

JIS

JAPANESE INDUSTRIAL STANDARD

Nonsparking Beryllium Copper Alloy Tools

Ⓔ **JIS M 7615**—1987

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.



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Nonsparking Beryllium Copper
Alloy Tools

M 7615-1987

1. Scope

This Japanese Industrial Standard specifies the nonsparking beryllium copper alloy tools, hereinafter referred to as the "nonsparking tools", used in mines, factories, other business places, ships, vehicles, aircraft, etc., where explosion may occur by sparking.

- Remarks 1. Spanners and offset wrenches used for repair are respectively given in Appendixes 1 and 2.
2. The units and numerical values given in { } in this Standard are in accordance with the conventional units to be the Standard values.

2. Classification

The classification of nonsparking tools shall be as given in Table 1.

Applicable Standards:

JIS H 1261-Methods for Chemical Analysis of Beryllium Copper

JIS H 3260-Copper and Copper Alloy Wires

JIS M 7002-Non-Ignition Testing Methods for Non-sparking Beryllium Copper Alloy Tools

JIS Z 2245-Method of Rockwell and Rockwell Superficial Hardness Test

JIS Z 2611-General Rules for Photoelectric Emission Spectrochemical Analysis of Metal Materials

Reference Standards:

JIS A 8901-Picks

JIS A 8903-Double Sledge Hammers and Single Sledge Hammers

JIS B 4604-Adjustable Angle Wrenches

JIS B 4606-Pipe Wrenches

JIS B 4609-Screw Drivers

JIS B 4613-Hand Hammers

JIS B 4614-Slip Joint Combination Pliers with Cutters

JIS B 4623-Cutting Pliers

JIS B 4630-Open Ended Spanners

JIS B 4632-Offset Wrenches

Table 1. Classification

Classification				Reference
Name	Classification by the number of mouths	Classification by the mouth and the angle of handle	Classification by other characteristics	Reference Standards
Spanner	Single end		Round type	JIS B 4630
	Double ends			
Chisel				—
Hand hammer				JIS B 4613
Large hammer				JIS A 8903
Drum mouthpiece wrench			Flat plate type	—
Adjustable angle wrench		23 degree type		JIS B 4604
Pipe wrench				JIS B 4606
Screw driver			Ordinary type	JIS B 4609
Offset wrench	Single end	15 degree type		—
		45 degree type		
	Double ends	15 degree type		JIS B 4632
		45 degree type		
Slip joint combination pliers with cutters				JIS B 4614
Cutting pliers				JIS B 4623
Double picks				JIS A 8901

3. Quality

3.1 Appearance The appearance shall be free from defects on use such as harmful flaws, cracks, burrs, bends, etc. and finished excellently.

3.2 Hardness The hardness shall be not less than HRC 35. The hardness of a pipe wrench inserted blade shall be, however, not less than HRC 40.

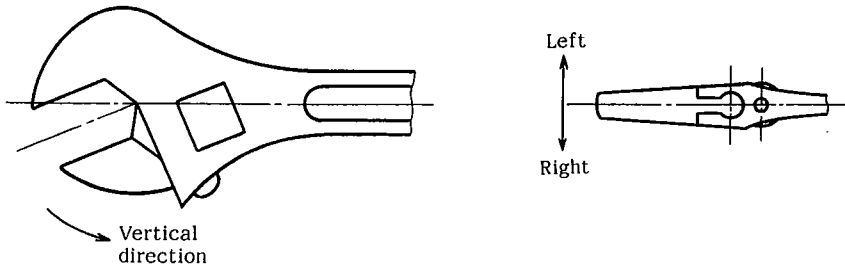
3.3 Strength After tested according to the method specified in 6.4, respective parts of nonsparking tools shall conform to the qualities given in Table 2.

Table 2. Strength

Name	Quality of each part			
Spanner	The permanent set at the tip of width across flats shall be 0.15 mm max. for spanner of 10 to 18 mm in designation and 0.2 mm max. for that of 19 to 46 mm. Remarkable flaw marks shall not remain on the surface of width across flats contacted with a test bar.			
Drum mouthpiece wrench	The maximum deformed amount of a mouth width shall be not more than 0.5 mm and remarkable flaw marks shall not remain at positions contacted with the fixing mouthpiece for test.			
Adjustable angle wrench	The engagement of worm with rack and the motion of lower jaw shall be smooth and the maximum deformed amount of a mouth width shall be not more than 0.5 mm. Further, the depth of a pressed dent at the position contacted with a test bar shall be within 0.1 mm.			
Pipe wrench	Remarkable flaws shall not remain at the position contacted with a test bar.			
Screw driver	There shall not be crack and torsion at the tip and injuries on other respective parts.			
Offset wrench	Remarkable flaw marks shall not remain at positions on the surface of the mouth width contacted with a test bar.			
Slip joint combination pliers with cutters	The deformation of the maximum width of a handle in loading and the permanent set shall meet respective allowable value.	Nominal size	Deformation in loading	Permanent set
		150	2 to 6 mm	0.4 mm max.
		200	2 to 8 mm	0.5 mm max.
Cutting pliers	The permanent set at the maximum width of a handle after loading shall be not more than 2 %.			

3.4 Function The function of each part shall meet the quality shown in Table 3.

Table 3. Function

Name	Function														
Adjustable angle wrench	(1) The engagement of worm with rack The engagement of worm with rack shall have little clearance and the motion thereof shall be smooth.														
	(2) The maximum opening of a lower jaw shall be as follows. Unit: mm <table><tr><td>Designation</td><td>100</td><td>150</td><td>200</td><td>250</td><td>300</td><td>375</td></tr><tr><td>Maximum aperture</td><td>11⁺²₀</td><td>18.5⁺²₀</td><td>23.5⁺²₀</td><td>28⁺³₀</td><td>33.5⁺³₀</td><td>42⁺³₀</td></tr></table>	Designation	100	150	200	250	300	375	Maximum aperture	11 ⁺² ₀	18.5 ⁺² ₀	23.5 ⁺² ₀	28 ⁺³ ₀	33.5 ⁺³ ₀	42 ⁺³ ₀
	Designation	100	150	200	250	300	375								
	Maximum aperture	11 ⁺² ₀	18.5 ⁺² ₀	23.5 ⁺² ₀	28 ⁺³ ₀	33.5 ⁺³ ₀	42 ⁺³ ₀								
	(3) Play of a lower jaw The motion of a lower jaw shall be smooth, kept parallel to an upper jaw and its play shall be as follows. Further, the play shall be examined in both vertical and lateral direction as shown in Fig. 1.														
Fig. 1. Direction of Play of Lower Jaw 															
Range of Play of Lower Jaw Unit: mm <table><tr><td>Designation \ Play</td><td>100 and 150</td><td>200 and 250</td><td>300 and 375</td></tr><tr><td>Vertical direction</td><td>Within 1</td><td>Within 1.2</td><td>Within 1.5</td></tr><tr><td>Lateral direction</td><td>Within 1.2</td><td>Within 1.2</td><td>Within 1.5</td></tr></table>	Designation \ Play	100 and 150	200 and 250	300 and 375	Vertical direction	Within 1	Within 1.2	Within 1.5	Lateral direction	Within 1.2	Within 1.2	Within 1.5			
Designation \ Play	100 and 150	200 and 250	300 and 375												
Vertical direction	Within 1	Within 1.2	Within 1.5												
Lateral direction	Within 1.2	Within 1.2	Within 1.5												
Screw driver	The joining of a screw driver body and a grip part shall be firm.														
Slip joint combination pliers with cutters	The contact surface of a joining part with a cutting edge part shall have little clearance and the transfer from a hole to other hole and the opening and shutting of a plier body shall be smooth.														
Cutting plier	The slide contact surface of joining part shall have little clearance and the opening and shutting thereof shall be smooth.														

3.5 Cutting Quality When the cutting quality is tested according to the method specified in Tables 26 and 27, test wire rods shall be cut by not more than a specific value.

4. Shape and Dimensions

4.1 Single Ended Spanner The dimensions of single ended spanner shall be as given in Table 4. An example of the shape is shown in Fig. 2.

Fig. 2. Shape of Single Ended Spanner (an Example)

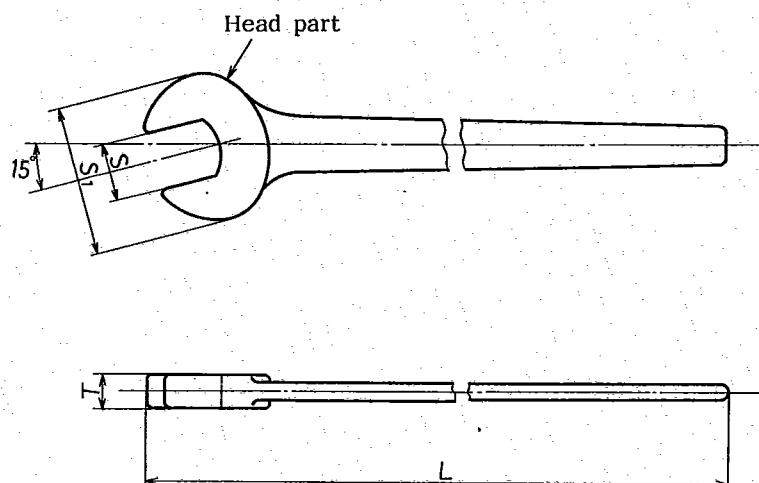


Table 4. Dimensions of Single Ended Spanner

Designation	Unit: mm				
	Width across flats S		External width S_1	Thickness T	Total length L
	Basic size	Tolerance	Maximum	Maximum	Tolerance $\pm 6\%$
10	10	$+0.19$ $+0.04$	26	6	110
13	13	$+0.24$ $+0.04$	33	7.5	135
16	16	$+0.27$ $+0.05$	40	9.5	160
18	18	$+0.30$ $+0.05$	44.5	10	170
21	21	$+0.36$ $+0.06$	52	11	200
24	24		58	11.5	220
30	30	$+0.48$ $+0.08$	70	13.5	270
36	36	$+0.60$ $+0.10$	82	15.5	320
46	46		105	19	400

4.2 Double-Ended Spanner The combination and dimensions of double-ended spanner shall be as given in Table 5. An example of the shape is shown in Fig. 3.

Fig. 3. Shape of Double-Ended Spanner (an Example)

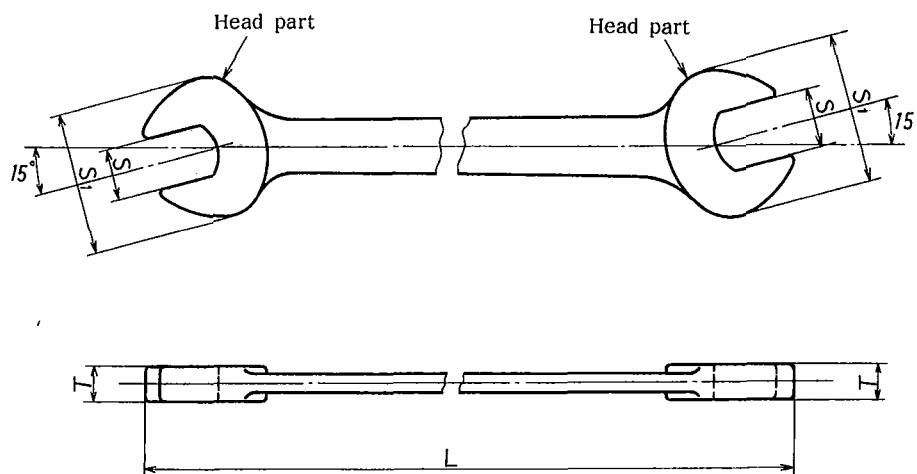


Table 5. Dimensions of Double-Ended Spanner

Unit: mm

Designation	Width across flats S				External width S ₁		Thick- ness T	Total length L
	Smaller one		Larger one		Smaller one	Larger one		
	Basic size	Tolerance	Basic size	Tolerance	Maximum	Maximum	Maximum	Tolerance ± 6 %
10×13	10	+0.19 +0.04	13	+0.24 +0.04	26	33	6.5	135
13×16	13	+0.24 +0.04	16	+0.27 +0.05	33	40	9.5	160
16×18	16	+0.27 +0.05	18	+0.30 +0.05	40	44.5	10	170
18×21	18	+0.30 +0.05	21	+0.36 +0.06	44.5	52	11	200
21×24	21	+0.36 +0.06	24		52	58	11.5	220
24×27	24		27	+0.48 +0.08	58	62	12.5	245
27×30	27	+0.48 +0.08	30		62	70	13.5	270
30×32	30		32	+0.60 +0.10	70	74	14	285
32×36	32	+0.60 +0.10	36		74	82	15.5	320
36×41	36		41	+0.60 +0.10	82	92	17	360
41×46	41		46		92	105	19	400

4.3 Chisel The dimensions of a chisel shall be as given in Table 6. An example of the shape is shown in Fig. 4.

Fig. 4. Shape of Chisel (an Example)

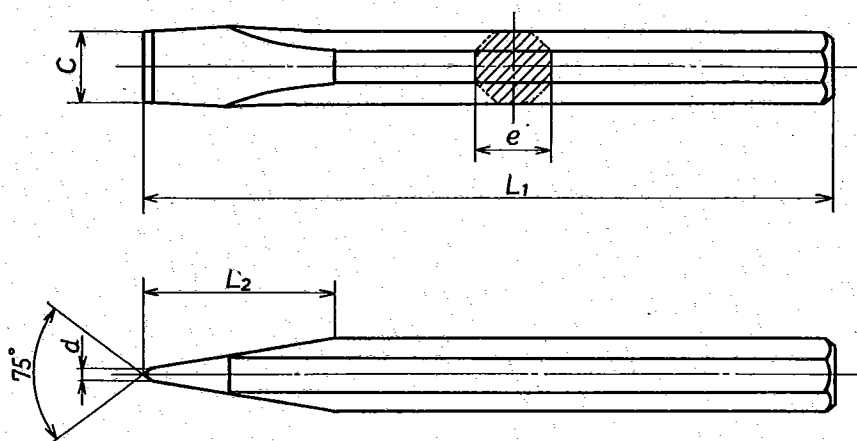


Table 6. Dimensions of Chisel

Designation	Total length L_1	Length of tip L_2 (approx.)	Width of knife edge C	Thickness of knife edge d (approx.)	Unit: mm
					Width across flat e
20×200	200	50	20	3	19
27×200	200	70	27	4.5	25
27×250	250	70	27	4.5	25

4.4 Hand Hammer The dimensions and mass of hand hammer shall be as given in Table 7. An example of the shape is shown in Fig. 5.

Fig. 5. Shape of Hand Hammer (an Example)

