


INTER PLANT STANDARD IN STEEL INDUSTRY		
 IPSS	SPECIFICATION FOR REMOTE CONTROL HYDRAULIC JACKS	IPSS: 1-02-002-18 <i>(First Revision)</i>
	Corresponding IS does not exist	Formerly: IPSS: 1-02-002-75

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). This Interplant Standards is prepared and revised based on the standard committee on Basic Standards, 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 adopted in April, 1975. Thereafter, standard was first 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 plants and provides guidance in indenting stores for existing equipment (or while placing orders for additional requirements) by individual steel plants. For exercising effective control on the inventories, it is advisable to select a fewer number of capacities of products mentioned in this standards, in the form of Company Standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. SCOPE

This standards covers the main dimensions, capacities, constructional and operational features and inspection and performance tests for remote control hydraulic jacks used in the steel industry.

2. TYPES

Jacks shall be of the following three types:

- Single acting, plain ram (Type SPR);
- Single acting, hollow piston (Type SHP); and
- Double acting, hollow piston (Type DHP).

3. DIMENSIONS AND OPERATING PRESSURE

3.1 Operating Pressure-

Jacks shall be categorized into following three type based on the pressure:-

- a) Low pressure (Type L) ≤ 450 kgf/cm²;
- b) Medium pressure (Type ML) $> 450 < 900$ kgf/cm²; and
- c) High pressure (Type H) ≥ 900 kgf/cm².

4. DESIGNATION

Jacks shall be designated by :

- a) Type (see 2)
- b) Nominal capacity in tonnes
- c) Stroke in mm, and
- d) Pressure type
- e) Number of this standard,

Example :

Remote Control hydraulic jack, single acting, plain mm (Type SPR) , having nominal capacity of 5 tonnes, stroke of 20 mm and pressure 250 kgf/cm² conforming to this standard shall be designated as :

SPR- 5- 20- L- IPSS 1-02-002-18)

5. CONSTRUCTION

- 5.1 **Ram** – The ram shall be made of material which is resistant to abrasion and impact. The ram shall have an indication mark to show the completion of stroke. Material of jack shall be specified.
- 5.2 **Body** – The jack body shall be of robust construction for rugged handling and outside surface shall be smooth finished. Material of jack shall be specified. Carbon steel shall be used for general purpose. All jacks shall be used for application at higher location.
- 5.3 Jack shall be supplied complete with protective cap for the thread.
- 5.4 The connection thread for jack half coupler shall be M18 x 1.5 conforming to IS: 4218 'ISO metric screw threads'.
- 5.5 The jack shall be provided with a handle to facilitate transportation.

6. **OPRATIONAL FEATURES**

The jack shall be capable of being used in all positions (Vertical, inclination of 45°). It shall collapse fully to its retracted height when the pressure under its rated load. It shall be capable of jerk-free operation throughout its entire movement both in the extended as well as retracted strokes. Even if the jack is operated beyond its marked end of the stroke, it shall not show any sign of yield.

7. **TESTS**

Test load on jack shall be applied directly or through a hydraulic ram operated at calculated pressure to impact correctively the test load. The jack shall be subjected to tests given in 7.1 to 7.5.

7.1 **No Load Test** – The jack shall be operated without load to its maximum position and shall work smoothly without any leakage or jerk.

7.2 **Actuation Test** – The jack shall be connected to a hydraulic test bench with maximum pressure setting at 9.81MN/m² (100kgf/cm²) and actuated 25times in each of the three positions namely vertical, horizontal and at an inclination of 45Deg. The jack shall collapse itself to the specified retracted height after every operation and shall operate smoothly without any leakage.

7.3 **Performance Test** – Every jack shall be loaded 100 percent of the nominal capacity and operated from the minimum to maximum position and back. After repeating the cycle for 25 times the jack shall work smoothly without any jerk or slip between moving parts. This test shall be conducted for 110 cycles in case of random sampling as mutually agreed to between the customer and the manufacturer.

7.4 **Overload Test** – The jack shall be loaded to 125 percent of its nominal capacity and operated from minimum to maximum position and back. During this test the jack shall operate smoothly throughout the range without any slip and other visible damage.

7.5 **Load Sustaining Test** – The jack shall be lifted to the middle of stroke and loaded 125 percent at its nominal capacity. The load is sustained for one hour. The jack shall not show any reduction in height. The load shall be removed at the end of this period and it is repeated 3 times. After this test the jack shall be left with nominal load on for 24 hours at room temperature and shall not show any sign of distortion or leakage of oil at the end of the test.

7.6 **Sequence of Testing** – Following shall be the sequence of testing :

- a. Visual Inspection (see 5.1 and 6)
- b. No load test (see 7.1)
- c. Actuation test (see 7.2)
- d. First overload test (see 7.4)
- e. Performance test (see 7.3)

- f. Second overload test (see 7.4)
- g. Load sustaining test (see 7.5)

7.6.1 After completing the sequence of tests given under 7.6, the jack shall show no sign of damage and shall operate without any slip between the moving parts when it is in any position against the load equal to nominal capacity.

8. **TEST CERTIFICATE**

The manufacturer shall provide a certificate with every jack that it has been tested according to this standard.

9. **MARKING**

The jack shall be legibly and indelibly marked with :

- a. Name, initials or trade-mark of the manufacturer.
- b. Serial / batch number.
- c. Designation of the jack and
- d. Its mass without oil.

FIG .1: REMOTE CONTROL HYDRAULIC JACKS, SINGEL ACTING PLAIN RAM (TYPE SPR)

(The illustration is diagrammatic only and is not to indicate details of design.)

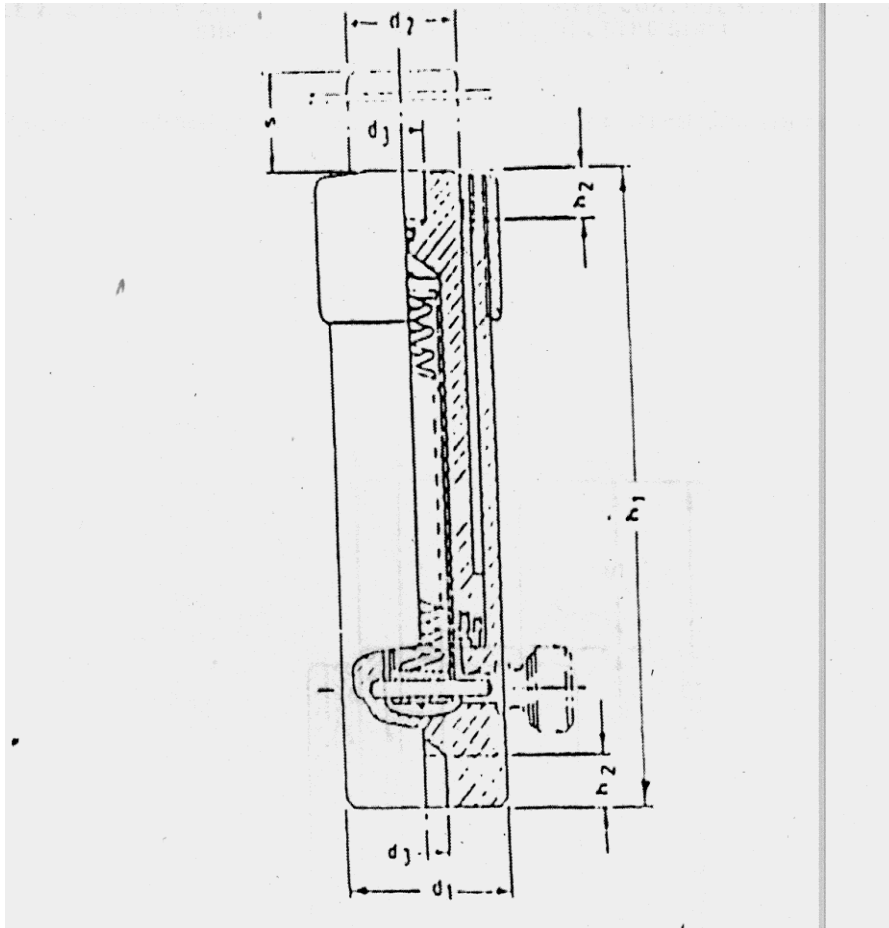


Figure 1

where,

d_1 = Maximum Outer Cylinder Body Diameter

d_2 = Minimum Ram Diameter

d_3 = Dia-meter of Centre Bore

h_1 = Maximum Permissible Retracted height

h_2 = Depth of Centre Bore

s = Stroke

**FIG .2: REMOTE CONTROL HYRAULIC JACKS, SINGEL ACTING HOLLOW PISTON
(TYPE SHP)**

(The illustration is diagrammatic only and is not to indicate details of design.)

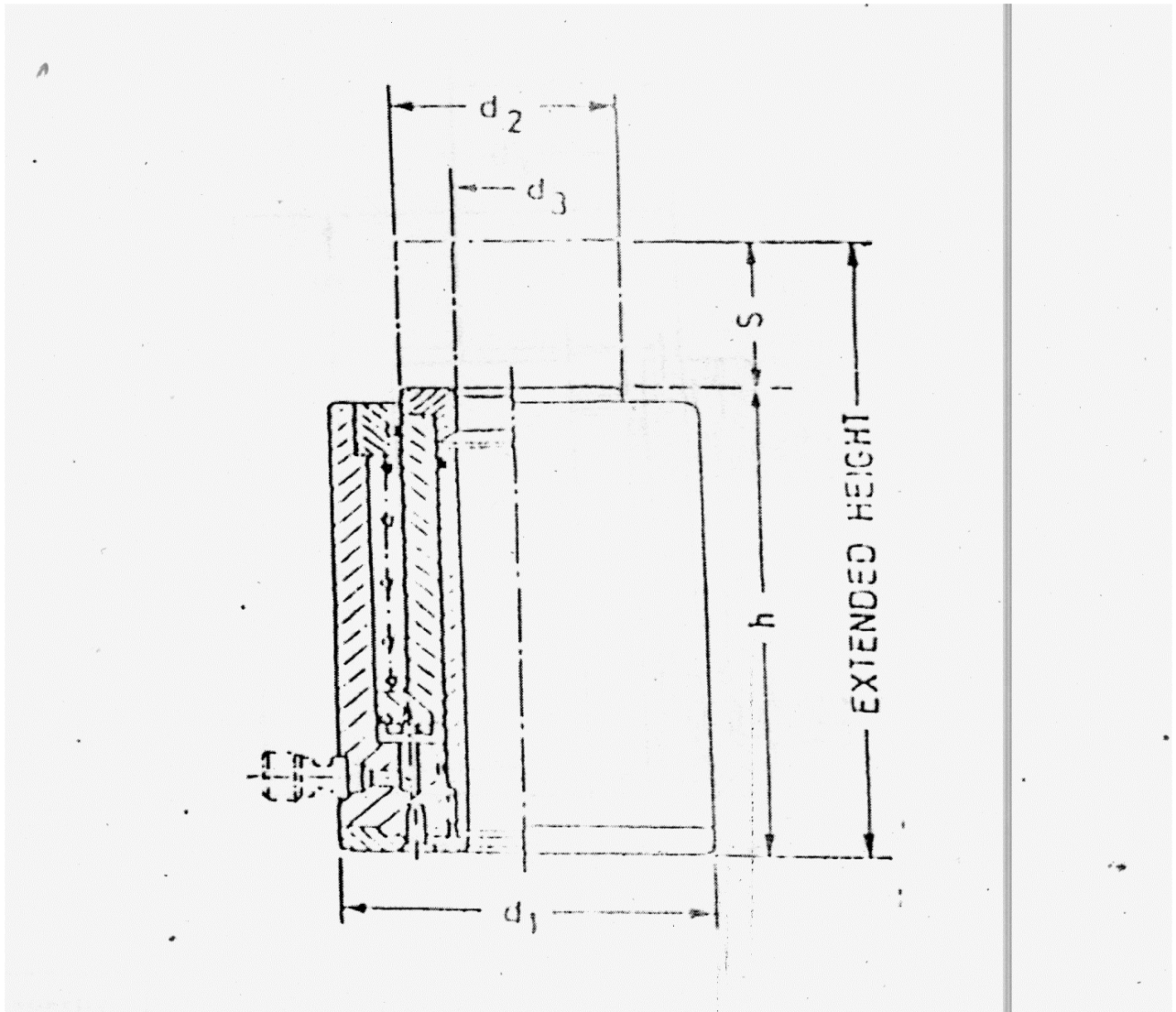


Figure 2

where,

d_1 = Maximum Outer Cylinder Body Diameter

d_2 = Minimum Ram Diameter

d_3 = Piston Bore Diameter

h = Maximum Permissible Retracted height

s = Stroke

**FIG .3: REMOTE CONTROL HYRAULIC JACKS, SINGEL ACTING HOLLOW PISTON
(TYPE DHP)**

(The illustration is diagrammatic only and is not to indicate details of design.)

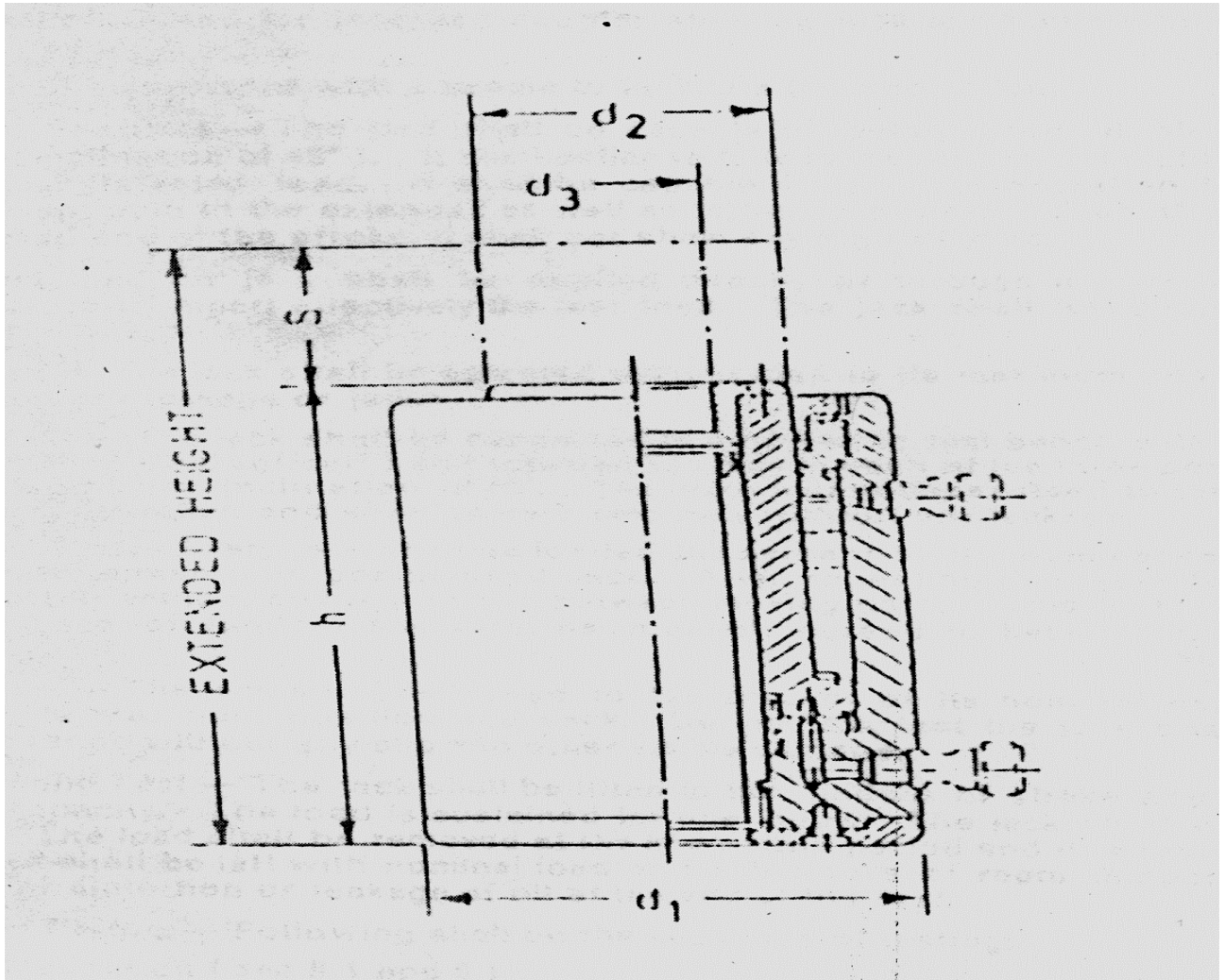


Figure 3

where,

d_1 = Maximum Outer Cylinder Body Diameter

d_2 = Minimum Ram Diameter

d_3 = Piston Bore Diameter

h = Maximum Permissible Retracted height

s = Stroke