केन्द्रीय खनन् अनुसंधान संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)
बरवा रोड, धनबाद-826 001
बिहार, भारत

C M R I

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

NO. CMRI/TC/.H.28C..... 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 and Weatherproof (IP-65) Testing as per IS:2147-1962 of your Flameproof - cum - Weatherproof (IP-65) 20 WAY JUNCTION BOX in cast aluminium alloy LM-6 construction, rated at upto 150 Amps., 500 Volts AC, designated as TYPE HA-54, for application in explosive atmospheres of Gas Groups of I, IIA & IIB in accordance with IS:2148-1981. - REPORT ON.

Your application Ref.No. L/CMRS/1697 Dated January 29, 1996.

Dear Sirs,

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

Charges of Rs.5075/- (Rupees Five thousand Seventy five) 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. Bandopadhyay)
Scientist-in-charge
Testing Cell

Encl : As above.

Test Report in Triplicate.

Copy to (1)Sri J.Achari, Sc. E-II (2)B/11 Section

CMRI

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केन्द्रीय खनन अनुसंधान संस्थान
CENTRAL MINING RESEARCH INSTITUTE
(Council of Scientific & Industrial Research)
बरवा रोड, धनबाद-८२६००१ (भारत) BARWA ROAD, DHANBAD-826001 (India)

Estd. 1958

परीक्षण प्रमाण पत्र TEST CERTIFICATE

FIRST SCHEDULE

[For association with the report of tests sent (under cover of this office letter No.CMRI/TC/.14289..dated..14...March,1996) to M/s. HANSU CONTROLS LIMITED, A-420 T.T.C. IND. AREA. M.I.D.C MAHAPE, NEW BOMBAY-400 701, in respect of the equipment mentioned below submitted to CMRI for test.]

APPARATUS :

TYPE HA-54, FLAMEPROOF-CUM-WEATHERPROOF (IP-65) 20 WAY JUNCTION BOX in cast aluminium alloy LM-6 construction, rated at upto 150 Amps 500 volts AC, comprising enclosure and spigotted cover. the spigotted cover is fixed on the enclosure by 8-M6 x 25 long high tensile steel hexagon socket head cap screws. The heads of these screws are adequately provided with shrouds to prevent their unauthorised removal by ordinary tools. A name / rating / warning plate of brass/ss is affixed permanently on the cover by hammer-drive brass/ss rivets with 3 mm minimum metal thickness left. The Junction Box contains 15 way terminals with one internal & two external EARTHING SCREWS. The minimum wall thickness of the enclosure is 6 mm and over all dimensions are as mentioned on the drawing. The warning provided on cover instructs "ISOLATE ELSEWHERE BEFORE OPENING".

The flameproof joints in the structure between spigotted cover and enclosure is spigot joints with effective length of the flamepath 15 mm (min.) and diametral clearance 0.15 mm (max.) excluding neoprene rubber "O"-ring of maximum cross-sectional diameter 3 mm which has been provided as supplement to the effective flameproof joints to ensure IP-65 Degree of Protection as per IS:2147-1962. Any displacement, damage, disintegration or inadvertent omission of the "O"-ring will not adversely affect the flameproof nature of the enclosure.

5 Nos. 1/2" or 3/4" ET/BSC/NPT/BSP cable entries (each side) or 4 Nos. 1" ET/BSC or 2 Nos. 1¼" NPT/BSP cable entries (each side) are drilled & tapped through padded side walls of the Junction Box, for the attachment of the certified & approval double compression type flameproof-cum-weatherproof (IP-65) cable glands. The minimum un-interrupted & engaged FLP axial threaded length of all cable entries is 25 mm.

Unused cable entries if supplied as drilled & tapped shall be blanked off by certified & approved FLP/WP blanking plugs of types removable by only special tools or shall alternatively be left unworked at the time of manufacture.

VOLUME

GROSS VOLUME OF THE ENCLOSURE 1490 cm^3
NETT VOLUME OF THE ENCLOSURE 1450 cm^3

For further details the drawing mentioned below may be consulted.

D R A W I N G :

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

DRG. NO. : HA 54 (Rev.0) (Sheet 1 of 1) Dated 28/10/95.

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

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

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 & performance.	: Not Declared.
(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 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 Group IIC gas mixture i.e. one gas group higher than the Gas Group IIB for which it is certified to meet DGMS approval as per their directives.

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

(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.

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.

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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 :-

The alternate material of construction of the enclosure may be 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

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. Continuation Sheet

TEST CERTIFICATE

ROUTINE TEST

(Preliminary Pressure Test and Final External Ignition Test)

[Accompanies this office letter no. CMRI/TC/H280.....dt.14..... March,1996 and pertains to Flameproof-cum-Weatherproof (IP-65) 20 Way Junction Box in cast aluminium alloy LM-6 construction, rated at upto 150 Amps, 500 volts AC, manufactured & submitted for test by M/s. HANSU CONTROLS LIMITED, A-420 T.T.C. IND. AREA. M.I.D.C. MAHAPE, NEW BOMBAY-400 701.]

Date(s) of Test:01/03/96

Conditions of Test :

1. Explosive mixture used		Group IIC Gas	% in air
(a)Preliminary Pressure Test	- Internal	Hydrogen	31.0
(b)Final External Ignition Test	- Internal	-do-	28.0
	External	-do-	28.0

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/cm2	Time of Pressure rise in millisecs	Remarks
(A) Test for observation & pressure recording as per clause 25.4.1 of IS: 2148-1981 :					
JUNCTION BOX (20 WAY) :					
PPM/131739	Body	Body	6.36	4.0	No evidence of distress
PPM/131740	Body	Body	6.07	4.0	-do-
PPM/131741	Body	Body	6.05	4.0	-do-
(B) Tests with surrounding explosive atmosphere as per clause 25.5 of IS:2148-1981					
(i) Main Enclosure :					
EIT/131742					No external Ignition.
EIT/131743					No external Ignition.
EIT/131744					No external Ignition.
EIT/131745					No external Ignition.
EIT/131746					No external Ignition.

Est. 1958 Testing Cell

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Continuation Sheet

TEST CERTIFICATE

EXCESS PRESSURE TEST (STATIC METHOD)

Date(s) of Test:01/03/96

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
	JUNCTION BOX (20 WAY) :		
OPM/131747	Body	19.0	No evidence of distress

4. **Details of Test**: The tests were made on the above enclosure of the unit as per clause 25.4.2.3 of IS:2148-1981.

(a) A pressure of 19.0 Kg/cm2 was applied hydraulically to the above enclosure, and the pressure being maintained for one minute, as required by clause 25.4.2.3 of IS: 2148-1981.

(b) The above pressure applied was equal to 3 times the reference pressure (PPM).

5. **OBSERVATIONS** :

The enclosure of the unit withstood the pressure applied without any visual evidence of distress.

6. **COMMENTS** :

The enclosure of the unit satisfies 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 every enclosure to a static pressure of 19.0 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 ENCLOSURE DURING TEST :

The Type HA-54, FLAMEPROOF-CUM-WEATHERPROOF (IP-65) 20 Way Junction Box in cast aluminium alloy LM-6 construction under reference, 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 :

A Computer print out on "Reference Pressure Curve" for above mentioned enclosure, obtained through "KISTLER PIEZO ELECTRIC TRANSDUCER" and "CHARGE AMPLIFIER", is enclosed for your reference.

(TESTING OFFICER)

Dated: 14 March, 1996

(DISCIPLINE HEAD)

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

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TESTING CELL

14/3/96
उपनिदेशक
DEPUTY DIRECTOR

TEST FOR IP-65 DEGREE OF PROTECTION

[Accompanies this office letter No.CMRI/TC/ 4286 Dated 14 March, 1996 and pertains to Type HA-54, Flameproof-cum-Weatherproof (IP-65) 20 Way Junction Box in cast aluminium alloy LM-6 construction, rated at upto 150 Amps 500 volts AC, manufactured & submitted for test by M/s. HANSU CONTROLS LTD., A-420 T.T.C. IND. AREA, M.I.D.C. MAHAPE, NEW BOMBAY-400 701.]

1. TEST AGAINST INGREES 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 above mentioned 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 enclosure was a differential pressure equivalent to 200 mm column of water. This condition within the enclosure was maintained for 2 continuous hours during which time air were drawn through the joints in the enclosure. The test was then stopped.

RESULTS :

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

2. TEST AGAINST INGREES 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 above mentioned JUNCTION BOX from every direction by means of a hose nozzle of 12.5 mm inside diameter which was held 3 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.

RESULTS :

The test was repeated three times and on examination after each test it was observed that no water entered inside the enclosure of the Junction Box.

CONCLUSION :

The Flameproof-cum-Weatherproof (IP-65) 20 Way Junction Box, Type HA-54, under reference meets the test requirements of IS:2147-1962 in respect of IP-65 Degree of Protection.

(TESTING OFFICER)

(DISCIPLINE HEAD)

Dated 14 March, 1996.

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

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