First Reprint DECEMBER 1996
(Incorporating Amendment No. 1)

IS : 4003 (Part 2) - 1986
(Reaffirmed - 2008)

UDC 621.883.6

Indian Standard

(Reaffirmed 2013)

SPECIFICATION FOR PIPE WRENCHES

(Reaffirmed 2019)

PART 2 HEAVY DUTY

(*First Revision*)

[Ref : Doc : EDC 12 (4597)]
Hand Tools Sectional Committee, EDC 12; Spanners and Pliers Subcommittee EDC 12 : 7

1. Scope — Covers the dimensions and other requirements for heavy duty pipe wrenches.

2. Terminology — For the purpose of this standard, the following definition in addition to those given in IS : 4003 (Part 1)-1978 'Specification for pipe wrenches: Part 1 General purpose (*first revision*)' shall apply.

2.1 *Maximum Capacity* — Maximum diameter of pipe that shall be gripped with safety, when the end of the movable jaw flushes with back face of the adjusting nut.

3. Dimensions — Shall be as given in Table 1.

4. Material — Suitable materials meeting with the requirements laid down in 5 and 11.

Suitable Examples:

Component	*Material*
Handle	Steel casting conforming IS : 2707-1982 'Carbon steel castings for surface hardening (*second revision*)' malleable iron castings conforming IS : 2108-1977 'Black-heart malleable iron casting (*first revision*)' forging steel; SG iron castings conforming IS : 1865-1974 'Iron castings with spheroidal or nodular graphite (*second revision*)' or alluminium alloy meeting the requirements given at **11.1**.
Springs	Patented and cold drawn spring steel wires, unalloyed, Grades 1,2,3 and 4 to IS : 4454 (Part 1)-1981 'Steel wires for cold formed springs: Part 1 Patented and cold drawn steel wires unalloyed (*second revision*)'.
Movable and Heel Jaw	Forging steel.
Adjusting Nut and Pin	Suitable carbon steel selected from IS : 1570 (Part 2)-1979 'Carbon steels (unalloyed steels) (*first revision*)'.

5. Hardness

Component	*Hardness*
Movable and Heel Jaw	550 to 700 *HV* when measured at any point within the triangular profile of any teeth.
Shank of Movable Jaw	265 to 400 *HV*
Adjustable Nut	285 to 445 *HV*

6. Manufacture

6.1 *Handle* — Handle shall be of malleable cast iron, steel castings, S.G. Iron aluminium alloy, forging steel or any other suitable material. Frame shall be integral part of the handle. It shall allow easy adjustment of the movable jaw allowing easy and proper operation of the wrench both forward and backward.

6.2 *Movable Jaw* — Movable jaw shall be a one piece forging with integral teeth. Teeth shall be of adequate number, shape and size to enable the assembled tool to meet the test requirements without slipping and to grip positively during operation of tightening any appropriate diameter of pipe within the safe capacity.

Adopted 14 July 1986

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

6.3 *Heel Jaw* — Teeth of the heel jaw shall be of adequate number, shape and size to enable the tool to meet the test requirement without slipping and to grip positively during operation of tightening any appropriate diameter of pipe within the safe capacity. Heel jaw shall be replaceable and attached to the handle with a suitable pin.

6.4 *Adjusting Nut* — The adjusting nut shall be cylinderical, knurled and threaded integrally to engage the threads of the movable jaw. The threads shall be of sufficiently robust form and pitch so that with the jaws at any point of adjustment within the appropriate maximum capacity, the wrench shall be capable of passing the tests given in **11.**

6.5 *Springs* — Two springs shall be provided. Springs shall be so provided in wrench assembly as to balance properly the movable jaw so that action both in the forward and the backward direction shall be smooth.

7. Workmanship and Finish — Heavy duty pipe wrenches shall be free from flaws, cracks, blow holes, rust, burrs and the other injurious defects. Movable jaws shall be properly finished. All unmachined surfaces shall be painted or suitably treated. The machined surfaces shall be protected by a rust preventive treatment.

8. Operation — The motion between the various parts of the wrench shall permit the teeth to grip and hold the pipe for successive turns without the necessity of altering the adjusting nut. The heavy duty pipe wrenches shall release freely when the direction or pressure on the handle is reversed.

9. Designation — A heavy duty pipe wrench of 900 mm nominal size shall be designated as follows:

PIPE WRENCH H 900 IS : 4003 (Part 2)

10. Marking — Pipe wrenches shall be marked with the nominal size, manufacturer's name, initials and/or recognized trade-mark.

10.1 *Certification Marking* — Details available with the Bureau of Indian Standards.

11. Tests

11.1 *Static Load Test* — A heavy duty pipe wrench shall be tested according to **13.1** of IS : 4003 (Part 1)-1978. The diameter of test bar, proof torque and the load position for testing the heavy duty pipe wrench shall be as given in Table 2. While applying torque, the length of handle shall not be increased by inserting hollow pipe onto the handle. The load shall be applied only at the position specified.

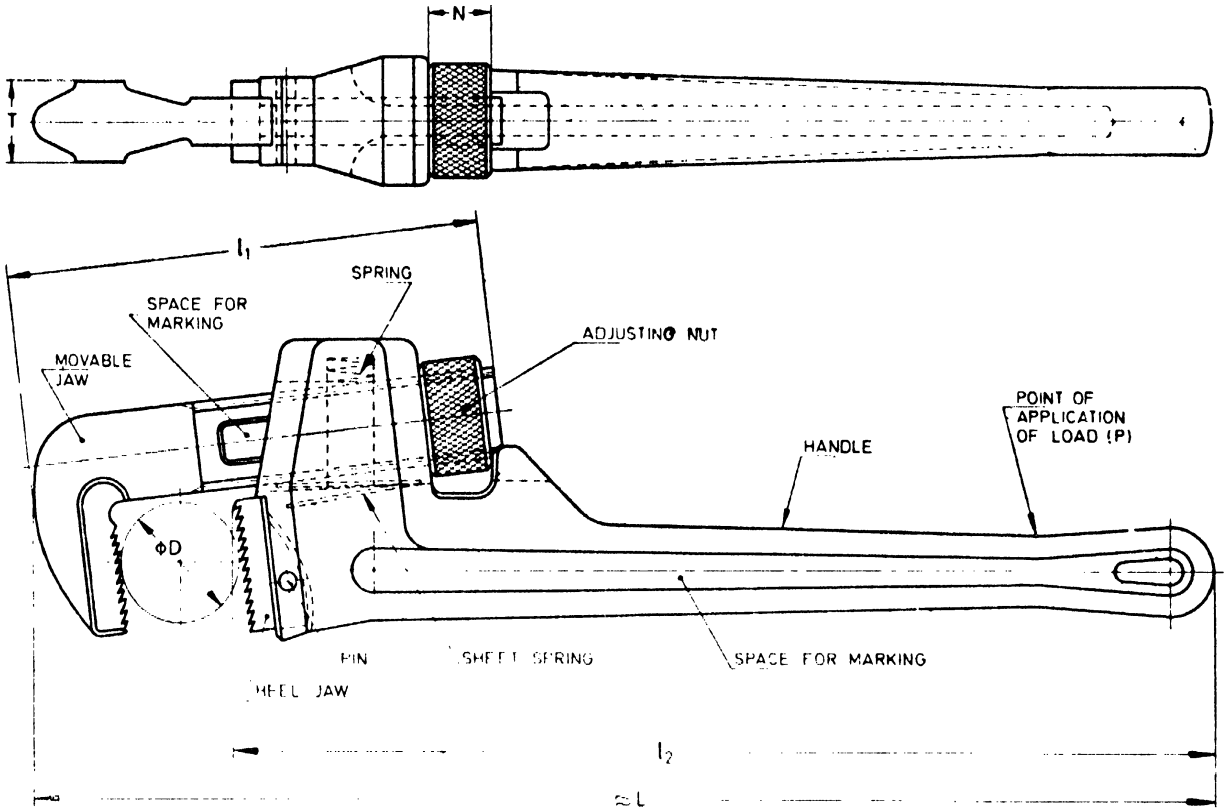
12. Sampling — Refer IS : 4003 (Part 1)-1978.

13. Packing — Each pipe wrench shall be suitably packed to avoid damage during transit.

TABLE 1 DIMENSIONS FOR PIPE WRENCHES (HEAVY DUTY)

(*Clause* 3)

All dimensions in millimetres.



Nominal Size *L*	Capacity *D*		Jaw Thickness *T* *Min*	Length of Movable Jaw l_1 ≈	Length of Handle from Heel Jaw l_2 ≈	Width of Nut *N* *Min*
	Min	*Max*				
200	10	38	11	95	160	11.0
250	10	50	14	125	200	13.8
350	14	63	19	160	250	15.0
450	27	75	25	200	370	18.0
600	27	90	28	240	500	24.0
900	38	140	31	315	730	29.0
1 200	50	165	35	420	990	35.0

TABLE 2 TEST LOADS FOR PIPE WRENCHES (HEAVY DUTY)

(Clause 11.1)

Nominal Size mm	Diameter of Test Bar mm	Proof Torque N.m	Load Position *L* mm
200	20	360	120
250	25	880	160
350	40	1 470	220
450	60	2 265	330
600	75	3 265	450
900	100	5 090	700
1 200	125	5 890	950

EXPLANATORY NOTE

This standard (Part 2) was first issued in 1978 consequent upon the revision of the original version of the standard, in two parts. Part 1 of the standard deals with general purpose pipe wrenches, whereas Part 2 deals with heavy duty pipe wrenches. Heavy duty pipe wrenches are mostly used in oil exploration and mining work.

This revision has been taken up in order to align the dimensions and torque values based on the prevalent practices followed in the industries. Alumiuium alloy handles which are lighter in weight have also been incorporated in the standard.

While revising this standard, assistance has been taken from the data supplied by leading manufacturers of the product.

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 SEPTEMBER 2014
TO
IS 4003 (PART 2) : 1986 SPECIFICATION FOR PIPE WRENCHES

PART 2 HEAVY DUTY

(First Revision)

(*Page* 3, *Table* 1)—Insert the following between 250 mm and 350 mm:

Nominal Size *L*	**Capacity** *D*		**Jaw Thickness** *T* *Min*	**Length of Movable Jaw** l_1 ≈	**Length of Handle from Heel Jaw** l_2 ≈	**Width of Nut** *N* *Min*
	Min	*Max*				
300	12	50	16	142	240	14.4

(*Page* 4, *Table* 2) — Insert the following between 250 mm and 350 mm:

Nominal Size mm	**Diameter of Test Bar** mm	**Proof Torque** N.m	**Load Position** *L* mm
300	32.5	1175	190

Publication Unit, BIS, New Delhi, India