INTER PLANT STANDARD IN STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR TWO-STAGE OIL HYDRAULIC HAND PUMPS FOR REMOTE CONTROL HYDRAULIC JACKS**	**IPSS: 1-02-004-18** *(First Revision)*
	Corresponding IS does not exist	*Formerly*: IPSS: 1-02-004-77

0. FOREWORD

0.1 Interplant standardization in steel industry has been initiated under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). The Interplant Standards prepared by the standard committee on Hydraulic, Pneumatic and Lubricating Equipment, IPSS 1:2, with the active participation of the representatives of all the steel plants and leading consultants and was first adopted in December, 1977. Thereafter, standard was revised in January, 2018.

0.2 Interplant standardization for steel industry primarily aims at achieving rationalization and unification of capacities and characteristics of remote control hydraulic jacks used in steel plant and provides guidance in indenting stores or equipment for existing or new installations by individual steel plants. For exercising effective control on the inventories, it is advisable to select a fewer number of sizes (or type) from among the products mentioned in this standards for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. SCOPE

This standards covers the constructional and operational features and inspection and performance tests for two-stage oil hydraulic and pumps used in remote control hydraulic jacks as per : 1-02-002-18 : Specification for remote control hydraulic jacks .

2. TYPE

Pumps shall generally be of the following two types:

a) Type 10:18 – High pressure piston diameter 10 mm and low pressure piston diameter 18 mm; and

b) Type 10:25 – High pressure piston diameter 10 mm and low pressure piston diameter 25 mm

[Note- Other types may be considered depending on pressure rating (up to 700 bar) and Vendor’s recommendation]

3. DESIGNATION

The pumps shall be designated by**:**

a) Type (see 2)

b) Container capacity (see Table 1), and

c) Number of this standards,

Example: Two-stage oil hydraulic hand pump of Type 10:18 having capacity of oil container of 6 litres conforming to this standard shall be designated as : **Pump 10:18 – 6 – IPSS: 1-02-004- 18**

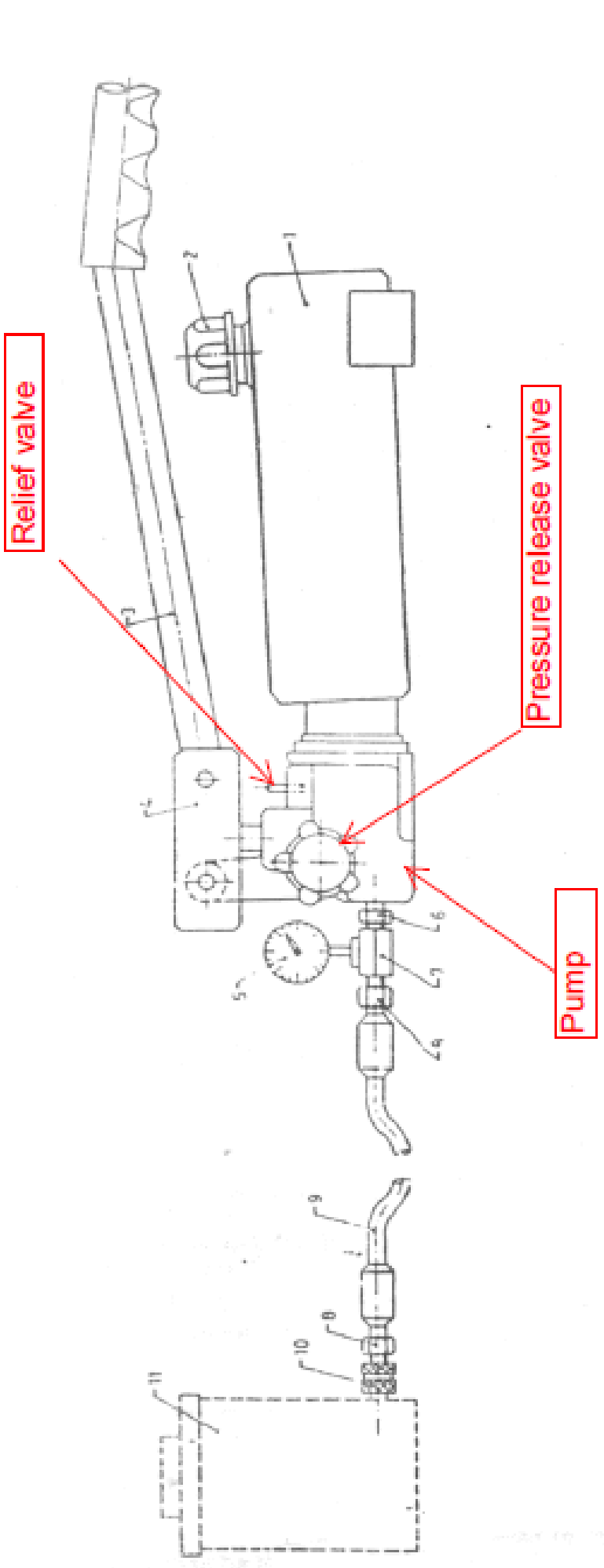

FIG. 1 SCHEMATIC DIAGRAM OF TWO-STAGE HYDRAULIC HAND PUMP AND ITS CONNECTION TO THE REMOTE CONTROL HYDRAULIC JACK

(Figure 1)

4. CONSTRUCTIONAL AND OPERATIONAL FEATURES

The schematic diagram of a two-stage oil hydraulic hand pump with its connection to a remote control hydraulic jack is shown in Fig. 1.

4.1 **Body** – The pump body shall not have any manufacturing defect and shall stand 1:5 times the rated operating pressure. It shall be made of:

a) Forged light metal,

b) Cast steel, or

c) Rolled or forged carbon steel.

4.2 **Suction and Delivery Valves** – These valves shall be of mushroom, ball or cone type. H springs are used, they shall conform to the relevant Indian Standard and spring holding screws, where used, shall be of good quality. The valves and valve seats shall be hardened and lapped and shall be leak-proof at the rated operating pressure.

4.3 **Pressure Relief Valves** – The pressure relief valves shall be preferably of cone type with pressure spring so that relief pressure could be exactly maintained at the set value. The relief valve pressure should be adjusted to the maximum at 1.5 times the rated operating pressure.

4.3.1 After the tests, pressure relief valve shall be adjusted in the manufacturer's workshop to the rated operating pressure of 44.13 MN m2 (450 Kgf, cm2) and shall be indelibly marked to indicate.

4.4 **Release Valve** – Release valve meant to release the pressured oil from the delivery port back to the oil container shall be of ball or cone type. This should be conveniently located on the pump body and shall be operated by a hand wheel or lever. It shall be so designed that minimum effort is required to operate it. The operation of the release valve shall be such that when it is closed, the pump is operative; and when it is open delivery pressure oil is bypassed from delivery port to the oil container. There shall not be any external leakage from this release valve for which necessary sealing arrangement has to be provided.

4.5 **Delivery Port** – The hydraulic hose with end fitting shall be fitted with suitable adapter to the delivery port. The internal thread of the delivery port shall be of size M18 x 1.5 conforming to IS: 4218 Isometric screw threads.

4.6 **Suction Strainer** – The suction strainer shall be located at the inlet of the suction valve in order to avoid rift entering the pump. The mesh size of the strainer shall not exceed 50 microns.

4.7 **Low Pressure (LP) and High Pressure (HP) Plunger Pistons** – The plunger seals located in the pump body shall be either a single packing or a set of packings. Plungers shall be carbon steel with hard chrome plated polished surface. The piston seals shall be compatible with the operating medium that is Grade 3 hydraulic mineral oil as per IPSS: 1-09-002 'Specification for hydraulic oil, mineral oil type'.

4.8 **Actuating Mechanism** – The LP and HP plunger shall be actuated by a simple hand lever mechanism. The LP and HP plunger may be either

integral of separated depending on the manufacturer's design. The actuating hand lever shall have a maximum length of 600 mm.

4.9 **Hand Level Clamp** – A clamp shall be provided to hold the hand lever when pump is not in operation.

4.10 **Capacity and Dimensions** – The capacity and dimensions of the pump shall be as specified in Table 1.

TABLE 1 CAPACITY AND MAIN DIMENSIONS OF TWO-STAGE HYDRAULIC HAND PUMPS

(Clause 4.10 and Fig 1)

Capacity Dimension	Pump Type	
	10 18	10 25
(1)	(2)	(3)
Rated operating pressure MN/m2 (the value in kgf/cm2 is given in parenthesis)	44.13 (450)	44.13 (450)
Container capacity litre (effective oil volume as 95 percent of container volume)	2,6,12	2,6,12
Weight (without handle and oil), Max. Kg	9	9
High Pressure plunger dia, mm	10	10
Low Pressure Plunger dia, mm	18	25
High pressure and low pressure plunger stroke, mm (not binding)	18	18
Handle effort max. KG	15	15

5. TESTS

5.1 **Performance Test** – The pump shall be connected to a test stand by means of steel tubing and operated oil pressure reaches a value of 8.83 MN/m2 (90 kgf/cm2). The pressurized pipe shall then be bleeped and the release valve unscrewed to release the pressurized oil back to the container. This shall be repeated several times till it is ensured that there is no air in the system. Finally the pump shall be loaded to a pressure gauge at 44.13 MN/m2 (450 kgf/cm2). The pump shall be left in loaded condition for three minutes during which period it shall not show any pressure drop. This shall be repeated 20 times.

5.2 **Overload Test** – The pump shall be tested to hold the pressure 1.5 times the rated operating pressure for a minimum period of 15 minutes, during which period, it shall not show any pressure drop.

5.3 **Repeat Performance Test** – After the overload test, the pump shall be tested 10 times for performance to hold pressure at rated operating pressure of 44.13 MN/m2 (450 kgf/cm2) for three minutes each time.

5.4 **Load Sustaining Test** – The pump shall be operated and the pressure shall be held at 44.13 MN/m2 (450 kgf/cm2). The pump shall be left in loaded condition for 24 hours during which there shall not be any pressure drop.

5.5 **Sequence of Testing** – The tests shall be carried out in the following sequence:

a) Visual inspection for any obvious imperfection,

b) Performance test (see 5.1)

c) Overload test (see 5.2), and

d) Repeat performance test (see 5.4)

5.5.1 After completing the sequence of tests given under 5.5, the pump shall not show any sign of damage.

5.6 **Guarantee Test** – The pump sampled at random agreed to between the manufacturer and the user may be tested to check the quality of seals and other parts by operating it for the guaranteed number f cycles as specified by the manufacturer. For the purpose of this test, one cycle shall consist of operating the pump to the rated working pressure and releasing the pressure to zero.

6. TEST CERTIFICATE

The manufacturer shall provide a certificate with every pump for its compliance with the provisions of this standard.

7. MARKING

Each pump shall be legibly and indelibly marked stamped on the body with :

a) Name, initials or trade mark of the manufacturer;

b) Serial batch number; and

c) Designation of the pump

8. ACCESSORIES

The pumps may be ordered with any or all of the following accessories:

a) Adapters to interconnect the matching fittings to the threaded hole of the pumps (m18 x 1.5);

b) Pressure gauge adapter for connecting a pressure gauge to read the load pressure;

c) Flexible multiple spirally wound steel wire reinforced hose to connect the pump to the standard jack normally of 2 metre length unless specified otherwise by the purchaser; and

d) Self-closing quick coupler meant to connect and disconnect the hose from the jack quickly and to serve as a self-closing device to allow the oil to flow out from the hose or the jack.