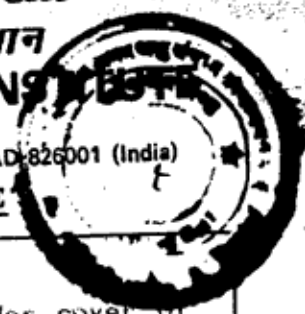




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केन्द्रीय खनन अनुसंधान संस्थान
CENTRAL MINING RESEARCH INSTITUTE
(Council of Scientific & Industrial Research)
बरवा रोड, धनबाद-८२६००१ (भारत) BARWA ROAD, DHANBAD-826001 (India)
परीक्षण प्रमाण पत्र **TEST CERTIFICATE**



FIRST SCHEDULE

[For association with the report of tests sent (under cover of this office letter No. CMRI/TC/...351...dated...09 July 1997) to M/s. HANSU CONTROLS LIMITED, 4-420, T.T.C. INDUSTRIAL AREA M.I.D.C., MAHAPE, NAVI MUMBAI-400 701, in respect of the equipment mentioned below submitted to CMRI for test.]

APPARATUS : Flameproof cum Weatherproof Enclosures for 2-Way Push Button Station in cast aluminium alloy LM-6 construction, designated by Type:HD-55 is a direct-entry-type "Y" enclosure as per clause 18.3.1 of IS:2148-1981.

It has a top spigotted cover fixed to the enclosure by 2 Nos. M6 x 20 mm long socket head cap screws with spring washers. The heads of these two bolts are effectively shrouded. The length of path in between cover and body (spigotted joint) is 15 mm and diametral clearance is 1.5 mm (max.). Endless neoprene "O"-ring is placed over the groove of the cover, outside the effective flamepath for IP-65 protection.

The cover is fitted with 2 Nos. Push Button having flameproof joint & gap as per IS:2148-1981.

Name, ratings & warning inscription plate made of brass, ss is permanently fixed on the cover by rivets stating "Isolate supply before opening".

The external/exit cable entries shall be applied through certified flameproof double compression type cable glands. The number of such entries may be maximum upto four. The entry size may be either 1/2" or 3/4" ET/BSC/NPT/BSP or 1" ET/BSC.

Alternatively, the unit may be used as an ON-OFF push button or as an FLP/WP rotary switch or as an FLP/WP Limit Switch. The details are available on the design drawing.

The electrical ratings of the unit as declared by the applicant is "16/30 Amps upto 500 volts (max.)".

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. : HD-55 Rev. "0" dated 22/03/97.

MANUFACTURER & APPLICANT : M/s. HANSU CONTROLS LIMITED
A-420, TTC INDUSTRIAL AREA
MIDC, MAHAPE,
NAVI 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 general design rating & performance : Not Declared.
(c) As to weatherproof construction : IS:2147-1967 (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:2147-1967 (For IP-65).

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

NOTES : (i) 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.

(ii) 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 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.

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

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

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

1. The alternate material of construction of the 2-Way Push Button Station may be cast iron instead of cast aluminium alloy LM-6 for application in Groups I IIA & IIB atmosphere.

By replacement of the top bolted cover the 2-Way Push Button Station Type:HD-55 may be used with their respective type designation as :-

- (i) FLP/WP 1-Way Push Button Station Type:HC-52
(Stop or Start)
- (ii) FLP/WP Rotary Switch / Selector Switch Type : HE-54.
(Result of test enclosed)
- (iii) FLP/WP Limit Switch, Type : HY-51.
(Result of test enclosed)
- (iv) FLP/WP Junction Box Type : HA-51.

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ROUTINE TEST

(Preliminary Pressure Test and Final External Ignition Test)

[Accompanies this office letter no. CMRI/TC/359...dt.09 July 1997 and pertains to cast aluminium alloy LM-6 constructed direct-entry-type flameproof enclosure for 2-Way Push Button Station Type : HD-55 manufactured & submitted for test by M/s. Hansu Controls Ltd., MIDC, Mahape, Navi Mumbai-400 701.]

Date(s) of Test : 07/07/97

Conditions of Test :

1. Explosive mixture used	Gas	% in air
(a) Preliminary Pressure - Internal Test	Hydrogen/Methane 85:15	24.0
(b) Final External Ignition Test	-do-	20.0
	External	18.0

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 Bar	Time of Pressure rise in milliseconds	Remarks

(A) Test for observation & pressure recording :

(i) Enclosure for 2-Way Push Button

PPM/139585	Body	Body	4.48	10.5	No evidence of distress
PPM/139586	Body	Body	4.26	10.5	-do-
PPM/139587	Body	Body	4.35	10.4	-do-

(ii) Enclosure for Rotary Switch

PPM/139588	Body	Body	4.71	10.6	-do-
PPM/139589	Body	Body	4.55	10.6	-do-
PPM/139590	Body	Body	4.46	10.6	-do-

(iii) enclosure for Limit Switch

PPM/139591	Body	Body	4.16	10.6	-do-
PPM/139592	Body	Body	4.08	10.6	-do-
PPM/139593	Body	Body	4.16	10.6	-do-

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(B) Tests with surrounding explosive atmosphere :

(i) Enclosure for 2-Way Push Button

EIT/139594	No external Ignition.
EIT/139595	No external Ignition.
EIT/139596	No external Ignition.
EIT/139597	No external Ignition.
EIT/139598	No external Ignition.

(ii) Enclosure for Rotary Switch

EIT/139599	No external Ignition.
EIT/139600	No external Ignition.
EIT/139601	No external Ignition.
EIT/139602	No external Ignition.
EIT/139603	No external Ignition.

(iii) Enclosure for Limit Switch

EIT/139604	No external Ignition.
EIT/139605	No external Ignition.
EIT/139606	No external Ignition.
EIT/139607	No external Ignition.
EIT/139608	No external Ignition.



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EXCESS PRESSURE TEST (STATIC METHOD)

Date(s) of Test : 07/07/97

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) Enclosure for 2-Way Push Button

OPM/139609	Body	10.0	No evidence of distress
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(ii) Enclosure for Rotary Switch

OPM/139610	Body	10.0	-do-
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(iii) Enclosure for Limit Switch

OPM/139611	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 clauses 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.

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.

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GENERAL OBSERVATION REGARDING CONSTRUCTION OF THE ENCLOSURE :

CONNECTIONS FROM EXTERNAL CIRCUIT :

The method of cable entry is Type "Y" i.e. cable enters direct, inside the main enclosure as per clause 18.1 (b) of IS:2148-1981.

The clause 18.1.1 and clause 18.3.1 of the above standard has made the following observations regarding cable entry, which is being reproduced.

Clause 18.1.1 : The direct entry of external circuit conductors into the main enclosure shall not be permitted. However, where due to space limitations direct entry is inevitable, the same shall be permitted subject to the approval of the competent authority.

Clause 18.3.1 : Direct entry of conductor or cables where adopted due to special consideration, shall be by means of flameproof compression type cable gland, packing gland or sealing box which does not alter the flameproof properties of the equipment.

GENERAL OBSERVATIONS ON THE BEHAVIOUR OF THE ENCLOSURES DURING TEST :


The Direct-Entry-Type Flameproof cum Weatherproof Enclosure for 2-Way Push Button Station and the alternative enclosures, 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 : THIS 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 FITTED MUST BE OF A TYPE APPROVED FOR USE WITH THIS UNIT.



(TESTING OFFICER)

Dated: 08 July 1997

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


समन्वय वैज्ञानिक
परीक्षण प्रकोष्ठ
Scientific Officer
Testing Cell


(DISCIPLINE HEAD)


समन्वय वैज्ञानिक
CO-ORDINATING SCIENTIST

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TEST FOR IP-65 DEGREE OF PROTECTION

[Accompanies this office letter No. CMRI/TC/ 359 Dated 08 July 1997 and pertains to cast aluminium alloy LM-6 constructed, Direct-Entry-Type flameproof enclosure for 2-Way Push Button Station Type : HD-55, manufactured & submitted for tests by M/s. Hansu Controls Ltd., MIDC, Mahape, Navi Mumbai-400 701.]

1. TEST AGAINST INGRESS OF DUST AS PER REQUIREMENTS LAID DOWN AGAINST 1ST CHARACTERISTIC NUMERAL 6 OF IP-65 OF IS:2147-1962 :

The test was conducted on the enclosure for Direct Entry-Type 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.

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


2. TEST AGAINST INGRESS OF WATER AS PER REQUIREMENTS LAID DOWN AGAINST 2ND CHARACTERISTIC NUMERAL 5 OF IP-65 OF IS:2147-1962 :

The test was performed by washing down the enclosure for Direct-Entry-Type 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.

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


CONCLUSION : The Flameproof-cum-Weatherproof enclosure for Direct-Entry-Type 2-Way Push Button Station, in cast aluminium alloy LM-6 construction, designated by Type : HD-55, under reference, meets the test requirements of IS:2147-1962 in respect of IP-65 Degree of Protection.


(TESTING OFFICER)


विभागाध्यक्ष
परीक्षण प्रकोष्ठ
Scientist-in-Charge
Testing Cell


(DISCIPLINE HEAD)

Dated 08 July 1997.
Flame and Explosion Laboratory,
Central Mining Research Institute (CSIR),
Barwa Road, Dhanbad-826 001 (Bihar State)


समन्वय वैज्ञानिक
CO-ORDINATING SCIENTIST