

PINS

HEADED CLEVIS PINS [METRIC SERIES]**ASME
B18.8.8M
1994****IFI NOTES:**

1. *ASME B18.8.8M is a standard developed through the procedures of The American Society of Mechanical Engineers. B18.8.8M is under the jurisdiction of ASME Standards Committee B18 and is the direct responsibility of Subcommittee 8.*
2. *Appendix A, Calculation for Hole Location, and referenced standards have been omitted. For this information, refer to the complete B18.8.8M. All paragraphs are numbered identically to those in the standard.*
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1. INTRODUCTORY NOTES**1.1 Scope**

1.1.1 This standard covers the complete dimensional and general data for two types, A and B, of metric series headed clevis pins intended for general applications and recognized as American National Standard.

Type A headed clevis pins are without holes.

Type B headed clevis pins specified herein are with holes intended for use with cotter pins. However, a means is provided to specify other hole sizes when required for use with other types of pins.

1.1.2 The inclusion of dimensional data in this standard is not intended to imply that all sizes described are production stock items. Consumers should consult with suppliers concerning lists of stock production items.

1.2 Comparison With ISO 2341-1986

Unhardened steel clevis pins produced to this standard are functionally interchangeable

with pins of the same nominal size which conform to ISO 2341-1986, Clevis Pins With Head. Many of the recommended hole spacings in this standard provide greater lengths from the holes to the ends of the pins than the minimums specified in ISO 2341-1986.

1.3 Dimensions

1.3.1 All dimensions in this standard are in millimeters (mm), and apply before any coating, unless stated otherwise.

1.3.2 Symbols specifying geometric characteristics are in accordance with ANSI Y14.5M, Dimensioning and Tolerancing.

1.3.3 Symbols specifying surface texture are in accordance with ANSI Y14.36, Surface Texture Symbols.

1.4 Terminology

For definitions of terms relating to fasteners or component features thereof used in this standard, refer to ASME B18.12, Glossary of Terms for Mechanical Fasteners. See page K-37.

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1.5 Referenced Standards

(IFI Note: Titles and sources of availability of referenced standards are given on page K-41.)

1.6 Designation

Pins conforming to this standard shall be designated by the following data, preferably in the sequence shown:

- (a) product name;
- (b) ASME document number;
- (c) Type A or B, preceded by dash;
- (d) nominal shank diameter, D , preceded by a dash;
- (e) diameter tolerance class, if other than standard;
- (f) nominal pin length, L , preceded by $\times$;
- (g) for Type B, hole size, D_h , if other than standard preceded by $\times$;
- (h) for Type B, head to hole center, L_h , preceded by $\times$;
- (i) material, hardened if required, preceded by dash;
- (j) finish, if other rust preventive lubricant, preceded by dash.

Examples:

Headed Pin B18.8.8M-B-20 $\times$ 100 $\times$ 90
– Steel – Zinc Plated per ASTM B633 Fe/Zn 5
Type II.

Headed Pin B18.8.8M-B-20 $\times$ 100 $\times$ 6.3
 $\times$ 89.5 – Steel, Case Hardened.

2. GENERAL DATA

2.1 Shank Diameter

Unless otherwise specified, the shank diameter, D , shall be within the limits specified in Table 1. The surface roughness of the shank shall not exceed 3.2 micrometers (μm) arithmetical average in accordance with ANSI/ASME B46.1, Surface Texture. The standard shank diameter limits specified in Table 1 are in accordance with tolerance class h11 of ANSI B4.2, Preferred Metric Limits and Fits. If, in special cases, other shank diameter limits are required, they should be selected from ANSI B4.2; i.e., tolerance class a11, c11, or f8.

2.2 Head

2.2.1 Top of Head. The top of the head shall be flat and chamfered or rounded at the periphery.

2.2.2 Bearing Surface. The bearing surface of the head, within a diameter equal to 0.8 times the maximum head diameter, D_h , shall be flat and perpendicular to the axis of the shank, determined over a length under the head equal to the nominal shank diameter, within the circular runout, t_1 , specified in Table 1.

2.2.3 Head Periphery. The periphery of the head shall be within the circular runout, t_2 , determined over a length under the head equal to the nominal shank diameter.

2.3 Pin Length

The pin length, L , is the distance, parallel to the shank axis, from the bearing surface of the head to the end of the point. The standard nominal pin lengths are specified in Table 2. The tolerances on pin length are specified in Table 3.

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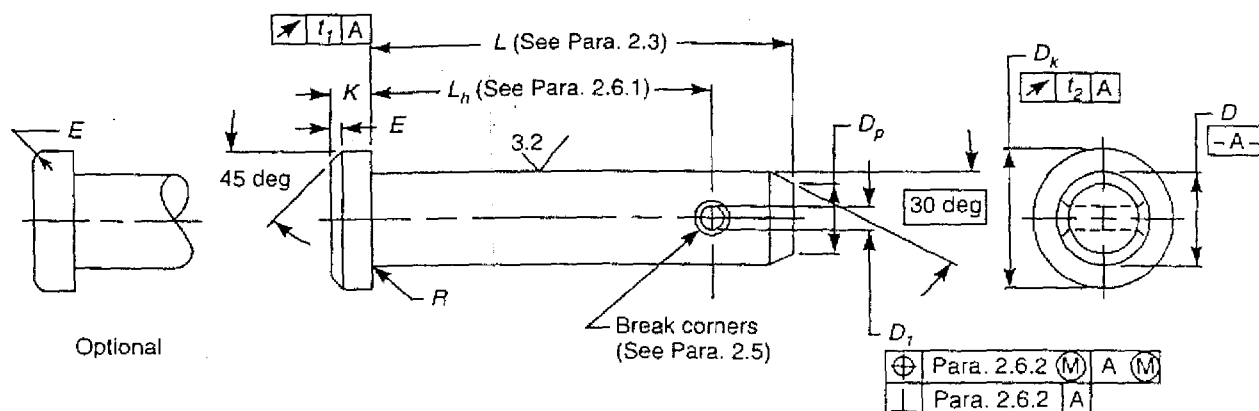
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Table 1 Dimensions of Types A and B Headed Clevis Pins

D			D _k		K		E	R	t ₁	t ₂	D _p		D ₁		
Shank Diameter			Head Diameter		Head Height		Head Chamfer or Radius	Filllet Radius	Bearing Surface	Head Periphery Circular Runout	Point Diameter		Hole Diameter		
Nom	Max	Min	Max	Min	Max	Min	Approx	Nom	Max	Max	Max	Min	Nom	Max	Min
3	3.00	2.94	5.00	4.70	1.2	0.8	0.5	0.6	0.14	0.60	2.2	1.8	0.8	0.94	0.80
4	4.000	3.925	6.00	5.70	1.2	0.8	0.5	0.6	0.17	0.60	3.2	2.8	1	1.14	1.00
5	5.000	4.925	8.00	7.64	1.8	1.4	1	0.6	0.22	0.72	3.3	2.7	1.2	1.34	1.20
6	6.000	5.925	10.00	9.64	2.2	1.8	1	0.6	0.28	0.72	4.3	3.7	1.6	1.74	1.60
8	8.00	7.91	14.00	13.57	3.2	2.8	1	0.6	0.39	0.86	6.3	5.7	2	2.14	2.00
10	10.00	9.91	18.00	17.57	4.2	3.8	1	0.6	0.50	0.86	8.3	7.7	3	3.38	3.20
12	12.00	11.90	20.00	19.48	4.2	3.8	1.5	0.6	0.56	1.04	9.5	8.5	3	3.38	3.20
14	14.00	13.90	22.00	21.48	4.2	3.8	1.5	0.6	0.61	1.04	11.5	10.5	4	4.18	4.00
16	16.00	15.90	25.00	24.48	4.7	4.3	1.5	0.6	0.70	1.04	13.5	12.5	4	4.18	4.00
18	18.00	17.90	28.00	27.48	5.2	4.8	1.5	1	0.78	1.04	15.5	14.5	5	5.18	5.00
20	20.00	19.87	30.00	29.48	5.2	4.8	2	1	0.84	1.04	16.6	15.4	5	5.18	5.00
22	22.00	21.87	33.00	32.38	5.7	5.3	2	1	0.92	1.24	18.6	17.4	5	5.18	5.00
24	24.00	23.87	36.00	35.38	6.2	5.8	2	1	1.01	1.24	20.6	19.4	6.3	6.52	6.30
27	27.00	26.87	40.00	39.38	6.2	5.8	2	1	1.12	1.24	23.6	22.4	6.3	6.52	6.30
30	30.00	29.87	44.00	43.38	8.3	7.7	2	1	1.23	1.24	26.6	25.4	8	8.22	8.00
33	33.00	32.84	47.00	46.38	8.3	7.7	2	1	1.31	1.24	29.6	28.4	8	8.22	8.00
36	36.00	35.84	50.00	49.38	8.3	7.7	2	1	1.40	1.24	32.6	31.4	8	8.22	8.00
40	40.00	39.84	55.00	54.26	8.3	7.7	2	1	0.77	1.48	36.6	35.4	8	8.22	8.00
45	45.00	44.84	60.00	59.26	9.3	8.7	2	1	0.84	1.48	41.6	40.4	10	10.22	10.00
50	50.00	49.84	66.00	65.26	9.3	8.7	2	1	0.92	1.48	46.6	45.4	10	10.22	10.00
55	55.00	54.81	72.00	71.26	11.4	10.6	3	1	1.01	1.48	50.0	48.0	10	10.22	10.00
60	60.00	59.81	78.00	77.26	12.4	11.6	3	1	1.09	1.48	55.0	53.0	10	13.27	13.00
70	70.00	69.81	90.00	89.13	13.4	12.6	3	1	1.26	1.74	65.0	63.0	13	13.27	13.00
80	80.00	79.81	100.00	99.13	13.4	12.6	3	1	1.40	1.74	75.0	73.0	13	13.27	13.00
90	90.00	89.78	110.00	109.13	13.4	12.6	3	1	1.54	1.74	85.0	83.0	13	13.27	13.00
100	100.00	99.78	120.00	119.13	13.4	12.6	3	1	1.68	1.74	95.0	93.0	13	13.27	13.00
See Para.		2.1					2.2.1		2.2.2	2.2.3	2.4		2.5		

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Table 2 Hole Location

D Nom Dia	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30	33	36	40	45	50	55	60	70	80	90	100
L Nom Length	Nominal Head to Hole Center (See Para. 2.6.1)																									
6	3.2																									
8	5.2	5.2																								
10	7.2	7.1	6.0																							
12	8.9	8.9	7.8	7.5																						
14	11.0	11.0	9.8	9.5																						
16	13.0	13.0	11.5	11.5	11.0																					
18	15.0	15.0	13.5	14.5	13.0																					
20	17.0	17.0	15.5	16.5	15.0	14.0																				
22	19.0	19.0	17.5	18.5	17.0	16.0																				
24	21.0	20.5	19.5	19.5	19.0	18.0	17.0																			
26	23.0	22.5	21.5	21.5	21.0	20.0	19.0																			
28	25.0	24.5	23.5	23.5	23.0	22.0	21.0	20.5																		
30	27.5	26.5	25.5	25.5	25.0	24.0	23.0	22.5																		
32		28.5	27.5	27.5	27.0	26.0	25.0	24.5	24.5																	
35		31.5	30.5	30.5	30.0	29.0	28.0	27.5	27.5	26.5																
40		36.5	35.5	35.5	34.5	34.0	32.5	32.0	32.5	31.5	30.5															
45			40.5	40.5	39.5	39.0	37.5	37.0	37.5	38.5	35.5	36.0														
50			45.5	45.5	44.5	44.0	42.5	42.0	42.5	41.5	40.5	41.0	40.0													
55				50.5	49.5	48.5	47.5	47.0	47.0	46.5	45.5	45.5	44.5	44.5												
60				55.5	54.5	53.5	52.5	52.0	52.0	51.5	50.5	50.5	49.5	49.5	49.0											
65					59.5	58.5	57.5	57.0	57.0	56.5	55.5	55.5	54.5	54.5	53.5	53.5										
70					64.5	63.5	62.5	62.0	62.0	61.5	60.5	60.5	59.5	59.5	58.5	58.5	59.0									
75					69.5	68.5	67.5	67.0	67.0	66.5	65.5	65.5	64.5	64.5	63.5	63.5	64.0									
80					74.5	73.5	72.5	72.0	72.0	71.5	70.5	70.5	69.5	69.5	68.5	68.5	69.5	69.0								
85						78.5	77.5	77.0	77.0	76.5	75.5	75.5	74.5	74.5	73.5	73.5	74.5	74.0								
90						83.5	82.0	82.0	82.0	81.5	80.0	80.0	79.5	79.5	78.5	78.5	79.5	79.0	77.5							
95						88.5	87.0	87.0	87.0	86.0	85.0	85.0	84.5	84.5	83.5	83.5	84.5	84.5	82.5							
100						93.5	92.0	92.0	92.0	91.0	90.0	90.0	89.5	89.5	88.5	88.5	88.5	88.5	87.5	87.0						
120							112.0	112.0	112.0	111.0	110.0	110.0	109.5	109.5	109.0	109.0	109.5	109.5	108.0	107.0	105.0	105.0				
140								132.0	132.0	131.0	130.0	130.0	129.0	129.0	128.0	128.0	129.0	129.0	127.0	127.0	125.0	125.0	123.0			
160									152.0	151.0	150.0	150.0	149.0	149.0	148.0	148.0	149.0	149.0	147.0	147.0	145.0	145.0	143.0	143.0		
180										171.0	170.0	170.0	169.0	169.0	168.0	168.0	169.0	169.0	167.0	167.0	165.0	165.0	163.0	163.0	164.0	
200											190.0	190.0	189.0	189.0	188.0	188.0	189.0	189.0	187.0	187.0	185.0	185.0	183.0	183.0	183.0	
220													209.0	209.0	208.0	208.0	209.0	209.0	207.0	207.0	205.0	205.0	203.0	203.0	203.0	
240													229.0	229.0	228.0	228.0	229.0	229.0	227.0	227.0	225.0	225.0	223.0	223.0	223.0	
260														249.0	248.0	248.0	249.0	249.0	247.0	247.0	245.0	245.0	243.0	243.0	243.0	
280															268.0	268.0	268.0	268.0	267.0	267.0	265.0	265.0	263.0	263.0	263.0	
300															288.0	288.0	288.0	288.0	287.0	287.0	285.0	285.0	283.0	283.0	283.0	



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L Nominal Length		Length Tolerance
over	thru	
—	10	±0.25
10	50	±0.50
50	—	±0.75

2.4 Points

The points of the pins shall be chamfered 30 deg to the point diameters, D_p , specified in Table 1.

2.5 Hole Diameter for Type B Pins

The hole shall be countersunk or otherwise relieved at both ends to break the corners and remove all burrs.

Unless otherwise specified, the hole diameter, D_h , shall be within the limits specified in Table 1. The standard nominal hole diameters, specified in Table 1, correspond to the nominal diameters of the recommended cotter pins. The hole diameter limits, specified in Table 1, are in accordance with tolerance class H13 of ANSI B4.2.

2.6 Hole Location for Type B Pins

2.6.1 Head to Hole Center. The standard nominal lengths, L_h , from the bearing surface of the head to the center of the hole are specified in Table 2, and are recommended for use with the standard hole sizes. The tolerances on the head to hole center dimensions are specified in Table 4.

If a larger than standard hole is specified, it may be necessary to specify shorter length, L_h , from head to hole center in order to maintain adequate material between the edge of the hole and the end of the pin, or to avoid a sharp edge between the countersunk hole and the end chamfer. See Appendix A.

2.6.2 Position of Hole. The axis of the hole shall be within the positional tolerance specified in Table 5 with respect to the axis of the shank, determined over a length from the center of the hole equal to the nominal shank diameter, D , at maximum material condition, and perpendicular to the axis of the pin within 2 deg.

2.7 Material and Hardness

Unhardened clevis pins shall be furnished unless hardened is specified.

2.7.1 Unhardened Clevis Pins. Unhardened steel clevis pins shall be made from steel with a maximum carbon content of 0.28 percent, and shall have hardness of 125–245 HV, 119–234 HB, or 69–99 HRB.

2.7.2 Hardened Clevis Pins. Hardened steel clevis pins shall be marked with a capital "H" on top of the head. Unless otherwise specified by

**Table 4
Length From Head to Hole Center**

L _h Nominal Length From Head to Hole Center		Head to Hole Center Tolerance Plus (Nothing Minus)
over	thru	
—	3	+0.25
3	6	+0.30
6	10	+0.36
10	18	+0.43
18	30	+0.52
30	50	+0.62
50	80	+0.74
80	120	+0.87
120	180	+1.00
180	250	+1.15
250	315	+1.30
315	400	+1.40
400	500	+1.55

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Table 5 Hole to Shank Position Tolerance

D Nominal Shank Diameter		Hole to Shank Position Tolerance at MMC (Max Width)
over	thru	
—	3	0.28
3	6	0.36
6	10	0.44
10	18	0.54
18	30	0.66
30	50	0.78
50	80	0.92
80	100	1.08

the purchaser, hardened clevis pins may be either through hardened or case hardened as follows:

- (a) Through hardened clevis pins shall be made from SAE 52100, AISI E52100, UNS G52986, or equivalent alloy steel, and shall have hardness of 550-650 HV30, 52-58 HRC, or 517-611 HB.
- (b) Case hardened clevis pins shall be made from low carbon steel, such as SAE/AISI 1010, UNS G10100, or SAE/AISI 12114, UNS G12144, or equivalent, and shall have a surface hardness of 600-700 HV1 or 88-90 HR15N, and a minimum hardness at case depth of 0.25-0.4 mm of 550 HV1 or 87 HR15N.

2.8 Workmanship

Clevis pins shall be free from burrs, sharp edges, loose scale, and all other detrimental defects.

2.9 Finish

Unless otherwise specified, the finish of the pins shall be plain:

- as processed for unhardened steel pins
- in general, black oxide for hardened steel pins

The pins shall be delivered in a clean condition and lightly oiled with rust preventive lubricant.

Hardened steel pins which are plated or coated and subject to hydrogen embrittlement shall be baked for a suitable time at a temperature that will obviate such embrittlement. Baking shall be accomplished as soon as possible following the plating or coating process inasmuch as delay is detrimental to achievement of the desired results.

2.10 Inspection and Quality Assurance

Unless otherwise specified, acceptability of clevis pins shall be determined based on ASME/ANSI B18.18.1M, Inspection and Quality Assurance for General Purpose Fasteners, page L-5.