

केन्द्रीय खनन अनुसंधान संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)
बरवा 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/11286.....

Dated: 14 March 1996.

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

Sub:- Flameproof Testing as per IS:2148-1981 of your Flameproof
cum Weatherproof Enclosure for 16-Way JUNCTION BOX in cast
Aluminium Alloy LM-6 construction, designated by Type :
HA-53. - REPORT ON.

Your Ref.No. L/CMRS/1696 Dated : 29/01/1996.

Dear Sirs,

Please find enclosed the test report (Prototype) of the
above Junction Box, submitted by you.

Charges of Rs. 5075/- (Rupees Five thousand Sevetyfive) only
including contingency 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. Bandyopadhyay)
Scientist-in-charge
Testing Cell

Encl : As above.

Test Report in Triplicate.

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

फोन-निदेशक, Director पी० ए० एक्स, PAX
Phone - Off, 822156 (2) 822157, 832088, 832101

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



के. स. व. स. परीक्षण प्रकोष्ठ **CMRI TESTING CELL**

केन्द्रीय खनन अनुसंधान संस्थान

CENTRAL MINING RESEARCH INSTITUTE

(Council of Scientific & Industrial Research)

बरवा रोड, धनबाद-८२६००१ (भारत) BARWA ROAD, DHANBAD-826001 (India)

परीक्षण प्रमाण पत्र **TEST CERTIFICATE**



FIRST SCHEDULE

[For association with the report of tests sent (under cover of this office letter No. CMRI/TC/....H/286 dated....4....March'1996) to M/s. Hansu Controls Limited, A-420 TTC Ind. Area MIDC Mahape, New Bombay-400 701, in respect of the equipment mentioned below submitted to CMRI for test.]

APPARATUS :

Flameproof cum Weatherproof Enclosure for 16-Way JUNCTION BOX in cast aluminium alloy LM-6 construction is designated by Type: HA-53. It is a rectangular box (132 x 132 x 80) mm size without cover. It has a top spigoted cover, fixed to the body by 4 Nos. M6 x 25 mm long socket head cap screws with spring washers. The heads of these bolts are all effectively shrouded. Neoprine 'O'-ring flat gasket is placed over the flange out side the effective flamepath for IP-65 protection. The four side of walls of the junction box are made additionally thick for drilling & tapping holes for cable entries.

The external / exit cable entries shall be made by certified flameproof double compression type cable glands. The size for such cable entries shall be 16 nos. 3/4" ET / BSC or 1/2" NPT/BSP or 12 nos. 1" ET / BSC (four side).

The name, rating & warning plate made of brass/ss shall be fixed on the cover by revets.

The ratings of the Junction Box, as declared by the applicant is 100 Amps, 500 volts AC.

For further details the drawing mentioned below may be consulted.

DRAWING :

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

DRG. NO. : HA 53 Rev.'0' Dated 16/10/95.

MANUFACTURER & APPLICANT : M/S. HANSU CONTROLS LIMITED,
A-420 T.T.C. IND. AREA, MIDC MAHAPE,
NEW BOMBAY-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 general design rating : NOT DECLARED
& performance.
(c) As to weatherproof construction : IS:2147-1962(For IP-65)

Note: The CMRI has however not checked and tested the compliance of the apparatus to any standards other than IS 2148-1981 and IP-65 of IS:2147-1962.

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

NOTES :

(i) The unit under reference has been tested with IIC~~ABC~~ gas mixture i.e. one group higher than the Gas Group for which it is certified as per DGMS directive & approval.

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

(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.

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

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SCOPE OF CERTIFICATION :

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.

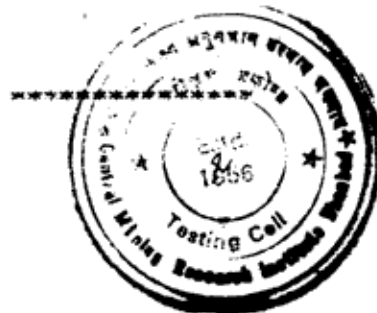
This Institute reserves the right to review, amend or withdraw this Test Report at any time, if considered necessary in the interest of safety.

SECOND SCHEDULE

The following are alternative permissible variation to otherwise identical unit covered by this Test Report :

1. The alternate material of construction of the 16-Way Junction box may be cast iron instead of cast aluminium alloy IM-6 for application in Groups I, IIA & IIB atmosphere.

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Continuation Sheet

ROUTINE TEST

(Preliminary Pressure Test and Final External Ignition Test)

[Accompanies this office letter no. CMRI/TC/11206 dt. 14 March, 1996 and pertains to cast aluminium alloy LM-6 constructed flameproof enclosure for 16-Way JUNCTION BOX, Type : HA-53, manufactured & submitted for test by M/s. Hansu Controls Ltd., A-420 TTC Ind. Area MIDC Mahape, New Bombay-400 701.]

Date(s) of Test: 01/03/1996

Conditions of Test :

- | | | |
|---------------------------------|----------|----------|
| 1. Explosive mixture used | Gas | % in air |
| (a) Preliminary Test - Internal | Hydrogen | 31 |
| (b) Final Test - Internal | -do- | 28 |
| | External | 28 |
2. Ignition by inductive break spark : Location as stated .
3. Pressure recorded by "COMPUTER" through "PIEZO ELECTRIC TRANSDUCER and CHARGE AMPLIFIER manufactured by "KISTLER" of SWITZERLAND. Position as shown.

Test Ref.No.	Ignition	Gauge Position	Max. Pressure Kg/cm ²	Time of Pressure rise in millisecl	Remarks

(A) Test for observation & pressure recording :

(i) Enclosure for 16-Way Junction Box :

PPM/131730	Body	Body	6.69	4	No evidence of distress
PPM/131731	Body	Body	6.79	4	-do-
PPM/131732	Body	Body	5.09	4	-do-

(B) Tests with surrounding explosive atmosphere :

(i) Enclosure for 16-Way Junction Box :

EIT/131733
 EIT/131734
 EIT/131735
 EIT/131736
 EIT/131737



No external Ignition.
 No external Ignition.
 No external Ignition.
 No external Ignition.
 No external Ignition.

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EXCESS PRESSURE TEST (STATIC METHOD)

Date(s) of Test: 01/03/1996

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) Enclosure for 16-Way Junction Box :

OPM/131738	Body	20.0	No evidence of distress
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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) The pressure of 20.0 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 on plug enclosure 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.

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 the enclosure to a static pressure of 20.0 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.



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GENERAL OBSERVATIONS ON THE BEHAVIOUR OF THE ENCLOSURES DURING TEST :

The Flameproof cum Weatherproof 16-Way JUNCTION BOX in cast aluminium alloy LM-6 construction, designated by Type : HA-53, 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 :

THE UNIT IS ONLY FLAMEPROOF WHEN ALL CABLE ENTRIES HAVE EITHER A CORRECTLY FITTED FLP BLANKING PLUG OR FLP CABLE GLAND, COMPLETE WITH CABLE TERMINATED IN THE PROPER MANNER CABLE GLANDS AND BLANKING PLUGS FITTD MUST BE OF A TYPE APPROVED FOR USE WITH THIS UNIT.



[Signature]

(TESTING OFFICER)

[Signature]

(DISCIPLINE HEAD)

Dated: 14..March'1996

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

[Signature]
स्वामी वैदिक
परीक्षण प्रकोष्ठ
SCIENTIST-IN-CHARGE
TESTING CELL

[Signature] 14/3/96
उपनिदेशक
DEPUTY DIRECTOR

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TEST FOR IP-65 DEGREE OF PROTECTION

[Accompanies this office letter No. CMRI/TC/ H286 Dated 14 March '1996 and pertains to cast aluminium alloy LM-6 constructed flameproof enclosure for 16-Way Junction Box, Type : HA-53, manufactured & submitted for test by M/s. Hansu Controls Ltd., A-420 TTC Ind. Area, MIDC Mahape, New Bombay-400 701.]

1. **TEST AGAINST INGRESSES OF DUST AS PER REQUIREMENTS LAID DOWN AGAINST FIRST CHARACTERISTIC NUMERAL NO. 6 OF IP-65 OF IS:2147-1962 :**

The test was conducted on the 16-Way Junction Box in a closed Test Chamber in which talcum powder (passing 1575 micron sieve) was maintained in suspension by an air current. The amount of talcum powder used was 2 Kg. per cubic metre of the Test Chamber. The equipment under test was hung inside the Test Chamber and was connected to a vacuum pump of the Testing set-up. The vacuum maintained inside the enclosures was a differential pressure equivalent to 200 mm column of water. This condition within the enclosures was maintained for 2 continuous hours during which time air were drawn through the joints in the enclosures. The test was then stopped.

The test was repeated three times on each enclosure and on examination after each test it was observed that no dusts had entered inside the enclosures.

2. **TEST AGAINST INGRESSES OF WATER AS PER REQUIREMENTS LAID DOWN AGAINST SECOND CHARACTERISTIC NUMERAL NO. 5 OF IP-65 OF IS:2147-1962 :**

The test was performed by washing down the 16-Way Junction Box from every direction by means of a hose nozzle of 12.5 mm inside diameter which was held 1.5 metre away from the equipment under test with a water pressure corresponding to a head of about 10 metre of water. The duration of the test was 15 minutes.

The test was repeated three times and on examination after each test it was observed that no water entered the enclosures.

CONCLUSION : The Flameproof-cum-Weatherproof 16-Way Junction box Type : HA-53 under reference meets the test requirements of IS:2147-1962 in respect of IP-65 Degree of Protection.

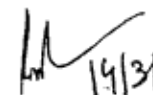

(TESTING OFFICER)

Dated 14 March, 1996.

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


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14/3/96
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