

केन्द्रीय खनन अनुसंधान संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)
बरबा रोड, धनबाद-826 001
बिहार, भारत



Central Mining Research Institute

(Council of Scientific & Industrial Research)
BARWA ROAD, DHANBAD-826 001
BIHAR, INDIA

NO. CMRI/TC/.*H. K.*.....

Dated: *09* June 1997

M/s. HANSU CONTROLS LIMITED
A-420, T.T.C. IND. AREA
MIDC, MAHAPE
NEW MUMBAI-400 701.

Sub:- Flameproof Testing as per IS:2148-1981 of your Flameproof 8
WAY PUSH BUTTON PENDENT/STATION OR 8 WAY INDICATING LAMP,
or any combination of push buttons & indicating lamps
(total number in combination maximum eight), in cast alu-
minium alloy LM-6 construction, rated at upto 16 A 500 V or
9W 230 V single phase 50 Hz, TYPE HU-51, for application in
explosive atmospheres of Gas Groups of I, IIA & IIB in
accordance with IS:2148-1981. - REPORT ON.

Your application Ref. No. CMRI/5182 Dated 10/04/97

Dear Sirs,

Please find enclosed the test report (prototype) of the
above prototype sample, submitted by you.

Charges of Rs. 6175/- (Rupees Six thousand One hundred
Seventyfive) only 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 CMRI would dispose
off the sample by public auction without further notice.

Kindly acknowledge receipt.

Thanking you.

Yours faithfully,

(C. Bandopadhyay)
Scientist-in-charge
Testing Cell

Encl : As above.

Test Report in Triplicate.

Copy to (1) Sri J. Achari, Sc. E-II

फोन-निदेशक, Director

पी० ए० ए० ए०, PAX

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कार्यालय के दिन : सोमवार से शुक्रवार तक Working days : Monday to Friday



के. ए. प्र. म. परीक्षण प्रयोगशाला CMRI TESTING CELL

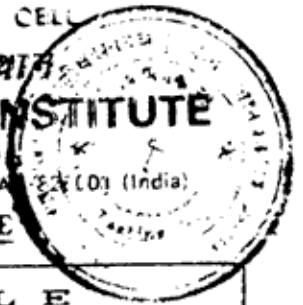
केन्द्रीय खनन अनुसंधान संस्थान

CENTRAL MINING RESEARCH INSTITUTE

(Council of Scientific & Industrial Research)

बरवा रोड, धनबाद-८२६००१ (झारखण्ड) BARWA ROAD, DHANBAD (India)

परीक्षण प्रमाण पत्र TEST CERTIFICATE



F I R S T S C H E D U L E

[For association with the report of tests sent (under cover of this office letter No. CMRI/TC/... dated... June 1997) to M/s. HANSU CONTROLS LIMITED, A-420 T.T.C. IND. AREA, M.I.D.C., MAHAPE, NEW MUMBAI-400 701, in respect of the equipment mentioned below submitted to CMRI for test.]

APPARATUS :

TYPE HU-51, FLAMEPROOF 8 WAY PUSH BUTTON PENDENT/STATION OR 8 WAY INDICATING LAMP, or any combination of push buttons & indicating lamps (total number in combination maximum eight), rated at upto 16 A upto 500 V or 9 W 230 V single phase 50 Hz., Temperature class T6 as per IS:8239-1976, in cast aluminium alloy LM-6 construction.

The enclosure is divided in two compartments, viz.

- (i) Main enclosure containing 8 push button elements for various control operations.
- (ii) Associated enclosure - Terminal compartment for necessary termination at site.

The enclosure is made of cast aluminium alloy LM-6 having minimum 6 mm wall thickness at any cross section and tested at 10 Kg/sq. cm. internal hydraulic test pressure to ascertain mechanical strength.

The main & associated (terminal) enclosure compartments are integrally cast having epoxy moulded threaded terminal block (M.S.) in between two compartments, in which required terminals (i.e. insulated wires) are encapsulated permanently. Both the compartments are closed with a common top cover secured by 8-M6 X 20 long high tensile steel hexagon socket head cap screws which are having their heads adequately shrouded. A name/rating/warning plate of brass/steel is permanently fitted on the main cover by hammer-drive brass/steel rivets.

A Separate side access cover is fitted to the terminal compartment by 6-M6 x 20 long high tensile steel hexagon socket head cap screws whose heads are properly shrouded. A separate warning label of brass/ss is affixed permanently on the side cover by hammer drive brass/ss rivets. The warning states "ISOLATE SUPPLY BEFORE OPENING".

Eight operating rods (brass/M.S) pass through eight press fitted M.S. / brass bushed holes in the push button holders which are fitted on the main cover by FLP threaded joints for various controls operations of the enclosed push button elements, with flamepath 15 mm (min.) and diametral clearance 0.15 mm (max.) in between operating rods and bushed holes.

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Continuation Sheet

VARIATIONS

Alternatively, eight sight glasses of cemented type or LED type shall be provided on the main cover as per arrangement shown on the drawing, for viewing of eight indicating lamps.

The joints in the flameproof enclosures between covers and compartments are flanged joints with flamepath greater than 12.5 mm and surface gap not exceeding 0.15 mm.

VOLUME

ENCLOSURE	VOLUME	
	Gross Volume	Nett Volume
Main Enclosure	1195 C.C.	1003 C.C.
Terminal Enclosure	800 C.C.	700 C.C.

CABLE ENTRY

One or two cable entries of the following sizes are drilled & tapped through an integrally cast pad on the side wall of the terminal compartment with minimum 25 mm axial threaded length for the attachment of the certified & approved double compression type flameproof cable glands :-

2 Nos. 1" or 1/2" or 3/4" ET / BSC / NPT / BSP or
1 No. 1 1/2" ET / BSC or 1 1/4".

Unused entry if any shall be closed by certified & approved flameproof blanking plug of the type removable by only special tools.

METHOD OF CABLE ENTRY

Cable entry is indirect (Type X) inside the main enclosure via terminal box by means of certified & approved double compression type flameproof cable gland, as per IS:2148-1981.

For further details the drawing mentioned below may be consulted.

DRAWING :

The unit is designed and constructed as flameproof in accordance with the following drawings conforming to the requirements of IS:2148-1981.

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DRG. NO. : HU 51 (Rev.0) Dated 20/03/97

MANUFACTURER & APPLICANT : M/s. HANSU CONTROLS LIMITED
A-420 T.T.C. IND. AREA, MIDC, MAHAPE
NEW MUMBAI-400 701.
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Declarations by the applicant/manufacturers as to standards with which the apparatus complies in respects of :-

- (a) As to flameproof construction : IS:2148-1981
(b) As to Temperature Class T6 : IS:8239-1976.

Note: The CMRI has however not checked and tested the compliance of the apparatus to any standard other than IS:2148-1981 in respect of flameproof construction.

Group Classification: Groups I, IIA & IIB only as per IS:2148-1981.

NOTES :

(i) The unit under reference has been tested with Group IIC gas mixture i.e. one gas group higher than the Gas Group IIB for which it is certified to meet DGMS approval.

(ii) For group I application, the material of construction of the enclosure shall be of cast iron, fitted with appropriate & approved cable sealing box & gland.

(iii) Composition of LM-6 alloy purported to be forming the material of construction of the enclosure has been declared by the manufacturer to be as follows (no sample of the alloy was drawn from the prototype enclosure for verifying the chemical composition declared)

COMPOSITION OF ALUMINIUM ALLOY LM-6 :

Copper	0.1% (Max)	Silicon	10 to 13% (Max)
Titanium	0.2% (Max)	Lead	0.1% (Max)
Tin	0.05% (Max)	Magnesium	0.1% (Max)
Iron	0.6% (Max)	Zinc	0.1% (Max)
Nickel	0.1% (Max)	Manganese	0.5% (Max)

Aluminium by difference 85 to 88%

As per section 5.1 of IS: 2148-1981, the enclosure may be of a material chosen for its lightness provided it does not give rise to other hazards like incentive frictional spark hazards. therefore, it should be appropriate that sample of material used for construction of the enclosure should be submitted for verification of its safe qualities as regards to frictional impact spark hazard and this test Report should be read in conjunction with the frictional spark incendivity tests report of the material of construction of the enclosure.

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Continuation Sheet

TEST CERTIFICATE

Accordingly, the applicant/maker has submitted a sample for frictional incendivity test. The results of test is being issued under separate cover.

SCOPE OF CERTIFICATE :

Certificates issued by the certifying authority testify only that the apparatus has been found to comply with the Definitions of Flameproof Enclosure contained in the relevant Indian Standard specification. They do not vouch for the quality of the equipment in any other respect.

CONDITIONS OF CERTIFICATION :

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

A. Kumar



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Continuation Sheet

TEST CERTIFICATE

S E C O N D S C H E D U L E

The following are permissible variations to otherwise identical apparatus covered by this Test Report :-

1. Alternatively the material of construction of the enclosure may be of cast iron instead of cast aluminium alloy LM-6.

(a) For Group I - cast iron

(b) For Groups IIA & IIB- cast iron or cast aluminium alloy LM-6

2. Alternatively, flameproof 5 way Push Button Pendent/Station or 5 way indicating lamp or any combination of push button & indicating lamp (total number not exceeding five in combination), rated at upto 16 A 500 V or 9 W 230V, designated as TYPE HR-53.

3. Alternatively, flameproof 6 way Push Button Pendent/Station or 6 way indicating lamp or any combination of push button & indicating lamp (total number not exceeding six in combination), rated at upto 16 A 500 V or 9 W 230V, designated as TYPE HS-51.

4. Alternatively, flameproof 7 way Push Button Pendent/Station or 7 way indicating lamp or any combination of push button & indicating lamp (total number not exceeding seven in combination), rated at upto 16 A 500 V or 9 W 230V, designated as TYPE HS-53.

A. Anand



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Continuation Sheet

VARIATIONS

(iii) Main Enclosure with main cover having
8 way indicating lamps :

PPM/139129	Body	Body	2.30	11.3	-do-
PPM/139130	Body	Body	2.26	11.3	-do-
PPM/139131	Body	Body	2.28	11.3	-do-

(B) Tests with surrounding explosive atmosphere as per clause 25.5 of IS:2148-1981

(i) Main Enclosure :

EIT/139135	No external Ignition.
EIT/139136	No external Ignition.
EIT/139137	No external Ignition.
EIT/139138	No external Ignition.
EIT/139139	No external Ignition.

(ii) Terminal Enclosure :

EIT/139145	No external Ignition.
EIT/139146	No external Ignition.
EIT/139147	No external Ignition.
EIT/139148	No external Ignition.
EIT/139149	No external Ignition.

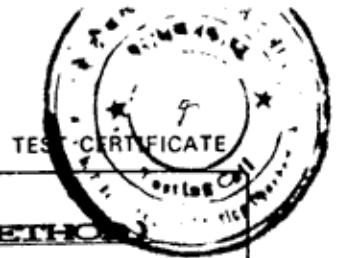
VARIATIONS

(iii) Main Enclosure with main cover having
8 way indicating lamps :

EIT/139140	No external Ignition.
EIT/139141	No external Ignition.
EIT/139142	No external Ignition.
EIT/139143	No external Ignition.
EIT/139144	No external Ignition.

A. H. Menon

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Continuation Sheet

EXCESS PRESSURE TEST (STATIC METHOD)

Date(s) of Test : 30/05/97

1. Pressure applied hydraulically.
2. Pressure recorded by "Pressure-Gauge" of the Hydraulic Testing Machine.
3. Position of application of Pressure : As stated.

Test Ref.No.	Position of application of pressure	Max.Pressure (Kg/sq.cm)	Remarks
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(i) Main Enclosure :

OPM/139150	Cover	10.0	No evidence of distress
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(ii) Terminal Enclosure :

OPM/139152	Body	10.0	-do-
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VARIATIONS

(iii) Main Enclosure with main cover having 8 way indicating lamps :

OPM/139151	Body	10.0	-do-
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4. **Details of Test:** The tests were made on the above enclosures of the unit as per clause 25.4.2.3 of IS:2148-1981.

(a) A pressure of 10.0 Kg/cm² was applied hydraulically to the above enclosures, and the pressure being maintained for one minute in each case, as required by clause 25.4.2.3 of IS: 2148-1981.

(b) The above pressure applied was equal to the pressure specified in Table 4 of IS:2148-1981, as it is more than 1.5 times reference pressure (PPM).

5. **OBSERVATIONS :**

The enclosures of the unit withstood the pressures applied without any visual evidence of distress.

Ar. H. ...

6. COMMENTS :

The enclosures of the unit satisfy the test requirements of clause 25.4.2.3 of IS:2148-1981.

7. NOTE :

As a result of the tests the manufacturer will be required to test each and every enclosure to a static pressure of 10.0 Kg/cm² as mentioned in column III of above Table. The enclosures of the unit should not suffer any damage or deformation as a result of static pressure applied.

GENERAL OBSERVATIONS ON THE BEHAVIOUR OF THE ENCLOSURES DURING TEST :

The Type HU-51 FLAMEPROOF 8 WAY PUSH BUTTON PENDENT/STATION OR 8 WAY INDICATING LAMP, and its associated enclosures in cast aluminium alloy LM-6 construction, sustained no damage as a result of the routine tests applied and the surrounding flammable atmosphere was not ignited. The structure also withstood the excess pressure test, when applied hydraulically, without any visual evidence of distress.

NOTE :

Computer print outs on "Reference Pressure Curves" for above mentioned enclosures, obtained through "KISTLER PIEZO ELECTRIC TRANSDUCER" and "CHARGE AMPLIFIER", are enclosed for your reference.

A. Asman

(TESTER OFFICER)



Dated: ... 03 June 1997

Flame and Explosion Research Laboratory,
Central Mining Research Institute (CSIR)
Barwa Road, Dhanbad-826 001 (Bihar State)

S. Kumar
(DISCIPLINE HEAD)

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