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मानक

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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4003-1 (1978): Pipe Wrenches, Part 1: General Purpose  
[PGD 5: Assembly Hand Tools]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*  
**SPECIFICATION FOR PIPE WRENCHES**  
**PART I GENERAL PURPOSE**  
*(First Revision)*

**1. Scope** — Covers requirements for general purpose pipe wrenches.

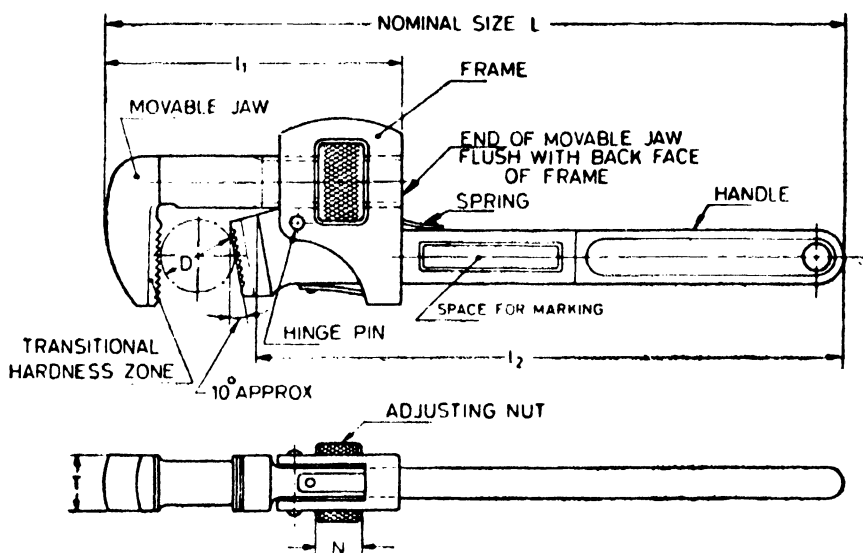
**2. Terminology**

**2.1 Nominal Size** — The overall length of the tool when the jaws are open to the maximum capacity (see 3).

**2.2 Maximum Capacity** — The maximum diameter of pipe that shall be gripped with safety when the end of the movable jaw flushes with back face of the frame.

**2.3 Greatest Angle Movement** — The difference in angles between the jaws at their minimum and maximum possible angular positions.

**3. Dimensions**



All dimensions in millimetres.

Nominal Size <i>L</i>	Minimum Capacity	Maximum Capacity <i>D</i>	Jaw Thickness <i>T</i> <i>Min</i>	Approximate Length of Movable Jaw <i>I</i> <sub>1</sub>	Approximate Length of Handle <i>I</i> <sub>2</sub>	Width of Nut <i>N</i> <i>Min</i>
200	6	20	15	85	160	12
250	6	26	17	110	200	13
300	9	32	19	125	240	16
350	13	38	21	140	285	17
450	25	52	24	165	370	18
600	38	65	28	200	495	25
900	50	95	34	260	750	35
1 200	65	130	40	330	1 000	35

Adopted 9 August 1978

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
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## IS : 4003 ( Part I ) - 1978

### 4. Material — Suitable materials meeting with the requirements laid down in 5 and 13.

#### *Suitable Examples :*

<i>Component</i>	<i>Material</i>
Handle and movable jaw	C40, C50, C55, C60 or C65 of Schedule II of IS : 1570-1961 'Schedules for wrought steels for general engineering purposes'
Frame	Malleable cast iron conforming to IS : 2108-1962 'Specification for blackheart malleable iron castings'
Spring	Steel to designation 50Cr1 of Schedule IV to IS : 1570-1961
Adjusting nut and hinge pin	Suitable carbon steel selected from IS : 1570-1961

### 5. Hardness

<i>Component</i>	<i>Hardness</i>
Jaws	510 to 600 HV when measured at any point within the triangular profile of any tooth or within one millimetre of the root of the tooth
Handle and shank of the movable jaw	400 HV Max

5.1 The transitional hardness zone (*see* 3) shall not extend beyond a point defined as twice the height of the teeth measured back from the tooth root.

### 6. Manufacture

6.1 *Handle* — The handle shall be a one-piece forging with integral teeth. The teeth shall be of a definite number, shape and size to enable the assembled tool to meet the test requirements without slipping and to grip positively during normal operation any appropriate diameter of pipe within the safe capacity as given in 3. The toothed portion of the handle shall be so positioned that the common plane of the crests of the teeth shall be inclined at an angle of 10° relative to a plane perpendicular to the longitudinal axis of the handle (*see* 3). The crests of the teeth shall be parallel and square relative to the lateral axis of the handle.

6.2 *Movable Jaw* — The movable jaw shall be a one-piece forging with integral teeth. The 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 any appropriate diameter of pipe within the safe capacity.

6.2.1 The shank of the movable jaw shall be threaded in order to engage the internal threads of the adjusting nut.

6.2.2 The toothed portion of the movable jaw shall be so positioned that the common plane of the crests of the teeth shall be square relative to the axis of the threaded shank. The crests of the teeth shall be parallel and shall be square relative to the lateral axis of the threaded shanks.

6.3 *Adjusting Nut* — The adjusting nut shall be suitably knurled or longitudinally serrated. The threads shall be of sufficiently robust form and pitch so that, with the jaws set at any point of adjustment within the appropriate capacity (*see* 3), the wrench shall be capable of passing the tests given in 13.

6.4 *Frame* — The frame shall be a one-piece casting. It shall be integral with the handle or be attached to the handle by means of a riveted pin. It shall allow easy adjustment of the movable jaw allowing easy and proper operation of the wrench both forward and backward.

6.5 *Hinge Pin* — When in position the hinge pin shall have heads formed at each end by riveting; alternatively, it shall be provided with equally effective securing means.

6.6 *Spring* — One or more spring shall be provided, the greatest angle movement shall not exceed 10°. The spring or springs provided in the wrench assembly shall properly balance the movable jaw so that action, both forward and backward, is provided. The spring or springs shall be secured to the frame by riveting or any other suitable means.

### 7. Workmanship and Finish

7.1 The wrenches shall be free from flaws, cracks, rust, burrs and other injurious defects. The movable jaw shall be properly finished.

**AMENDMENT NO. 2 AUGUST 2008  
TO  
IS 4003 (PART 1) : 1978 SPECIFICATION FOR PIPE  
WRENCHES**

**PART 1 GENERAL PURPOSE**

*( First Revision )*

*(Page 2, clause 4)* — Substitute the following clause for the existing:

**‘4. Material** — Suitable materials meeting with the requirements laid down in 5 and 13.

*Suitable Examples:*

<i>Component</i>	<i>Material</i>
Handle and movable jaw	40C8, 50C4, 55C4, 60C4, or 65C6 of IS 1570 (Part 2) : 1979 Schedules for wrought steels : (Part 2) Carbon steels (Unalloyed steels)
Frame	Malleable cast iron conforming to IS 14329 : 1995 Specification for malleable iron castings or 20C8, 25C4 or 15C8 of IS 1570 (Part 2) : 1979 Schedules for wrought steels : Part 2 Carbon steels (Unalloyed steels)
Spring	Steel to designation 50Cr4 of IS 1570 (Part 4) : 1988 Schedules for wrought steels : Part 4 Alloy steels (Alloy constructional and spring steels) with specified chemical composition and mechanical properties
Adjusting nut and hinge pin	Suitable carbon steel selected from IS 1570 (Part 2) : 1979 Schedules for wrought steels : Part 2 Carbon steels (Unalloyed steels)'

*(Page 2, clause 5, first sentence under column Hardness)* — Substitute ‘510 to 700 HV (50 to 60 HRC)’ for ‘510 to 600 HV’

**Amend No. 2 to IS 4003 (Part 1) : 1978**

(Page 2, clause 6.4, first line) — Substitute 'The frame shall be one-piece casting or one steel piece' for 'The frame shall be one-piece casting'.

(PG 05)

**AMENDMENT NO. 1 JULY 2001  
TO  
IS 4003 ( Part 1 ) : 1978 SPECIFICATION FOR PIPE  
WRENCHES**

**PART 1 GENERAL PURPOSE**

*( First Revision )*

*( Page 2, clause 5 ) —*

- a) Insert '(50 to 55 HRC)' after '510 to 600 HV'.
- b) Insert '(41 HRC)' after '400 HV'.

3P 05 )

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Reprography Unit, BIS, New Delhi, India



**7.2** All unmachined surfaces shall either be painted or suitably treated with rust preventives. The machined surfaces shall be protected by any 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 wrench shall release freely when the direction of pressure on the handle is reversed.

**9. Designation** — A general purpose pipe wrench of 200 mm nominal size shall be designated as follows:

Pipe Wrench G 200 IS : 4003 ( Part I )

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

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

**11. Packing** — Each pipe wrench shall be wrapped in grease or waxed paper and then suitably packed in cardboard carton bearing the designation and size of the wrench and the manufacturer's name, initials and/or trade-mark.

## **12. Sampling**

**12.1 Lot** — In any consignment, the wrenches of the same size and manufactured from the same raw material under similar conditions, shall be grouped together to constitute a lot.

**12.2** In order to ensure the quality of reliability of the assembly, it is necessary that all its components conform rigidly to the specification requirements. It is recommended that methods given in IS : 397 ( Part I )-1972 ' Method for statistical quality control during production: Part I Control charts for variables ( *first revision* ) ' and IS : 397 ( Part II )-1975 ' Method for statistical quality control during production: Part II Control charts for attribute and count of defects ( *first revision* ) ' shall be followed during production. Adequate record of testing and inspection carried out during process shall be maintained and be produced for the scrutiny of the purchaser. In case the purchaser is satisfied with the quality control procedure, the conformity of the lot may be ascertained by the procedure given in 12.3, otherwise the procedure given in 12.4 may be followed.

**12.3** For characteristics such as dimensions, workmanship and finish, manufacture and operation, the single sampling plan with inspection level II and AQL of 4 percent as given in Tables 1 and 2 of IS : 2500 ( Part I )-1973 ' Sampling inspection tables: Part I Inspection by attributes and by count of defects ( *first revision* ) ' shall be followed.

**12.3.1** For hardness and tests, the sampling plan corresponding to inspection level I and AQL of 1 percent as given in Tables 1 and 2 of IS : 2500 ( Part I )-1973 shall be followed.

**12.4** For dimensions, workmanship, finish, manufacture and operation, the sampling plan with inspection level IV and AQL of 1 percent as given in Tables 1 and 2 of IS : 2500 ( Part I )-1973 shall be followed.

**12.4.1** For hardness and tests, the sampling plan with inspection level II and AQL of 1 percent as given in Tables 1 and 2 of IS : 2500 ( Part I )-1973 shall be followed.

## **13. Tests**

**13.1 Static Load Test** — A cylindrical steel test bar shall be rigidly mounted in a test rig as illustrated diagrammatically in Fig. 1. The test bar shall be of diameter as given in Table 1 and shall have hardness within the range 300 to 380 HV at any point on its circumferential surface.

The wrench shall be mounted in the rig with the teeth in normal working engagement with the test bar ( *see* Fig. 1 ) and a load shall be supplied sufficient to result in a proof torque at point 'P' as given in Table 1. On the completion of test there shall be no permanent deformation or cracking of any portion of the wrench. The threads on the adjusting nut and movable jaw and the adjusting nut itself shall also not show any sign of permanent deformation.

**13.2 Static-Shock Load Test** — The wrench shall be in position as described in 13.1 with static load reduced by 25 percent; with this load in operation the shock load as given in Table 1 shall be applied at the point 'P'. Following this test, the wrench shall release freely when the direction of force on the handle is reversed. The teeth shall then grip and release freely without recourse to alteration of thumb adjustment over the whole length of the transverse. The wrench shall be capable of normal finger and suffered any permanent set on the completion of the test. The component parts shall not have

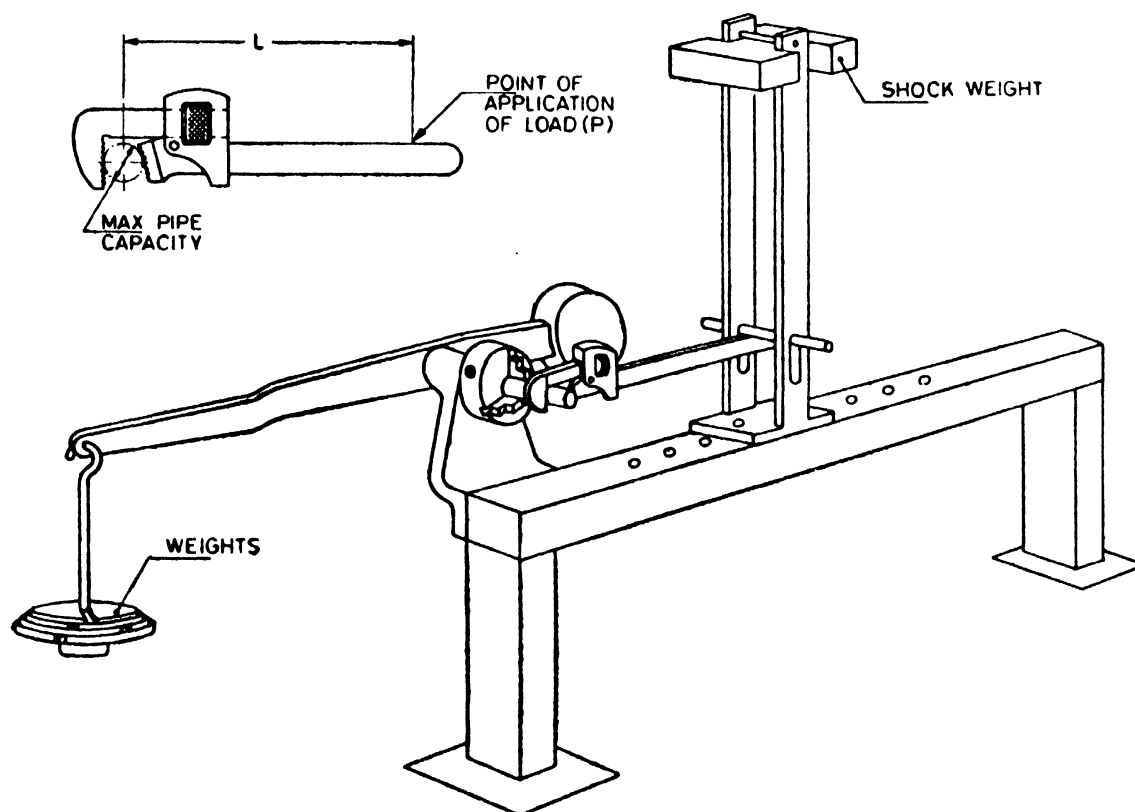


FIG. 1 DIAGRAMMATIC ARRANGEMENT OF TEST RIG

TABLE 1 TEST LOADS FOR PIPE WRENCHES

(Clauses 13.1 and 13.2)

Nominal Size	Dia of Test Bar	Proof Torque	Load Position	Shock Load Dropped Through 600 mm at Point 'P'
mm	mm	N.m	L	kg
200	16	180	150	13
250	20	330	200	13
300	25	500	225	13
350	30	650	262	18
450	40	1 000	362	18
600	52	1 450	500	22
900	75	2 350	762	27
1 200	100	3 250	1 025	27

### EXPLANATORY NOTE

This standard was first issued in 1967. The present revision has been necessitated because of the development that has taken place in the manufacture of the pipe wrenches since the publication of the standard. These developments led to issuing of the standard in two parts. Part I of the standard deals with the general purpose pipe wrenches, Part II lays down the requirements for heavy duty pipe wrenches, which were not covered in the original version of the standard. The heavy duty pipe wrenches are subjected to increased bending moment and are mostly employed in exploration and mining work.