


INTER PLANT STANDARD IN STEEL INDUSTRY		
 IPSS	<b>SPECIFICATION FOR INTEGRAL HYDRAULIC LIFTING JACKS</b>	<b>IPSS: 1-02-010-18</b> <i>(First Revision)</i>
	Corresponding IS does not exist	Formerly: IPSS: 1-02-010-78

## 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 prepared by 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 December, 1978. Thereafter, standard was first revised in January, 2018.
- 0.2 Interplant standardization for steel industry primarily aims at achieving rationalization and unification of parts and sub-assemblies used in plant equipment and accessories, and provide 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 standard for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

## 1.0 SCOPE

This standard covers types, main dimensions, constructional and operational features, tests, etc., for integral hydraulic lifting jacks of capacities varying from 5 to 100 tonnes used in steel industry

## 2 TYPE

The integral hydraulic lifting jacks shall be of three types as follows (See Figure in Table 1) :

- Type A – Plain Ram
- Type B – Plain Ram with screw extension, and
- Type C – Screw Ram with lock nut

## 3 DIMENSIONS AND OPERATING PRESSURE

The main dimensions of the jacks shall be as given in Table 1. The maximum operating pressure shall be 60 Mn/m<sup>2</sup> (or 600 kgf cm<sup>2</sup>)

## 4 DESIGNATION

The jack shall be designated by :

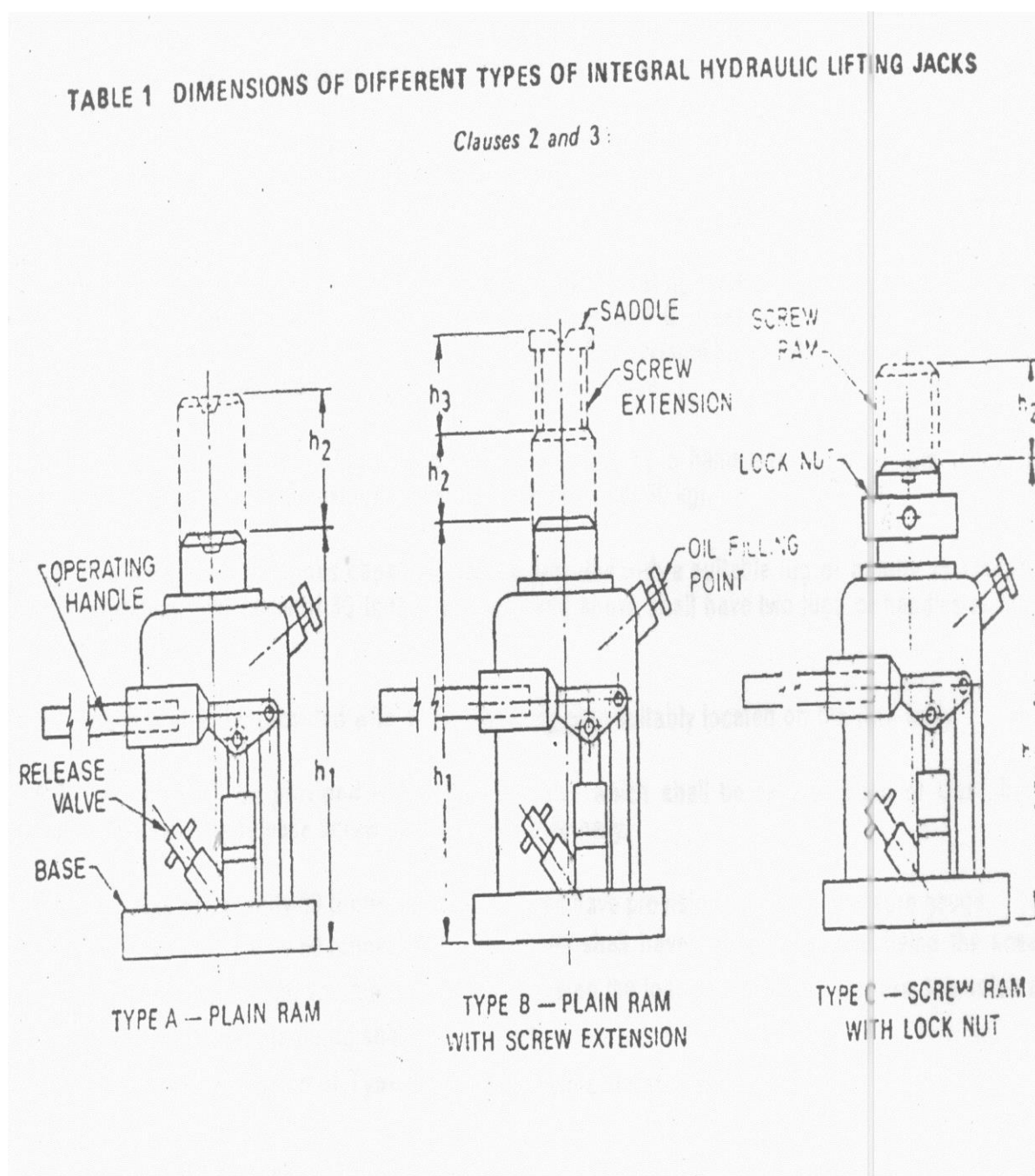
- a) Type (see 2),
- b) Capacity in tones,

- c) Lift in millimeters, and
- d) Number of this standard

Example – Integral hydraulic jack of plain ram with screw extension (of 100 mm) type having a lifting capacity of 5 tones and lift of 150 mm conforming to this standard shall be designated as : **JACK B5 150 – IPSS: 1-02-010-18**

**TABLE - 1 DIMENSIONS OF DIFFERENT TYPES OF INTERNAL HYDRAULIC LIFTING JACKS**

(Clauses 2 and 3)



Type	Rated Capacity	Closed Height h1 Max.	Lift h2	Screw Extension h2	Base Size (Contact Surface) Max		Total Weight Max.
					Length mm	Breadth mm	
	tonnes	mm	mm	mm			Kg
A	5	250	150	-	150	150	7
	10	250	150	-	150	150	10
	20	280	150	-	180	165	20
	50	290	150	-	280	240	50
	100	320	150	-	360	320	100
B	5	250	150	100	150	150	7
	10	250	150	100	150	150	10
	15	265	150	100	165	165	14
	20	280	150	100	180	165	20
	30	300	150	100	200	200	31
C	10	250	150	-	150	150	10
	20	280	150	-	180	165	21
	30	300	150	-	200	200	31
	50	310	150	-	280	240	51
	100	365	150	-	360	320	120

## 5 CONSTRUCTIONAL FEATURE

**5.1 Material** –Materials for jack body, ram and screw extension shall be homogeneous, free from manufacturing defects and of robust construction for rugged handling. The jack cylinder shall be of forged, cast or rolled steel with honed bore, or alternatively, of extrude light metal alloys. The valves shall be of carbon steel, hardened with grind finish, and valve springs shall be of oil hardened and tempered steel wire conforming to IS: 4454 (Parts II & III)-1975 'Specification for steel wires for cold formed springs : Part II Oil hardened and tempered steel wires – alloyed (First Revision). The ram shall be of forged or rolled alloy steel with grind finish or alternatively, of light metal alloys extruded or pressure die cast. It shall be resistant to impact and abrasion.

**5.1.1** The seals used shall be compatible with the operating medium, that is straight mineral hydraulic oil with viscosity 43-50 centistokes at 37o8C [See Grade 3 of IS : 3098-1975 'Specification for oil, hydraulic, mineral oil type (First Revision) coupled with IPSS : 1-09-002 (June 1977) 'Specification for hydraulic oil, mineral oil type'].

**5.2 Actuating Mechanism** – The jack shall be actuated by a hand lever of maximum length of 1000 mm operable with a maximum lever operating force of 30 kgf.

- 5.3 The jacks up to 20 tonnes capacity shall be provided with a suitable lug or handle to facilitate transportation. The jacks of 30 tonnes capacity and above shall have two lugs or handles suitably located on the body.
- 5.4 The jack shall be provided with a filling / venting plug suitably located on the jack body.
- 5.5 The jack shall be provided with a release valve which shall be easy to open or close by a release screw. The release screw shall not leak externally.
- 5.6 The jacks of capacity 30 tonnes and above shall have provision for fixing pressure gauge.
- 5.7 The jacks of capacity 50 tonnes and 100 tonnes shall have two pumps, one being the speed pump (low pressure, high volume) and the other being the load pump (high pressure, low volume), or alternatively, a double pump shall be provided.
- 5.8 The screwed extension of Type B jack shall have a serrated saddle.

## 6. **OPERATIONAL FEATURES**

- 6.1 The jacks shall be operated in vertical position and shall be able to lift the nominal load. When pressure is released and a force to 30 kgf is applied on to the ram, the ram shall be able to be lowered to its closed height.
  - 6.1.1 The ram shall move jerk-free throughout its entire range of movement either while lifting or while retracting.

## 7. **TESTS**

The test-load shall be either a direct load, a load with fulcrum mechanism with mechanical advantage, or a hydraulic press designed to impart effectively the required test-load. The jack shall be subjected to the tests given in 7.1 to 7.5.

- 7.1 **No Load Test** – The jack shall be operated without load to its maximum lift during which it shall work smoothly jerk-free and there shall be no leakage. After the jack lifts to its maximum the release screw shall be opened and the ram shall be made to collapse to its closed height by applying a light load of maximum 30 Kg. The release screw shall not show any sign of leakage.
- 7.2 **Performance Test** – When 100 percent rated load is applied to the ram and the jack is operated three times from its closed height to maximum lifting height, the following requirements shall be met:
  - a) The operations shall be smooth, reliable, free from oil leakage, bending of the lever or any other abnormality;
  - b) Release valve shall work safely and smoothly;
  - c) The lever operating force required shall not exceed 30 kgf; and
  - d) After attaining the maximum height under test-load, when the release valve is opened and the test-load removed, it shall be possible to lower the ram with a maximum load of 30 kg.
- 7.3 **Overload Test** – The jack shall be loaded to 125 percent of its rated capacity and operated from minimum to maximum height. During this test,

the jack shall operate smoothly without and slip and other visible damage or leakage.

7.4 **Load Sustaining Test** – The jack shall be operated without load till the ram attains middle position of its total lift and then a load of 100 percent of the rated capacity shall be applied. The load shall be sustained for one hour during which the reduction in height of the ram shall not exceed 3 mm.

7.5 **Repeat Performance Test** – The load shall be removed at the end of the load sustaining test (see 7.4) and the performance test shall be repeated in accordance with 7.2 but the jack operation shall be once only instead of three times.

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

- a) Visual inspection (see 5.1),
- b) No load test (see 7.1),
- c) Performance test (see 7.2),
- d) Overload test (see 7.3),
- e) Load sustaining test (see 7.4), and
- f) Repeat performance test (see 7.5).

## 8. **TEST CERTIFICATE**

The manufacturer shall provide a certificate with every jack for its conformity to this standard.

## 9. **GUARANTEE**

The jack shall be guaranteed by the manufacturer for a period of one year after the date of despatch or six months from the date of commissioning, whichever is earlier.

## 10. **PAINTING**

The outer body and the base of the jack shall be suitably painted, whereas other exposed steel parts shall be greased.

## 11. **MARKING**

The jack shall be provided with a name plate giving the following information

- a) Manufacturer's name or trade-mark,
- b) Serial batch number,
- c) Designation of the jack, and
- d) Weight of jack in kilo grams.