

# इंटरनेट

# 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 10102 (1982): Technical supply conditions for rivets  
[PGD 31: Bolts, Nuts and Fasteners Accessories]



“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***TECHNICAL SUPPLY CONDITIONS FOR RIVETS**

**1. Scope** — Covers the technical supply conditions for rivets. The standard is also applicable to such of those rivets which are not already covered under Indian Standards.

**2. General Requirements**

**2.1** The rivets shall have full surfaces and edges. They shall be free from burrs, although barely perceptible burrs which result from pressing or trimming may be left out, provided they do not affect the functioning of the rivet.

**2.2** Slight scaling which, however, does not peel off, as well as small scars and surface pits may be left out, provided they do not affect the strength or proper seating of the rivet head and shank when riveting.

**2.3** Unavoidable marks resulting from the shearing at the end of the shank are allowed, provided they do not affect the strength of the riveted joint. The rivets shall have clean sheared ends, free from rag or burr, reasonably flat and square, sufficient for the purpose of driving the rivet ends satisfactorily.

**2.4** Surface protection, if required for specific applications, shall be specified by the purchaser.

**2.5 Surface Cracks** — For snap head rivets, minor surface cracks or bursts having an opening at the periphery of rivet head not wider than 0.5 mm + 0.05 times the nominal rivet diameter or 1.5 mm, whichever is less, shall not be the cause for rejection. For rivets with head of diameter  $> 2d$  ( $d$  = shank diameter), the limit for minor surface cracks or bursts at the periphery of the rivet head shall be as agreed to between the purchaser and the manufacturer.

**3. Dimensional Tolerances**

**3.1** The tolerances on various dimensions shall be as indicated in Tables 1 to 4. The nominal dimensions, on which these tolerances are applicable, are given in the respective product standards.

**3.2** Between the measuring plane at a distance of  $0.5d$  from the underside of the head and the start of the rounding under the rivet head, the nominal size,  $d$ , may increase up to the rivet hole diameter or decrease towards the shank end to a value of  $d_s$ .

**3.3** In the case of rivets with snap head and countersunk rivets, a cylindrical edge at the head with the values as given in Table 5 shall be allowed.

**4. Tolerances for Form and Position**

**4.1** For concentricity and runout tolerance of the head with respect to the shank, the shank diameter shall be the datum. The tolerances shall be as given in Table 6.

**4.1.1** The point of measurement shall be outside the cylindrical edge,  $c$ , that is, above the edge in the case of snap head and below the edge in the case of countersunk head.

Rivets Sectional Committee, EDC 71 [Ref : Doc : EDC 71 (3634)]

Adopted 24 February 1982

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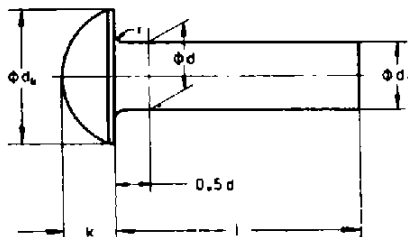
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BUREAU OF INDIAN STANDARDS  
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TABLE 1 TOLERANCES FOR COLD FORGED SNAP HEAD RIVETS

( Clause 3.1 )

All dimensions in millimetres.



Nominal Diameter, d	1.0	1.2	(1.4)	1.6	2.0	2.5	3.0	(3.5)	4.0	5.0	6.0	(7.0)	8.0	10	12	(14)	16
Tol	± 0.05				± 0.10				± 0.15				± 0.30				
d <sub>k</sub>	± 0.20				± 0.25				± 0.30				± 0.35	± 0.40	± 0.50		
d <sub>s</sub> Min	0.93	1.13	1.33	1.52	1.87	2.37	2.87	3.37	3.87	4.82	5.82	6.82	7.76	9.4	11.3	13.2	15.2
r Max	0.2						0.3				0.4			0.5	0.6	0.7	0.8
k	js 15																
l	Up to 10	+ 0.5 0															
	Over 10	+ 1.0 0															
	Up to 20	+ 1.5 0															
	Over 20	+ 1.5 0															

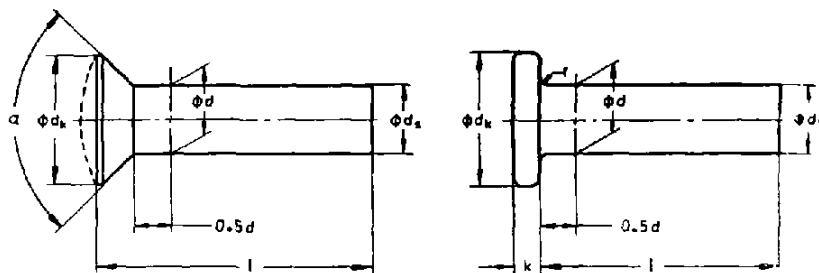
Note 1 — Nominal diameters in parentheses are of second preference.

Note 2 — Nominal diameter,  $d$ , shall be within the tolerance indicated at the plane at  $0.5 d$ . For other permissible limits on shank diameter, see 3.2.

**TABLE 2 TOLERANCES FOR COLD FORGED RIVETS  
(OTHER THAN SNAP HEAD RIVETS)**

(Clause 3.1)

All dimensions in millimetres.



Nominal Diameter, $d$		1-8	1-2	(1-4)	1-6	2-0	2-5	3-0	(3-5)	4-0	5-0	6-0	(7-0)	8-0	10	12	14	16	
Tol		$\pm 0.05$				$\pm 0.10$				$\pm 0.15$				$\pm 0.30$					
$d_h$		h 14								h 15									
$d_h$ Min		0.93	1.13	1.33	1.52	1.87	2.37	2.87	3.37	3.87	4.82	5.82	6.82	7.76	9.4	11.3	13.2	15.2	
$k$		$+0.10$ 0		$+0.20$ 0		$+0.30$ 0				$+0.40$ 0		$+0.50$ 0			$+0.60$ 0				
$r$ Max		0.2						0.3				0.4		0.5	0.6	0.7	0.8		
$\alpha$										$+5^\circ$ 0									
$l$	Up to 10									$+0.5$ 0									
	Over 10									$+1.0$ 0									
	Up to 20									$+1.5$ 0									
	Over 20																		

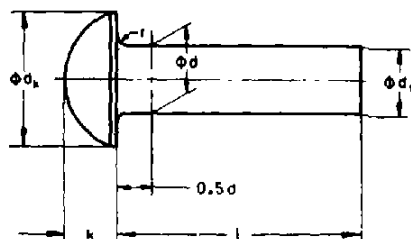
Note 1 — Nominal diameters in parantheses are of second preference.

Note 2 — Nominal diameter,  $d$ , shall be within the tolerance indicated at the plane at  $0.5d$ . For other permissible limits on shank diameter, see 3.2.

TABLE 3 TOLERANCES FOR HOT FORGED SNAP HEAD RIVETS

(Clause 3.1)

All dimensions in millimetres.



Nominal Diameter, $d$	12	(14)	16	(18)	20	(22)	24	(27)	30	(33)	36
Tol	$\begin{matrix} +0.8 \\ 0 \end{matrix}$										
$d_s$ Min	11.3	13.2	15.2	17.1	19.1	20.9	22.9	25.8	28.6	31.6	34.6
$d_k$	$\pm 0.35$	$\pm 0.4$	$\pm 0.5$		$\pm 1.2$						$\pm 1.4$
$k$	$+IT\ 16$										
$r$ Max	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.5	1.7	1.8
$l$	$\begin{matrix} +1.5 \\ 0 \end{matrix}$			$\begin{matrix} +3.0 \\ 0 \end{matrix}$							

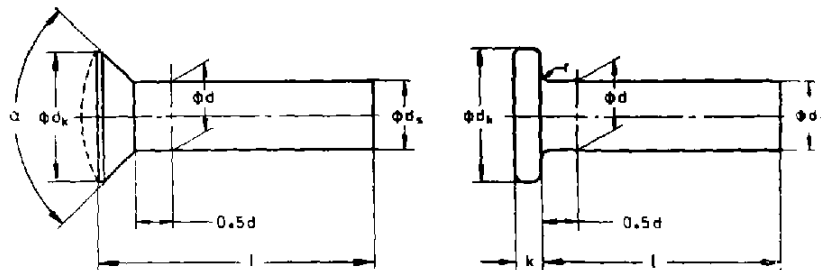
Note 1 — Nominal diameter in parentheses are of second preference.

Note 2 — Nominal diameter,  $d$ , shall be within the tolerance indicated at the plane at  $0.5d$ . For other permissible limits on shank diameter, see 3.2.

**TABLE 4 TOLERANCES FOR HOT FORGED RIVETS  
(OTHER THAN SNAP HEAD RIVETS)**

(Clause 3.1)

All dimensions in millimetres.



Nominal Diameter $d$	12	(14)	16	(18)	20	(22)	24	(27)	30	(33)	36
Tol	+ 0.8 - 0										
$d_s$ Min	11.3	13.2	15.2	17.1	19.1	20.9	22.9	25.8	28.6	31.6	34.6
$d_k$	h16										
$k$	+ 17 16										
$r$ Max	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.5	1.7	1.8
$\alpha$	+ 5° 0										
$l$	+ 1.5 0				+ 3.0 0						

**Note 1** — Nominal diameters in parantheses are of second preference.

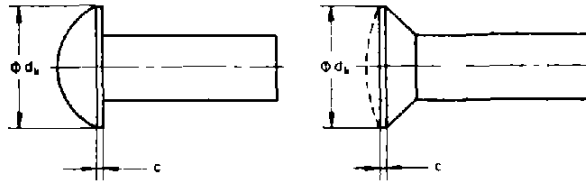
**Note 2** — Nominal diameter,  $d$ , shall be within the tolerance indicated at the plane at 0.5d. For other permissible limits on shank diameter, see 3.2.



TABLE 5 DIMENSIONS FOR SHOULDER OF RIVETS

( Clause 3.3 )

All dimensions in millimetres.

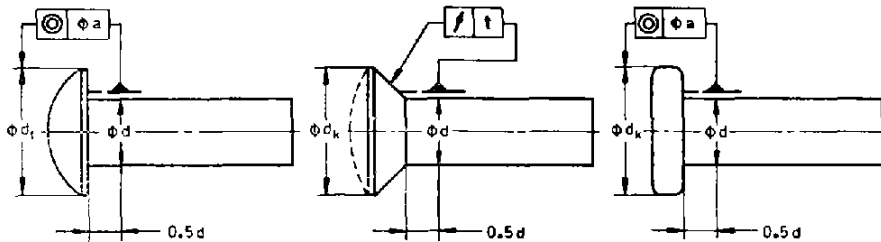


Head Diameter, $\phi d_k$	Over	3	5	7	10	15	18	28	36	48
	Up to	3	5	7	10	15	18	28	36	48
Cylindrical edge, $c$ Max		0.2	0.3	0.5	0.6	0.8	1.0	1.5	2.5	3.5

TABLE 6 CONCENTRICITY AND RUNOUT TOLERANCES FOR RIVETS

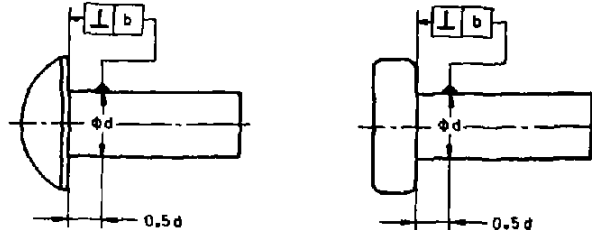
( Clause 4.1 )

All dimensions in millimetres.



Nominal Diameter $d$		Concentricity Tolerance, $a$		Runout Tolerance, $t$
Over	Up to	Snap head	Flat head	Countersunk head
—	8	2 IT 14	2 IT 14	2 IT 14
8	—	2 IT 15	2 IT 15	2 IT 15

**4.2 The Perpendicularity Tolerance** — The perpendicularity tolerance shall be as specified below, based on an angle of  $2^\circ$ .



All dimensions in millimetres.

Nominal Diameter, $d$		Perpendicularity Tolerance, $b$
Over	Up to	
—	4	0.2
4	10	0.3
10	16	0.4
16	30	0.6
30	36	0.8

**4.3** For ready reference, the values of basic tolerances and tolerance zones are given in Appendix A (for further reference, see IS : 919 (Part I)-1963).

**5. Designation** — The designation of rivets shall be as given in the respective product standards.

**6. Material** — The material of rivets shall be as given in the respective product standards.

**7. Marking** — Such marks, as specified in the product standards, shall be stamped (raised or sunk) during the process of manufacture on the heads of all rivets with nominal size greater than 5 mm. Rivets of size greater than 5 mm made of high tensile steel shall be marked with letter HT on the rivet head.

## 8. Mode of Delivery

**8.1** Unless the purchaser has specified specific treatment at the time of enquiry or placing the order, the rivets shall be supplied in a well cleaned condition and suitably protected against rust.

**8.2** Rivets shall be packed in such a way that they are prevented from rust and mechanical damage during transit. All rivets of sizes greater than 5 mm shall be packed in single gunny bags of 50 kg weight approximately.

**8.2.1** The bags containing the rivets shall bear appropriate designation as given in the product standards. In addition, the quantity and the manufacturer's trade-mark and where possible, a pictorial representation of the rivet shall be given on the bags, unless otherwise agreed upon.

## 9. Testing

**9.1 Testing for Dimensional Accuracy** — The following characteristics shall be tested in accordance with AQL values given in Table 7.

### Dimensional Characteristics

**Major Defect**  
Nominal diameter,  $d$   
Concentricity,  $a$   
Runout,  $f$   
Perpendicularity,  $b$

**Minor Defect**  
Head diameter,  $d_h$   
Head height,  $h$   
Nominal length,  $l$   
Countersink angle,  $\alpha$   
Fillet radius,  $r$

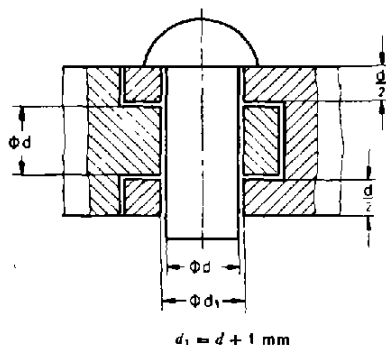
TABLE 7 AQL VALUES FOR DIMENSIONAL CHARACTERISTICS

AQL for Major Defects	AQL for Minor Defects
4.0	6.5

Note—The scale of sampling and criteria for conformity for dimensional characteristics shall be as given in IS : 6621-1973 'Methods for sampling non-threaded fasteners'.

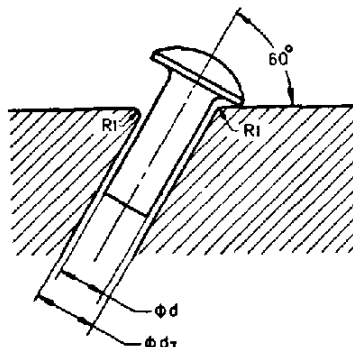
## 9.2 Testing for Mechanical Properties and Material

**9.2.1 Shear test** — Rivets shall be tested for shear by a suitable method for double shear testing as shown in the figure. If the rivets are too short for the shear test, the test shall be conducted on the representative samples of the rivet bars from which the rivets are produced.



**9.2.2 Hardness test** — The Brinell hardness test shall be carried out in accordance with IS : 1500-1968 'Method for Brinell hardness test for steel (first revision)'. The ball indentation shall be made preferably on the zone of the upset point (head). The tensile strength calculated from the Brinell hardness is only for guidance and may be considered for acceptance purposes only when it is not possible to carry out the shear test for limitation of lengths. In the case of non-ferrous metals, conversion of hardness values to tensile strength is not permissible.

**9.2.3 Head soundness test** — The rivet shall be placed as shown in the figure. When struck several blows with a hammer, the head of the rivet should bend through an angle of  $30^\circ$  ( $90^\circ$ - $60^\circ$ ) without exhibiting any sign of cracking at the fillet between the head and the shank. The hardness of the block shall be  $50 \pm 2 \text{ HRC}$ .



Nominal diameter, $d$	1	1.2	1.4	1.6	2	2.5	3	3.5	4	5	6
Hole diameter, $d_1$ H12	1.05	1.25	1.45	1.65	2.1	2.6	3.1	3.6	4.2	5.2	6.3

Nominal diameter, $d$	8	10	12	14	16	18	20	22	24	27	30	33	36
Hole diameter, $d_1$ H12	8.4	10.5	13	15	17	19	21	23	25	28	31	34	37

**9.2.4** For non-destructive tests for mechanical properties and material, the scale of sampling shall conform to Table 2 of IS: 6821-1973 with acceptance numbers corresponding to AQL of 1 percent. Hardness test is considered a non-destructive test.

**9.2.5** For destructive tests for mechanical properties and material, the scale of sampling and criteria for conformity shall conform to Table 1 of IS: 6821-1973.

### EXPLANATORY NOTE

This standard lays down the general supply conditions of delivery for rivets. In addition to general requirements, limits of surface cracks are included. Tolerances for dimensions as well as for concentricity, runout and perpendicularity are also included based on which the limits are given in the product standards. Shear test and head soundness test have been included in place of bend test and flattening test earlier included in the product standards. Sampling plans and criteria for conformity are also covered.

In the preparation of the standard, assistance has been derived from the following publications:

DIN 101-1977 Niete, Technische Lieferbedingungen (Rivets, technical specifications) issued by DIN Deutsches Institut for Normung.

ISO/TC 2 documents N 703, N 704, N 705 and N 706 (February 1979) issued by International Organization for Standardization (ISO).

# APPENDIX A

( Clause 4.3 )

TABLE A-1 BASIC TOLERANCES AND TOLERANCE ZONES

All dimensions in millimetres.

Nominal Size Range		Basic Tolerances					Tolerance Zones External Dimensions						Internal Dimensions			
		IT13	IT14	IT15	IT16		h13	h14	h15	h16	js14	js15	js16	H12	H13	H14
Over	Up to															
1	3	0.14	0.25	0.40	0.60		0 -0.14	0 -0.25	0 -0.40	0 -0.60	±0.125	±0.20	±0.30	+0.10 0	+0.14 0	+0.25 0
3	6	0.18	0.30	0.48	0.75		0 -0.18	0 -0.30	0 -0.48	0 -0.75	±0.15	±0.24	±0.375	+0.12 0	+0.18 0	+0.30 0
6	10	0.22	0.36	0.59	0.90		0 -0.22	0 -0.36	0 -0.58	0 -0.90	±0.18	±0.29	±0.45	+0.15 0	+0.22 0	+0.30 0
10	18	0.27	0.43	0.70	1.10		0 -0.27	0 -0.43	0 -0.70	0 -1.10	±0.215	±0.35	±0.55	+0.18 0	+0.27 0	+0.41 0
18	30	0.33	0.52	0.84	1.30		0 -0.33	0 -0.52	0 -0.84	0 -1.30	±0.26	±0.42	±0.65	+0.21 0	+0.33 0	+0.52 0
30	50	0.39	0.62	1.00	1.60		0 -0.39	0 -0.62	0 -1.00	0 -1.60	±0.31	±0.50	±0.80	+0.25 0	+0.39 0	+0.82 0
50	80	0.46	0.74	1.20	1.90		0 -0.46	0 -0.74	0 -1.20	0 -1.90	±0.37	±0.60	±0.95	+0.30 0	+0.46 0	+0.70 0
80	120	0.54	0.87	1.40	2.20		0 -0.54	0 -0.87	0 -1.40	0 -2.20	±0.435	±0.70	±1.10	+0.35 0	+0.54 0	+0.87 0
120	180	0.63	1.00	1.60	2.50		0 -0.63	0 -1.00	0 -1.60	0 -2.50	±0.50	±0.80	±1.25	+0.40 0	+0.63 0	+1.00 0
180	250	0.72	1.15	1.85	2.90		0 -0.72	0 -1.15	0 -1.85	0 -2.90	±0.575	±0.925	±1.45	+0.46 0	+0.72 0	+1.11 0
250	315	0.81	1.30	2.10	3.20		0 -0.81	0 -1.30	0 -2.10	0 -3.20	±0.65	±1.05	±1.60	+0.52 0	+0.81 0	+1.30 0

Note — The basic tolerances and tolerance zones indicated for the range of nominal sizes from 1 to 3 mm are provisionally applicable also for the range of nominal dimensions below 1 mm.