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N-25-03

USA STANDARD

PUNCH GUIDE BUSHINGS — Variable, Press Fit

USAS B94.23 - 1969

Sponsor

The American Society of Mechanical Engineers

Collaborator

National Association of Punch Manufacturers

Published by

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AMERICAN NATIONAL STANDARD

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FOREWORD

This Standard is one of a series of interchangeable punches and accessories for precision stamping dies. It comprises a group of Punch Guide Bushings to be used in conjunction with long pointed punches (see B94.22-1968) mounted in precision stamping dies (also called permanent dies); that is, the dies built by die makers, within die sets, for long-run production of specific and individual metal parts in many different kinds of punch presses.

Members of the National Association of Punch Manufacturers have been major contributors to the development of these Standards in their committee work, their individual concessions to the general good, their intimate knowledge of the items standardized, and their active efforts in the promotion of adoption of the Standards.

NAPM Standard numbers referred to herein are a temporary device to coordinate industry conversion to the proposed Standards without costly delays. Reference to NAPM Standards can eventually be discontinued.

Technical Committee No. 16 (TC-16), which is responsible for organizing the Standard in its final form, has balanced representation of the interests of punch manufacturers and punch users and has thoroughly reviewed the proposal before approving it. User representatives on TC-16 have been uniquely effective in their concise presentation of application needs that so greatly contributed to the rapid progress of the Committee.

The first meeting of TC-16 was on April 23, 1964. Meetings have been held at regular intervals, and in addition, much work has been done by correspondence and letter ballot.

This Standard, after approval by TC-16, was submitted to industry for review and comment. Following the approval by the USA Standards Committee B94 and the sponsor, it was approved by the USA Standards Institute on June 10, 1969, and designated USAS B94.23-1969.

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USA STANDARD

PUNCH GUIDE BUSHINGS - VARIABLE, PRESS FIT

1. Scope

This standard covers the USA standard practice for punch guide bushings, variable, press fit, including dimensions, tolerances, nomenclature, sizes, and shapes. These bushings are in two styles: solid and split; and three types: headless, head down, and head up. Round bushings are in the solid style only and shaped bushings are in the split style only.

2. Nomenclature

2.1 Punch Guide Bushing

An element of a stamping die that fits in the stripper and supports and guides the punch (see illustration page 2). It consists of a working portion and a retainer portion.

2.1.1 Working Portion. The working portion is a precisely sized hole with a suitable lead-in, which, has the proper fit to the related punch, contained in a retaining portion or body.

2.1.2 Retaining Portion (Body). The retaining portion is cylindrical to fit a round hole in the stripper. The fit of the body to the stripper provides location of the bushing relative to other bushings, die buttons, etc., in the stamping die. The body is generally retained by press fitting.

2.2 Types of Punch Guide Bushings included in this Standard

There are two styles: solid and split. In each style there are three types: headless, head down, and head up.

2.2.1 Solid. One piece press-fit bushings with round hole only.

2.2.2 Split (For Shaped Holes only). Two-piece press-fit bushings with the shaped hole formed by grinding.

2.2.3 Headless. Solid or split bushings with a straight cylindrical body which may be pressed in from either end.

2.2.4 Head Down. Solid or split bushings with a head consisting of a cylindrical section larger than the body which has the lead-in on the end opposite the head.

2.2.5 Head Up. Same as **Head Down** except that lead-in is on same end as head.

2.3 Punch Guide Bushing Feature Nomenclature

2.3.1 Hole Dimension (P). The diameter of a round hole or the distance across the flats of a square hole.

2.3.2 Hole Dimensions. The dimensions required to define the size of hole shapes other than round or square.

P – The larger dimension.
W – The smaller dimension.

2.3.3 Body Diameter (D). The cylindrical portion of the guide bushing that fits to a hole in a stripper.

2.3.4 Head Diameter (H). The diameter of the head portion of a guide bushing.

2.3.5 Head Thickness (T). The thickness (length) of the head.

2.3.6 Overall Length (L). The total length of a guide bushing.

2.3.7 Fillet. The blend of body diameter to head diameter of a head type guide bushing to avoid stress concentration of a sharp corner.

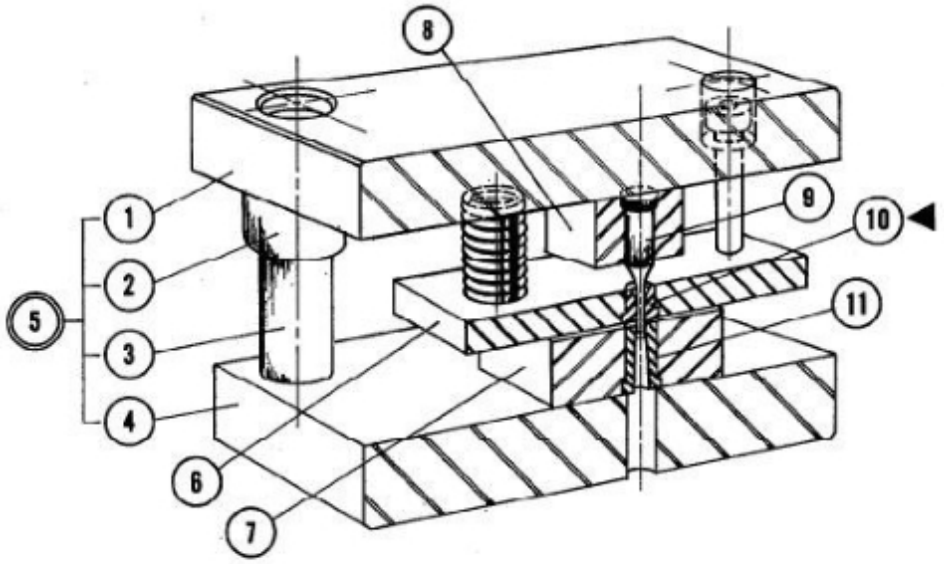
2.3.8 Diagonal (G). The diagonal of a rectangular hole.

2.3.9 Limiting Diameter (G_{max}). The maximum circumscribed diameter of a rectangular hole.

2.3.10 Lead-In. A radiused or tapered portion of the hole to facilitate punch-point entry and provide clearance for the radius blend of the mating punch.

2.3.11 Length of Straight (V). The length of the straight portion in the hole.

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THE COMMON DIE LANGUAGE

① PUNCH HOLDER

② GUIDE POST BUSHING

③ GUIDE POST

④ DIE HOLDER

⑤ DIE SET

⑥ STRIPPER (GUIDED OR FIXED)

⑦ DIE BLOCK OR RETAINER

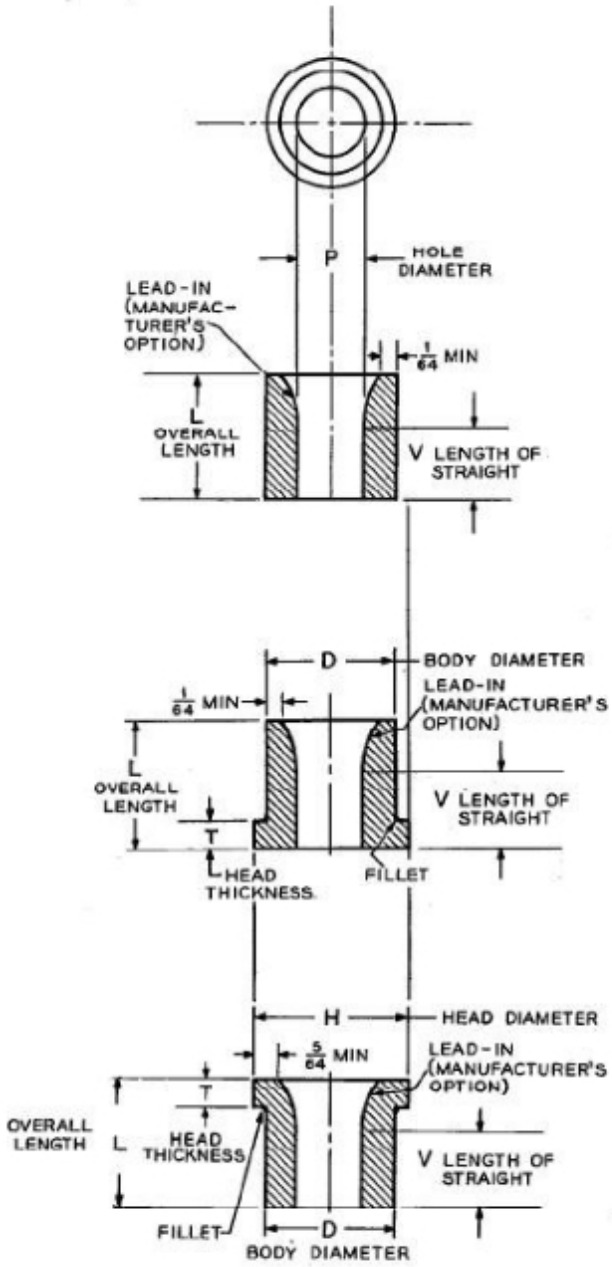
⑧ PUNCH RETAINER

⑨ PERFORATING (PIERCING) PUNCH

▶⑩ PUNCH GUIDE BUSHING

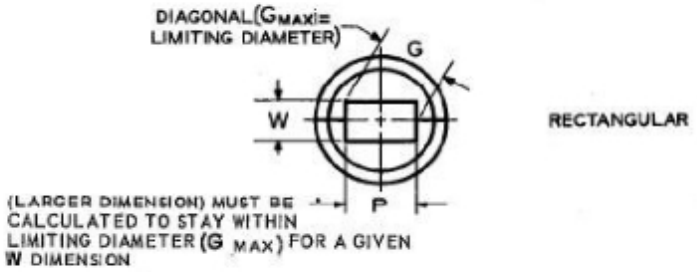
⑪ DIE BUTTON

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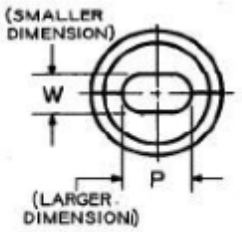


SOLID STYLE PUNCH GUIDE BUSHINGS

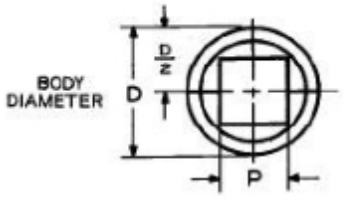
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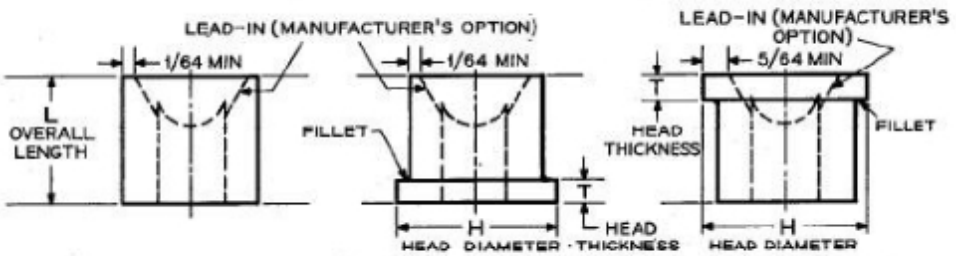
RECTANGULAR



OBLONG



SQUARE



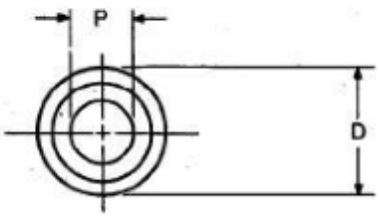
VARIABLE, PRESS FIT, HEADLESS

VARIABLE, PRESS FIT, HEAD DOWN

VARIABLE, PRESS FIT, HEAD UP

SPLIT STYLE PUNCH GUIDE BUSHINGS

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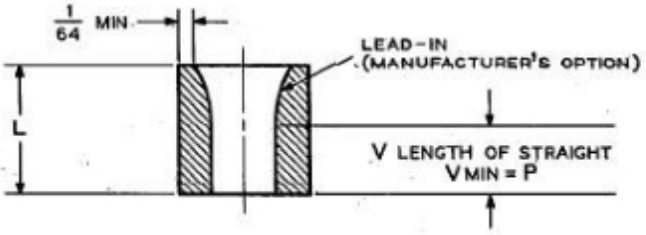


Table 1. Punch Guide Bushing, Variable, Press Fit, Headless, Round (NAPM No. 31.00)

Nominal Body Dia D	Range of Hole Sizes P	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.0002 −0.0000	Tolerance +0.015 −0.000		
1/8 (0.125)	0.031 – 0.046	3/8		
3/16 (0.1875)	0.046 – 0.128	3/8	1/2	
1/4 (0.2500)	0.062 – 0.170	3/8	1/2	5/8
5/16 (0.3125)	0.093 – 0.212	3/8	1/2	5/8
3/8 (0.375)	0.125 – 0.255	3/8	1/2	5/8
7/16 (0.4375)	0.187 – 0.297		1/2	5/8
1/2 (0.500)	0.212 – 0.344		1/2	5/8
5/8 (0.625)	0.293 – 0.425			5/8

All dimensions given in inches.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (inside to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0005 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (lead-in end large).

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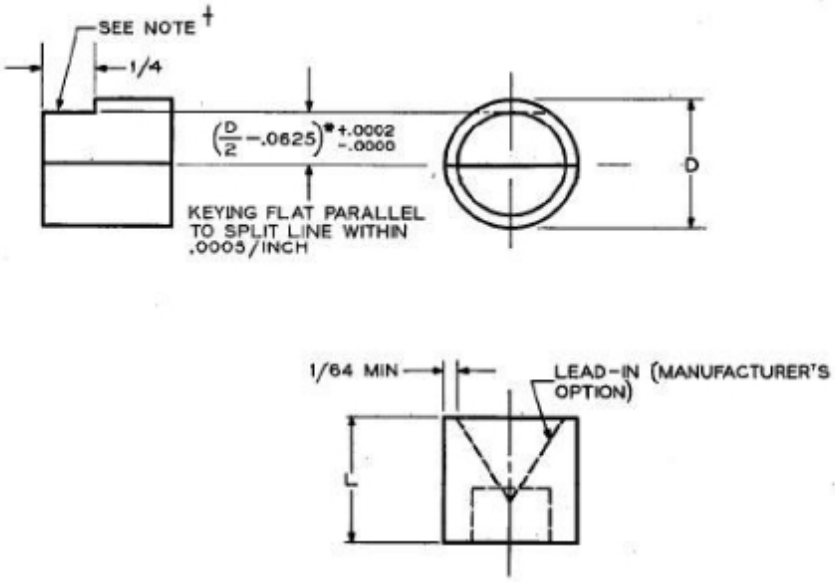


Table 2. Punch Guide Bushing, Variable, Press Fit, Headless, Split, Blank (NAPM No. 3 I. 10)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Overall Lengths L Tolerance +0.015 −0.000		
1/4 (0.250)	3/8	1/2	5/8
5/16 (0.3125)	3/8	1/2	5/8
3/8 (0.375)	3/8	1/2	5/8
7/16 (0.4375)		1/2	5/8
1/2 (0.500)		1/2	5/8
5/8 (0.625)			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63
Body: Straight to tapered within diameter tolerance (lead-in end large).
† Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
*Except ¼ (0.250) body diameter which has flat (D/2 −0.0312) +0.0002, −0.0000.

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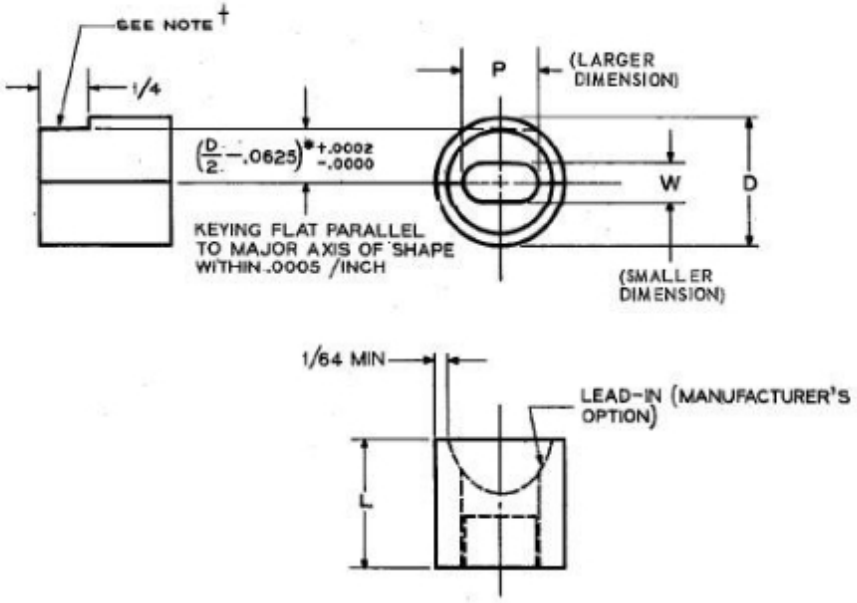


Table 3. Punch Guide Bushing, Variable, Press Fit, Headless, Split, Oblong (NAPM No. 31.11)

Nominal Body Dia D		Range of Hole Sizes		Overall Lengths L		
		P(max)	W(min)			
Tolerance +0.0002 +0.0004		Tolerance +0.0002 −0.0000	Tolerance +0.0002 −0.0000	Tolerance +0.015 −0.000		
1/4	(0.250)	0.170	0.062	3/8	1/2	5/8
5/16	(0.3125)	0.212	0.062	3/8	1/2	5/8
3/8	(0.375)	0.255	0.093	3/8	1/2	5/8
7/16	(0.4375)	0.297	0.093		1/2	5/8
1/2	(0.500)	0.344	0.125		1/2	5/8
5/8	(0.625)	0.425	0.125			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P and W to outside dia) 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (lead-in end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
*Except ¼ (0.250) body diameter which has flat (D/2 –0.0312) +0.0002, –0.0000.

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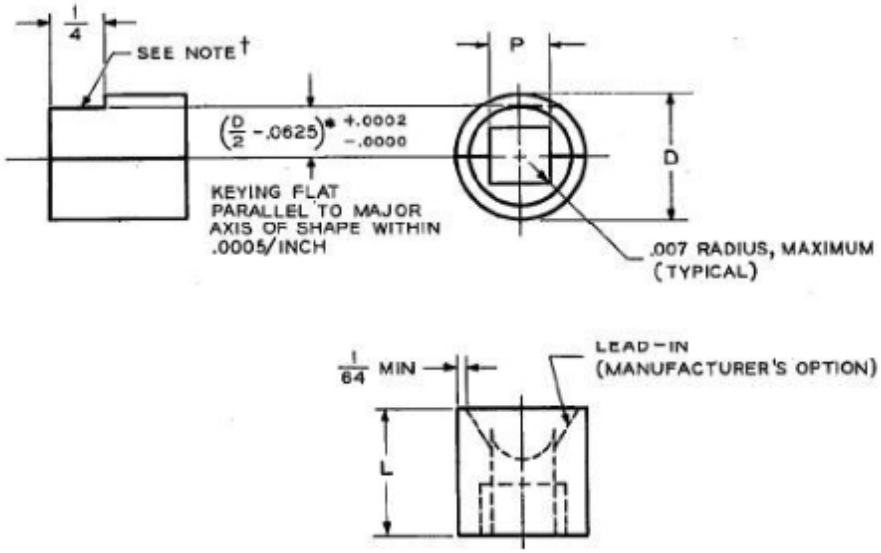


Table 4. Punch Guide Bushing, Variable, Press Fit, Headless, Split, Square (NAPM No. 31.12)

Nominal Body Dia D	Range of Hole Sizes P	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.0002 −0.0000	Tolerance +0.015 −0.000		
1/4 (0.250)	0.062 – 0.120	3/8	1/2	5/8
5/16 (0.3125)	0.062 – 0.150	3/8	1/2	5/8
3/8 (0.375)	0.093 – 0.180	3/8	1/2	5/8
7/16 (0.4375)	0.093 – 0.210		1/2	5/8
1/2 (0.500)	0.125 – 0.243		1/2	5/8
5/8 (0.625)	0.125 – 0.300			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (lead-in end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
*Except ¼ (0.250) body diameter which has flat (D/2 –0.0312) +0.0002, –0.0000.

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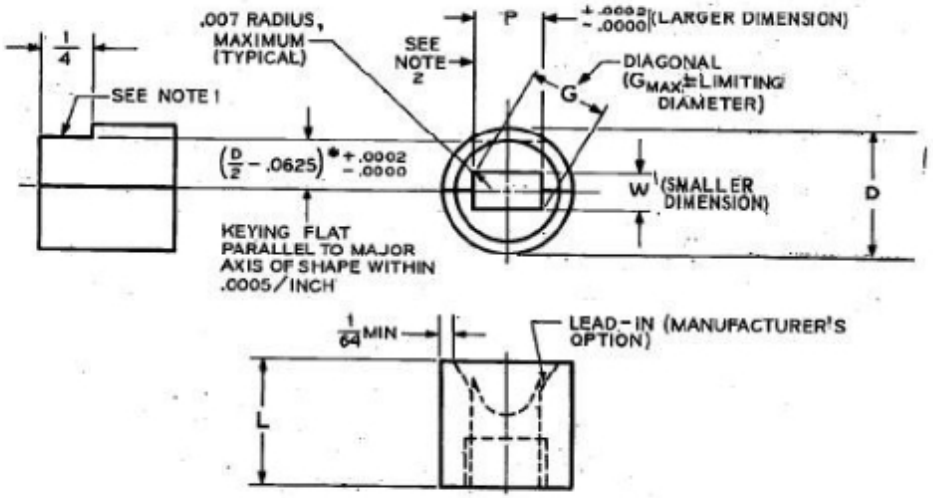


Table 5. Punch Guide Bushing, Variable, Press Fit, Headless, Split, Rectangular (NAPM No. 31.13)

Nominal Body Dia D	Range of Hole Sizes		Overall Lengths L		
	$G_{(max)}$	W(min)			
Tolerance +0.0002 +0.0004		Tolerance +0.0002 −0.0000	Tolerance +0.015 −0.000		
1/4 (0.250)	0.170	0.062	3/8	1/2	5/8
5/16 (0.3125)	0.212	0.262	3/8	1/2	5/8
3/8 (0.375)	0.255	0.093	3/8	1/2	5/8
7/16 (0.4375)	0.297	0.093		1/2	5/8
1/2 (0.500)	0.344	0.125		1/2	5/8
5/8 (0.625)	0.425	0.125			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P and W to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch, max (lead-in end large).
Body: Straight to tapered within dia tolerance (lead-in end large).
1. Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
2. P (larger dimension) must be calculated to stay within the limiting dia (G_{max}) for a given W dimension.
* Except ¼ (0.250) body diameter which has flat (D/2-0.0312) +0.0002, -0.000.

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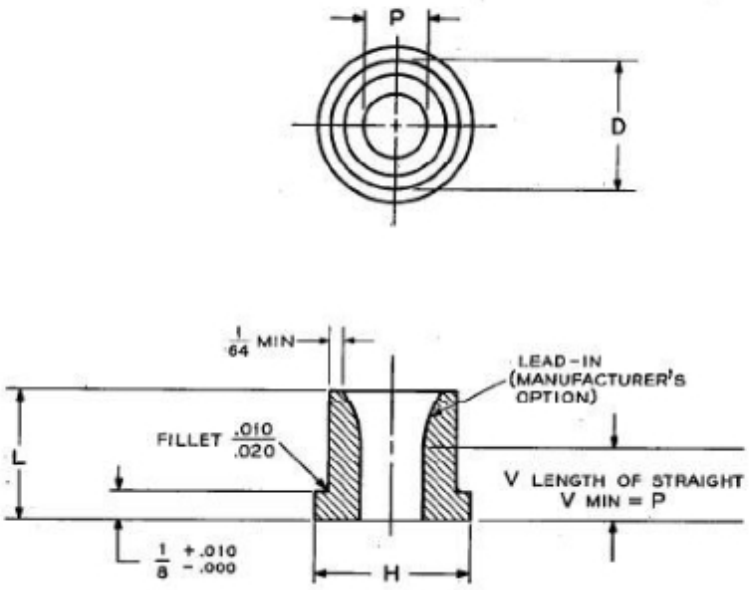


Table 6. Punch Guide Bushing, Variable, Press Fit, Head Down, Round (NAPM No. 31.20)

Nominal Body Dia D	Range of Hole Sizes P	Head Dia H	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.0002 −0.0000	Tolerance +0.000 −0.010	Tolerance +0.020 −0.000		
1/8 (0.125)	0.031–0.046	1/4	3/8		
3/16 (0.1875)	0.046–0.128	5/16	3/8	1/2	
1/4 (0.250)	0.062–0.170	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.093–0.212	7/16	3/8	1/2	5/8
3/8 (0.375)	0.125–0.255	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.187–0.297	9/16		1/2	5/8
1/2 (0.500)	0.212–0.344	5/8		1/2	5/8
5/8 (0.625)	0.293–0.425	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (inside to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0005 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (lead-in end large).

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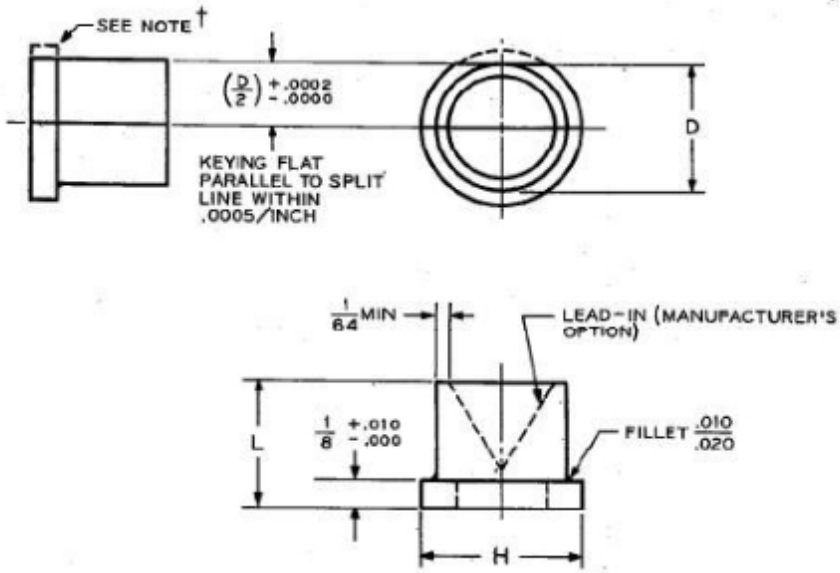


Table 1. Punch Guide Bushing, Variable, Press Fit, Head Down, Split, Blank (NAPM No. 31.30)

Nominal Body Dia D	Head Dia H	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.000 -0.010	Tolerance +0.020 -0.000		
1/4 (0.250)	3/8	3/8	1/2	5/8
5/16 (0.3125)	7/16	3/8	1/2	5/8
3/8 (0.375)	1/2	3/8	1/2	5/8
7/16 (0.4375)	9/16		1/2	5/8
1/2 (0.500)	5/8		1/2	5/8
5/8 (0.625)	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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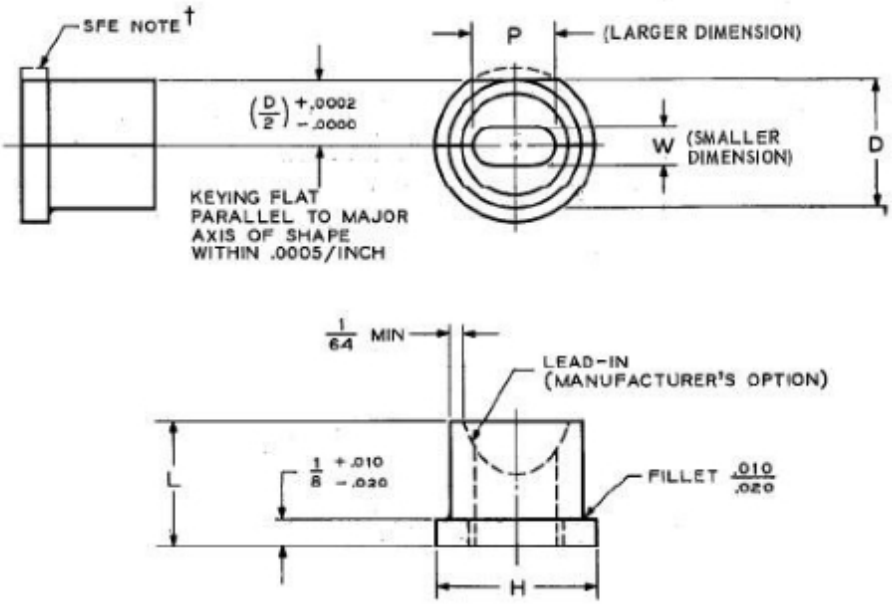


Table 8. Punch Guide Bushing, Variable, Press Fit, Head Down, Split, Oblong (NAPM No. 31.31)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Range of Hole Sizes P(max) Tolerance +0.0002 −0.0000	 W(min) Tolerance +0.0002 −0.0000	Head Dia H Tolerance +0.000 +0.010	Overall Lengths L Tolerance +0.020 −0.000		
1/4 (0.250)	0.170	0.062	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.212	0.062	7/16	3/8	1/2	5/8
3/8 (0.375)	0.255	0.093	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.297	0.093	9/16		1/2	5/8
1/2 (0.500)	0.344	0.125	5/8		1/2	5/8
5/8 (0.625)	0.425	0.125	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P and W to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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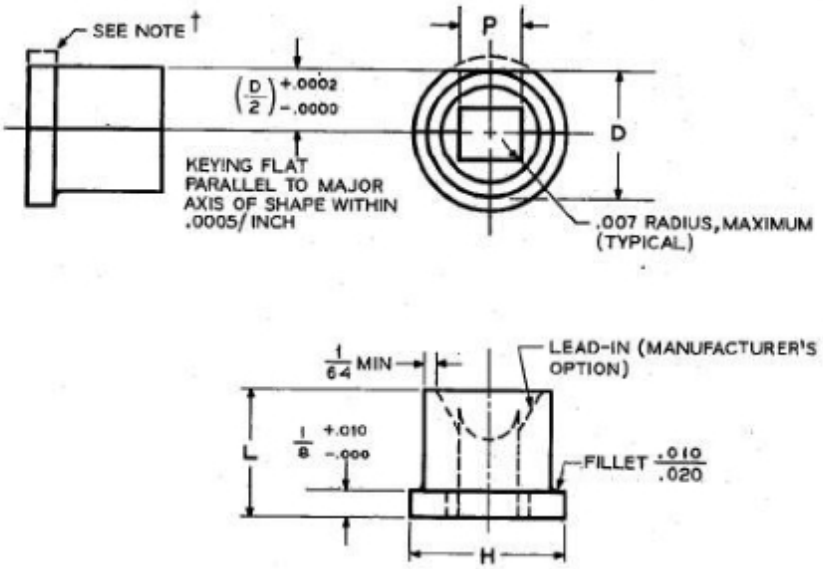


Table 9. Punch Guide Bushing, Variable, Press Fit, Head Down, Split, Square (NAPM No. 31.32)

Nominal Body Dia D	Range of Hole Sizes P	Head Dia H	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.0002 −0.0000	Tolerance +0.000 −0.010	Tolerance +0.020 −0.000		
1/4 (0.250)	0.062–0.120	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.062–0.150	7/16	3/8	1/2	5/8
3/8 (0.375)	0.093–0.180	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.093–0.210	9/16		1/2	5/8
1/2 (0.500)	0.125–0.243	5/8		1/2	5/8
5/8 (0.625)	0.125–0.300	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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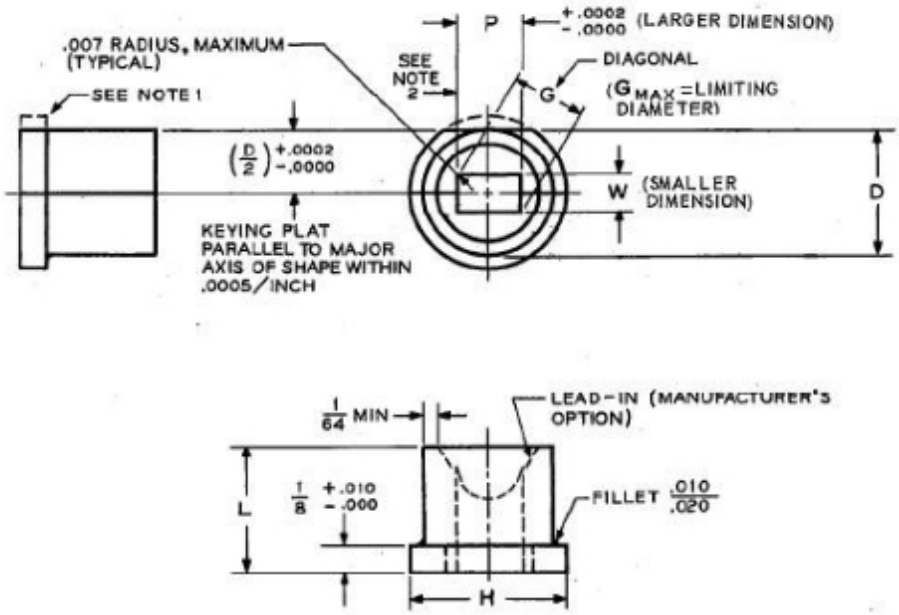


Table 10. Punch Guide Bushing, Variable, Press Fit, Head Down, Split, Rectangular (NAPM No. 31.33)

Nominal Body Dia D	Range of Hole Sizes		Head Dia H	Overall Lengths L		
	G(max)	W(min)				
Tolerance +0.0002 +0.0004		Tolerance +0.0002 −0.0000	Tolerance +0.000 −0.010	Tolerance +0.020 −0.000		
1/4 (0.250)	0.170	0.062	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.212	0.062	7/16	3/8	1/2	5/8
3/8 (0.375)	0.255	0.093	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.297	0.093	9/16		1/2	5/8
1/2 (0.500)	0.344	0.125	5/8		1/2	5/8
5/8 (0.625)	0.425	0.125	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P and W to outside dia); 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
1. Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
2. P (larger dimension) must be calculated to stay within the limiting dia (G_{max}) for a given W dimension.

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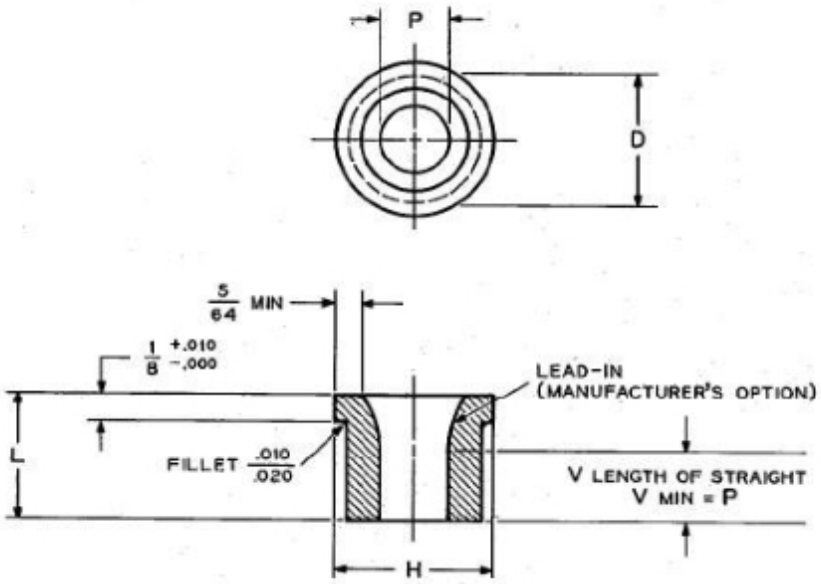


Table 11. Punch Guide Bushing, Variable, Press Fit, Head Up, Round (NAPM No. 31.40)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Range of Hole Sizes P Tolerance +0.0002 −0.0000	Head Dia H Tolerance +0.000 −0.010	Overall Lengths L Tolerance +0.020 −0.000		
1/8 (0.125)	0.031 – 0.046	1/4	3/8		
3/16 (0.1875)	0.046 – 0.128	5/16	3/8	1/2	
1/4 (0.250)	0.062 – 0.170	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.093 – 0.212	7/16	3/8	1/2	5/8
3/8 (0.375)	0.125 – 0.255	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.187 – 0.297	9/16		1/2	5/8
1/2 (0.500)	0.212 – 0.344	5/8		1/2	5/8
5/8 (0.625)	0.293 – 0.425	3/4			5/8

All dimensions given in inches.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (inside to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0005 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).

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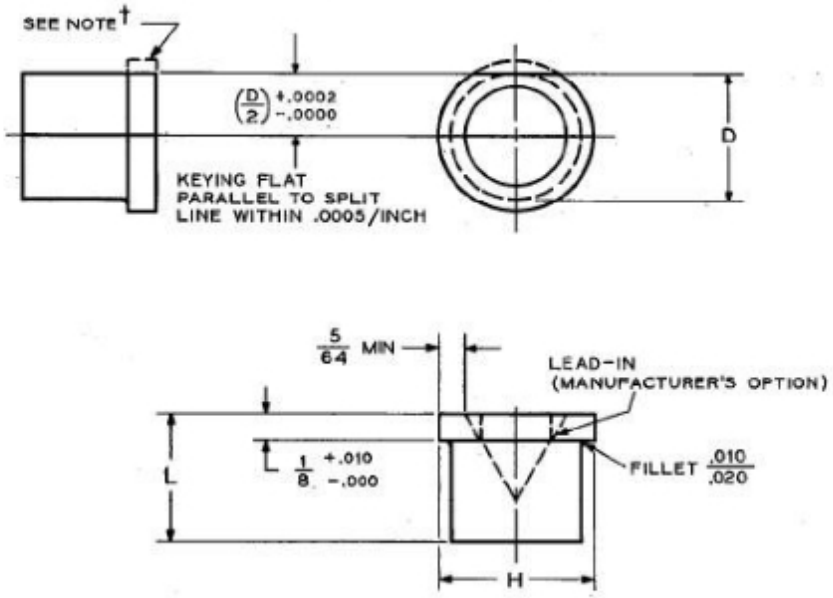


Table 12. Punch Guide Bushing, Variable, Press Fit, Head Up, Split, Blank (NAPM No. 31.50)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Head Dia H Tolerance +0.000 −0.010	Overall Lengths L Tolerance +0.020 −0.000		
1/4 (0.250)	3/8	3/8	1/2	5/8
5/16 (0.3125)	7/16	3/8	1/2	5/8
3/8 (0.375)	1/2	3/8	1/2	5/8
7/16 (0.4375)	9/16		1/2	5/8
1/2 (0.500)	5/8		1/2	5/8
5/8 (0.625)	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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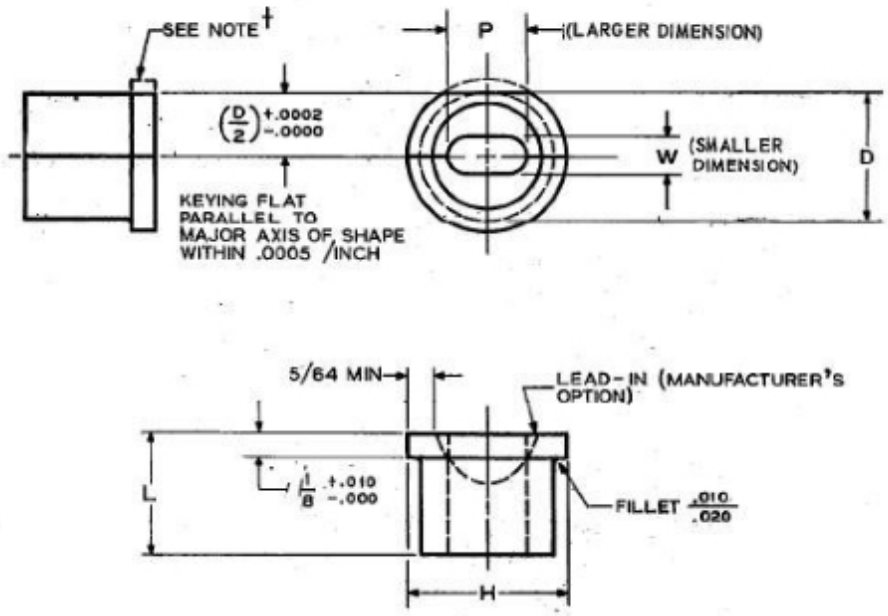


Table 13. Punch Guide Bushing, Variable, Press Fit, Head Up, Split, Oblong (NAPM No. 31.51)

Nominal Body Dia D	Range of Hole Sizes P(max)	Range of Hole Sizes W(min)	Head Dia H	Overall Lengths L		
Tolerance +0.0002 +0.0004	Tolerance +0.0002 −0.0000	Tolerance +0.0002 −0.0000	Tolerance +0.000 −0.010	Tolerance +0.020 −0.000		
1/4 (0.250)	0.170	0.062	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.212	0.062	7/16	3/8	1/2	5/8
3/8 (0.375)	0.255	0.093	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.297	0.093	9/16		1/2	5/8
1/2 (0.500)	0.344	0.125	5/8		1/2	5/8
5/8 (0.625)	0.425	0.125	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P to outside dia), 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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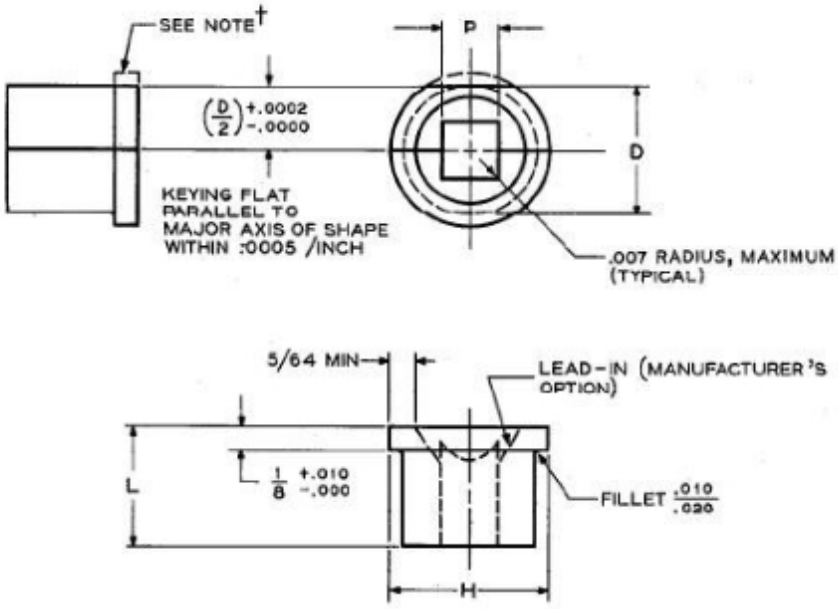


Table 14. Punch Guide Bushing, Variable, Press Fit, Head Up, Split, Square (NAPM No. 31.52)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Range of Hole Sizes P Tolerance +0.0002 −0.0000	Head Dia H Tolerance +0.000 −0.010	Overall Lengths L Tolerance +0.020 −0.000		
1/4 (0.250)	0.062 – 0.120	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.062 – 0.150	7/16	3/8	1/2	5/8
3/8 (0.375)	0.093 – 0.180	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.093 – 0.210	9/16		1/2	5/8
1/2 (0.500)	0.125 – 0.243	5/8		1/2	5/8
5/8 (0.625)	0.125 – 0.300	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P to outside dia) 0.0003 T.I.R. (max).
Taper: Hole (P) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
†Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.

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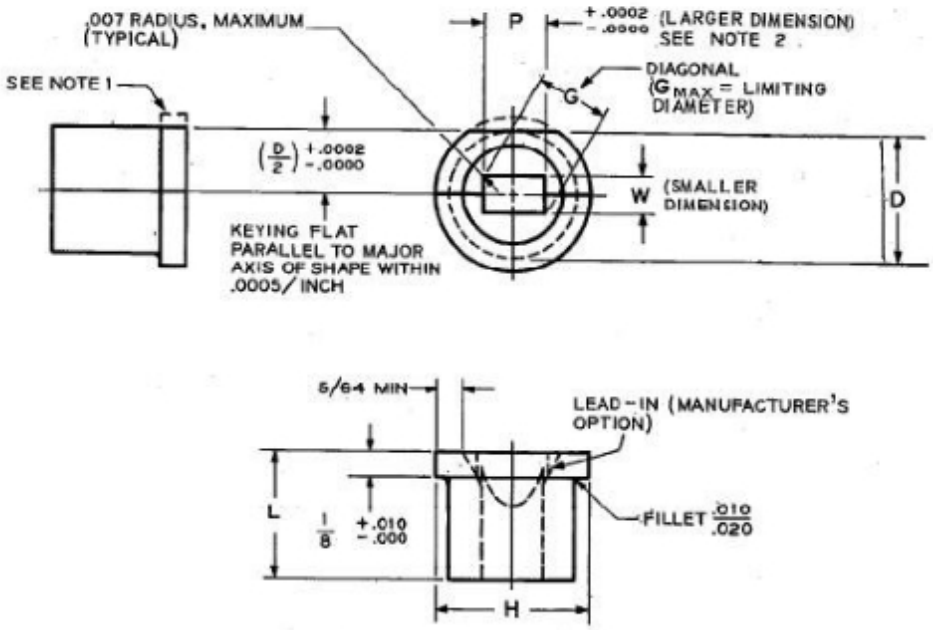


Table 15. Punch Guide Bushing, Variable, Press Fit, Head Up, Split, Rectangular (NAPM No. 31.53)

Nominal Body Dia D Tolerance +0.0002 +0.0004	Range of Hole Sizes $G_{(max)}$	 W(min) Tolerance +0.0002 −0.0000	Head Dia H Tolerance +0.000 −0.010	Overall Lengths L Tolerance +0.020 −0.000		
1/4 (0.250)	0.170	0.062	3/8	3/8	1/2	5/8
5/16 (0.3125)	0.212	0.062	7/16	3/8	1/2	5/8
3/8 (0.375)	0.255	0.093	1/2	3/8	1/2	5/8
7/16 (0.4375)	0.297	0.093	9/16		1/2	5/8
1/2 (0.500)	0.344	0.125	5/8		1/2	5/8
5/8 (0.625)	0.425	0.125	3/4			5/8

All dimensions given in inches.
This bushing consists of two identical halves.
Material: Tool steel.
Hardness: Rockwell C60-63.
Concentricity: Hole to body (P and W to outside dia) 0.0003 T.I.R. (max).
Taper: Hole (P and W) straight to 0.0002 per inch max (lead-in end large).
Body: Straight to tapered within dia tolerance (head end large).
1. Keying flat to be optional with user and/or manufacturer. If "standard keying flat" is specified, it is to be as shown.
2. P (larger dimension) must be calculated to stay within the limiting dia (G_{max}) for a given W dimension.

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USA STANDARDS FOR MACHINE TOOLS AND CUTTING TOOLS

TITLE OF STANDARD	
T-Slots, Their Bolts, Nuts, Tongues, and Cutters	B5.1–1949
Milling Cutters	B5.3–1960
Rotating Air Cylinders and Adapters	B5.5–1959
Jig Bushings	B5.6–1962
Circular and Dovetailed Forming Tool Blanks	B5.7–1954
Chucks and Chuck Jaws	B5.8–1954 (Reaffirmed 1959)
Spindle Noses for Tool Room Lathes, Engine Lathes, Turret Lathes, and Automatic Lathes	B5.9–1967
Machine Tapers	B5.10–1963
Spindle Noses and Adjustable Adapters for Multiple Spindle Drilling Heads	B5.11–1964
Involute Splines, Serrations and Inspection	B5.15–1960
Accuracy of Engine and Tool Room Lathes	B5.16–1952
Markings for Identifying Grinding Wheels and Other Bonded Abrasives	B5.17–1958
Spindle Noses and Arbors for Milling Machines	B5.18–1960
Life Tests of Single-Point Tools	B5.19–1946 (Reaffirmed 1953)
Machine Pins	B5.20–1958
Die Sets	B5.25–1968
Drill Drivers	B5.27–1959
Mounting Dimensions of Lubricating and Coolant Pumps for Machine Tools	B5.28–1958
Designation and Working Ranges of Grinding Machines	B5.32 & 33–1953
Life Tests for Single-Point Tools of Sintered Carbide	B5.34–1956
Machine Mounting Specifications for Abrasive Discs and Plate Mounted Wheels	B5.35–1969
Driving and Spindle Ends for Portable Air and Electric Tools	B5.38–1958
Spindle Flanges for Precision Boring Machines	B5.39–1961
Spindle Noses and Tool Shanks for Horizontal Boring Machines	B5.40–1962
Blanks and Semi-Finished Blanks for Solid Carbide Taps	B94.1–1964
Reamers	B94.2–1964
Straight Cut-Off Blades for Lathes and Screw Machines	B94.3–1965
Identification System for Throw Away Inserts for Cutting Tools	B94.4–1965
Carbide Blanks and Cutting Tools	B94.5–1966
Knurling	B94.6–1966
Hobs	B94.7–1966
Inserted Blade Milling Cutter Bodies	(Rev. B5.23–1958) B94.8–1967
Taps Cut and Ground Threads	(Rev. B5.4–1959) B94.9–1967
High-Speed Steel and Cast Nonferrous Single-Point Tools and Tool Holders	(Rev. B5.29–1959) B94.10–1968
Twist Drills	(Rev. B5.12–1958) B94.11–1967
Carbide-Tipped Masonry Drills, and Blanks for Carbide-Tipped Masonry Drills	(Rev. B82.1–1962) B94.12–1968
Blanks for Carbide Burs	(Rev. B83.1–1962) B94.13–1968
Punches-Basic Head Type	B94.14–1968
Retainers – Basic Ball-Lock Punch and Die Button, Light and Heavy Duty	B94.16–1968
Gages – Functional, Ball-Lock Punch and Die Button, Light and Heavy Duty	B94.17–1968
Punches – Basic Ball-Lock Light and Heavy Duty	B94.18–1968
Milling Cutters and End Mills	(Rev. B5.3–1960) B94.19–1968
Specifications for Carbide Blanks for Twist Drills, Reamers, End Mills, and Random Rod (Rev. B85.1–1963)	B94.20–1968
Gear Shaper Cutters	B94.21–1968
Punches-Variable Head Type	B94.22–1968
Punch Guide Bushings- Variable Press Fit	B94.23–1969
Heavy Duty Carbide Inserts for Cutting Tools	B94.24–1969

Binders for holding standards are available.

A complete list of USA Standards published by The American Society of Mechanical Engineers obtainable upon request

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