



No. CIMFR/TC/SR/1504
Equipment ID NO. 46/12

Dated : 16 February, 2012
Code No. FLP/221A/11-12

To
M/s Sudhir Switchgears Pvt. Ltd.,
305/6, Apeejay House,
130, Bombay Samachar Marg,
Mumbai - 400 023

Sub: Flameproof Testing as per IS/IEC 60079-1: 2007 of your **Flameproof - Weatherproof (IP-66) Hand Lamp Fitting**, in cast aluminium alloy LM-6 construction, **Cat No.: HL/2C/126** for use in Gas Group: IIC and Zone 1&2 atmosphere only.

REVALIDATION @

Your Ref. Appl. No.: SSPL/2011/REV/HL2C126-008

Dated: 25/08/2011

Dear Sir,

Please find enclosed the **Test Report (Revalidation)** of the above sample submitted by you.

Charges of Rs. ^{22,678/-} ~~21,465.00~~ ^{two} **(Rupees Twenty one thousand four hundred and sixty** ^{seven} **five)** ^{seventy eight @} only including applicable service charges involved towards the testing/issuing the schedule 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 sample by public auction without any further NOTICE to you.

Kindly acknowledge receipt.

Thanking you,

Enclo: As above
Proto Test Report in Triplicate
Copy to: 1. Head, Flame & Explosion Lab.
2. Bill Section.

Yours faithfully,


(G. M. Prasad)
H. O. D
Testing Cell

के० ख० एवं ई० अ० सं० परीक्षण प्रकोष्ठ-CIMFR TESTING CELL

केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान

(वैज्ञानिक, प्रौद्योगिकी और औद्योगिक अनुसंधान परिषद)



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CENTRAL INSTITUTE OF MINING AND FUEL RESEARCH

FORMERLY CENTRAL MINING RESEARCH INSTITUTE
(COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH)

बरवा रोड, धनबाद-826015 (INDIA) BARWA ROAD, DHANBAD-826015 (INDIA)

परीक्षण प्रमाण पत्र-TEST CERTIFICATE

FORMAT NO.: (CIMFR: DQM: FLP02: F-01:REV-01)
(Flame & Explosion Laboratory)

Revalidation Report No.: CIMFR/TC/SR/1504	Dated: 16 February, 2012
Equipment. ID NO. 46/12	Code No.: FLP/221A/11-12
Application Ref. No.: SSPL/2011/REV/HL2C126-008	Dated: 25/08/2011

- Applicant** : M/S. SUDHIR SWITCHGEARS PVT. LTD.,
305/6, APEEJAY HOUSE,
130, BOMBAY SAMACHAR MARG,
MUMBAI - 400 023
- Manufacturer** : M/S. SUDHIR SWITCHGEARS PVT. LTD., - (UNIT NO. -1)
"SUDHIR HOUSE", PLOT NO. A-305,
ROAD NO. 32, VIA ROAD NO. 16,
WAGLE INDUSTRIAL ESTATE,
THANE - 400 604
M/S. SUDHIR SWITCHGEARS PVT. LTD., - (UNIT NO. - 2)
GUT NO.: 144A, NEXT TO OM AAKASH FIBRES, BEHIND SAI,
KRIPPA DHABA (TAMBI DHABA), VILLAGE GHONSAI (MET),
THANE - 421 312
- Apparatus** : Flameproof-Weatherproof (IP-66) Hand Lamp Fitting,
in cast alluminium alloy construction.
- Designated by** : Cat. No.: HL/2C/126
- Gas Group, Zone** : Gas Group : IIC and Zone 1 & Zone 2
- Electrical ratings**: rated 100W GLS /CFL lamp at 250V AC/DC
- Temperature Class**: Refer test report no.: CMRI/TC/P/H250 Dated: 07/07/2006
- Degree of Ingress Protection**: IP-66 (Ref. test report. No.: CMRI/TC/P/H250
Dated: 07/07/2006)
- Material of Construction**: Cast aluminium Alloy. Refer drawing for material thickness at
different locations of the enclosure.

10. Description of the apparatus Flameproof-Weatherproof (IP-66) Hand Lamp Fitting.

A.

Description	Volume in ltrs.		Min. Wall Thickness (mm)	Nos. & Size of Bolts/Fasteners
	Gross	Net		
Main Glass Enclosure Size: ref. drg.	1.250 ltrs.	1.000 ltrs.	4mm	NIL
Terminal Enclosure Size: ref. drg.	0.290 ltrs.	0.250 ltrs.		NIL

Note: For further details refer drawings.



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B.

Glass details	Max no. of aperture on cover
Size = 123 length, 100 OD, 76 ID Type = Heat resistant toughened type 'A' dome shape well glass Thickness = 8mm Cemented Path = 35mm Sealing Material = Litharge+ Glycerin, calcium sulphate COT: -20°C to 220°C	NIL

Note: Glass is protected by wire guard. For further details refer drawings.

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

Sr. No	Location of flamepath	Type of joint	Min. length of flamepath (in mm)		Max. gap or minimum no. engaged threaded (in mm)	
			Req.	Spec.	Req.	Spec.
01.	Between main enclosure body and glass cover.	Threaded Joint	8	9	6	6

Bushing: One no. ring for Bakelite holder is fitted dividing the main & terminal enclosure with the help of two Allen Hex. Head screws maintaining 13mm (min.) cylindrical flamepath with 0.1mm (max.) diametrical clearance. DMC moulded sleeve is fitted into the threaded hole on ring for Bakelite holder maintaining 25mm (min.) axial threaded length with minimum 15 nos. of thread engaged.

Max. No. & size of cable entries: One no. cable entry hole of size M25mm is provided on the enclosure maintaining 25mm (min.) axial threaded length for attachment of approved & certified type double compression type cable glands.

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: 2004 and IS/IEC 60079-1: 2007.

Sl. No.	Drg. No.	Title	Rev.	Sheet	Date
1.	HL/126	Flameproof-Weatherproof enclosure for Hand lamp Fitting.	1	1 of 1	10/12/2011

Navin Kumar



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14. Any other relevant information:

- 1) The above apparatus has already been tested and certified by the CIMFR vide prototype Test Report No.: CMRI/TC/P/H250 Dated: 07/07/2006 as per IS: 2148-2004.
- 2) The apparatus under reference has also been tested for weatherproof IP-66 degree of protection as per IS: 12063-1987 (IEC 60529-1989), hence it may be acceptable for weatherproof degree of protection IP-66 as per IS/IEC: 60529(2001).
- 3) The apparatus under reference has also been tested for surface temperature rise classification/impact test/thermal shock test as per IS: 13346-2004 (IEC 60079-0/2000). Hence it may be acceptable as per IS/IEC 60079-0-2004 for temperature class impact test/thermal shock test since the test procedure for temperature rise testing are same in both the standard.
- 4) The material of construction may be cast iron instead of aluminium alloy construction.
- 5) As per Clause 4.2.1 Note - 2 of IS/IEC 60079-0:2004 the apparatus mark IIC is suitable for application requiring IIA & IIB apparatus.

15. Declaration by the Applicant/Manufacturer:

- (i) As to standards with which the apparatus complies in respect of:
 - a) Electrical apparatus for Potentially Explosive atmosphere - General requirements: IS/IEC 60079-0: 2004
 - b) As to flameproof protection IS/IEC 60079-1: 2007
 - c) Ingress protection as per IS/IEC: 60529(2001).

(ii) **Composition of the cast aluminum alloy declared by the manufacturer:** Composition of cast aluminum alloy purported to be forming the material of construction of the enclosure has been declared manufacturer in the drawing.

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

16. Documents/Samples Submitted :

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

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

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

SCOPE OF THE TEST CERTIFICATE

The Test Certificate issued by CIMFR testifies that the apparatus has been found to comply with the definition of flameproof-weatherproof APPARATUS 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.



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TEST CERTIFICATE परीक्षण प्रमाण पत्र

FORMAT NO.: (M: FLP02: F-01: REV-01)
(Flame & Explosion Laboratory)

Revalidation Report No. CIMFR/TC/SR/1504 Dated: 16 February, 2012

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

REPORT OF TEST**Date of Test: 18/01/2012****Test Equipment Used:**

- Computer, Kistler Piezo Electric Transducer and Charge Amplifier for conducting Explosion Pressure Tests.
- Hydraulic Test Setup

Result #A: Tests as per IS/IEC 60079-0: 2004:

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	Apparatus grouping and temperature classification	Gr. IIC Ref. test report no.: CMRI/TC/P/H250 Dated: 07/07/2006	Complies
5	Temperatures	-20 to 40° Ambient	Complies
6	Requirements for all electrical apparatus		Complies
7	Non-metallic enclosures and non-metallic parts of enclosures		NA
8	Enclosures containing light metals	For Gr. II, Mg. 0.5% For Zone 1 & 2	Complies
9	Fasteners		Complies
10	Interlocking devices	Grub screw	Complies
11	Bushings	As declared by manufacturer	Complies
12	Materials used for cementing/sealing	Litharge+ Glycerin calcium sulphate COT: -20°C to 220°C	Complies
13	Ex components	-----	NA
14	Connection facilities and terminal compartments		Complies
15	Connection facilities for earthing or bonding conductors		Complies
16	Entries into enclosures		Complies
17	Supplementary requirements for rotating electrical machines		NA



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TEST CERTIFICATE / प्रमाण पत्र
 (Flameproof Laboratory)
 FORMAT NO. CIMFR/DO/02: F-01:REV-01

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

18	Supplementary requirements for switchgear		NA
19	Supplementary requirements for fuses		NA
20	Supplementary requirements for plugs and sockets		NA
21	Supplementary requirements for luminaries		NA
22	Supplementary requirements for caplights and handlights		Complies
23	Apparatus 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 'd' requirements as per IS/IEC 60079-1: 2007	P/As per Result #B
26.4	Test of enclosures		
26.4.2	Test for resistance to Impact	Ref. test report no.: CMRI/TC/P/H250 Dated: 07/07/2006	Complies
26.4.3/26.4.4	Drop test		P/As per Result #A1
26.4.5	Tests for the Degree of protection IP		
26.4.5	IP of apparatus	IP-66 (For Ref. Test report no.: CMRI/TC/P/H250 Dated: 07/07/2006)	Complies
26.5	Thermal tests		
26.5.1	Temperature measurement	Ref. test report no.: CMRI/TC/P/H250 Dated: 07/07/2006	Complies
26.5.2	Thermal shock test – for glass parts	Ref. test report no.: CMRI/TC/P/H250 Dated: 07/07/2006	Complies
26.6	Torque Test for bushings		
26.6	Torque test for bushings	As declared by the manufacturer	Complies
26.7	Tests for non- metallic enclosures or of non-metallic parts of encl.		
26.8	Thermal endurance to heat	Tested DMC moulded sleeve assembly as declared by manufacturer COT: -20°C to 220°C	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 apparatus)



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TEST CERTIFICATE प्रमाण पत्र

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(Flame & Explosion Laboratory)

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

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 hydraulic test at the pressure given in Result#B2 for every sample.	
28	Manufacturer's responsibility	Conformity of the apparatus to the applicable standards	Complies
29	Marking		Exd IP-66 IIC
30	Instructions	Instruction related to use, installation, maintenance, adjustment to be provided by the manufacturer along with the apparatus	

Result #A1: Drop Test: The FLP/WP Hand Lamp Fitting ready for use was dropped four time from a height of 1meter onto a horizontal concrete surface.

Navin Kumar



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FORMAT NO.: (CIMFR/FORM/FLP02: F-01:REV-01)
(Flame & Explosion Laboratory)

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

Result #B: Tests in explosive mixtures: Tests for type of protection Ex 'd' as per IS/IEC 60079-1:2007.

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	Equipment grouping and temperature classification	Gr. IIC Ref. test report, no.: CMRI/TC/P/H250 Dated: 07/07/2006	Complies
5	Flameproof joints	Threaded joint.	Complies
6	Cemented joints	Litharge+ Glycerin, calcium sulphate COT: -20°C to 220°C	Complies
7	Operating rods		NA
8	Supplementary requirements for shaft and bearings		NA
9	Light transmitting parts	-----	Complies
10	Breathing and draining devices which form part of a flameproof enclosure		NA
11	Fasteners, associated holes and blanking elements		Complies
12	Materials and mechanical strength of enclosures- materials inside the enclosures		Complies
13	Entries for flameproof enclosures		Complies
14	Verification and tests		Complies
15.1	Tests of ability of the enclosure to withstand pressure		
15.1.2	Determination of Explosion pressure (Reference Pressure)		P/As per Result #B1
15.1.3	Over Pressure Test		P/As per Result #B2
15.2	Test for non-transmission of Internal ignition		
15.2.1.1	Test for non-transmission of an Internal ignition		P/As per Result #B4
15.3	Reserved for future use		
15.4	Flame proof enclosures with breathing & draining devices		NA
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
19.3	Supplementary requirements for type tests		
19.3.1.3	Flame erosion test		P/As per Result #B3
19.3.2	Flammability	As declared by manufacturer	Complies
20	Marking	The warning inscription shall read as "ISOLATE SUPPLY BEFORE OPENING".	

Narain Kumar



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TEST CERTIFICATE / परीक्षण प्रमाण पत्र

FORMAT No. CIMFR/DCM/FLP02: F-01:REV-01
(Flame & Explosion Laboratory)

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

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: 3 nos. test with main & terminal enclosure.

Test Condition: Enclosure fitted with component. and clause 15.1.2.1

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/461201	6.09	8.58	PPM/461204	7.19	7.02	Satisfactory
Body	Body	PPM/461202	5.92	8.62	PPM/461205	7.02	7.21	Satisfactory
Body	Body	PPM/461203	5.89	7.86	PPM/461206	6.98	7.84	Satisfactory
Terminal Enclosure								
Body	Body	PPM/461207	3.45	8.7	PPM/461210	5.33	8.36	Satisfactory
Body	Body	PPM/461208	3.29	8.66	PPM/461211	5.56	8.59	Satisfactory
Body	Body	PPM/461209	3.36	8.82	PPM/461212	5.94	8.88	Satisfactory

*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. 15.1.3.1 of IS/IEC 60079-1: 2007.

Enclosure	Test reference no.	Over pressure (kg/cm ²) maintained for 1 min.	Remark
Main Enclosure	OPM/461213	11.0 kg/cm ²	No damage or deformation
Terminal Enclosure	OPM/461214	10.0 kg/cm ²	No damage or deformation

Result #B3: Test for Erosion by flame:

Gas Mixture: Tests with 31% Hydrogen in air and 14% Acetylene in air for Gas Gr. IIC

No. of Tests: 50 nos. tests in the main enclosure (Test Ref.: ERF/461215 to ERF/461264)

Test Condition: As per Clause 15.1.2.1 for DMC molded.

Navin Kumar

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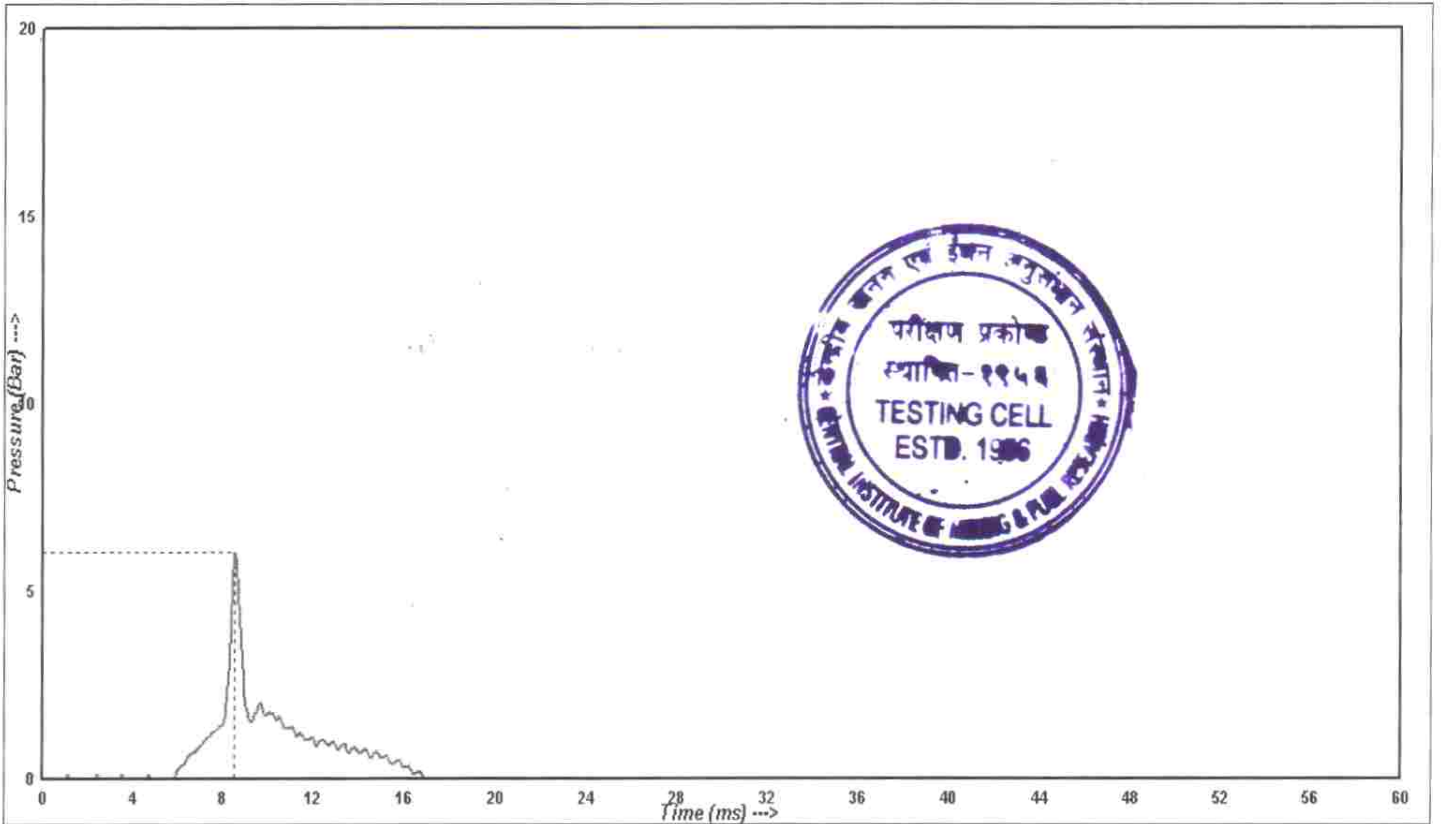
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TEST CERTIFICATE / परीक्षण प्रमाण पत्र

ID Number: 46/12 Code Number: FLP/221A/1
 Test Date: 18/01/2012
 Manufacturer Details: M/S SUDHIR SWITCHGEARS PVT. LTD.
 Manufacturer Address: THANE - 400 604
 Model / Type: NA
 Category No.: CAT. NO.: HL/2C/126
 Gas: HYDROGEN
 Gas Group: IIC
 Equipment Details: FLP/WP HAND LAMP FITTING
 Enclosure Details: MAIN GLASS ENCLOSURE
 Serial / Badge No.: NA
 Peak Pressure: 6.09 Bar at 8.58 ms

Explosion Pressure vs Time Graph



Vinay Kumar
13/02/12
(Testing Officer)

[Signature]
13/02/12
(Discipline Head)

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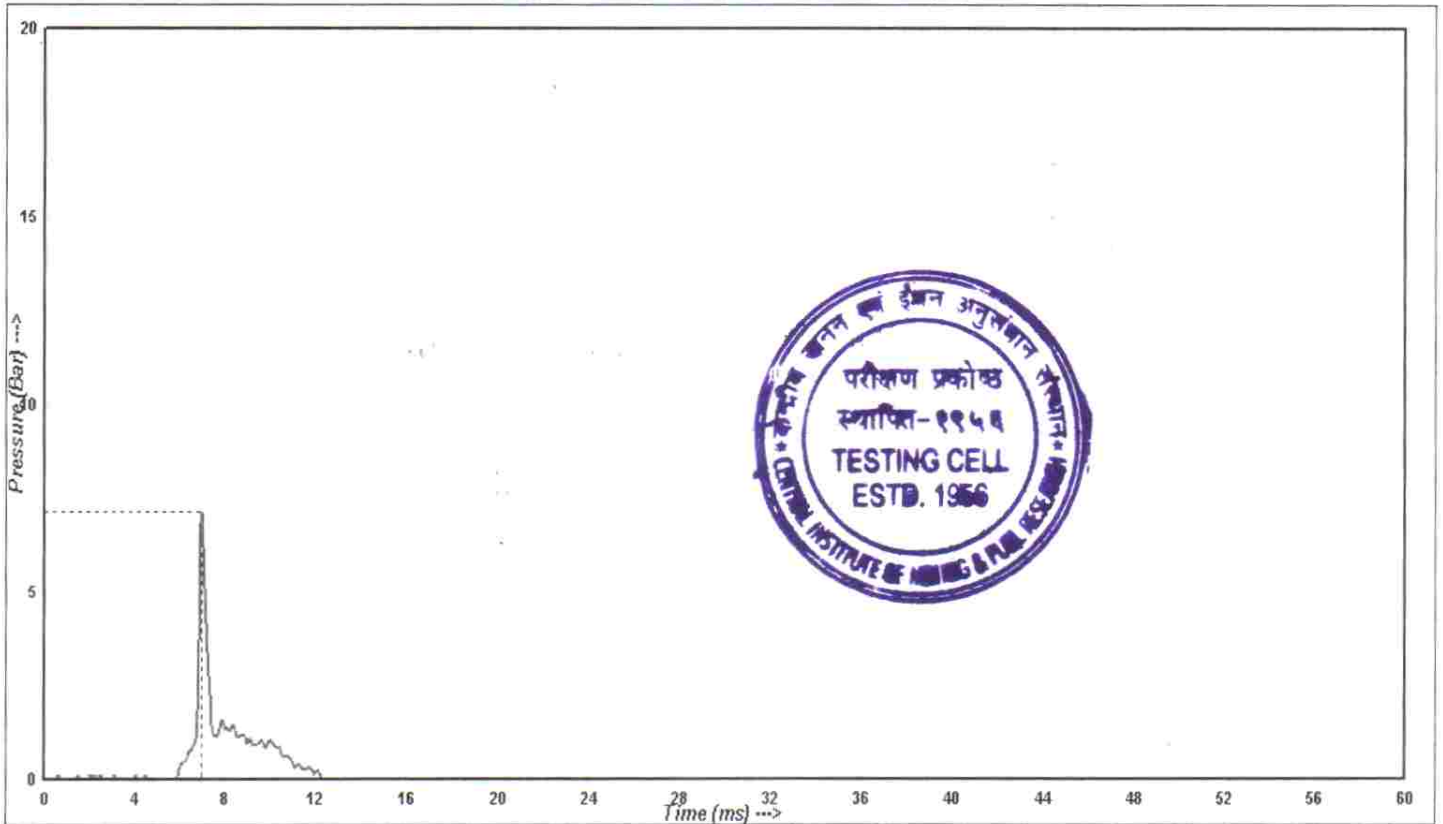
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TEST CERTIFICATE / परीक्षण प्रमाण पत्र

ID Number: 46/12 Code Number: FLP/221A/1
 Test Date: 18/01/2012
 Manufacturer Details: M/S SUDHIR SWITCHGEARS PVT. LTD.
 Manufacturer Address: THANE - 400 604.
 Model / Type: NA
 Category No.: CAT. NO.: HL/20/126
 Gas: ACETYLENE
 Gas Group: IIC
 Equipment Details: FLP/WP HAND LAMP FITTING
 Enclosure Details: MAIN GLASS ENCLOSURE
 Serial / Badge No.: NA
 Peak Pressure: 7.19 Bar at 7.02 ms

Explosion Pressure vs Time Graph



Vinay Kumar
13/02/12
(Testing Officer)

13/02/12
(Discipline Head)

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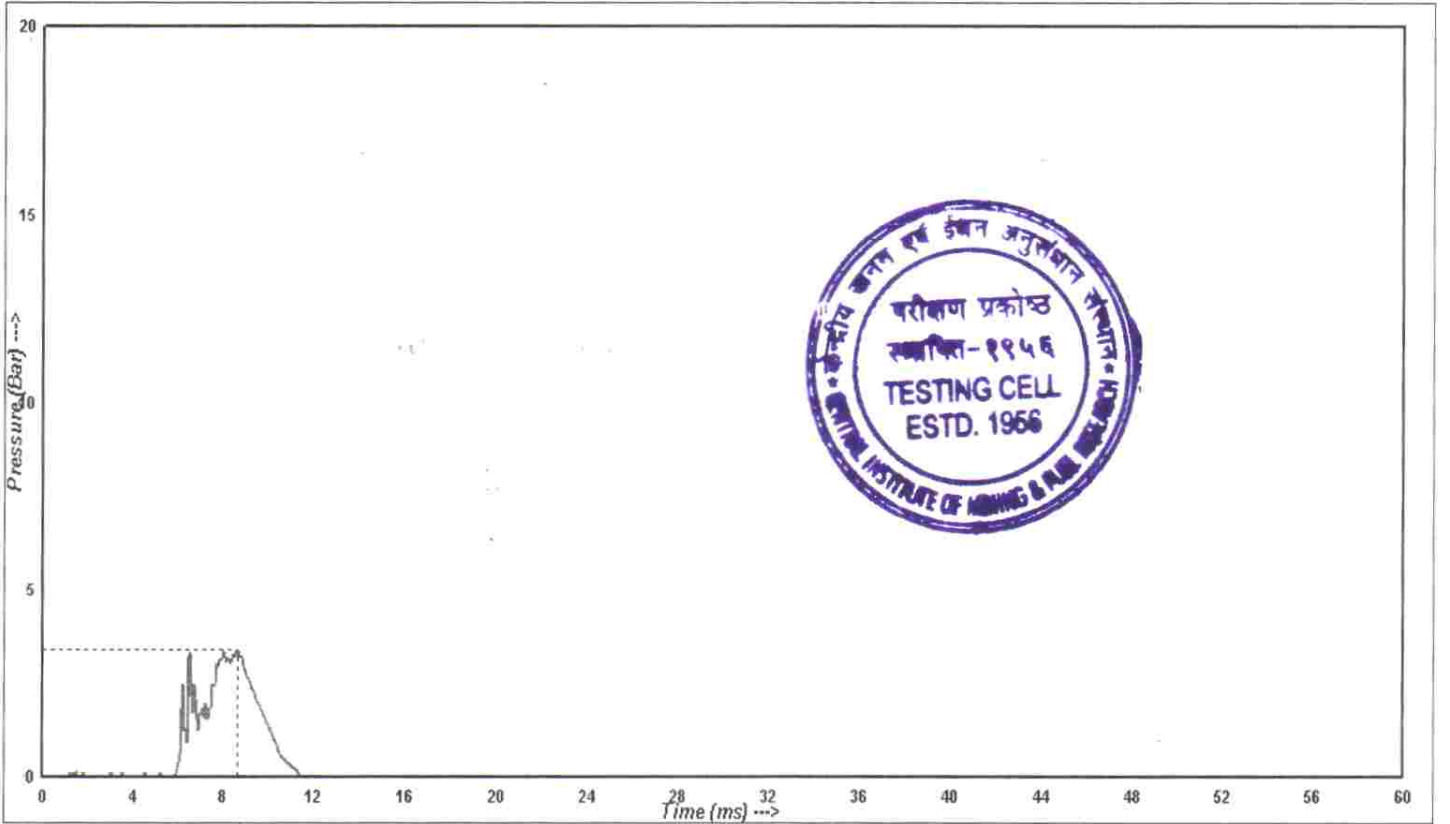
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TEST CERTIFICATE / परीक्षण प्रमाण पत्र

ID Number: 46/12 Code Number: FLP/221A/1
 Test Date: 18/01/2012
 Manufacturer Details: M/S SUDHIR SWITCHGEARS PVT. LTD.
 Manufacturer Address: THANE - 400 604.
 Model / Type: NA
 Category No.: CAT. NO.: HL/2C/126
 Gas: HYDROGEN
 Gas Group: IIC
 Equipment Details: FLP/WP HAND LAMP FITTING
 Enclosure Details: TERMINAL ENCLOSURE
 Serial / Badge No.: NA
 Peak Pressure: 3.45 Bar at 8.7 ms

Explosion Pressure vs Time Graph



Narain Kumar
13/02/12
(Testing Officer)

(Discipline Head)

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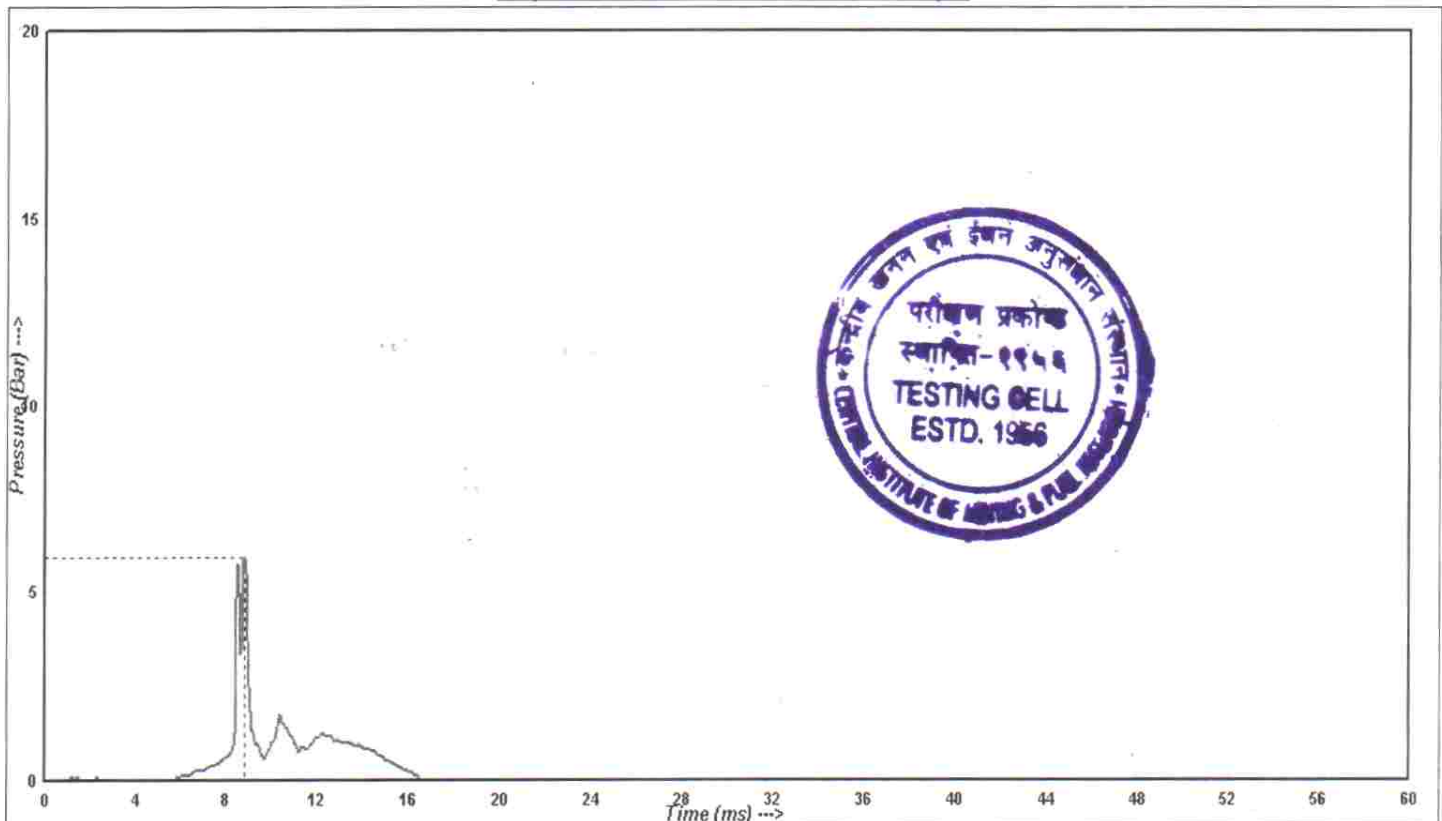


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TEST CERTIFICATE / परीक्षण प्रमाण पत्र

ID Number: 46/12 Code Number: FLP/221A/1
 Test Date: 18/01/2012
 Manufacturer Details: M/S SUDHIR SWITCHGEARS PVT. LTD.
 Manufacturer Address: THANE - 400 604.
 Model / Type: NA
 Category No.: CAT. NO.: HL/2C/126
 Gas: ACETYLENE
 Gas Group: IIC
 Equipment Details: FLP/WP HAND LAMP FITTING
 Enclosure Details: TERMINAL ENCLOSURE
 Serial / Badge No.: NA
 Peak Pressure: 5.94 Bar at 8.88 ms

Explosion Pressure vs Time Graph



Navin Kumar
13/02/12
(Testing Officer)

[Signature]
(Discipline Head)



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TEST CERTIFICATE प्रमाण पत्र

FORMAT NO.: IMFR- DOM/FLP02: F-01:REV-01)
(Flame & Explosion Laboratory)

ID NO.: 46/12

CODE NO.: FLP/221A/11-12

Result #B4: 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 main & terminal enclosure.
Test Condition:	15.2.1.1 (No pre compression required)

Non - transmission of internal ignition test:

Enclosure	Test Ref. Nos.	Gas Group	Gas Mixture % in Air	No. of Test	Result
Main Enclosure	EIT/461265 to EIT/461269	IIC	28 % Hydrogen	Five	Pass
	EIT/461270 to EIT/461274		7.5 % Acetylene		
Terminal Enclosure	EIT/461275 to EIT/461279	IIC	28 % Hydrogen	Five	Pass
	EIT/461280 to EIT/461284		7.5 % Acetylene		

CONCLUSION: The **Flameproof-Weatherproof (IP-66) Hand Lamp Fitting**, in cast aluminium Alloy construction designated by **Cat. No.: HL/2C/126**, meets the test requirements for flameproofness as per IS/IEC 60079-1:2007 & general requirements as per IS/IEC 60079-0:2004. Hence, the above mentioned apparatus may be used in Gas Group: IIC and Zone 1 & 2 atmospheres only.

Reported By

(NAVIN KUMAR)
Group III(2)

Dated: 13th February, 2012
Flame & Explosion Laboratory
Central Institute of Mining & Fuel Research, (CSIR)
(Erstwhile: Central Mining Research Institute)
Barwa Road, DHANBAD - 826 015,
(JHARKHAND) INDIA

Approved By

(A. K. SINGH)
Head of the Department