INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR ELECTRO-HYDRAULIC THRUSTOR** (*First Revision*)	**IPSS: 1-10-003-02**
	Corresponding IS does not exist	Formerly : IPSS :1-10-003-81

0. FOREWORD

0.1 This Inter Plant Standard has been prepared by the Standards Committee on Electrical Components and Equipment, IPSS 1:10 with the active participation of the representatives of the steel plants, major consulting organizations and established manufacturers of electro-hydraulic thrustors and was adopted in February 2002.

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment (or while placing orders for additional requirements) by individual steel plants. For exercising effective control on inventories, it is advisable to select a fewer number of sizes/types from those mentioned in this standard, for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. SCOPE

1.1 This Interplant Standard covers the requirements of electro-hydraulic thrustors for working at 415 V, 3-phase and 50 Hz ac supply, used in indoor and outdoor installations in steel plants such as cranes, conveyors, crushers, winches and ground equipment.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS 1885 (Part 35) :1993 `Electrotechnical vocabulary Part 35 Rotating machines (*first revision*) ' shall apply.

3. SITE CONDITIONS

3.1 The following shall constitute the normal site conditions :

3.1.1 *Ambient temperature* - The reference ambient temperature shall be 50^{o}C.

3.1.2 *Altitude* - The altitude not exceeding 1000m.

3.1.3 *Ambient air* - The ambient air may contain fair amount of conductive dust.

3.1.4 *Relative Humidity* - The relative humidity can be upto the maximum of 100%. Maximum temperature and 100% relative humidity may not occur simultaneously.

3.2 The thrustor shall be suitable for both indoor and outdoor installations. For special applications where steam and corrosive fumes are present, the details shall be as agreed to between the manufacturer and the purchaser.

4. VOLTAGE AND FREQUENCY VARIATION

4.1 The thrustors shall be capable of achieving performance requirements of this standard with :

a) The terminal voltage differing from its rated value of 415 V in a 3-phase ac supply by not more than $\pm$10%.

b) The frequency differing from its rated value by not more than +3% and –6%.

5. DIMENSIONS

5.1 The dimensions of the thrustors shall be as given in **Table-1**.

5.2 The design of the thrustor need not correspond to pictorial representation shown in the IPSS. Only the given dimensions shall be maintained.

5.3 Dimension D given in the Table-1 is approximate.

6. CONSTRUCTION

6.1 The thrustor body shall be of pressure die-casting of suitable aluminium alloy (LM 6).

6.2 Material for some vital parts of the thrustor shall be as given below :

Shaft : SS grade AISI 446/IS 1870 Sh-V
Bush: RG 7 DIN 1705/IS 318/1981 LT B-2
Body: IS 202/1981 Alloy Designation 4458/4600.

6.3 The thrustor rods shall be protected against dust and dampness by fixed and/or movable protective weather-proof cover tubes.

6.4 Transformer oil / spindle oil is used for thrustor.

6.5 The oil level inspection hole and oil draining hole shall be of adequate diameter. Pouring will be done through the inspection hole.

6.6 The joints and flanges of the thrustor shall be leak-proof. All joints including terminal boxes shall have proper seals.

6.7 For special applications, regulating valves may be provided to adjust time of lifting and lowering.

6.8 All the six leads shall be brought out for connection in star or delta as required. The terminal block should have sealing arrangement to prevent oil leakage.

6.9 Oil pouring hole shall be suitably located to facilitate easy oil pouring and maintenance.

6.10 **Motor** – The motor of the thrustor shall be located on top and not immersed in oil and it shall have protection according to IP55 of IS 4691:1985 `Degree of protection provided by enclosures for rotating electrical machinery (*first revision*). The motor shall be suitable for frequent reversals (see Note in **Table-2**).

6.10.1 The motor shall have a terminal box suitable for accommodating aluminium cable of not less than 10 mm^2.

6.10.2 Insulation used in the motor shall conform to class **`F'** or superior depending upon the application. The temperature rise in the motor shall be limited to **class-`B'**.

7. CLASS OF DUTY

7.1 The thrustor and motor shall be continuously rated.

7.2 The performance of the thrustor shall not be affected if the inclination is within 15^o from the vertical.

8. PERFORMANCE

8.1 The number of operations to be performed by the thrustors shall be as given in **Table-2**.

8.2 The thrustors shall preferably have the thrust and stroke time of lifting and lowering as mentioned in **Table-2**. Tolerance in thrust shall not exceed +6% and –0%.

8.3 Stalling load shall not have any adverse effect on the lift and performance of thrustors.

9. EARTHING

9.1 Suitable and adequate size of earthing terminals shall be provided on the body of the thrustor in accordance with the relevant provisions of IS 3043:1987 `Code or practice for earthing (first revision)'.

10. MARKING

10.1 Each thrustor shall have a name plate stating the following :

a) Designation number of this standard indicating conformity to it
b) Name of the manufacturer
c) Manufacturer's Type serial number and year of manufacture
d) Class of insulation of motor
e) Voltage
f) Frequency
g) Number of phases
h) Nominal thrust (kg)
i) Maximum stroke (mm)
j) Motor connection details, and
k) Type of oil used.

11. TESTS

11.1 The following tests shall be carried out at factory prior to despatch and the manufacturer shall supply a test certificate along with each thrustor.

11.2 **Type Test**

a) *High voltage test of motor* – The motor shall withstand 2 000V ac for one minute.

TABLE 1
(Clause 5.1, 5.3) & Fig.1

DIMENSIONS OF THRUSTOR

SL NO.	THRUST Kg	STROKE mm	A	B	C	D	E $^{+0}_{-1}$	F	G	H	J	K	L	M	N	O	P $^{+0}_{-1}$
1	20	50	284	334	50	160	80	20	20	10	12	20	20	15	16	28	40
2	35	50	433	483	50	151	80	25	25	15	16	20	20	15	16	34.5	40
3	45	75	509	584	75	190	120	25	25	16	16	30	29	22	24	29	60
4	75	50	509	559	50	190	120	25	25	18	16	30	29	22	24	29	60
5	75	120	609	729	120	190	120	25	25	16	16	30	29	22	24	29	60
6	185	60	600	660	60	252	160	40	40	25	25	40	45	25	27	32	80
7	185	160	700	860	160	252	160	40	40	25	25	40	45	25	27	32	80

Note:

1. The figure shown in the IPSS is only indicative. No. of bottom hooks, 1 or 2, shall be as per requirement,
2. All dimensions are in mm, unless otherwise specified.

TABLE – 2
[Clause 6.10, 8.1, 8.2, 11.2 (b)]

PERFORMANCE CHARACTERISTICS

SL NO.	THRUST Kg.	STROKE mm	LIFTING TIME Sec.	LOWER TIME Sec.	NO. OF OPERATIONS PER HOUR
1	20	50	0.6	0.5	720
2	35	50	0.6	0.5	720
3	45	75	0.8	0.6	600
4	75	50	0.6	0.5	600
5	75	120	1.6	0.8	600
6	185	60	0.7	0.5	600
7	185	160	1.8	0.8	600

Note :

1. The thrustor shall be capable of 450 reversals per hour
2. The thrustor shall be capable of taking 15 percent overload with lifting time not exceeding by 50 percent
3. Oil pouring hole shall be located near the terminal box to facilitate easy oil pouring.

b) *Load stroke test* – The thrustor shall be subjected to the specified nominal load (thrust) and the stroke and lifting and lowering time shall conform to the data furnished in **Table-2**.

c) *On-load operation* – The thrustor shall operate reasonably free from noise in on-load conditions.

d) *Temperature rise test* – The thrustor shall be operated continuously and the maximum temperature-rise of the oil shall be noted. The maximum temperature-rise of oil shall not exceed 50^{o}C over and above ambient temperature.

e) *Duty test* – Each type of thrustor shall be operated on load for the rated number of operations in one hour and it shall withstand the test without any damage to the mechanical and electrical parts.

f) *Enclosure test* – The test shall be carried out in accordance with IS 4691:1985.

11.3 Routine Tests

a) Tests indicated in 11.2 (a), (b) and (c) shall constitute the routine tests for thrustors.

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