

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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SPEED POST/COURIER SERVICE

Test & Assessment Report No.: IN/CIMFR/TR20/ 236

Dated: 21 January, 2020

ID. NO.: 138/19

ULR No.: TC59622000000209F

TC CODE NO. FES/87 A/19-20

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

Subject: Type Examination Certificate along with test assessment report of Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure, in cast aluminium Alloy LM-6 construction designated by Model: KK/LED/19, Cat. No.: KK/LED/TR/2019/A/IIB construction as per IS/IEC: 60079-1:2014 for use in Gas Group: IIB, EPL, Gb atmosphere.

- (Test Report)

Your Ref. Appli. No.: KK/CIMFR/19/02

Dated: 07/07/2019

Dear Sir,

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

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

Charges of Rs. 49,690/- (Rupees Forty Nine Thousand Six Hundred & Ninety Only) including applicable service tax involved towards the testing have been adjusted against the advance deposit made by you.

Kindly acknowledge the receipt.

Thanking you.

Yours faithfully,

S. K. Mondal
21/01/2020

(S. K. MONDAL)
HOS
TESTING CELL

Encl: As above.

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

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



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Barwa Road, Dhanbad - 826015, Jharkhand, India

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण प्रमाण पत्र / TEST CERTIFICATE



NAEIL, Certificate No.: TC-5962

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FORMAT NO.: (CIMFR: DQM: PLO2: F-01:REV-01)
(Flameproof & Equipment Safety)

Equipment ID No.: 138/19 ULR No.: TC596220000000209F Code No. FES/87A/19-20

Test & Assessment Report No.: IN/CIMFR/TR20/236 Dated: 21 January, 2020

Application Ref. No.: KK/CIMFR/19/02 Dated: 07/07/2019

- Applicant : M/S. KESHKAMAT & COMPANY
9/129, ADARSH NAGAR, PRABHADEVLI,
MUMBAI - 400 030
- Manufacturer : Same as above
- Equipment : Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure.
- Designated by : Model: KK/LED/19, Cat. No.: KK/LED/IR/2019/A/11B.
- Type of protection : Ex d for Group : IIB, EPL Gb & Db.
- Electrical ratings : Rated 240V AC, 23W LED.
- Temperature Class : T6
- Degree of Ingress Protection : IP-66
- Material of Construction : Cast aluminium Alloy LM-6 construction.
- Description of the equipment: Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure.

A.

Enclosure Type	Volume (cc).		Dimension (mm) LxBxH	Min. Wall Thickness (mm)	Nos. & Size of Bolts/Fasteners in (mm)
	Gross	Net			
Single Enclosure	6600	800	310x310x284	10mm	16 Nos. M6x35L.

B.

Glass details	Max. no. of aperture on cover
Size - 212x212mm, Shape = Square	One No.
Type - Toughened Polished, Thickness = 16mm	
Cement path = 28mm, Sealing compound = Epoxy Resin+hardner	
Make - Araldite	
DOT - -20°C to 120°C	

B/M Model

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परीक्षण रिपोर्ट / TEST REPORT

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FORMAT NO.: (CIMPR: DQM: FLPO2: P-01:REV-01)

(Flameproof & Equipment Safety)

Equipment ID No.: 138/19 ULR No.: TC596220000000209F Code No. PES/87A/19-20

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

Sr. No	Location of flamepath	Type of Joint	Min. length of flamepath (in mm)		Max. gap (in mm)/no. of threads (pitch)	
			Req.	Spec.	Req.	Spec.
1.	Between enclosure body and glass cover	Flange	l = 8 L = 12.5	l = 8 L = 21	0.20	0.15
2.	Between body and cover	Threaded	8	20	5T	13T(1.5P)

Max No. & size of external/exit cable entries: Maximum threaded entry is provided for attachment of certified and approved FLP/WP double compression type cable glands as follows.

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 = 20mm, T=13nos.)	01	NA	NA	NA
2	M19X1.5P (L = 20mm, T=13nos.)	NA	01	NA	NA

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 "ISOLATE SUPPLY BEFORE OPENING".

13. Drawing: 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 & IS/IEC 60529: 2001 (Reaffirmed 2014).

Sl. No.	Dwg. No.	Title	Rev.	Sheet	Date
1.	KK/LED/2019/01	FLAMEPROOF CUM WEATHERPROOF LED/LR LIGHTING FITTING ENCLOSURE (FOR GAS GROUP-IIB ZONE 1)	0	1 of 4 To 4 of 4	07/05/2019

14. Any other relevant information:

- As per Clause 4.2 Note - 2 of IS/IEC 60079-0:2011 the equipment mark IIB is suitable for application requiring IIA equipment.
- The material of construction of the enclosure may be CI/MS/SS instead of die cast aluminum alloy LM-6 construction.
- Equal and equivalent medium class 1/2 NPT threads 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.

15. Declaration by the Applicant/Manufacturer:

- As to standards with which the equipment complies in respect of:
 - Electrical equipment for Potentially Explosive atmosphere - General requirements: IS/IEC 60079-0: 2011
 - As to flameproof protection IS/IEC 60079-1: 2014
 - Ingress protection as per IS/IEC 60529: 2001 (Reaffirmed 2014)

P. K. Mohan

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नवासाह एवं उपकरण सुरक्षा (FLAMEPROOF & EQUIPMENT SAFETY)

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 7.5% in total of magnesium, titanium and zirconium.

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

16. Documents Submitted :

- Application form
- Drawings
- Prototype/test sample

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.

18. Condition of sample on receipt: Good

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 testifies that the equipment has been found to comply with the definition of flameproof cum weatherproof EQUIPMENT contained in the relevant Standard specifications. 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.

[Signature]

KK/LED/19 (5)

[Continuation Sheet]

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परीक्षण रिपोर्ट / TEST REPORT

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FORMAT NO. : (CIMFR: DQM: PLP02: F-01:REV-01)
 (Flameproof & Equipment Safety)

Equipment ID No.: 138/19 ULR No.: TCS9622000000209F Code No. PES/87A/19-20

Test & Assessment Report No.: IN/CIMFR/TR20/236 Dated: 27 January, 2020

REPORT OF TEST

Date of Test: 29/08/2019

Test Equipment Used:

Computer, Kistler Piezo Electric Transducer and Charge Amplifier for conducting Explosion Pressure Tests, Impact test setup, Ingress protection (IP) test setup, Temperature class test setup, Thermal Shock Test Setup, Overpressure Test Setup.

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

Type Tests		Remarks	Results (Complies, P- Pass, NA-Not Applicable, F-Fail) References
Clause	Tests		
1	Scope		Complies
2	Normative references		Complies
3	Terms and definitions		Complies
4	Equipment grouping and temperature classification	Gas Group: IIB, IIC, Gb.	Complies
5	Temperatures		
5.1.1	Ambient temperature	-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		NA
11	Bushings		NA
12	Materials used for cementing	Epoxy Resin +hardner COT = -20°C to 120°C	Complies
13	Ex components		NA
14	Connection facilities and terminal compartments		NA
15	Connection facilities for earthing or bonding conductors		Complies
16	Entries into enclosures		Complies
17	Supplementary requirements for rotating electrical machines		NA
18	Supplementary requirements for switchgear		NA

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Equipment ID No.: 138/19 ULR No.: TC59622000000209F Code No. FES/87A/19-20

19	Supplementary requirements for fuses		NA
20	Supplementary requirements for plugs and sockets		NA
21	Supplementary requirements for luminaries		Complies
22	Supplementary requirements for caplights and handlights		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 mixtures		
26.3	Tests for Flameproof (Ex 'd') protection	Verification for Compliance to Ex 'db' requirements as per IS/IEC 60079-1: 2014	P/As per Result #B
26.4	Test of enclosures		
26.4.2	Test for resistance to Impact		Complies
26.4.3/2-6.4.4	Drop test		NA (Not a handheld equipment or portable device)
26.4.5	Tests for the Degree of protection IP		
26.4.5	IP of equipment	IP-66 Ability to prevent ingress of dust & water - as per IS/IEC 60529:2001 (Reaffirmed 2014)	Complies
26.5	Thermal tests		
26.5.1	Temperature measurement		Complies
26.5.2	Thermal shock test - for glass parts		Complies
26.6	Torque Test for bushings		
26.6	Torque test for bushings	-----	NA
26.7	Tests for non- metallic enclosures or of non-metallic parts of encl.		
26.8	Thermal endurance to heat	Epoxy Resin +hardner COT = -20°C to 120°C Ratio : 1:1 (by volume) Make = Araldite	Complies
26.9	Thermal endurance to cold		
26.10	Resistance to light	-----	NA
26.11	Resistance to chemical agents for Gr.I	-----	NA (Only applicable for Gr. I equipment)
26.12	Earth continuity test via non-metallic enclosure		NA
26.13	Surface resistance test of parts of enclosures of Non metallic materials	-----	NA
26.14	Charging test		NA
26.15	Measurement of Capacitance		NA
27	Routine verification and tests	Manufacturer's responsibility: Compliance to prototype of the product and physical measurement of gap and flamepath and overpressure at the pressure 8 kg/cm ² for every sample.	
28	Manufacturer's responsibility	Conformity of the equipment to the applicable standards	Complies

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ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOFING & EQUIPMENT SAFETY

परीक्षण रिपोर्ट / TEST REPORT

FORMAT NO.: (CIMFR: DQM: FL/P02: F-01:REV-01)
(Flameproof & Equipment Safety)

Equipment ID No.: 138/19 ULR No.: TC596220000000209F Code No. FES/87A/19-20

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29	Marking	Ex d IIB T6 Gb
30	Instructions	Instruction related to use, installation, maintenance, adjustment to be provided by the manufacturer along with the equipment.

Result#A1: 1kg mass of hardened steel has been fallen vertically on the surface of the Ex d enclosure and 16mm thick Toughened Polished glass to create impact energy for group II apparatus. No significant damage was observed.

Result#A2: The surface temperature rise classification of the Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure, designated by Model: KK/LED/19, Cat. No.: KK/LED/IR/2019/A/IIB was observed after achieving the equilibrium state with the following lamps energized at 110% of 230V AC/DC supply.

Sl. No	Lamps with rating	Temperature Class at 40° C ambient
1	23W LED	T6

Result#A3: The 16mm thick Toughened Polished glass was subjected to thermal shock test at maximum service temperature.

Result#A4: IP-Protection: Neoprene 'O' ring gasket (Ø5mm thick) is provided at the end of joint for weatherproof IP-66 degree of protection. Tests have been conducted as per IS/IEC 60529:2000 as tabulated below for IP-66 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 in harmful quantity.	Pass
2.	Water Test (Second Numeral 6)	Clause 14.2.6	No water had accumulated inside the enclosure in harmful quantity.	Pass

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ज्वालामुह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

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Result #B: Tests in explosive mixtures: Tests for type of protection Ex db 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 IIB, EPL Gb	Complies
5	Flameproof joints	Flange, 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)		P/As per Result #B1
15.2.3	Overpressure Test		P/As per Result #B2
15.3	Test for non-transmission of an internal ignition		
15.3.1	General		Complies
15.3.2	Electrical equipment of Groups IIB		P/As per Result #B3
15.3.3	Electrical equipment of Group IIC		NA
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 As per Result #B2	Complies
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

03/10/2019

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परीक्षण रिपोर्ट / TEST REPORT

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

Equipment ID No.: 138/19 ULR No.: TC596220000000209F Code No. FES/87A/19-20

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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 IIB T6 Gb	
20.2	Caution and warning markings	"ISOLATE SUPPLY BEFORE OPENING"	
21	Instruction	The manufacturer shall supply instruction manual regarding the equipment.	Complies

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

Gas mixture: Test with 8% Ethylene in air.

No. of Tests: 3 nos. test with single enclosure.

Test Condition: Enclosure fitted with component and tested as per clause 15.2.2.2

Type of Test	Gas Group	Gas Mixture % in Air		No. of Tests	
Preliminary Test (reference pressure)	IIB	8% Ethylene in air		Three	
Test Ref. No.	Ignition	Gauge Position	Max. Pressure in Bar	Time of Pressure rise in millisecond	Remark
Single Enclosure					
PPM/1381901	Body	Body	5.14	25.86	No evidence of distress
PPM/1381902	Body	Body	5.01	26.34	-do-
PPM/1381903	Body	Body	5.23	23.64	-do-

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

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

Enclosure	Test reference nos.	Over pressure (kg/cm ²) maintained for 10 sec.	Remark
Single Enclosure	OPM/1381904	8.0 kg/cm ²	No damage or deformation

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

Gas Mixture: Test with 37% Hydrogen in air for Gas Gr. IIB

No. of Tests: 5 nos. tests with Single enclosure.

Test Condition: Table 12 and 15.3.2.1 (No precompression required)

Name of Enclosure	Test Ref. Nos.	Gas Group	Gas Mixture % in Air	No. of Test	Result
Single Enclosure	EIT/1381905 to EIT/1381909	IIB	37 % Hydrogen	Five	Pass

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ID Number: 138/19 ज्वलासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY
Code Number: FES/87A/19

Test Date: 26/08/2019 परीक्षण प्रमाण पत्र / TEST CERTIFICATE

Manufacturer Details: M/S KESHIKAMAT & COMPANY

Manufacturer Address: MUMBAI - 400 30

Model / Type: MODEL NO.: KK/LED/19

Category No.: CAT. NO.: KK/LED/IR/2019/A/IIB

Gas: ETHYLENE

Gas Group: IIB

Equipment Details: FLP/WP ENCL. FOR LED/IR LIGHTING FITTING

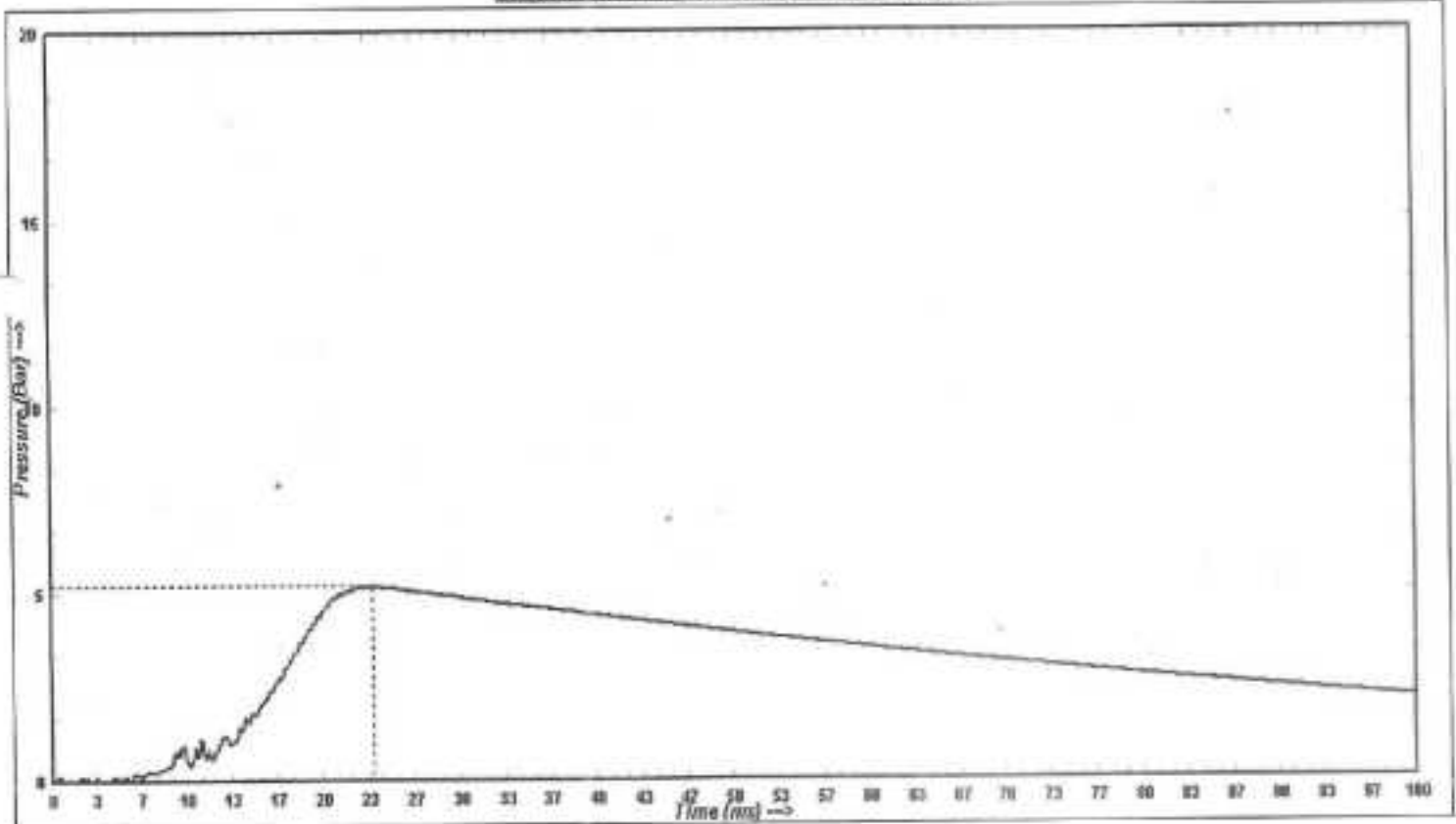
Enclosure Details: SINGLE ENCLOSURE

Serial / Badge No.: NA

Peak Pressure: 5.23 Bar at 23.64 ms

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Explosion Pressure vs Time Graph



Bishujit Mohale
20/01/2020
(Testing Officer)

[Signature]
20/01/2020
(Discipline Head)

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

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)

बरवा रोड, धनबाद - 826015, झारखण्ड, भारत

ज्वालासह एवं उपकरण सुरक्षा / FLAMEPROOF & EQUIPMENT SAFETY

परीक्षण रिपोर्ट / TEST REPORT

FORMAT NO. : (CIMFR: DQM: PLP02: F-01:REV-01)
(Flameproof & Equipment Safety)

Equipment ID No.: 138/19 ULR No.: TC596220000000209F Code No. PES/87A/19-20

CONCLUSION: The Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure, in cast aluminium Alloy LM-6 construction designated by Model: KK/FE/LED/19, Cat. No.: KK/LED/IR/2019A/IIIB meets the test requirements for flameproofness as per IS/IEC 60079-1: 2014, general requirements as per IS/IEC 60079-0: 2011, Ingress protection (IP-66 degree) as per IS/IEC 60529:2001 (Reaffirmed 2014). Hence, the above mentioned equipment may be used in Gas Group: IIB Category EPL Gb atmosphere.

Reported By

Bishnujit Modak
20/01/2020

(B. MODAK)

Tech. Officer

Dated: 20th 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
20/01/2020

(A. K. SINGH)

HOS

Flameproof & Equipment Safety

KK/LED/19

12



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



NABL, Certificate No.: TC-8962

TYPE EXAMINATION CERTIFICATE

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

Certificate No.: CMF 20 INEx 0092
ID. NO. 138/19

ULR No.: TC596220000000209F

Dated: 20/01/2020
(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 LED/IR Lighting Filing Enclosure. |
| 4. Designated by | : | Model: KK/LED/19, Cat. No.: KK/LED/IR/2019/A/IB. |
| 5. Type of protection | : | Ex d for Gas Group IIB. |
| 6. Marking | : | (Ex d IIB T6 Gb). |

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". |

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)/document(s) of the equipment listed have successfully meet the examination and test requirements as recorded in IN/CIMFR/TR20/ 236 Dated: 21 January, 2020.

KK/LED/19 13



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

NABL, Certificate No. : TC-5963

TYPE EXAMINATION CERTIFICATE

Certificate No.: CMF 20 INEx 0092

Dated: 20/01/2020

SCHEDULE

10. **Description of equipment:** Flameproof cum Weatherproof LED/IR Lighting Fitting Enclosure Model: KK/ LED/19, Cat. No.: KK/LED/IR/2019/A/11B, Rated 240V AC, 23W LED, material of construction Cast Aluminium Alloy LM-6.

Enclosure Type	Volume (in cc).		Dimension (mm) LxBxH	Max. no. of aperture on cover	Temp. Class at ambient 40°C
	Gross	Nett			
Single Enclosure	6600	800	310x310x284	One no.	T6

11. **Drawing and documents:**

Sl. No.	Dwg. No.	Title	Rev.	Sheet	Date
1.	KK/LED/2019/01	FLAMEPROOF CUM WEATHERPROOF LED/IR LIGHTING FITTING ENCLOSURE (FOR GAS GROUP-11B ZONE 1)	0	1 of 4 To 4 of 4	07/05/2019

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 8 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:** Not Applicable.

Approved & issued on behalf of CSIR-CIMFR

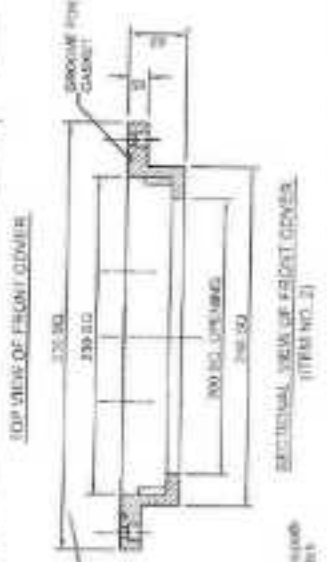
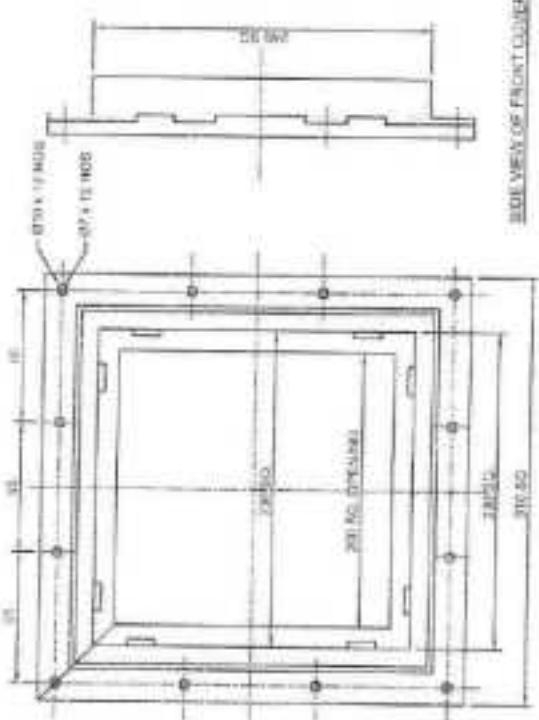
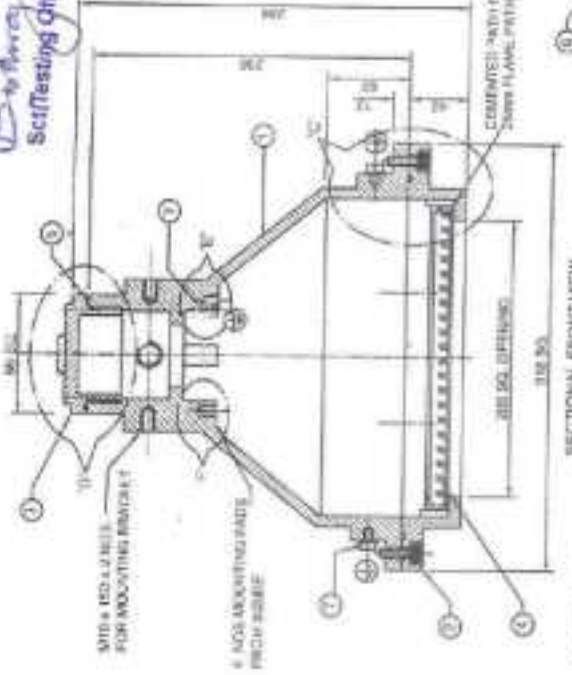
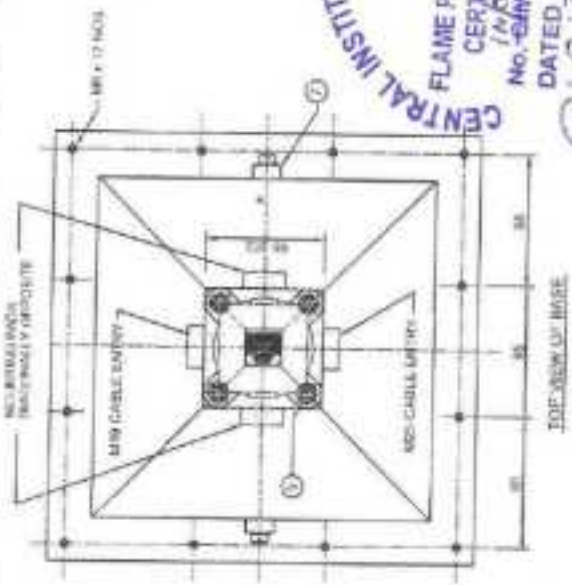
(Dr. A. K. Singh)
Chief Scientist & HOS

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.

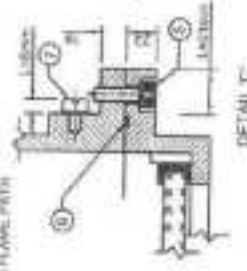
JK/LED/19 (14)

CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
 DHANBAD (INDIA)
 FLAME PROOF & EQUIPMENT SAFETY
 CERTIFIED VIDE TEST REPORT
 No. SAF/PT/19/236
 DATED 21.07.2014

Biswajit Chakrabarti
 Scaffolding Officer



DETAIL 'D'



DETAIL 'C'

CONCRETE SIZE
 B - 50
 C - 50
 D - 50
 E - 10 x E = 25mm
CONCRETE - External - Epoxy resin + Hardener
 + (1-1) (BY VOLUME)
 C.O.T = 20' C to 120' C
 Mix = ARABI ONE Colour = WHITE

ALL DIMENSIONS ARE IN (mm).
 TOLERANCE IN OVERALL DIMENSIONS ±0.1mm,
 EXCEPT FOR FLAME PATH & GAP

TITLE: FLAMEPROOF CLIM WEATHERPROOF LED / IR LIGHTING FITTING ENCLOSURE (FOR GAS GROUP-IB ZONE - 1)

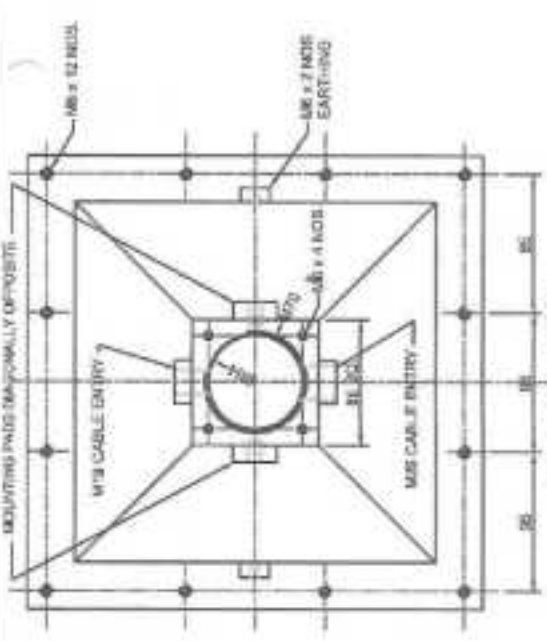
MODEL: KK/LED/19
 AS PER: IS/IEC: 60079-1 (2014)
 IS/IEC: 60079-0 (2011)
 IS/IEC: 60529 (2001)

REV. NO.	REV. DATE	ORIG. CHG.	APPD.
0	07.05.2019	ORIGINAL	
		SCALE	N.T.B.
DRAWN	CHECKED	DRW	ENGINEER
		GA	
DRAWN	CHECKED	GA	APPD.
			DRAWN
DRAWN	CHECKED	GA	
			DRAWN

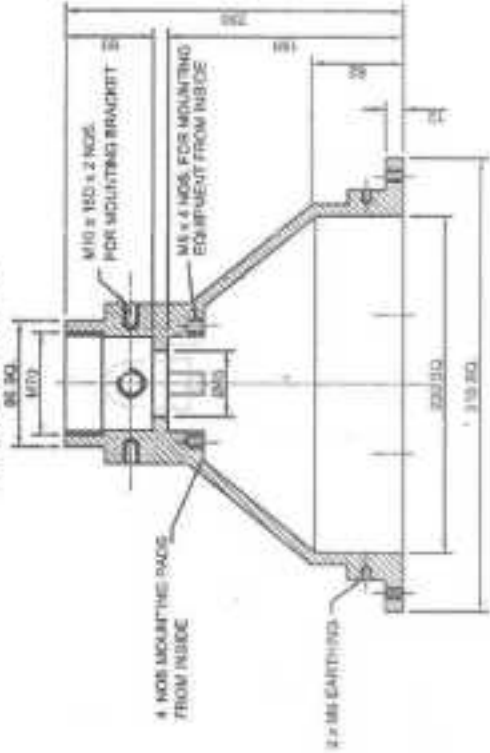
Keshkamat & Company
 MUMBAI - 400 228

DATE: 21.07.2014
 DRAWN: Biswajit Chakrabarti
 CHECKED: M.S.
 APPD.: M.S.
 SHEET 1 OF 4
 SIZE B

KK/LED/19/15

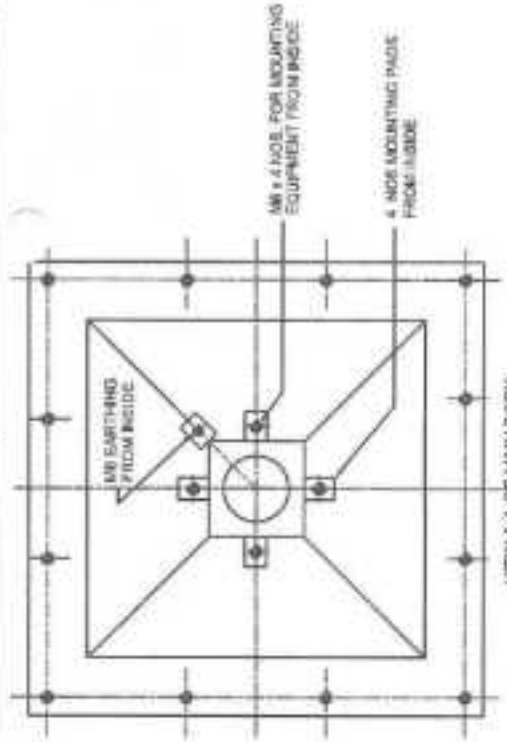


TOP VIEW OF MAIN BODY

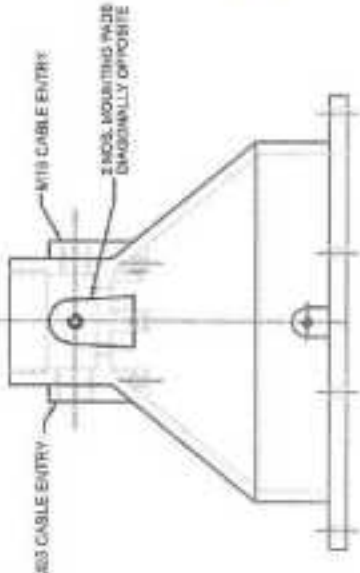


SECTIONAL FRONT VIEW OF MAIN BODY (ITEM NO. 1)

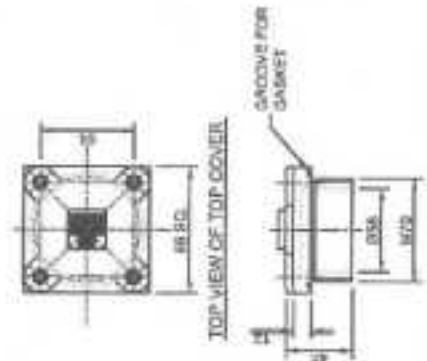
↑ A-A



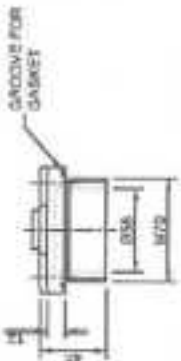
VIEW A-A OF MAIN BODY



SECTIONAL VIEW OF MAIN BODY



TOP VIEW OF TOP COVER



SECTIONAL FRONT VIEW OF TOP COVER

DHANBAD (INDIA)
FLAME PROOF & EQUIPMENT SAFETY
CERTIFIED WIDE TEST REPORT
IN COMPLIANCE WITH TR 20/2016
NO. CAMEE/CG/17/20/296
DATED 21.01.2020
Bhargav Kulkarni
Sect Testing Officer

ALL DIMENSIONS ARE IN mm.
TOLERANCE IN OVERALL DIMENSIONS ±0.10mm.
EXCEPT FOR FLAME PATH & GAP

TITLE : FLAMEPROOF CUM WEATHERPROOF LED / IR LIGHTING FITTING ENCLOSURE (FOR GAS GROUP-II B ZONE - 1)	
MODEL :	KK/LED/19
AS PER :	IS/IEC: 60079-1 (2014) IS/IEC: 60079-0 (2011) IS/IEC: 60529 (2001)
CAT NO.:	KK/FI/LED/01
DRG. NO.:	KK/LED/2019/01
SHEET	2 OF 4
SIZE	A3

REV. NO.	07.05.2019	ORIGINAL	APPD
REV. NO.		CHANGE	
DRAWN	<i>Saswathy</i>	CHECKED	<i>Bhargav</i>
SCALE	N.T.S.	ENGINEER	<i>Bhargav</i>
Keshkamat & Company MUMBAI - 400 030			

KK/LED/19 (16)

NOTE DETAILS :-

- 1. MATERIAL OF CONSTRUCTION - BELOW THE COMPARISON IS AS GIVEN BELOW.
 COPPER = 0.1 % MAX. MAGNESIUM = 0.1 % RFD = 0.5 %
 ZINC = 0.1 % MAX. LEAD = 0.1 % MAX. ARGONIFER = 0.5 % MAX.
 MANG. = 0.1 % MAX. SILICON = 0.0 TO 0.1 % TITANIUM = 0.2 % MAX.
 TIN = 0.05 % MAX. ALUMINIUM = 0.0 TO 0.05 % MAX. DIFFERENCE VARIATION.
 THE CONSTRUCTION MATERIAL CAN BE S.S.
 MAGNESIUM CONTENT NOT MORE THAN 0.5% IN TOTAL OF MAGNESIUM AND TITANIUM BY MASS.
 SURFACE FINISH - 6.3 MICRONS
- 2. 12.5mm IS MAINTAINED AS FLAME PATH ALONG THE SURFACE JOINTS AND THE CLEARANCE BETWEEN THE BODY AND COVER IS 3.0 TO 15mm.
 NEOPRENE O-RING GASKETS IS PROVIDED ON THE FLANGE PORTIONS FOR WEATHERPROOFING.
 THESE ARE ONLY SUFFICIENT AND DO NOT FORM PART OF FLAMPROOF JOINTS. ANY DISPLACEMENT/CHANGE OF THE GASKET WILL NOT HAMPER FLAMPROOFNESS OF THE EQUIPMENT.
- 3. THE MATERIAL THICKNESS AT THE BOTTOM AND AROUND THE TAPPED HOLES AND BUND HOLES IS 5mm
- 4. THE ALLEN HEAD SCREWS/BOLTS USED HAVE MINIMUM TENSILE STRENGTH AS 1000 N/mm² (MIN)
- 5. ONE INSIDE AND TWO OUTSIDE EARTHING SCREWS ARE PROVIDED AS SHOWN IN DRAWING (SEE DRAWING). THE EARTHING OF THE JOB IS DONE AT INSIDE AND OUTSIDE AS SHOWN IN DRAWING (SEE DRAWING). THE SCREWS HAVE FIRM THREADS AND MUST BE CORROSION RESISTANT. THE EARTHING CONDUCTOR USED SHALL BE AS PER FLAMPROOF & EQUIPMENT SAFETY STANDARDS AND SHALL BE CERTIFIED WIDE TEST REPORT.
- 6. NAME PLATE AND WARNING PLATES AND/OR SIGNS SHALL BE AS PER FLAMPROOF & EQUIPMENT SAFETY STANDARDS AND SHALL BE CERTIFIED WIDE TEST REPORT.
- 7. MAX. CABLE ENTRY PORTS AS UNDER
 1. SIZE M18 X 1.0 PITCH = 1 NO. OR
 2. SIZE M25 X 1.5 PITCH = 1 NO.
- 8. WALL THICKNESS IS MAINTAINED = 10mm MIN
- 9. HYDRO TEST PROCEDURE DETAILS
 STATE: PRESSURE = 10 kg/cm² OR 1.5 TIMES TEST PRESSURE, WHICHEVER IS GREATER.
- 10. AIRGAS PROTECTION = IP - 65/67.

INSTITUTE OF MINING & FUEL RESEARCH
 BISHNUPUR, RAJCHANDRA, JHARKHAND
 No. 41/2020
 DATED 21/01/2020
Bibhujyoti Ghosh
 Sr. Testing Officer

MODEL	TOTAL VOLUME G.C.	EFFECTIVE ACTUAL VOLUME G.C.
KK/LED/19	4800 C.C.	400 C.C.

- 11. TOTAL VOLUME - VOLUME OF THE JUNCTION BOX FROM INSIDE (IN N.C.C. (RIBBIC CENTIMETER))
- 12. EFFECTIVE ACTUAL VOLUME - VOLUME LEFT AFTER KEEPING EQUIPMENT / SWITCHES / WIRES ETC INSIDE THE JUNCTION BOX, IS IN C.C.
- 13. TEMPERATURE CLASS = T1.
- 14. MINIMUM THICKNESS AROUND ALL HOLES FOR BOLT / SCREW = 5mm
- 15. MAXIMUM WIDTH / GAP OF THE FLANGED PORTION OF THE FLANGE / SURFACE JOINT IS 15mm.
- 16. THE TERMINATIONS ARE PROVIDED ON THE TERMINAL BLOCK AS THIS IS A DIRECT CABLE ENTRY IN TO THE JOB. TERMINATION OF EQUIPMENT AND OUTGOING ARE DONE ON THIS TERMINAL BLOCK ONLY.
- 17. THE NEOPRENE GASKET Ø 5mm Ø RING ENDLESS IS USED FOR IP - 65/67 PROTECTION. THE GASKET IS EVENLY COMPRESSED TO FULLER BETWEEN THE COVER AND BODY. GASKET RING WILL BE RETAINED WITH COVER.
- 18. DEPTH OF THREADS AND BOLT ENGAGEMENT IS MAINTAINED AS PER REQUIREMENT OF IS STANDARD.

- 19. PITCH BETWEEN TWO CABLE GLAND ENTRY = 50mm, AS SHOWN IN THE DRAWING.
- 20. TOLERANCE FOR ALL THREADS - AS PER IS: 9000, 1/3
- 21. ELECTRICAL RATING: 240 V AC / 240 V DC AND MAX. POWER UP TO 750 WATTS

BILL OF MATERIAL

SR. NO.	DESCRIPTION	MATERIAL	QTY.	REMARKS
1	MAIN BODY	LMS	1	
2	FRONT COVER	LMS	1	
3	TOP COVER	LMS	1	
4	TIGHTENED GLASS	GLASS	1	Ø 12.5 x 18mm THK
5	ALLEN CAP HD SCREW / BOLTS WITH SPRING WASHERS	LMS	16	M8 x 25 L
6	O RING/GASKET / GASKET	NEOPRENE	1	Ø 4 ENDLESS
7	CHEESE HEAD SCREW WITH SPRING WASHERS FOR EARTHING	BRASS	3	M8 x 10 L
8	NAME PLATE	S.S.	1	
9	WARNING PLATE	S.S.	1	
10	TERMINAL BLOCK	DIAMOND CLIP-ON CONNECTOR	1	NON TERMINATING WIRE / CABLE

1. Flange Details

Sl. No.	Description of Flange and location	Type of Joint	Minimum Flange thickness		No. of bolts required	
			mm	mm	mm	mm
1	Between body and base cover	Flange Joint	1-8 1-12.5	1/2 1-21	0.20	0.12
2	Between body and cover	Tapped Joint	0.05	0.05	0.05	0.05

ALL DIMENSIONS ARE IN MM.
 TOLERANCE IN OVERALL DIMENSIONS ± 0.1mm.
 EXCEPT FOR FLAME PATH & GAP

TITLE: FLAMPROOF CUM WEATHERPROOF LED/IR LIGHTING FITTING ENCLOSURE (FOR GAS GROUP II B ZONE - I)

MODEL: KK/LED/19
 AS PER IS/IEC: 60079-1 (2014)
 IS/IEC: 60079-0 (2011)
 IS/IEC: 60529 (2001)

DAT. NO. KK/LED/19/01
 DRG. NO. KK/LED/19/01
 KK/LED/19/01/01
 KK/LED/2018/01

SCALE: A.T.S.
 ENGINEER: *Bibhujyoti Ghosh*
 CHECKED BY: *Bibhujyoti Ghosh*
 DRAWN BY: *Bibhujyoti Ghosh*

Keshkammat & Company
 MUMBAI - 400 030

Bibhujyoti Ghosh

 KESHKAMAT & COMPANY W-119, ADARSH NAGAR, PRASHADEVI, MUMBAI-400 030, INDIA	
TYPE : FLAMEPROOF CUM WEATHERPROOF LED / IR LIGHTING FITTING ENCLOSURE EX "II" B TB (+20° C TO +40° C) IP-65, T8	MODEL : KK/LED/19
CAT NO. : KK/FLP/LED/01	SR. NO. :
DRG. NO. : KK/LED/2019/01	AS PER : IS/IEC: 60079-1 (2014) IS/IEC: 60079-0 (2011) IS/IEC: 60529 (2001)
CIMFR CERT. NO. :	
ISOLATE SUPPLY BEFORE OPENING	

50

100

NAME PLATE
(ITEM NO. 8)

 WARNING ISOLATE SUPPLY BEFORE OPENING

20

60

WARNING PLATE
(ITEM NO. 9)

CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
 DHANBAD
 (INDIA)
 FLAME PROOF & EQUIPMENT SAFETY
 CERTIFIED VIDE TEST REPORT
 No. CMFR/FP/RS/2019/236
 DATED 21.01.2020
 B. K. Mishra
 Section Officer
 HOS

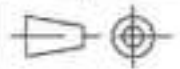
ALL DIMENSIONS ARE IN mm.
TOLERANCE IN OVERALL DIMENSIONS +/-10mm.
EXCEPT FOR FLAME PATH & GAP

TITLE : FLAMEPROOF CUM WEATHERPROOF
LED / IR LIGHTING FITTING ENCLOSURE
(FOR GAS GROUP-II B ZONE - 1)

MODEL : KK/LED/19

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

REV. NO.	REV. DATE	CHANGE	APPD.
0	07.05.2019	ORIGINAL	

	DOC. GA	DIM mm	SCALE N.T.S.
DRAWN <i>Seemson</i>	CHECKED <i>Sl</i>	ENGINEER <i>Keshkamat</i>	

 **Keshkamat & Company**
MUMBAI - 400 030

CAT NO.: *KK/FLP/LED/01*
KK/LED/IR/SNS/A/IR
DRG. NO.: KK/LED/2019/01

SHEET 4 OF 4
SIZE B

KK/LED/19 (17)