

Government of India
Ministry of Communications and Information Technology
Department of Information Technology, Standardisation Testing & Quality Certification Directorate
ELECTRONICS REGIONAL TEST LABORATORY (EAST)

COPY REPORT

TEST REPORT ON : FLAMEPROOF PRESSURE/TEMPERATURE SWITCH : PAGE : OF
: : 01 : 07

- 1.0 SCOPE :
- 1.1 Service Request No.: TE/0059/09-07
- 1.2 Test Report No. : ERTL(E)/TES/K085/0084/02-08
Date : 25/02/2008
- 1.3 Requested by : KAUSTUBHA UDYOG
(Name & Address of 7, PARICHAYA SOCIETY
of the organisation) 1000/6D, NAVIPETH
PUNE 411030
MAHARASTRA
- 1.4 Description , i) Item : FLAMEPROOF PRESSURE/TEMPERATURE SWITCH
Identification ii) Make : KAUSTUBHA, BRAND "ORION" INS
of the item iii) Model : FC/FA/FM
to be tested iv) Sl.No. : PROTOTYPE
v) Qty. : 1
- 1.4.1 Applicable Spec. of the item(s) tested:
240V AC, 15Amps (max.), Grey Cast Iron.
- 1.4.2 Characterisation and (i) Characterisation : Not applicable /
condition of the item (ii) Condition : Satisfactory /
- 1.5 Date of item received : 30/01/2008
- 1.6 Date of completion of : 25/02/2008
testing
- 1.7 Location where testing : In house
performed
- 1.8 Ambient condition during : 25 +/- 1.5 Deg.
measurement 70% RH. Max.
- 1.9 Spec. used for testing : IS:13346-2004, IS:2148-2004, GAS GROUP
I, IIA, IIB, IIC
- 1.9.1 Details of non-standard : NIL
method followed (if any)



T0002



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ELECTRONICS REGIONAL TEST LABORATORY (EAST) SALT LAKE CITY, BLOCK - DN, SECTOR - V, KOLKATA - 700 091	TEST REPORT NO. ERTL(E) / TES / K085 / 0084 / 02-08
REPORT ON: FLAMEPROOF PRESSURE / TEMPERATURE SWITCH	PAGE 02 OF 07

2.0) TEST RESULT :

Sl. No.	Test or Environment	Clause No.	Quantity		Specifications Limit	Test Result	Notes
			Tested	Failed			
1.0	Verification of documents.	23.2 of IS:13346-2004 & respective clauses of IS:2148-2004 as shown against Sr. no. (i) to (x) in the next column.	1	0	Documents submitted by the manufacturer should fully and correctly describe the following safety features, as applicable for the DUT. i) Apparatus grouping & temperature classification. ii) Flameproof joints. iii) Cemented joints. iv) Operating rods. v) Shafts & bearings. vi) Light transmitting parts. vii) Breathing & draining devices. viii) Fasteners, associated holes & closing devices. ix) Material & mechanical strength of enclosures. x) Entries for flameproof enclosures.	Complied	Certified FLP Drawing No: A24 EE 001, Sheet 1 of 2 to 2 of 2, Rev. 0, Dated:14-01-2007 are enclosed to this report as Annexure-I.
2.0	Compliances of prototype or sample with documents.	23.3 of IS:13346-2004	1	0	The prototype submitted for the type test should comply with the manufacturer's documents referred to above.	Complied	i) A brief description on the construction and feature of the DUT is enclosed to this report as Annexure-II. ii) Total measurement uncertainty at 95% confidence level for : Length: 0.03 mm Diametral clearance: 6µm.



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REPORT ON : FLAMEPROOF PRESSURE / TEMPERATURE SWITCH	PAGE 03 OF 07

2.0) TEST RESULT :

Sl. No.	Test or Environment	Clause No.	Quantity		Specifications Limit	Test Result	Notes
			Tested	Failed			
3.0	Mechanical test.	23.4.3 of IS:13346-2004					
3.1	Test for resistance to impact. On the Body Energy level : 20J Mass of fall : 2 kg. Height of fall : 1.0 mtr.	23.4.3.1 of IS:13346-2004	1	0	This test shall not produce damage invalidating the type of protection of the electrical apparatus.	Complied	Total measurement uncertainty at 95% confidence level : 0.17%
4.0	Test for the degree of protection IP by Enclosures	23.4.4 of IS:13346-2004	1	0	It shall comply With the requirements of IP66 of IS:12063-1987	Complied	Test conducted with cable gland duly fitted with proper cable piece.
5.0	Thermal tests	23.4.6 of IS:13346-2004					
5.1	Temperature measurement (Determination of maximum surface temperature)	23.4.6.1 of IS:13346-2004 & 14.0 of IS:2148-2004	1	0	For Group I apparatus: a) 150°C on any surface where coal dust can form a layer. b) 450°C where coal dust is not expected to form a layer. For Group II apparatus: The marked temperature, or the temperature class, less 5K for T6,T5,T4, & T3 and Less 10K for temperature class T2 & T1.	Complied for both Gr.I & Gr.II requirements.	i) The unit was loaded with full rating till the temperature gets stabilized. ii) Max.temperature measured was well below 85°C i.e. T6 class. iii) Total measurement uncertainty at 95% confidence level for: Temperature: 2.4%



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REPORT ON : FLAMEPROOF PRESSURE / TEMPERATURE SWITCH	PAGE 04 OF 07

2.0) TEST RESULT :

Sl. No.	Test or Environment	Clause No.	Quantity		Specifications Limit	Test Result	Notes
			Tested	Failed			
6.0	Marking	27.0 of IS:13346 -2004	1	0	<p>i) The electrical apparatus must be marked on the main part in a visible place. This marking shall be legible and durable taking into account possible chemical reaction.</p> <p>ii) The marking shall include :</p> <p>a) the name of the manufacturer or his registered trade mark.</p> <p>b) the manufacturer's type identification.</p> <p>c) the symbol 'Ex'.</p> <p>d) the symbol(s) for the type of protection(s) concerned.</p> <p>e) the symbol for the group of the electrical apparatus.</p> <p>f) the temperature class or the maximum surface temperature, or both for Group II apparatus.</p> <p>g) serial number.</p> <p>h) name and the mark of the testing, approving and certification body and the corresponding references.</p> <p>i) the symbol 'X' for special conditions of safe use, if any.</p> <p>ii) the markings© to (f) shall be placed in order to which they are given above.</p> <p>iii) the above symbol for the main type of protection shall appear first and be followed by the symbols for other types of protection, if applicable.</p>	Complied	



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2.0) TEST RESULT :

Sl No.	Test or Environment	Clause No.	Quantity		Specifications Limit	Test Result	Notes								
			Tested	Failed											
7.0	<p>Determination of the explosion pressure(reference pressure)</p> <p>i) To ignite an explosive mixture inside the enclosure (DUT) and measure the pressure developed by the explosion.</p> <p>ii) Three tests are to be made with the following explosive mixture to be used in volumetric ratio with air and at atmospheric pressure:</p> <table border="1"> <thead> <tr> <th>Gas Group</th> <th>% of Gas</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>9.8 ± 0.5, methane</td> </tr> <tr> <td>IIB</td> <td>8 ± 0.5, ethylene</td> </tr> <tr> <td>IIC</td> <td>14.0 ± 1.0, acetylene, 31.0 ± 1.0, hydrogen</td> </tr> </tbody> </table>	Gas Group	% of Gas	I	9.8 ± 0.5, methane	IIB	8 ± 0.5, ethylene	IIC	14.0 ± 1.0, acetylene, 31.0 ± 1.0, hydrogen	15.1.2 of IS:2148 -2004	1	0	To measure the maximum smooth pressure.	Refer Annex.-III for detail report.	Total measurement uncertainty at 95% confidence level for: Gas Mixture: 2.1% Pressure: 3.2%
Gas Group	% of Gas														
I	9.8 ± 0.5, methane														
IIB	8 ± 0.5, ethylene														
IIC	14.0 ± 1.0, acetylene, 31.0 ± 1.0, hydrogen														
8.0	<p>Pressure test (static)</p> <p>i) The relative pressure applied: 1.5 times the reference pressure with a minimum of 3.5 bar.</p> <p>ii) The period of application of the pressure shall be at least 10s but need not exceed 60s.</p> <p>iii) The test is made once.</p>	15.1.3.1 of IS:2148 -2004	1	0	i) The enclosure shall suffer no permanent deformation or damage, affecting the type of protection. ii) The joints shall in no place have been permanently enlarged. iii) There shall be no leakage through the wall of the enclosure.	Complied	i) Carried out at 9 bar. ii) Total measurement uncertainty at 95% confidence level for: Pressure: 4.7% Time: 1.2%								



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REPORT ON : FLAMEPROOF PRESSURE / TEMPERATURE SWITCH	PAGE 06 OF 07

2.0) TEST RESULT :

Sl. No.	Test or Environment	Clause No.	Quantity		Specifications Limit	Test Result	Notes										
			Tested	Failed													
9.0	<p>Test for non-transmission of an internal ignition. Electrical apparatus of Group I, IIA, IIB & IIC</p> <p>i) Gaskets are to be removed.</p> <p>ii) The length of threaded joints shall be reduced according to table 6 of IS:2148-2004.</p> <p>iii) The explosive mixtures to be used in the enclosure (DUT) and test chamber in volumetric ratio with air and at atmospheric pressure are as follows:</p> <table border="1"> <thead> <tr> <th>Group</th> <th>% of Gas</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>(12.5 ± 0.5) methane-hydrogen [(58 ± 1) methane & (42 ± 1) hydrogen].</td> </tr> <tr> <td>IIA</td> <td>(55 ± 0.5) hydrogen.</td> </tr> <tr> <td>IIB</td> <td>(37 ± 0.5) hydrogen.</td> </tr> <tr> <td>IIC</td> <td>(27.5 ± 1.5) hydrogen & (7.5 ± 1.0) acetylene.</td> </tr> </tbody> </table> <p>vi) The tests are repeated five times with the above gas mixtures.</p>	Group	% of Gas	I	(12.5 ± 0.5) methane-hydrogen [(58 ± 1) methane & (42 ± 1) hydrogen].	IIA	(55 ± 0.5) hydrogen.	IIB	(37 ± 0.5) hydrogen.	IIC	(27.5 ± 1.5) hydrogen & (7.5 ± 1.0) acetylene.	15.2.1.1 & 15.2.2.1 of IS:2148-2004	1	0	The ignition shall not be transmitted to the test chamber.	Complied.	<p>i) Test conducted with cable gland duly fitted with proper cable piece.</p> <p>ii) Total measurement uncertainty at 95% confidence level for: Gas Mixture: 1.5%</p>
Group	% of Gas																
I	(12.5 ± 0.5) methane-hydrogen [(58 ± 1) methane & (42 ± 1) hydrogen].																
IIA	(55 ± 0.5) hydrogen.																
IIB	(37 ± 0.5) hydrogen.																
IIC	(27.5 ± 1.5) hydrogen & (7.5 ± 1.0) acetylene.																



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: : : 07 : 07

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Date : 25/02/2008

3.0 Major Equipment used

EQPT_NO	NAME	MAKE	MODEL	CAL. VALID UPTO
0441	GAX MIX PUMP	H.WOSTHOFF	4KG18/3-F	18/01/2009
0826	100 MHZ STORAGE OSC	HINDITRON	2230	12/12/2008
1081	CHARGE METER	KISTLER	5015A	28/12/2008
1197	DIGITAL VERNIER CALIPER	MITUTOYO	CD-6"-CS	24/04/2008
0921	DIG. HEAT PROBER THERMOMETE	WAHL	1370 MVX	06/12/2008
1226	WEIGHT SET FOR IMPACT TEST	LOCAL		02/07/2008
1120	DUST CHAMBER	KASCO INDUST	PUNE	09/01/2009

4.0 Remarks (if any)

1. It complies with the requirements of IS:13346-2004 and IS:2148-2004 for Group I, IIA, IIB, IIC.
2. In order to establish a link for BIS & DGMS approval purpose, this item was previously tested, vide test report no. ERTL(E)/TES/K085/0038/11-05, ERTL(E)/TES/K085/0039/11-05 & ERTL(E)/TES/K085/0033/01-06 against IS:2148-1981.



Sonali Jana
28.2.08
Released by
(signature & date) SONALI JANA
Scientist - C

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