. DATE	CHANGE	APPR.
0	25.04.2018	ORIGINAL	

	DOC. GA	DIM mm	SCALE M.T.S.
DRAWN <i>Samson</i>	CHECKED <i>GA</i>	ENGINEER <i>Keshkamat</i>	

TITLE: FLAMEPROOF CUM WEATHERPROOF ENCLOSURE FOR CCTV CAMERA & LENS (FOR GAS GROUP - II C ZONE-1 & ZONE-2)	
MODEL:	KH19/IIC
AS PER:	IS/IEC: 60079-1 (2014) IS/IEC: 60079-0 (2011) IS/IEC: 60529 (2001)
CAT NO.	KH601/IIC
DRG. NO.	KK/CCTV/KH19/IIC
SHEET	4 OF 4
SIZE	B

Keshkamat & Company
MUMBAI - 400 030

KH19/IEC19