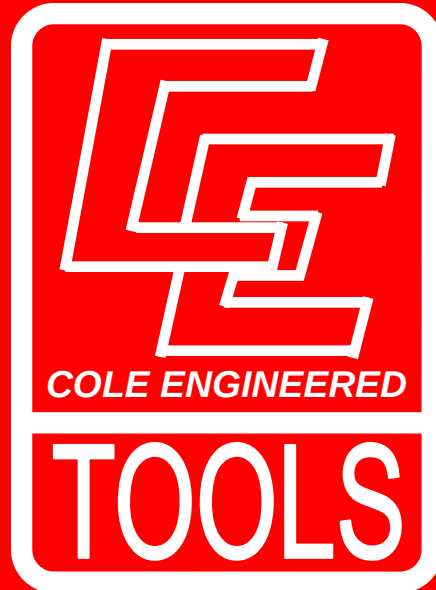


C.E. TOOLING

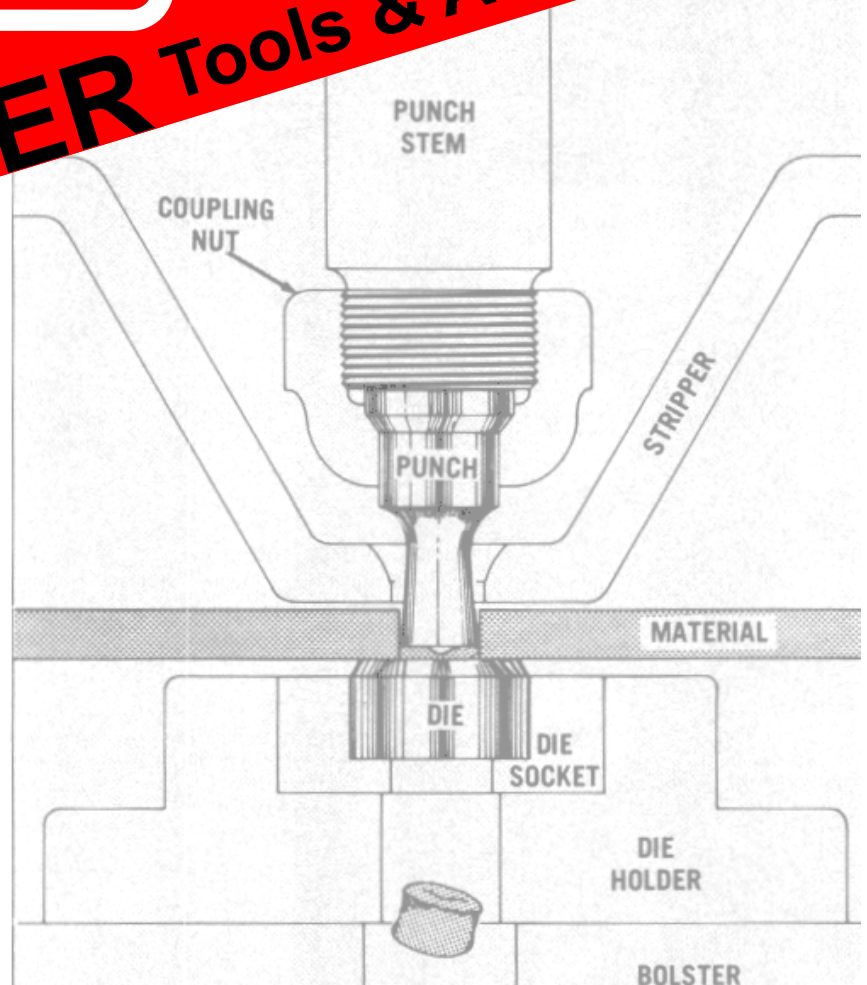
Section

18

Tooling Booklet



IRONWORKER Tools & Accessories



***CE Sells Edwards &
Kingsland See Section 30***

Table of Contents

CE can service all your Ironworker Tooling and many of the Machine parts you may need. Along with many styles of tools and machine parts, we have also teamed up with some of the best names in the industry to offer our customers savings and the convenience of a single source for all of your fabrication requirements!.

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COUPLING NUTS	27
ENERPAC™ SP-3834 Portable Hydraulic Punches	24
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OSHA “SAFETY” WARNING: It is the user’s responsibility that the machine and tooling be set up and used in accordance with OSHA Laws and ANSI B11.5 standards for safety. Do not permit unqualified personnel to set up or operate the machine. Extreme care should be used at all times.

DIE CLEARANCE

Plate $\frac{1}{4}$ " aim for CL. of 10-15% thickness.

Plate $\frac{1}{4}$ to $\frac{1}{2}$ " thick = $\frac{1}{32}$ CL.

Plate $\frac{1}{2}$ " to $\frac{3}{4}$ " thick = $\frac{1}{16}$ CL.

Plate $\frac{3}{4}$ to 1" thick $\frac{3}{32}$ CL.

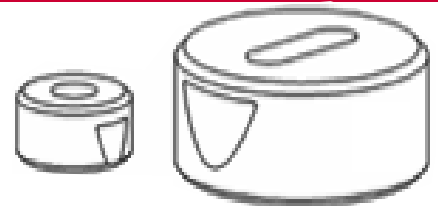
Standard Dies are Fraction Punch Sizes + $\frac{1}{32}$ & $\frac{1}{16}$ ". Note + 80% to standard die cost for non-standard die size or clearances.

Anti-Rotation Locators

5-10° Flat

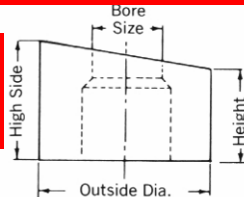
On Rounds add \$10.00

Shaped Notched @ 0 & 90° or 0 & 45° add \$15.00

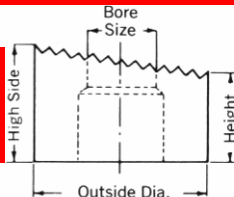


BEVEL DIES SPECIAL PURPOSE

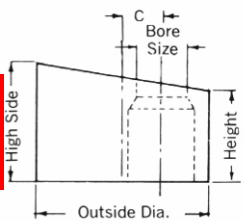
Plain Bevel
Smooth Top
Concentric



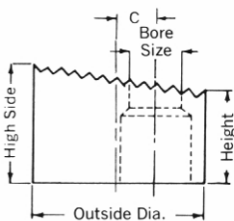
Bevel
Serrated
Saw tooth
Concentric



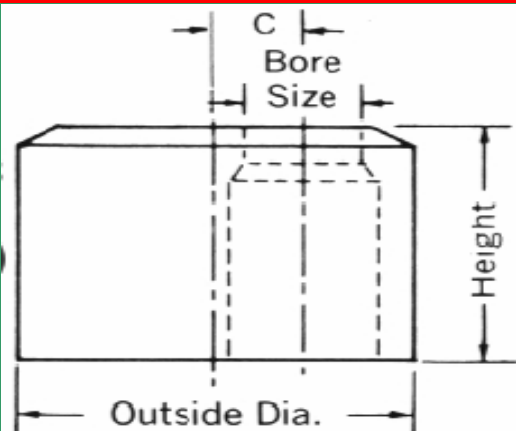
Plain Bevel
Smooth Top
Eccentric



Bevel
Serrated
Saw tooth
Eccentric



OFFSET FLAT TOP



Anti-Rotation Locators for PUNCHES

SINGLE SLOT, CROSS SLOT,
SINGLE GROVED, $\frac{1}{4}w$ $\frac{1}{8}d$

SINGLE



CROSSED



GROVED



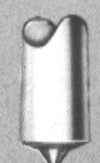
Common Styles Of Punch Faces



FLAT FACE



STRAIGHT EDGE



CROWNED EDGE
(STOCK)



FULL CROWN
(CONICAL SHEAR)



CHISEL POINT
(HOUSE TOP)



CHISEL POINT
WITH CENTER



CRISS CROSS

Catalog Code

IW-fig#-P or D-__shape-Size

Machine Tool Index

ALINDER EQUIPMENT™ See Fabricator

ALVA ALLEN™		
Model ->	25 Ton	
Punch Fig. ->	RW 8	RP See Booklet 5
Die Fig. ->	RPAD	

BATEMAN™	(Bantam, • Lehman)	
Model ->	ALL	
Punch Fig. ->	IW158	With Drill Spot
Die Fig. ->	IW46	

BATEY™	
Model ->	ALL
Punch Fig. ->	IW21
Die Fig. ->	IW59

BEATTY MACHINE™	
Model ->	
Punch Fig. ->	IW9, IW20 or IW26
Die Fig. ->	IW59 or IW62

BELOIT™ See Hendley & Whitmore

BOSCHERT™	
Model ->	XX-45
Punch Fig. ->	28XX See Booklet 5
Die Fig. ->	

BRACEWELL™ See Trojan

BUFFALO™	<i>Page 21</i>								Oversized & Triple Gage Attachment
Model No.->	0	1/2	1½	2½ (prior 1952)	2½ (after 1952)	3½ Universal	3½ Universal Diagonal	4½ Universal	
Punch Fig. ->	IW9	IW664	IW664	IW20	IW3T	IW26	MTO 1203	MTO 1862	MTO
Die Fig. ->	IW200	IW201	IW202	IW203	IW203	IW65	IW65	MTO 1863	MTO

BULLY™	Davco, B&H Tool, Kessington Machine						
Model No.->	M404	M408	M708	Oversized Attachment	Close Gage Line	Optional Attachments	
Punch Fig. ->	IW16			IW26	IW16	28XX or IW770	
Die Fig. ->	IW59			IW62	IW200	28XX or IW740	

CLEAVELAND STEEL™ See Edwards

CONTROLLED AUTOMATION™						
Model No.-	ABL100	PFP115	BFC522	BFC530	115-3	2AT-175
Punch Fig>	IW770				IW3T	IW770, IW7501
Die Fig. -	IW740				IW203 or IW200	IW740, IW7502, MTO7602

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

DAVCO™	See Bully	
Model No.->	M40	M1707
Punch Fig. ->	IW16	IW26
Die Fig. ->	IW59	IW62

DAVIS™	
Model No.->	
Punch Fig.->	IW26
Die Fig. ->	IW62

DVORAK™	See Scotchman
----------------	---------------

EAGLE FABRICATOR™	See Trojan
--------------------------	------------

EDWARDS JAWS IV™		
Model No.->	Small Table	Large Table
Punch Fig. ->	IW16	IW26
Die Fig. ->	IW55	IW62

ENERPAC™			
Model No.->	SP-35	SP-3834	SP-5010
Punch Fig. ->	IW9	IW5	IW16
Die Fig. ->	IW43	IW44	IW59

EXCEL™	
Model No.->	
Punch Fig. ->	IW20
Die Fig. ->	IW59

FABRICATOR™	Alinder Equipment
Model No.->	100 Ton
Punch Fig. ->	IW20
Die Fig. ->	IW59

FABRILINE™ Div of Peddinghaus™					MANCO Also See Peddinghaus										
Model No.->	FP-6	FP12	FP20	FP20-4	FP20-6	FP35	FP35-8	FP35CC	FP-45	FP60	FP80	FP80-8	FP-100	FP100-12	
Punch Fig. ->	IW232	IW242				IW252				IW272 or IW282					
Die Fig. ->	IW231	IW241				IW271		IW241		IW271				IW271 / 281	
Model No.->	FP-140-6-1/4			FP-140-12-1/2			FP-140-12-1/2CC			FP-250-12-1/2			STATIONARY 140		
Punch Fig. ->	IW400											MTO292			
Die Fig. ->	IW401									M-T-O IW403		IW89			
Model No.->	WP-20	WP-35	WP-60	WP-80	WP-100	WP-100-18	WP-100-25			WP-140	WP-140-12-1/2				
Punch Fig. ->	IW242	IW252	IW272, IW282								MTO292	IW400			
Die Fig. ->	RPAD			IW271, IW281								MTO291	IW401		

FABRIPUNCH™	See Peddinghaus
--------------------	-----------------

* Holes to 1-1/4" maximum use a Fig. C-272. Holes 1.251" to 1-1/4" require the use of a Fig. C-282 punch.

FICEP™	Continued On Next Page							
Model No.->	Super 10	Super 10E	Super 13	Super 14	Super 16	ST Super 16	Super 20	UIW-45
Punch Fig. ->	IW16			IW20	IW26	IW20	IW26	IW16
Die Fig. ->	IW46		IW59		IW62	IW59	IW62	IW59

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

FICEP	Continued From Previous Page						
Model No.->	UIW-60	UIW-80	UIW-100	UIW-125	H805	Jolly	Oversized Attachment
Punch Fig. ->	IW16	IW20	IW26	IW48	IW16	M-T-O	M-T-O
Die Fig. ->	IW59		IW62	IW89	IW55	M-T-O	M-T-OI

FRANKLIN MFG.™							
Model No.->	W&F 500	W&F 530	W&F 550	W&F 570	W&F 5100	W&F 5175	F-5275
Punch Fig. ->	IW272	IW242	IW272			IW7501	M-T-O 5250
Die Fig. ->	IW740	RPAD	IW740			IW7502	M-T-O 5250

GABRO™	
Model No.->	
Punch Fig. ->	RP8
Die Fig. ->	RP / 28XX (Refer To Section 5 Booklet)

GAIRU™					
Model No.->	MF10	MF16	MF20	Supreme 13	F-5275
Punch Fig. ->	IW15	IW21		IW12	M-T-O 5250
Die Fig. ->	M-T-O (1-11/16 O.D.)	IW62		IW59	M-T-O 5250

GEKA™	Puma, Hercules							
Model No.->	Microcrop	Minicrop	Maxicrop	Multi 11	11H	13H	16H	20H
Punch Fig. ->	IW16			IW7	IW16		IW20	
Die Fig. ->	IW59			IW43	IW55 OR IW59		IW59	

Model No.->	25H	CEP11	CEP13	CEP16	CEP20	HYD Models 50, & 70	HYD 80 & 100
Punch Fig. ->	IW26	IW16		IW20		IW16	IW20
Die Fig. ->	IW89	IW59					

Model No.->	HYD.150	HYD.200	PP50	PUMA 11	PUMA 13	PUMA 16	PUMA 20	PUMA 50H
Punch Fig. ->	IW26		IW16			IW20		IW16
Die Fig. ->	IW89		IW59					

Model No.->	PUMA 100H	PUMA 150H	PUMA 200H	Triple Gag -all	4" Oversized Attachment
Punch Fig. ->	IW20	IW26		IW7 or M-T-O	GIW0S1,GIW0S2,GIW0S3
Die Fig. ->	IW59	IW89		Spec.Die 1-3/8OD	GIW0S1,GIW0S2,GIW0S3

HMI™	Hydraulic Machines, Inc.											
Model No.->	35-07	35-14	35-19	35DT-19	35DT-20	42-20	50-07	50-14	50-19	50DT-19	50DT-20	50-25
Punch Fig. ->	IW16								IW26			
Die Fig. ->	IW59								IW62			

Model No.->	50-31	58-20	70-14	70-25	70-31	90-14	90-25	90-31	110-14	100-25	100-31	130-14	130-25
Punch Fig. ->	IW26												
Die Fig. ->	IW62												

Model No.->	130-31	5010-2500	7010-25	9010-25	Oversized Attachment	Optional Attachment
Punch Fig. ->	IW26				28XX,IW50,52, 53 or 54	IW770, 740, SR20, H-1 or H-2
Die Fig. ->	IW62				28XX	IW740, H-1 or H-2

HTC™	
Model No.->	
Punch Fig. ->	IW20
Die Fig. ->	IW59

HAWTHORNE™					
Model No.->	50 Ton	70 Ton	90 Ton	100 Ton	Oversized Attachment
Punch Fig. ->	IW16				IW26
Die Fig. ->	IW55				IW62

HELLER™						
Model No.->	403	404	604	805	1105	AL-48
Punch Fig. ->	IWH1P				IWH2P	IW13
Die Fig. ->	IWH1D				IWH2D	IW51

**Coupling Nuts
Available For Most
Machines • Call for
Part Number And
Availability!**

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Machine Tool Index (Cont.)

HENDLEY & WHITMORE™														<i>Beloit</i>				
Model No.->	51		52	53	54	55		55-½										
Punch Fig. ->	IW7			IW12			IW20		IW26									
Die Fig. ->	IW46				IW59				IW62									
HERCULES™														<i>Geka</i>				
Model No.->																		
Punch Fig. ->	IW20																	
Die Fig. ->	IW62																	
HILL ACME™		Kling Division																
Model No.->	3 Comb.	3-A	3 Hyd	4	4A	5	6	6A	7	7A	MW30	MW50	1½Oversize Attachment	2¼Oversize Attachment				
Punch Fig. ->	IW7	IW20	IW12	IW20				IW26	IW26, 50		IW12	IW20	IW26	IW50				
Small Jaw ->	IW41								IW46				IW59	IW62	IW91mm			
Large Jaw ->	IW46				IW59				IW62	IW62,91mm								
Stake Jaw	-	IW46	-	-	IW46													
HILLS & JONES™																		
Model No.->									H&J5		H&J6		H&J7					
Punch Fig. ->									IW12		IW20		IW26					
Die Fig. ->									IW59		M-T-O							
HONEOYE IND.™										See Inflation Fighter								
HOUGEN-OGURA™																		
Model No.->	75001				75002		75003			75004		75005		75006				
Punch Fig. ->	IWP001				IWP002		IWP002,IWP003			IWP004		IWP005		IWP006				
Die Fig. ->	IWD001				IWD002		IWD002, IWD003			IWD004		IWD005		IWD006				
INFLATION FIGHTER™										Honeoye Industries								
Model No.->	IF-20								IF-25		IF-45		IF-65					
Punch Fig. ->	IW20								IW26									
Die Fig. ->	IW59								IW62									
IRONCRAFTER™										Springwater								
Model No.->	Up To 95 Ton				120 Ton & Up			2¼ Oversize Attachment			28XX Attachment							
Punch Fig. ->	IW20 or IW21				IW26			IW50			28XX							
Die Fig. ->	IW59				IW62			IW91mm			28XX							
J.F. KIDDER™																		
Model No.->	56 Series								DP Series									
Punch Fig.->	AP-3				IW4				BP-3			IW4						
	AP-4				IW10				BP-4			IW10						
	AP-4				O.S. M-T-O				BP-4			O.S. M-T-O						
	APSS				M-T-O				BPSS			M-T-O						
Die Fig. ->	AD-3				IW46				BD-3			M-T-O 7/8OD						
	AD-4								BD-4			IW46						
	AD-3-7/16				M-T-O 3.437OD				BD-3-7/16			M-T-O 3.437OD						
									BD-4-5/8			M-T-O 4.625OD						
									BD-5-15/16			M-T-O 5.937OD						
KINGSLAND™																		
Model No.->																		
Punch Fig. ->	IW20 & IW26 Sleeve Included																	
Die Fig. ->	IW62																	

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

KLING IRONWORKER™ See Hill Acme

LANSING™ See Omera

MAGNUM™	
Model No.->	
Punch Fig->	IW16 OR IW23
Die Fig. ->	IW59

MANCO™ See Fabriline Div. Of Peddinghouse

MEGAWORKER™							
Model No.->	MW35	MW60	MW86	SEP35	SEP60	SEP86	Oversized Attachment
Punch Fig. ->	IW16	IW26	IW16	IW26	IW26	IW26	28XX
Die Fig. ->	IW55	IW62	IW55	IW62	IW62	IW62	28XX

METAL FABRICATING SYSTEMS™							
Model No.->	Bar Line	100 Ton Portables	105 Beam-line	106 Beamline	Series 250	Series 250 Angleline < 2½ Angle	Series 250 Angleline 2½ & > Angle
Punch Fig. ->	IW20	IW770	IW740	IW770	IW770	IW740	IW770
Die Fig. ->	IW59	IW740	RPAD	IW740	RPAD	RPAD	IW740

METAL MUNCHER™								
Model No.->	MM35	MM49	MM61	MM61E	MM90	MM90C	MM110	GB35
Punch Fig. ->	IW16	IW26	IW26	IW26	IW26	IW26	IW26	IW16
Die Fig. ->	IW59	IW62	IW62	IW62	IW62	IW62	IW62	IW59

Model No.->	GB50	GB60	GB86	GB90	GB110	Oversized Attachment	Optional Attachment
Punch Fig>	IW26	IW26	IW26	IW26	IW26	28XX	IW770
Die Fig. ->	IW62	IW62	IW62	IW62	IW62	28XX	IW740

MIDWEST MFG.™	
Model No.->	
Punch Fig->	IW20 Or IW26
Die Fig. ->	IW59 Or IW62

MUBEATM	Page 22															
Model No.->	BF-10	0	1/2	1-1/2	2-1/2	3-1/2	KL33	48-4	50	50-4	71	71-5	88	88-6	110	110-7
Punch Fig. ->	BF-10	IWH1P			IWH2P	IWH2P,H3	IW866								IW868	IW868, 870
Die Fig. ->	IWH1D				IWH2D	IWH2D,H3	IW867								IW869	IW869, 871

Model No.->	143	143-8	250	350	400	450	500	500/610	50	PROFI 500	560	600	750+800
Punch Fig. ->	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P	IWH2P, IWH3P
Die Fig. ->	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D	IWH2D, IWH3D

Model No.->	900	1000+	1000/610	1100	1300	Oversized Attachment
Punch Fig. ->	IWH2P or IWH3P	IWH2P or IWH3P	IWH2P or IWH3P	IWH2P or IWH3P	IWH2P or IWH3P	M-T-O Punch
Die Fig. ->	IWH2D or IWH3D	IWH2D or IWH3D	IWH2D or IWH3D	IWH2D or IWH3D	IWH2D or IWH3D	M-T-O Die

NITTO KOHKI™						
Model No.->	A05-1018	A06-1322	A07-1624A	A11-1624A	SC05	S06-0318
Punch Fig. ->	IW813	IW813	IW813	IW813	IW813	mini punch
Die Fig. ->	M-T-O	IW51	IW51	IW51	IW51	M-T-O

OMERA™		Lansing					
Model No.->	OM 1/2	M-10 Hydro	13-45S	16-70S	20-95S	115-35S	Oversize Attachment
Punch Fig. ->	IW20	IW20	IW20	IW20	IW20	IW20	M-T-O
Die Fig. ->	IW59	IW59	IW59	IW59	IW59	IW59	M-T-O

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

OMES/PROMACO™				
Model No.->	CH-50	CH-70	CH-100	Oversize Attachment
Punch Fig. ->	IW16	IW20		28XX
Die Fig. ->	IW55	W59		28XX or IW94

PANELMASTER™	See Whitney Booklet 25
---------------------	------------------------

PEDDINGHAUS™		Also See Fabriline Div. Of Peddinghaus Page 25											
Model No.->	Peddy	Peddy E	Forax 15E	Forax 25E	Forax 45	Forax 65	Forax 80	Forax 100	210/11	210/13	210/16		
Punch Fig ->	Peddy				IW12		IW815		IW12		IW20		
Die Fig. ->	Peddy				IW55			IW835		IW55		IW59	
Model No.->	210/20	210/25	225/11	225/13	225/16	225/20	225/25	225B45	225B60	225B80	225B130	450M	
Punch Fig ->	IW20	IW26	IW12		IW20		IW26	IW12		IW20		IW12	
Die Fig. ->	IW59	IW62	IW55		IW59		IW62	IW55		IW59		IW55	
Model No.->	31/44H	44/66H	66/110H	88/120	110/175H	120/185	275H	300H	Bradley 500,700,1100		360H	400H	440
Punch Fig ->	IW12			IW20			Peddy	IW20			IW12		
Die Fig. ->	IW55			IW59									IW55
Model No.->	550	660	880	881	H-40	H-60N	H-100	H-140	H-1000	H-1000GA	1100-G	1100-H	H1400
Punch Fig ->	IW12		IW20		IW12		IW20	26	IW20			IW26	
Die Fig. ->	IW55		IW59		IW55		IW59	65	IW59			IW62	

ANGLEMASTER, BEAMLINES, DUPLICATORS AND FABRIPUNCHES						
Model No.->	Anglemaster	Beam Fabricator	7130 Duplictor	118 Fabripunch	1120 Fabripunch	
Punch Fig ->	IW274			IW272 or IW282		
Die Fig. ->	IW273		RPBD, IW281	IW271F	IW271F or IW291F	
Model No.->	1154 Fabripunch	1154-30 Fabripunch	FBP 500/3	2000CNC, BPL 1000/5	3PFP	
Punch Fig ->		IW272 or IW282		IW272	IW19L	
Die Fig. ->		IW271F, IW275F or IW291F, IW293F	IW271F,291F	IW271F	IW59 W/45° Bevel	
Holes to 1¼ maximum use a C-272. Holes 1.251-1.5" require use of C-282 Punch						

PELS™		
Model No.->	13	16
Punch Fig. ->		IW12
Die Fig. ->	1-37/64OD	1-31/32OD or IW847

PIRANHA™														
Model No.->	P36 (P-2)	P36 (P-2) 1½ O.S.	P-50 (P-3)	P-50 (P-3) 1½ O.S.	P-70	P-90 (P-4)	P-120	SEPP 35	SEPP 65	SEPP 88	SEPP 120	P11-35	P11-65	P11-88
Punch Fig. ->	IW16	IW26	IW16		IW26			IW16		IW26		IW16		IW26
Die Fig. ->	IW55	IW62	IW55		IW62			IW55		IW62		IW55		IW62

PIRANHA™	28XX Oversized Attachment available for all models except P-36 (P-2)
-----------------	--

POWER TEAM™	
Model No.->	
Punch Fig->	IW5
Die Fig. ->	IW44

PROMACO™	See Omes
-----------------	----------

PROFEL™			
Model No.->	PC 120	PC 200	PP 3000
Punch Fig. ->		IW16	Old Machine PP 3000 IW740
Die Fig. ->		IW740	RPAD M-T-O W/Flange

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

PUMA™

See GEKA

ROPER WHITNEY™

Model No.->	5JR	XX	7	7-1/2	8	10	12	15				16	17	20	CTL20			
Punch Fig. ->	RW 5*	RW XX#	RW 7*	PR8		IW710P		RP8*,RPGP*,28XX				RW 16*	RW 17*	IW720				
Die Fig. ->	RW 5*	RW 7#	RW 7*		RW 8*	IW710D		28XX				RPAD			RPAD			
Model No.->	24	25	40	29	32	34	58	68	118	127	129	130	150	218	230	231	811	GP308
Punch Fig. ->	IW720	IW740	RP8, RPGP, 28XX													IW720		
Die Fig. ->	RPAD	IW740	28XX													RPAD		
Model No.->	GP313	GP323	HP512A	HP13	HP514	HPT20	HPT20X6	HPT22	HP535	HP535X35	HP550	HP550X10						
Punch Fig ->	IW720	IW740																
Die Fig. ->	RPAD	IW740																

ROTEX™

Page 26 CE-Mfg. is also a Rotex Dealer

Model No.->	18A	18AH	18B	18BCH	18C			20C	18CH	R-12
Punch Fig. ->										(*A101) Special Punch same for all machines
Die Fig. ->										(*A201) Special Die same for all machines

J.T.RYERSON™

Model No.->	
Punch Fig.->	IW7
Die Fig. ->	IW59

SCOTCHMAN™

Dvorak See Page 21 & 24

Model No.->	207	314C-6	314t (3688A)	4014CM	4014TM	4060B	5024	5075-24M	6509-24M	7012-24	M9012-24M
Punch Fig. ->				IWSP20					IW20		
Die Fig. ->				IW155					IW59		
Model No.->	9075-24	12012-24M		FI-5009-14M		FI-6008-14M		XL Models		F185/40	
Punch Fig. ->	IW20	IW26				IW20					
Die Fig. ->	IW59	IW65				IW59					
Model No.->	Oversize Attachment No.1			Oversize Attachment No.2			687 Special Die Holder			F185/40	
Punch Fig. ->	IW26			2" Straight Shank			-			IW20	
Die Fig. ->	IW65			IW71 or 6"X6" Sq. Die			2-5/8"OD X 7/8High			IW59	

SEGMA™

Model No.->	
Punch Fig.->	IW20
Die Fig. ->	IW59

SIZOR™

Memory N.C. Beam
Punching Machines

Memory N.C. Angle, Channel and Flat
Stock Fabricators

Hydraulic Structural
Presses

Model No.->	30,60, & 100 Ton	60 & 100 Ton	30 Ton	60 & 100 Ton
Punch Fig.->	M-T-O 4491	IW770	IW740	IW770
Die Fig. ->	IW740	IW740	RPAD	IW740

SON TAG™

Model No.->	
Punch Fig.->	IW16
Die Fig. ->	IW59

SPRINGWATER™

See Ironcrafter

STONEGATE™

Model No.->	10W1250	10F1250	20W1250	20F1250	20W21250	20F21250	30F21250	30F2750	40F21250	40F2750
Punch Fig. ->	28XX See Tooling Booklet 5									
Die Fig. ->	28XX 1¼ DIE See Tooling Booklet 5									

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

Machine Tool Index (Cont.)

SUMMIT™				
Model No.->	0	1/2	1	1-1/2
Punch Fig->	IW12	IW20	IW23XL	IW17
Die Fig. ->	IW46	IW59	IW52	

TECMA™							
Model No.->	3	3-DS	6	6-S	6-DS	9	Gooseneck Die Holder
Punch Fig->	IW19		IW20		IW26		
Die Fig. ->	IW46		IW59		IW62		

THOMAS™		
Model No.->	All	Oversize Attachment
Punch Fig->	IW16	M-T-O
Die Fig. ->	IW60	M-T-O

TROJAN™		Bracewell, Eagle Fabricator				
Model No.->	3-DS	45 Ton	65 Ton	75 Ton	85 Ton	150 Ton
Punch Fig->	IW19	IW16	IW23			
Die Fig. ->	IW46	IW59				

UNI-HYDRO™											
Model No.->	20-8	30-8	35-14	T40-14	42-14	50-14	65-14	55-24	70-24	120-24	150-24
Punch Fig	IWSR20						IWSR20, IW150 & IW50				
Die Fig. ->	IW155						IW155, IW65, IW71				

VERNET™	
Model No.->	UP40
Punch Fig->	IW16
Die Fig. ->	IW59

W.A. WHITNEY™																		
Model No.->	612	613	614	615A	615E	620	625E	626	627E	630	635A	637A	647A	647B	647C	650	651A	652E
Punch Fig->	28XX Refer to Booklet 5																	
Die Fig. ->	28XX Refer to Booklet 5																	

Model No.->	652-50	653E	653-50	655	705	710	710CC	720	720X4	720X6	721	730	730CC	730X8	730X8CC
Punch Fig->	28XX Ref to Booklet 5				IW710	IW720					IW740				
Die Fig. ->	28XX Ref to Booklet 5				IW710	RPAD	IW710	RPAD				IW740	RPAD	IW740	RPAD

Model No.->	731	750	751	770	771	790	791	750AX6	751AX7	771AX9	790AX6	M790MBL	791AX18	791AX30
Punch Fig->	IW740					IW770=Rounds • IW790XX=Shapes								
Die Fig. ->	RPAD	IW740					IW740D=Rounds • IW790XXD = Shapes							

Model No.->	7150AX6	7150AX12	7151AX12	7250AX12	790MBL & 792MBL	845 Anglematic	7130 Heviplate
					BEAMLINE	(Clipmaster)	Duplicator
Punch Fig->	IW770=Rds IW790XX*, IW7501**			IW770**	IW770 = Rounds • IW790XX=shapes		
Die Fig. ->	IW7502	MTO 7602	IW7502	MTO7602	IW740D or MTO4902=rounds. IW790XXD=shapes		

* Use IW790XX for shapes ** Use IW7501 on hole sizes larger than 1-1/2"

Hand Operated Presses Model					
Model No.->	No. 1	No.2	No.6	No.45	No.91
Punch Fig->	Special	RP8P	RP8P	RP5	Special
Die Fig. ->	Special	RP8D	Special	RP5	Special

WEBB™	
Model No.->	
Punch Fig->	IW16
Die Fig. ->	IW55

WYSONG™		
Model No.->	100	300
Punch Fig->	IW16	IW20
Die Fig. ->	IW41 Rounds IW46 Shapes	IW59

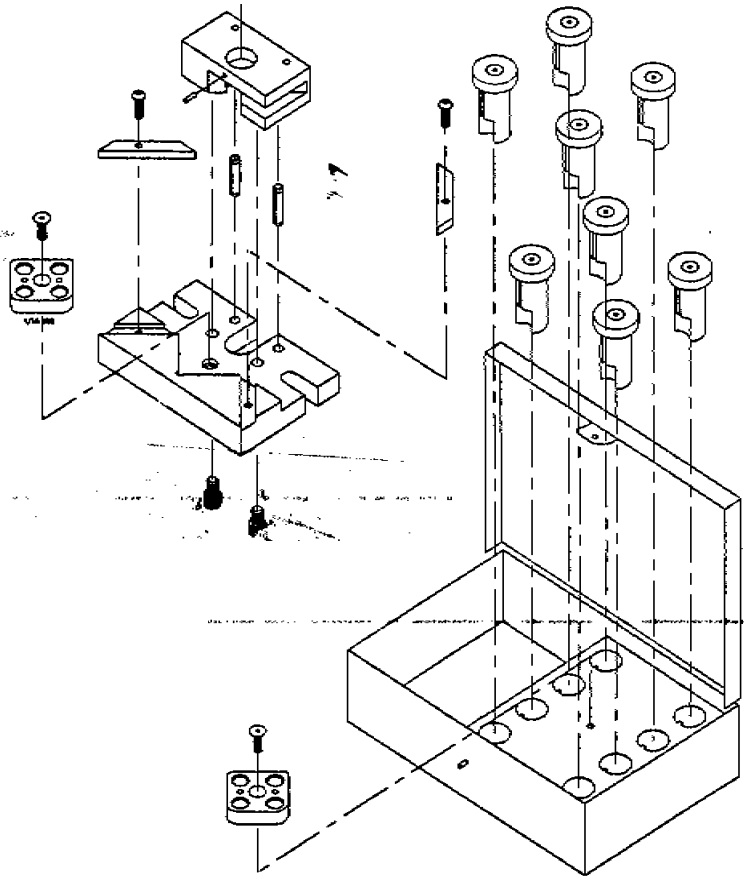
SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies where OEM allows.

Coupling Nuts Available For Most Machines • Call for Part Number And Availability!

CORNER RADIUS KITS

STYLE	KIT NO.	Includes (8) Eight Radius
INCH KIT	*ERK1002	1/16 • 1/8 • 3/16 • 1/4 • 5/16 • 3/8 • 7/16 • 1/2"
METRIC KIT	*ERK1001	2 • 3 • 4 • 5 • 6 • 8 • 10 • 12mm

SPARE PARTS	PART NUMBER
PUNCH	*E-RKP (Size 1/16 or 2)
PUNCH	*E-RKP- (Size)
DIE	*E-RKD (Size)
SPRING	*E-RKS
ALLEN DRIVER	*E-RKAD
LOCATION BLOCK	*E-RKLB
BASE	*E-RKB
GAUGING	*E-RKG-2
METAL BOX	*E-RKBOX



Produce eight (8) different sized radius corners equally and easily.

- *A Self-Contained Unit means fast easy set-up
- *Requires a vertical hit from any type press
- *Radius materials up to 13 gauge mild steel, 10ga for radii >1/4" and material is clamped down, so not to push away from punch.

CE's Corner Radius Kit takes the "Pain" out of corner rounding. This unique, self-contained unit requires only a vertical "hit" from a machine, press brake, etc... (You can use a soft hammer on a bench for short runs) to produce clean corner radii on sheet stock. Precision self-aligning punches and dies makes 30 second changeover common.

Fractional Unit: Cat. Code *E-RK1002

1/16, 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2

Metric Unit: Cat. Code *E-RK1001

2mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm, 12mm

Shut ht. 3 1/8 • Base 5" x 6 1/4
• box 10 1/2 x 6 1/2 • wgt 13 lb.



SPECIAL SHAPED TOOLS

NOTE: Ar, Br, Cr, means a radius value is requested. Further, a .015" Radius is always recommended on corners less than 90 degrees

Unless otherwise noted, dimension call out is Option 1
= theoretical sharp corner.

SP-1 SINGLE "D" STD SHAPE PRICE 	SP-2 30, 60, 90 Degree 	SP-3 HEXAGON STD SHAPE PRICE 	SP-4 OCTAGON STD SHAPE PRICE 	SP-5 	SP-6 TEARDROP 	SP-7 	SP-8 KEYWAY (1) 	SP-9 KEYWAY (2) 	SP-10 KEYWAY (4) 	SP-11 	SP-12 	SP-13 KEYHOLE (1) 	SP-14 KEYHOLE (2) 	SP-15 KEYHOLE (4) 	SP-16 	SP-17 	SP-18 	SP-19 	SP-20 	SP-21 	SP-22 	SP-23 	SP-24 	SP-25 	SP-26 	SP-27 	SP-28 	SP-29 	SP-30 	SP-31 	SP-32 	SP-33 TO APEX 	SP-34 	SP-35 	SP-36 	SP-37 	SP-38 	SP-39 	SP-40 	SP-41 	SP-42 	SP-43 	SP-44 	SP-45 	SP-46 	SP-47 	SP-48 	SP-49 	SP-50 Bow Tie 	SP-51 	SP-53 	SP-54
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For use in Auto Index.

NOTE:
For use in Auto Index.

Sheet & Tool Lubricant

- : Extend life of cutting edge
- : Reduce galling
- : Improve stripping
- : Improve forming results

REDUCED PRICING ON OUR WATER BASED Poly-Form™ LUBRICANT

Place with tooling order of \$500+ and receive additional 25% off our everyday list price!

Use with punching, forming or shearing. To use, simply spray or wipe this premixed lubricant on every 3-6 sheets placed in press.

CLM-50 Formula is an oil base, so may be mixed with kerosene to conserve, or for easier sheet cleaning when plating is to be performed.

If you are trying to keep away from an oil base, our **Poly-Form™** is a **water based soluble polymer** lubricant for CNC turret and high-speed punch presses. It's an excellent lubricant for soft, nonferrous metals such as aluminum, copper or brass, and will protect your nonferrous metals from oxidation, including galvanized and tin-plate. **Clean to work with and doesn't stain skin or clothing or cause dermatitis.**

Size	CLM-50		Poly-Form	
12oz.spray bottle	*ACLM50-12		*Apoly-12	
1 Gallon bottle	*ACLM50-64		*Apoly-64	
4 Gallon case	*ACLM50-4G		*Apoly-4g	
5 Gallon Bucket	N/A		*Apoly-5g	
55 Gallon Drum	N/A		*Apoly-55	

Application	Pre-coating	Blanking & Forming	Draw Forming While Flooding Die	Punching
Dilution	1:1	4:1	4:1	10:1

IRONWORKER PUNCHES

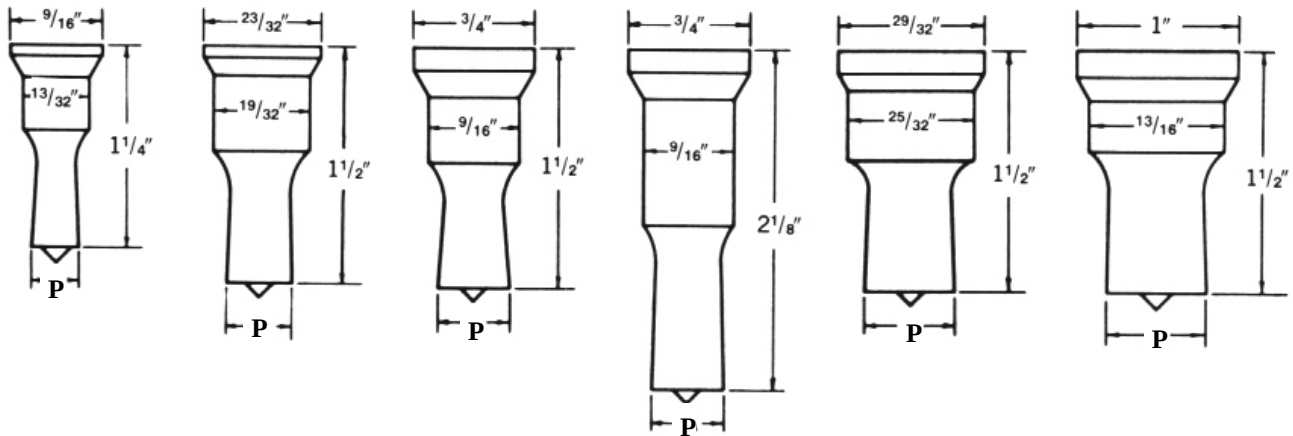


Fig No. IW2
P=1/8"-7/16"

Fig No. IW3
P=1/8"-19/32"

Fig No. IW4
P=1/8"-9/16"

Fig No. IW6
P=1/8"-9/16"

Fig No. IW7
P=1/8"-13/16"

Fig No. IW9
P=1/8"-13/16"

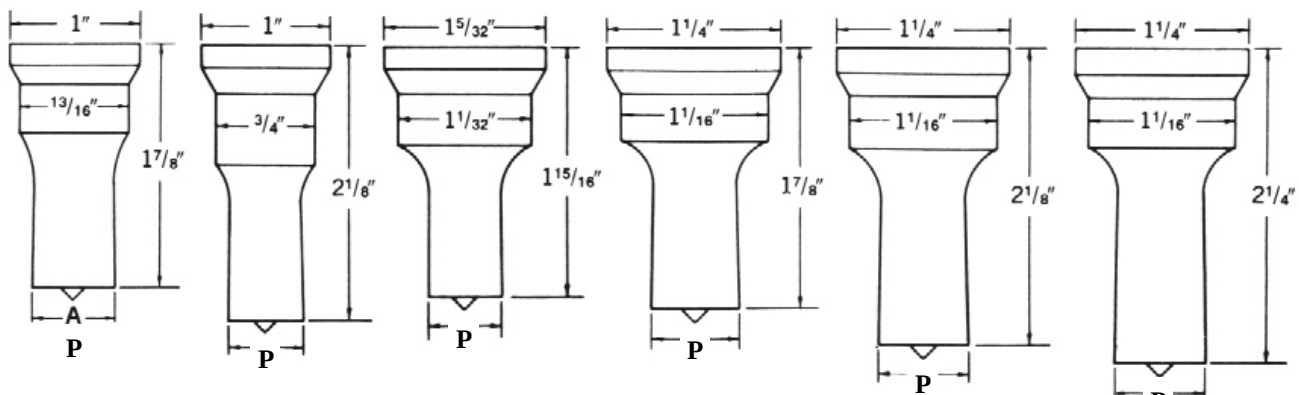


Fig No. IW10
P=3/16"-13/16"

Fig No. IW11
P=3/16"-3/4"

Fig No. IW12
P=1/8"-1-1/16"

Fig No. IW15
P=7/32"-1-1/8"

Fig No. IW16
P=1/8"-1-1/8"

Fig No. IW17
P=3/16"-1-1/8"

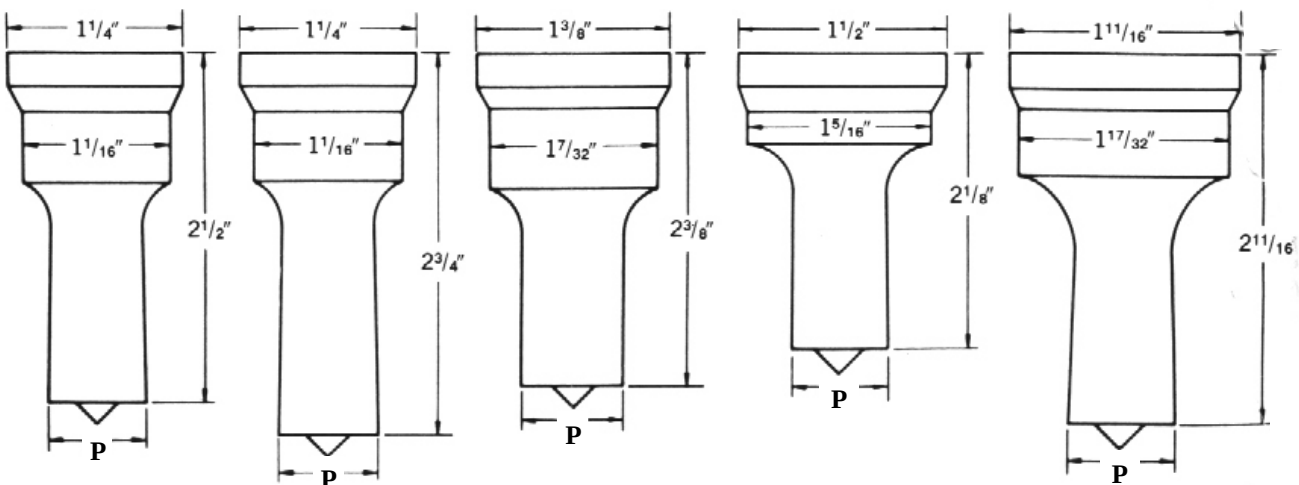


Fig No. IW19
P=3/16"-1-1/8"

Fig No. IW19L
P=5/16"-1-1/16"

Fig No. IW20
P=1/8"-1-1/4"

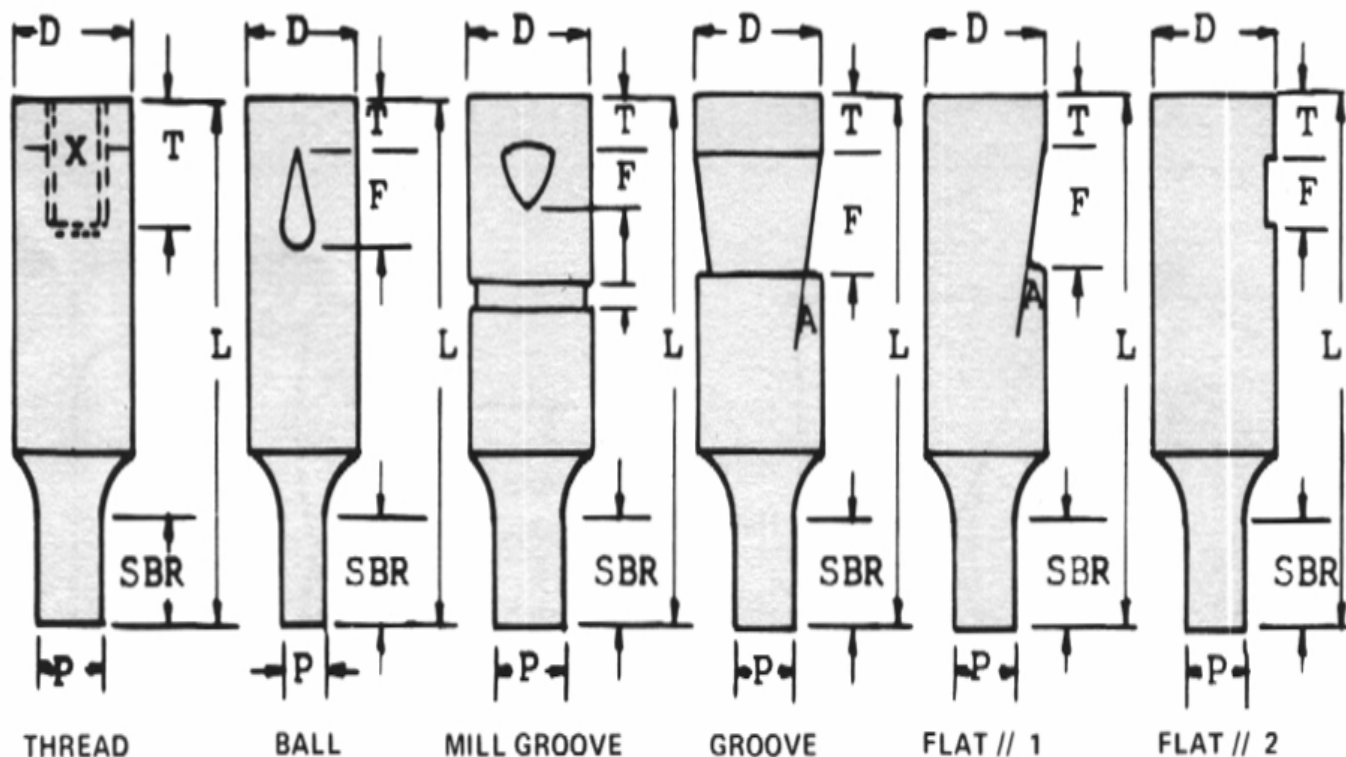
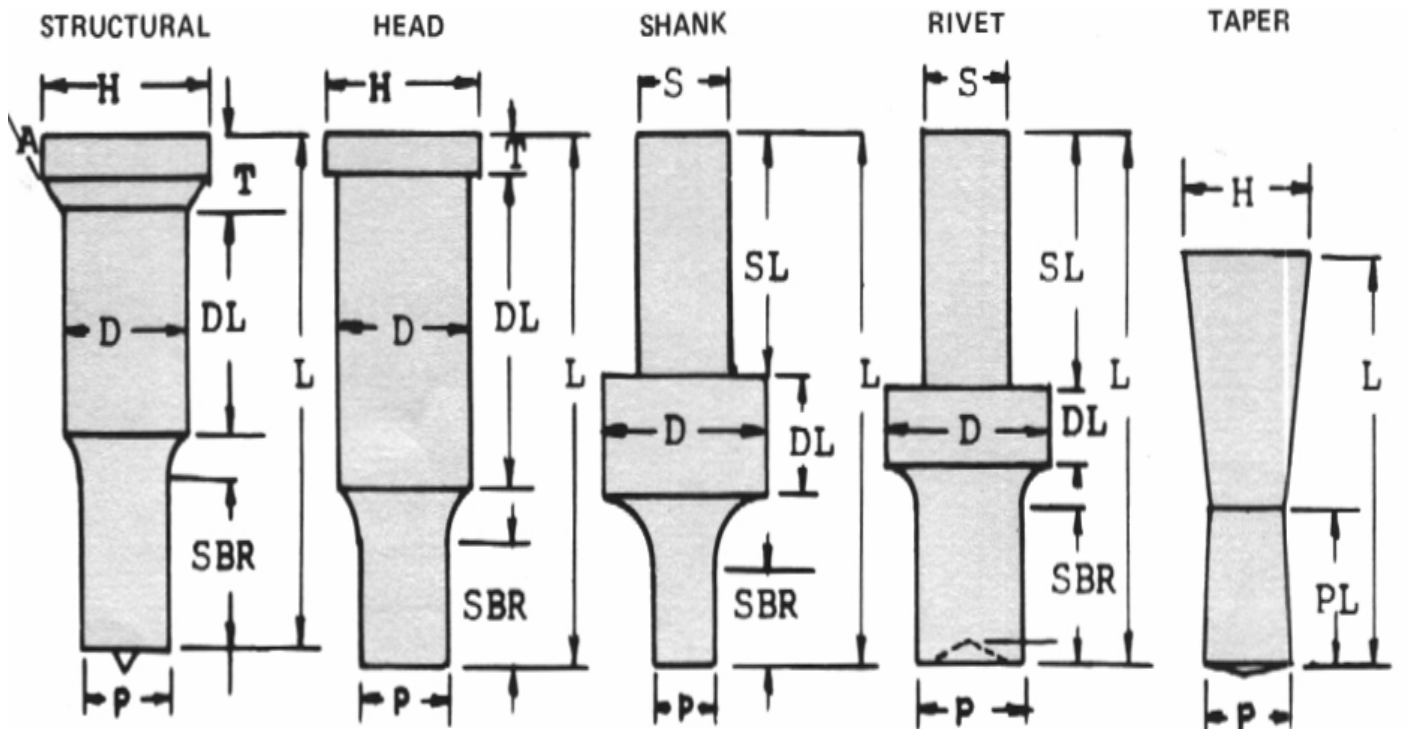
Fig No. IW23
P=1/4"-1-5/16"

Fig No. IW26
P=5/32"-1-9/16"

Fig. No. IW21 Similar
Except 2-5/8" Long

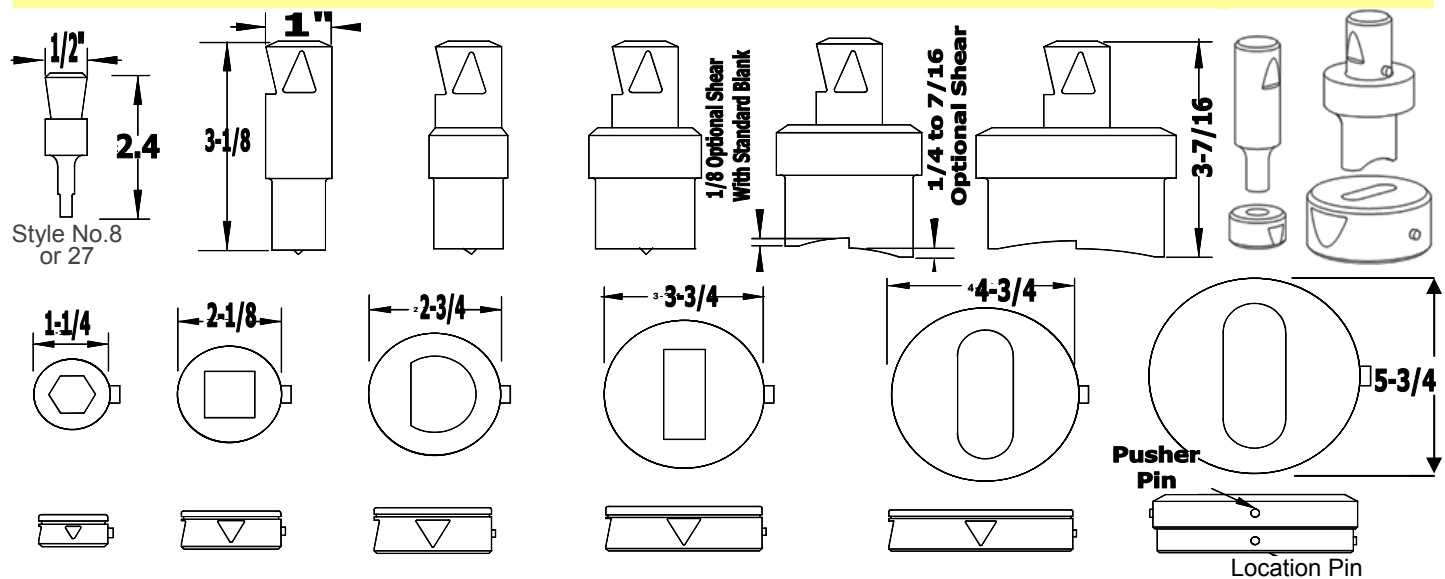
SPECIAL PURPOSE PUNCHES

Below are examples of some of the special purpose punches that can be provided for specific set-up. Fax or E-mail us your specifications per the illustrated style with dimensions for all the call-outs as shown. If the style of punch you require is not shown, fax or E-mail us your drawing and we will quote you accordingly.



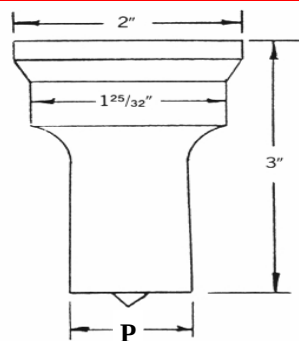
Common Oversize Attachment Tooling

NON-KEYED & KEYED 28XX QUICK CHANGE TOOLS, Go To Booklet 5



Sta. A	Sta. B	Sta. C	Sta. D	Sta. E	Sta. F
Height=5/8"	7/8"	1-5/32"	1-5/32"	1-5/32"	1-5/32"

Heavy Duty Punches



****Fig No. IW48**
13/16 to 1-25/32

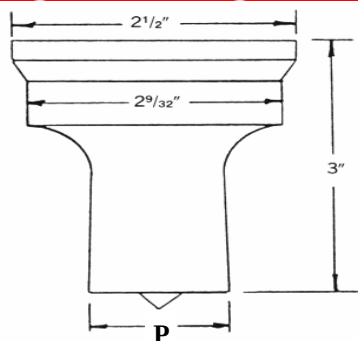
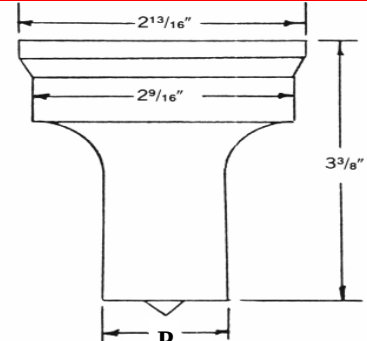
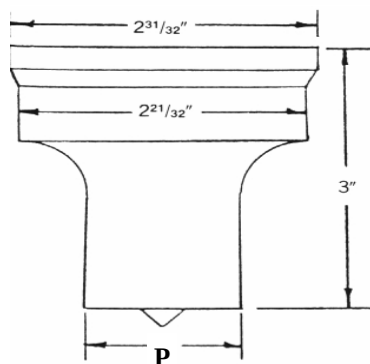


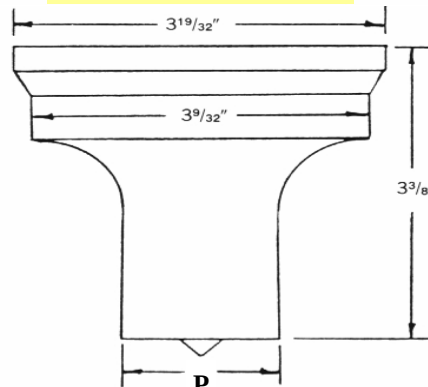
Fig No. IW50
1-1/16 to 2-9/32
(See Page 15 For Stock Sizes)



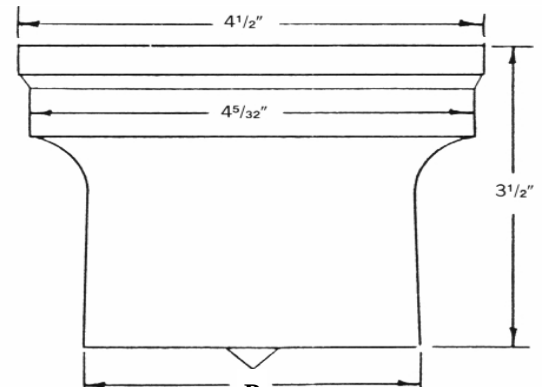
****Fig No. IW51**
13/16 to 2-9/16



****Fig No. IW52**
"P" to 2-21/32



****Fig No. IW53**
"P" to 3-9/32



****Fig No. IW54**
"P" to 4-5/32

**** Designates MADE-TO-ORDER**

STANDARD ROUND SIZES

IW No.	2	3	4	6	7	9	10	11	12	15	16	17	19	19L	20	21	23	26	28	29	30	31	32
Head	9/16	23/32	3/4	3/4	29/32	1	1	1	15/32	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 3/8	1 3/8	1 1/2	1 11/16	1 7/8	1 7/8	2 1/4	2 1/4	2 13/16
Body	13/32	19/32	9/16	9/16	25/32	13/16	13/16	3/4	1 1/32	1 1/16	1 1/16	1 1/16	1 1/16	1 1/16	1 7/32	1 7/32	1 5/16	1 17/32	1 9/16	1 9/16	2 1/16	2 1/16	2 9/16
Length	1 1/4	1 1/2	1 1/2	2 1/8	1 1/2	1 7/8	2 1/8	2 1/8	2 1/4	2 1/2	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 5/8	2 1/8	2 11/16	2 5/8	3 3/8	2 5/8	3 3/8	3 3/8
1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
15/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
19/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
21/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
23/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
25/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
27/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
29/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
15/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
31/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 1/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 1/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 3/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 5/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 3/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 7/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 1/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 9/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 5/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 11/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 3/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 13/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 7/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 15/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 17/32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 9/16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

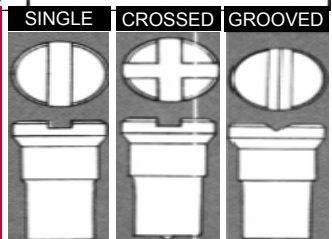
Fig No. IW50

Fig. No.	C-50
Head	2 1/2
Body	2 9/32
Length	3
PUNCH DIAMETER (SIZE)	
1 1/16	•
1 1/8	•
1 3/16	•
1 1/4	•
1 5/16	•
1 3/8	•
1 7/16	•
1 1/2	•
1 9/16	•
1 5/8	•
1 11/16	•
1 3/4	•
1 13/16	•
1 7/8	•
1 15/16	•
2	•
2 1/16	•
2 1/8	•
2 3/16	•
2 1/4	•

STANDARD OBOUND SIZES

IW No.	12	16	20	26
2 1/16X3/4	•	•	•	•
2 1/16X1	•	•	•	•
2 1/32X1 1/16	•	•	•	•
2 1/32X1	•	•	•	•
1 1/2X1 1/2	•	•	•	•
1 1/2X3/4	•	•	•	•
1 1/4X1	•	•	•	•
9/32X3/4	•	•	•	•
9/32X1	•	•	•	•
5/16X1 1/2	•	•	•	•
5/16X3/4	•	•	•	•
5/16X1	•	•	•	•
5/16X1 1/4	•	•	•	•
11/32X1 1/16	•	•	•	•
11/32X1	•	•	•	•
3/8X1 1/2	•	•	•	•
3/8X3/4	•	•	•	•
3/8X1	•	•	•	•
3/8X1 1/4	•	•	•	•
13/32X1 1/16	•	•	•	•
13/32X1	•	•	•	•

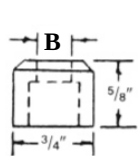
We Recommend Anti-Rotation Locators For All NON-ROUND PUNCHES. Keyways vary by OEM. Contact Factory For Price And Availability.



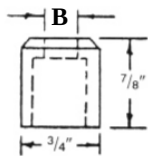
STANDARD SQUARE SIZES
IW 12 IW16 IW20 IW26

Size	IW 12	IW16	IW20	IW26
7/32	•	•	•	•
1/4	•	•	•	•
9/32	•	•	•	•
5/16	•	•	•	•
11/32	•	•	•	•
3/8	•	•	•	•
13/32	•	•	•	•
7/16	•	•	•	•
15/32	•	•	•	•
1/2	•	•	•	•
17/32	•	•	•	•
9/16	•	•	•	•
19/32	•	•	•	•
5/8	•	•	•	•
21/32	•	•	•	•
11/16	•	•	•	•
23/32	•	•	•	•
3/4	•	•	•	•
25/32	•	•	•	•
13/16	•	•	•	•
7/8	•	•	•	•
15/16	•	•	•	•
1	•	•	•	•
1 1/16	•	•	•	•

Ironworker Dies



****Fig No. IW122**
"B" To 3/8"



****Fig No. IW123**
"B" To 3/8"

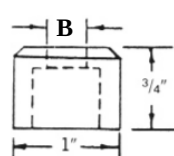


Fig No. IW41
5/32" to 3/4"

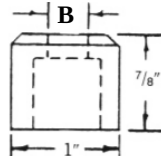
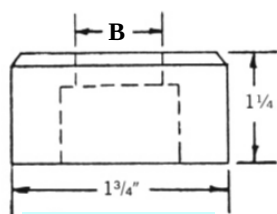
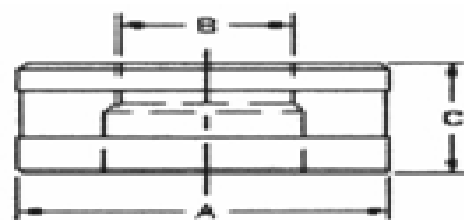


Fig No. IW42
5/32" to 3/4"



****Fig No. IW52**
"B" To 1-1/4"

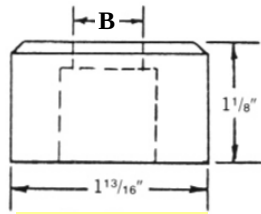


Fig No. IW55
5/32" to 1-3/8"

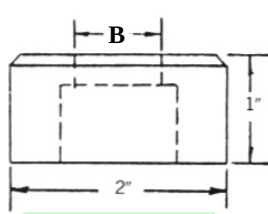
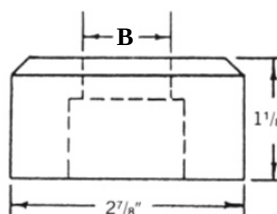
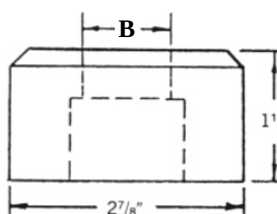


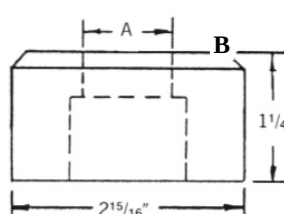
Fig No. IW59
5/32" to 1-7/16"



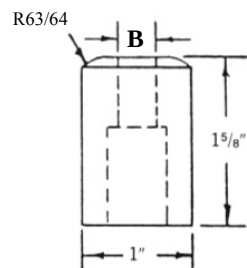
****Fig No. IW88**
"B" To 2-3/8"



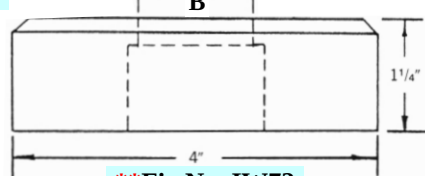
****Fig No. IW89**
"B" To 2-3/8"



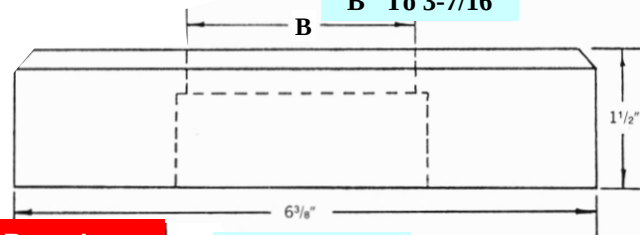
****Fig No. IW90**
"B" To 2-3/8" *Made-To-Order*



****Fig No. IW120**
Culvert Die



****Fig No. IW72**
"B" To 3-7/16"



****Fig No. IW96**
"B" To 5-3/8"

IW91mm Round
(See page 17 For Dimensions)

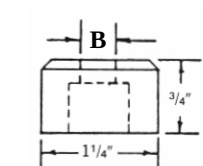
BORE SIZE		
1 3/32	•	1 23/32
1 1/8	•	1 3/4
1 5/32	•	1 25/32
1 3/16	•	1 13/16
1 7/32	•	1 27/32
1 1/4	•	1 7/8
1 9/32	•	1 29/32
1 5/16	•	1 15/16
1 11/32	•	1 31/32
1 3/8	•	2
1 13/32	•	2 1/32
1 7/16	•	2 1/16
1 15/32	•	2 3/32
1 1/2	•	2 1/8
1 17/32	•	2 5/32
1 9/16	•	2 3/16
1 19/32	•	2 7/32
1 5/8	•	2 1/4
1 21/32	•	2 9/32
1 11/16	•	2 5/16

**** Designates MADE-TO-ORDER**

STANDARD ROUND SIZES

IW No.	4 1	4 2	4 3	4 5	4 6	5 2	5 5	5 9	6 0	6 2	6 5
5/32	•	•	•	•	•	•	•	•	•	•	•
3/16	•	•	•	•	•	•	•	•	•	•	•
7/32	•	•	•	•	•	•	•	•	•	•	•
1/4	•	•	•	•	•	•	•	•	•	•	•
9/32	•	•	•	•	•	•	•	•	•	•	•
5/16	•	•	•	•	•	•	•	•	•	•	•
11/32	•	•	•	•	•	•	•	•	•	•	•
3/8	•	•	•	•	•	•	•	•	•	•	•
13/32	•	•	•	•	•	•	•	•	•	•	•
7/16	•	•	•	•	•	•	•	•	•	•	•
15/32	•	•	•	•	•	•	•	•	•	•	•
1/2	•	•	•	•	•	•	•	•	•	•	•
17/32	•	•	•	•	•	•	•	•	•	•	•
9/16	•	•	•	•	•	•	•	•	•	•	•
19/32	•	•	•	•	•	•	•	•	•	•	•
5/8	•	•	•	•	•	•	•	•	•	•	•
21/32	•	•	•	•	•	•	•	•	•	•	•
11/16	•	•	•	•	•	•	•	•	•	•	•
23/32	•	•	•	•	•	•	•	•	•	•	•
3/4	•	•	•	•	•	•	•	•	•	•	•
25/32	•	•	•	•	•	•	•	•	•	•	•
13/16	•	•	•	•	•	•	•	•	•	•	•
27/32	•	•	•	•	•	•	•	•	•	•	•
7/8	•	•	•	•	•	•	•	•	•	•	•
29/32	•	•	•	•	•	•	•	•	•	•	•
15/16	•	•	•	•	•	•	•	•	•	•	•
31/32	•	•	•	•	•	•	•	•	•	•	•
1	•	•	•	•	•	•	•	•	•	•	•
1 1/32	•	•	•	•	•	•	•	•	•	•	•
1 1/16	•	•	•	•	•	•	•	•	•	•	•
1 3/32	•	•	•	•	•	•	•	•	•	•	•
1 1/8	•	•	•	•	•	•	•	•	•	•	•
1 5/32	•	•	•	•	•	•	•	•	•	•	•
1 3/16	•	•	•	•	•	•	•	•	•	•	•
1 7/32	•	•	•	•	•	•	•	•	•	•	•
1 1/4	•	•	•	•	•	•	•	•	•	•	•
1 9/32	•	•	•	•	•	•	•	•	•	•	•
1 5/16	•	•	•	•	•	•	•	•	•	•	•
1 11/32	•	•	•	•	•	•	•	•	•	•	•
1 3/8	•	•	•	•	•	•	•	•	•	•	•
1 13/32	•	•	•	•	•	•	•	•	•	•	•
1 7/16	•	•	•	•	•	•	•	•	•	•	•
1 15/32	•	•	•	•	•	•	•	•	•	•	•
1 1/2	•	•	•	•	•	•	•	•	•	•	•
1 17/32	•	•	•	•	•	•	•	•	•	•	•
1 9/16	•	•	•	•	•	•	•	•	•	•	•
1 19/32	•	•	•	•	•	•	•	•	•	•	•
1 5/8	•	•	•	•	•	•	•	•	•	•	•
1 21/32	•	•	•	•	•	•	•	•	•	•	•
1 11/16	•	•	•	•	•	•	•	•	•	•	•

IW No. 4655596062



*****Fig No. IW124
"B" To 1"**

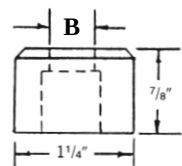


Fig No. IW43
5/32" To 1"

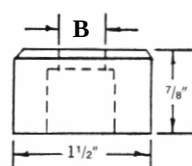


Fig No. IW45
5/32" To 1-1/8"

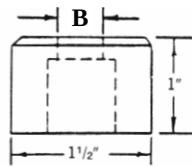
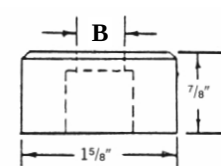


Fig No. IW46
5/32" To 1-3/16"

Oblong Standards →



*****Fig No. IW125
"B" To 1-1/8"**

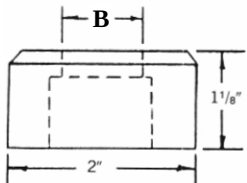
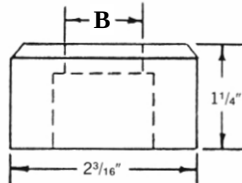


Fig No. IW60
5/32" To 1-17/32"



****Fig No. IW130
"B" To 1-1/16"**

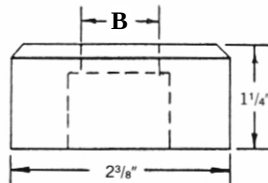


Fig No. IW62
3/16" To 1-5/8"

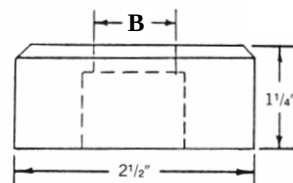
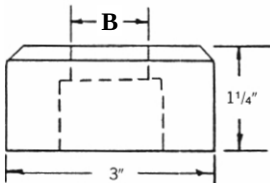


Fig No. IW65
7/32" To 1-7/8"



*****Fig No. IW71
"B" To 2"**

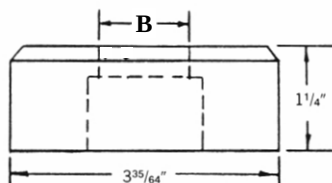
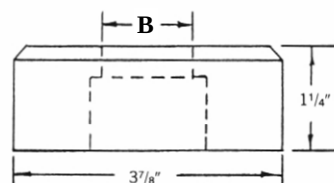
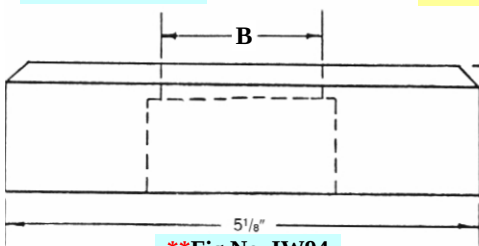


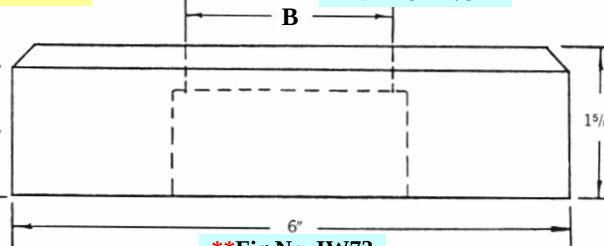
Fig No. IW91MM
1-3/32" To 2-5/16"



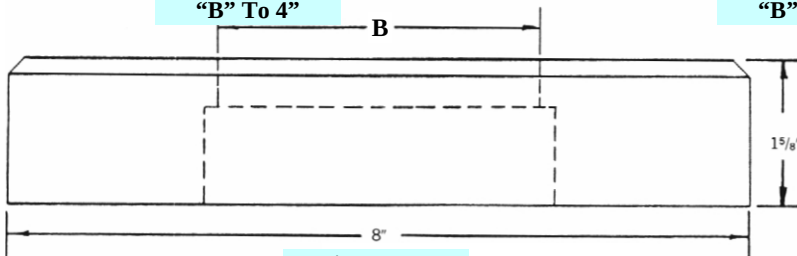
****Fig No. IW92
"B" To 2-7/8"**



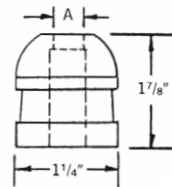
****Fig No. IW94**
"B" To 4"



****Fig No. IW73**
"B" To 5"



*****Fig No. IW74**
"B" To 7"



*****Fig No. IW121**

[illegible]

SAFETY NOTE: Anti-rotation locators recommended on all shaped punches and dies

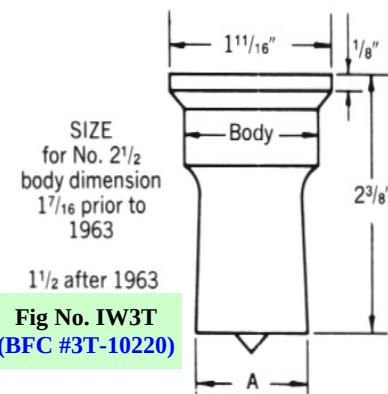
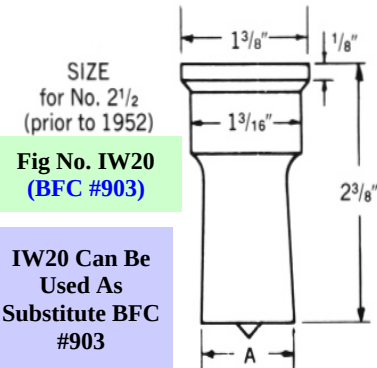
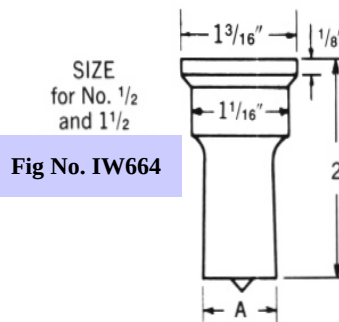
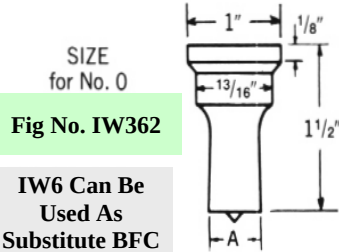


**** Designates MADE-TO-ORDER**

[illegible]

BUFFALO™ Punch & Dies

BUFFALO IRON WORKER™									Oversized & Triple Gage Attachment
Model No. ->	0	1/2	1 1/2	2 1/2 prior 1952	2 1/2 after 1952	3 1/2 Universal	3 1/2 Universal Diagonal	4 1/2 Universal	
Punch Fig. ->	IW362	IW664	IW664	IW20	IW3T	IW26	BFC1203	BFC1862	Made To Order
Die Fig. ->	IW200	IW201	IW202	IW203	IW203	IW65	IW65	BFC1863	Made To Order



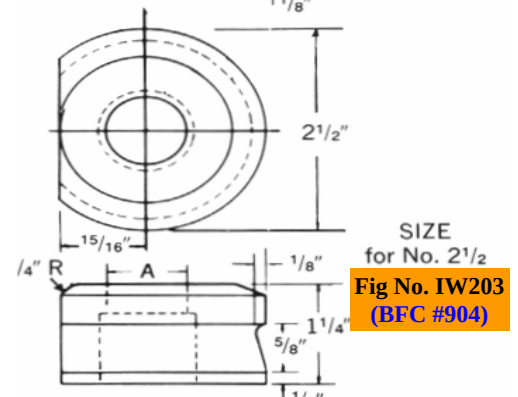
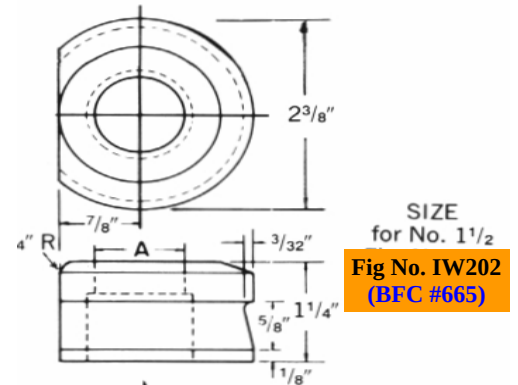
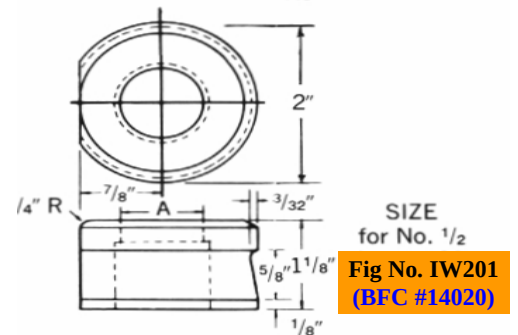
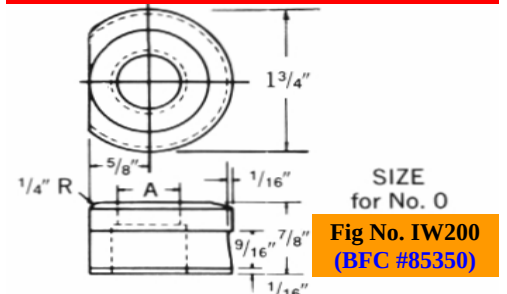
*Reg. Trademark of Buffalo Forge Co.

Standard Round Punch SIZES

Fig. No.	Fig. 9 (362)	664	Fig. 20 (903)	3T-10220*
1/8	•	•	•	•
5/32	•	•	•	•
3/16	•	•	•	•
7/32	•	•	•	•
1/4	•	•	•	•
9/32	•	•	•	•
5/16	•	•	•	•
11/32	•	•	•	•
3/8	•	•	•	•
13/32	•	•	•	•
7/16	•	•	•	•
15/32	•	•	•	•
1/2	•	•	•	•
17/32	•	•	•	•
9/16	•	•	•	•
19/32	•	•	•	•
5/8	•	•	•	•
21/32	•	•	•	•
11/16	•	•	•	•
23/32	•	•	•	•
3/4	•	•	•	•
25/32	•	•	•	•
13/16	•	•	•	•
27/32	•	•	•	•
7/8	•	•	•	•
29/32	•	•	•	•
15/16	•	•	•	•
31/32	•	•	•	•
1	•	•	•	•
1 1/32	•	•	•	•
1 1/16	•	•	•	•
1 3/32	•	•	•	•
1 1/8	•	•	•	•
1 5/32	•	•	•	•
1 3/16	•	•	•	•
1 1/4	•	•	•	•
1 5/16	•	•	•	•
1 3/8	•	•	•	•
1 7/16	•	•	•	•
1 1/2	•	•	•	•

*Stock round punches Fig. No. 3T-10220 have 1 7/16" body. (Except for 1 1/2" punch diameter size.)

Standard Round Die Sizes Are in 1/32" & 1/16" Clearances



Oblong Sizes Also Available From Stock. Call Factory For Availability!

MUBEA® Style Punches & Dies

Punch Fig. No.	IWH1P	IWH2P & IWH3P	IWH2P
Die Fig. No.	IWH1D	IWH2D & IWH3D	IWH2D
	500 560 750	900 1100 1300	
Model KBL, KL & KBLH	48-4 50-4 71-5 88-6	143-8	110-7
	*0 *1/2 *1-1/2	3-1/2	2-1/2
Model KLS		1100**	
Model KLSH	550	900 1100	
*Model HIW1	450 600		
* Model HPS	250 350		
*Model HPSN	450 600		
Model BLF + KL	350		
Model BFLH	400		
Model BF 10 + BF 350	Use IWH1D dies and IWH10 punches		

IW No.	H1P	H2P
	1.240	1.375
	1 ¹ / ₁₆	1 ⁷ / ₃₂
	2 ³ / ₁₆	2 ³ / ₈
1/8	•	•
5/32	•	•
3/16	•	•
7/32	•	•
1/4	•	•
9/32	•	•
5/16	•	•
11/32	•	•
3/8	•	•
13/32	•	•
7/16	•	•
15/32	•	•
1/2	•	•
17/32	•	•
9/16	•	•
19/32	•	•
5/8	•	•
21/32	•	•
11/16	•	•
23/32	•	•
3/4	•	•
25/32	•	•
13/16	•	•
27/32	•	•
7/8	•	•
29/32	•	•
15/16	•	•
31/32	•	•
1	•	•
1 ¹ / ₃₂	•	•
1 ¹ / ₁₆	•	•
1 ³ / ₃₂	•	•
1 ¹ / ₈	•	•
1 ⁵ / ₃₂	•	•
1 ³ / ₁₆	•	•
1 ⁷ / ₃₂	•	•
1 ¹ / ₄	•	•
1 ⁹ / ₃₂	•	•
1 ⁵ / ₁₆	•	•

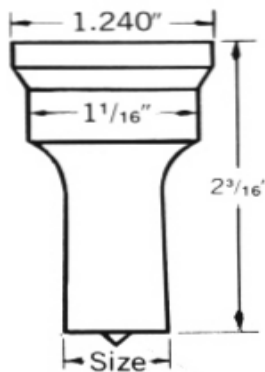


Fig No. IWH1P

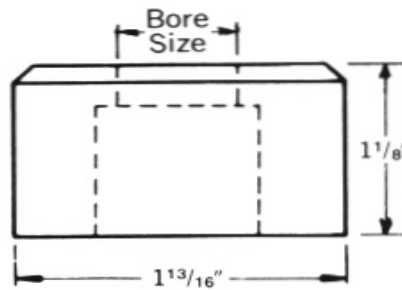


Fig No. IWH1D

NOTE: Due to tolerance changes on newer machines, Fig #IWH1D & IWH2D may NOT always interchange with H1 & H-2 dies.

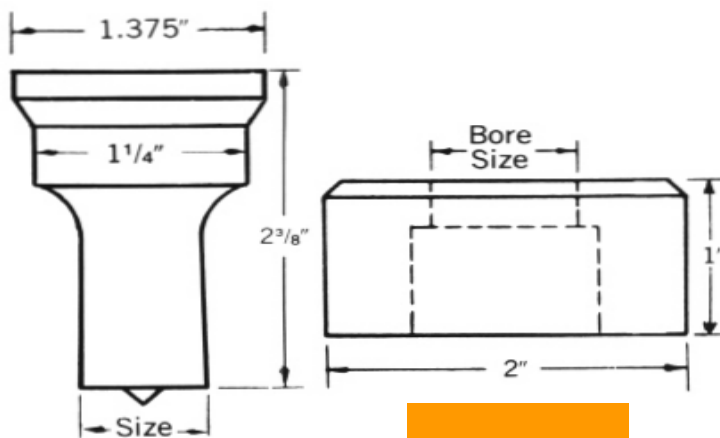


Fig No. IWH2P

Fig No. IWH2D

Drill spots will not be provide on round dies unless ordered with such.

Note: Mubea® Irownworkers with Standard coupling nuts will accept Figure IW16 and IW20 tools.

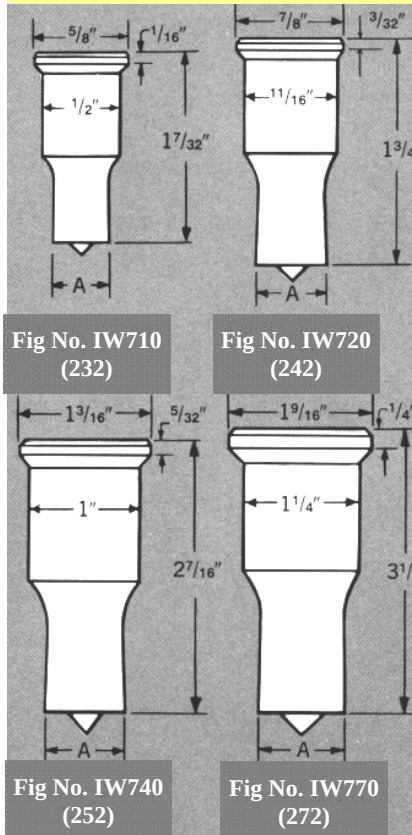
**** Registered Trademark Muhr and Bender**

For H-3 Tooling, Use Punch #IWH3P And For Die, Use #IWH3D.

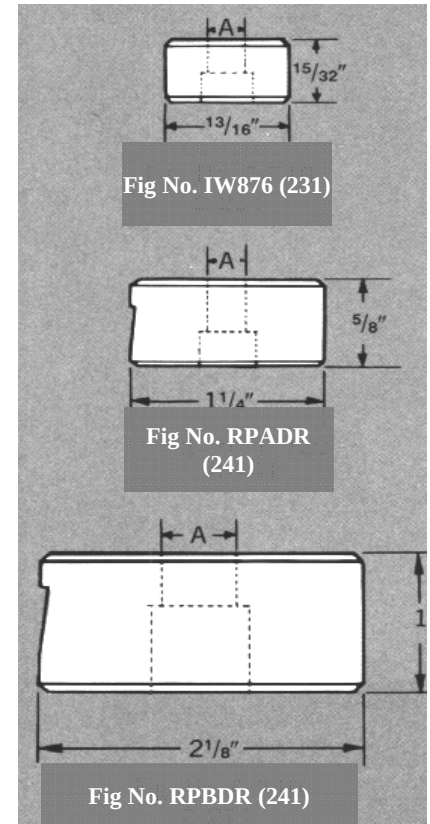
IW No.	867	869
	1 ¹³ / ₁₆	2
	1 ¹ / ₈	1
5/32	•	•
3/16	•	•
7/32	•	•
1/4	•	•
9/32	•	•
5/16	•	•
11/32	•	•
3/8	•	•
13/32	•	•
7/16	•	•
15/32	•	•
1/2	•	•
17/32	•	•
9/16	•	•
19/32	•	•
5/8	•	•
21/32	•	•
11/16	•	•
23/32	•	•
3/4	•	•
25/32	•	•
13/16	•	•
27/32	•	•
7/8	•	•
29/32	•	•
15/16	•	•
31/32	•	•
1	•	•
1 ¹ / ₃₂	•	•
1 ¹ / ₁₆	•	•
1 ³ / ₃₂	•	•
1 ¹ / ₈	•	•
1 ⁵ / ₃₂	•	•
1 ³ / ₁₆	•	•
1 ⁷ / ₃₂	•	•
1 ¹ / ₄	•	•
1 ⁹ / ₃₂	•	•
1 ⁵ / ₁₆	•	•
1 ¹¹ / ₃₂	•	•
1 ³ / ₈	•	•

HYDRAULIC ANGLELINES, BEAMLINES, AND PORTABLE PRESSES

For W.A. WHITNEY™, FABRILINE™, FRANKLIN™,
SIZOR™ AND METAL FABRICATING SYSTEMS™



Min. Standard Size = 1/8
Max. Punch dia.=body OD



FOR W.A. WHITNEY HYDRAULIC PORTABLE PRESSES, BEAMLINES & ANGLELINES

Quick-change type

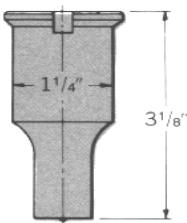


Fig No. IW790XX

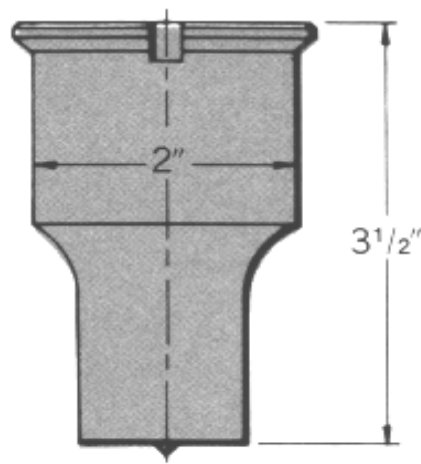


Fig No. IW7501

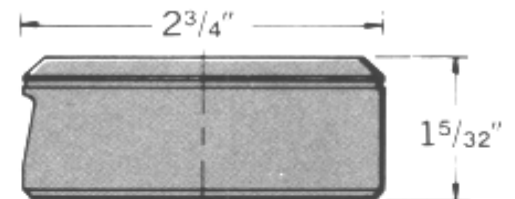


Fig No. IW7502

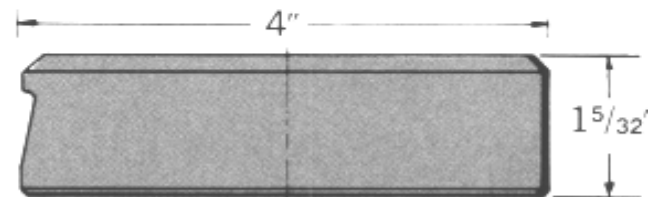


Fig No. IW7602

Quick-change type

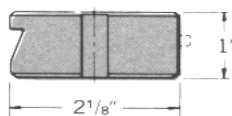
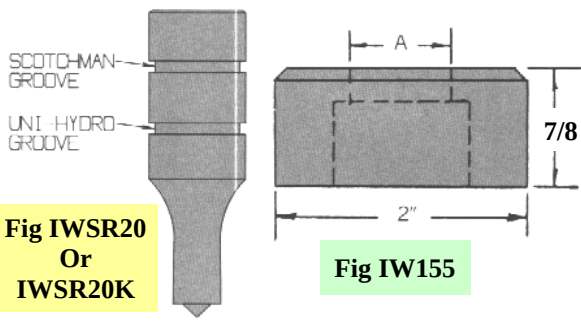


Fig No. IW790XX



**Fig IWSR20
Or
IWSR20K**

Fig IW155

**For Scotchman™,
Uni-Hydro™**

**NOTE: Fig #IW59 (1" Tall) May Be Used As
A Substitute!**

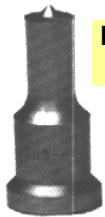
Min. Standard Size = 3/16
Max. Punch dia.=13/16



Fig IW5

Fig IW44

**For ENERPAC™
SP-3834 Portable
Hydraulic Punches**

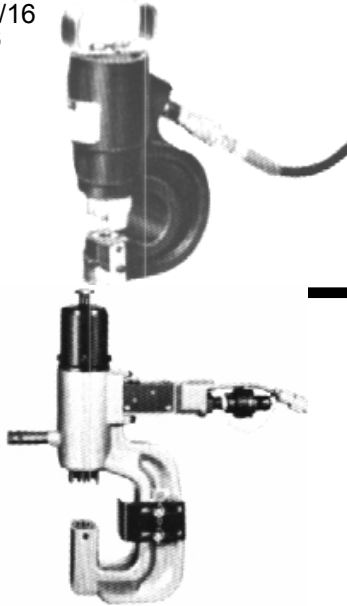


**Fig. No.
IW13**



**Fig. No.
IW51**

Min. Standard Size = 1/4
Max. Punch dia.=15/16



**For NITTO KOHKI™
Portable Hydraulic
Punches**

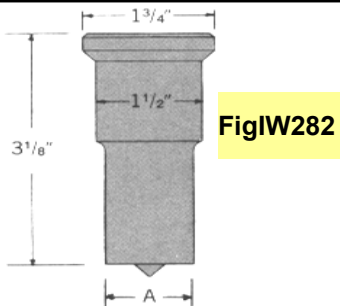
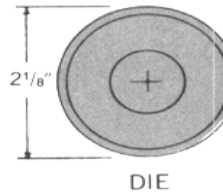


Fig IW282

**Fig. IW281
Die Height = 1"**



DIE

**For FABRILINE™
Hydraulic Beamlines
& Anglemasters**

Punch	A	B	C	Max. D	E	Die	A	Max. B	C
Fig IW400	37/16	7/32	31/8	3	33/8	IW401	23/4	23/32	11/4
						IW403	4	31/8	11/4

**For FABRILINE™
Punch 400**

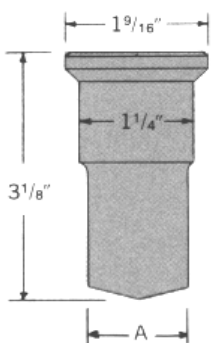
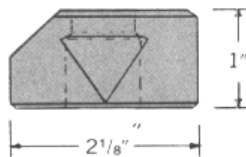


Fig. IW274

Min. Standard Size = 7/16

Fig. IW273



**For FABRILINE™
Anglemasters™**

PEDDINGHAUS™ FABRIPUNCH

Standard Round Punch SIZES

FIG No. IW	272	282
7/16	•	
9/16	•	
11/16	•	
23/32	•	
13/16	•	•
15/16	•	•
1-1/16	•	•
1-1/8	•	•
1-1/4		•
1-9/32		•
1-5/16		•
1-11/32		•
1-3/8		•
1-13/32		•
1-7/16		•
1-15/32		•
1-1/2		•

Standard Round Dies

FIG No. IW	271F	275F	291F	293F
1/2	•	•		
5/8	•	•		
3/4	•	•		
25/32	•	•		
27/32	•	•	•	•
7/8	•	•	•	•
1	•	•	•	•
1-1/8	•		•	•
1-3/16	•		•	•
1-5/16	•		•	
1-11/32			•	
1-3/8			•	
1-13/32			•	
1-7/16			•	
1-15/32			•	
1-1/2			•	
1-17/32			•	
1-9/16			•	

Fig. IW272

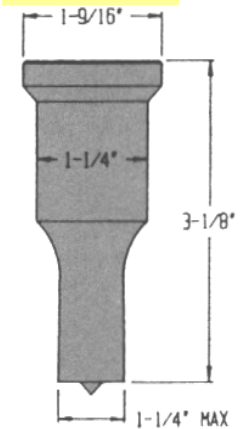


Fig. IW275-F

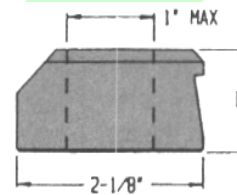
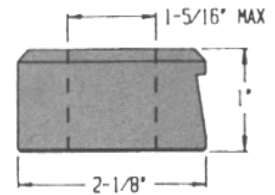


Fig. IW271-F



Standard Obround Punch Sizes

FIG No. IW	272	282
9/16 x 1-1/4	•	•
11/16 x 1	•	•
11/16 x 1-1/4	•	•
13/16 x 1	•	•
13/16 x 1-1/8	•	•
13/16 x 1-1/4	•	•
13/16 x 1-1/2		•
7/8 x 1-1/16	•	•
7/8 x 1-1/8	•	•
7/8 x 1-1/4	•	•
15/16 x 1-1/8	•	•
15/16 x 1-1/4	•	•
15/16 x 1-1/2		•
1-1/16 x 1-1/4	•	•
1-1/16 x 1-1/2		•

Standard OBROUND Die Sizes

FIG No.	271F	291F	293F
5/8 x 1-5/16	•	•	
3/4 x 1-1/16	•	•	•
3/4 x 1-5/16	•	•	
7/8 x 1-1/16	•	•	•
7/8 x 1-3/16	•	•	
7/8 x 1-5/16	•	•	
7/8 x 1-9/16		•	
15/16 x 1-1/8	•	•	
15/16 x 1-3/16	•		•
15/16 x 1-5/16	•	•	
1 x 1-3/16	•		
1 x 1-5/16	•	•	
1 x 1-9/16		•	
1-1/8 x 1-5/16	•	•	
1-1/8 x 1-9/16		•	

FigIW282

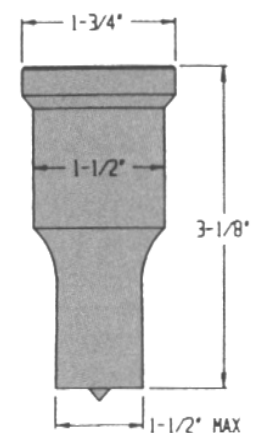


Fig. IW293-F

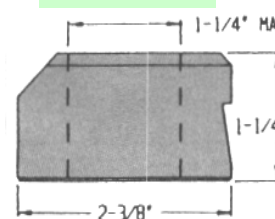
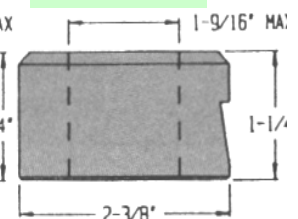


Fig. IW291-F

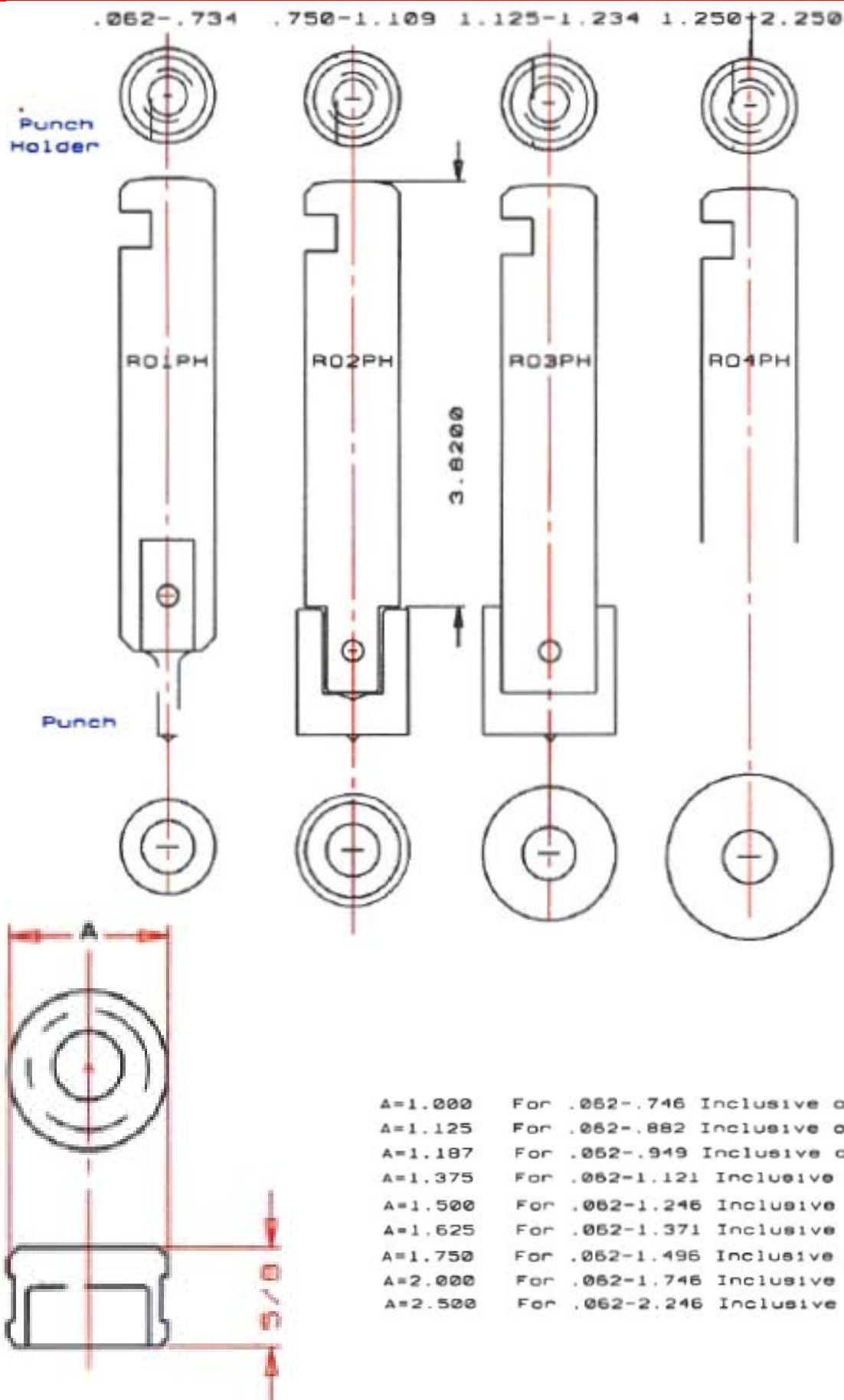


Standard Square Punches

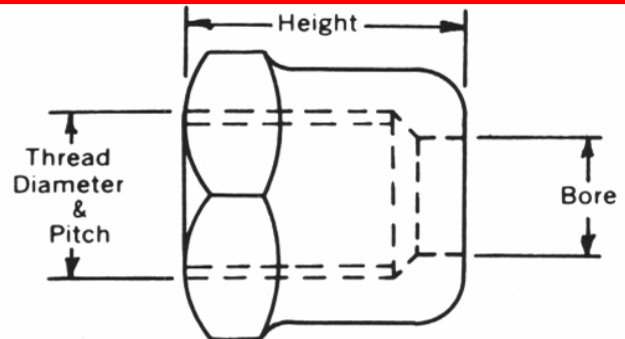
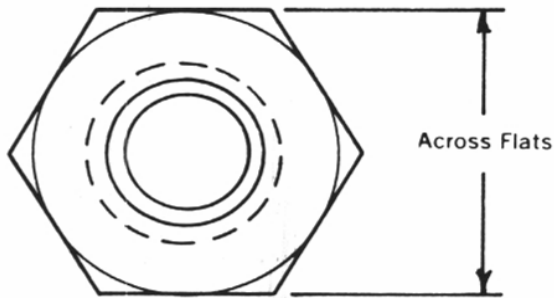
FIG No. IW	272	282
11/16	•	•
3/4	•	•

Standard Square Dies

FIG No. IW	271F	291F
25/32	•	•
27/32	•	•



COUPLING NUTS

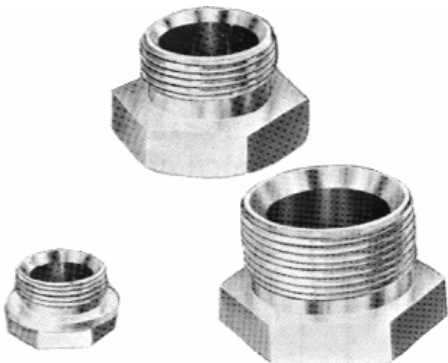


BUFFALO™

Coupling Nut Number	Model Number	Diam. of Stem	Threads Per Inch	Bore	Use With Punch Fig. No.
IWC77A	0	1 ¹ / ₈	14	53/64	IW6 Or IW362
IWC78B	1/2 & 1 ¹ / ₂	1 ³ / ₈	12	15/64	IW664
IWC77D before 1952	2 ¹ / ₂	1 ⁵ / ₈	12	1.228	IW15
IWC860A after 1952	2 ¹ / ₂	1 ⁷ / ₈	12	1.228	IW29 Or IW903
IWC77F	2 ¹ / ₂	1 ⁷ / ₈	12	1.445	IW3T 1.437 body
IWC77E	2 ¹ / ₂	1 ⁷ / ₈	12	1 ³³ / ₆₄	IW3T 1.500 body

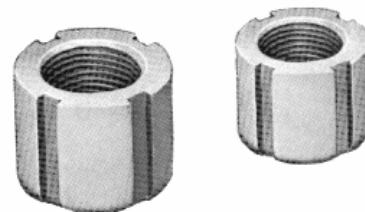
RICHARDS™

Coupling Nut Number	Largest O.D.	Threads Per Inch	Diameter of Stem	Bore
IWC0	1 ⁹ / ₃₂	14	1 ¹ / ₁₆	7/16
IWC1	1 ²³ / ₃₂	12	7/8	19/32
IWC2	1 ⁷ / ₈	10	1 ¹ / ₈	27/32
IWC3	2 ⁵ / ₁₆	10	1 ¹³ / ₃₂	13/32
IWC3S	2 ⁵ / ₁₆	10	1 ¹³ / ₃₂	27/32
IWC4	2 ⁵ / ₈	10	1 ¹¹ / ₁₆	1 ¹¹ / ₃₂
IWC4S	2 ⁵ / ₈	10	1 ¹¹ / ₁₆	13/32
IWC5	2 ⁷ / ₈	10	2	1 ¹⁹ / ₃₂
IWC6	3 ¹ / ₂	10	2 ¹ / ₄	1 ¹³ / ₁₆



W. A. WHITNEY™

Solid Coupling Nut	Alternate Number
IWC720, IWC740, IWC770	720-020-001, 740-040-001, 770-016
Split Coupling Nut	Alternate Number
IWC720S, IWC740S, IWC770S	720-020-002, 740-040-002, 770-024

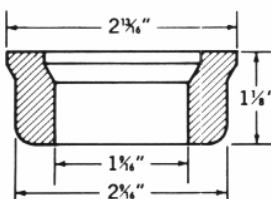


FABRILINE™

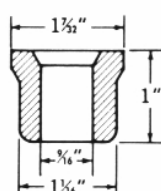
Coupling Nut	Alternate Number
IWC272	3750-042
IWC282	3750-735

REDUCING SLEEVES

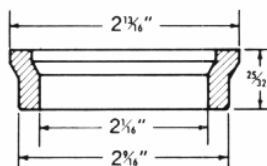
IWF75 Reducing Punch Sleeve



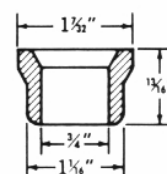
IWF76 Reducing Punch Sleeve



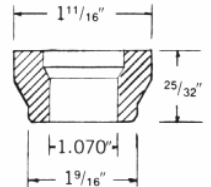
IWF77 Reducing Punch Sleeve



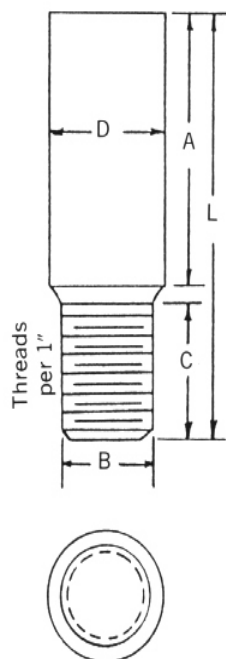
IWF78 Reducing Punch Sleeve



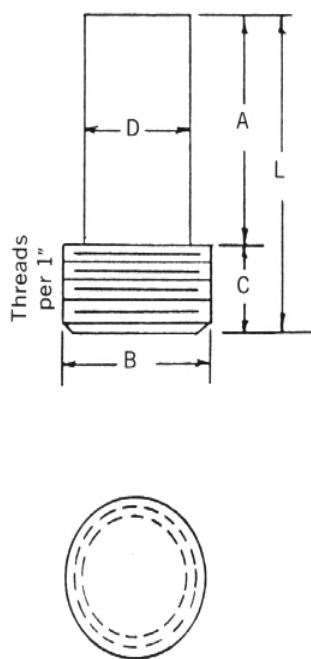
IWF79 Reducing Punch Sleeve



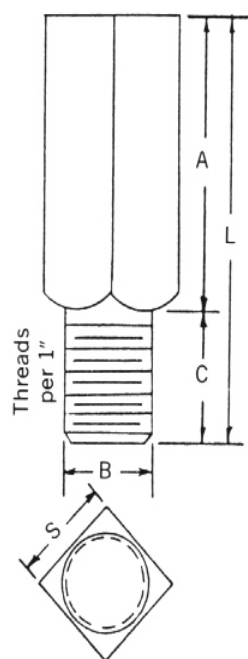
PUNCH STEMS



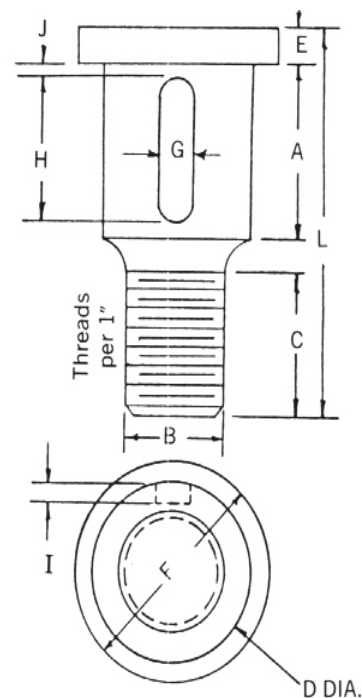
IW900



IW901

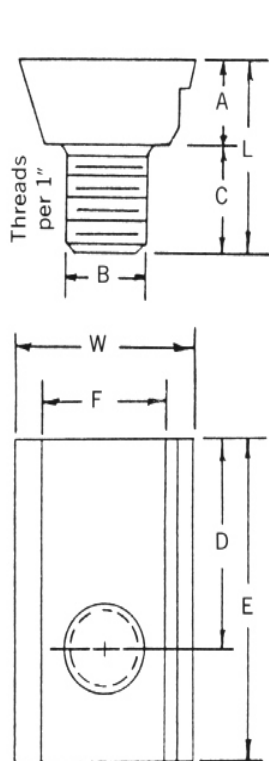


IW902

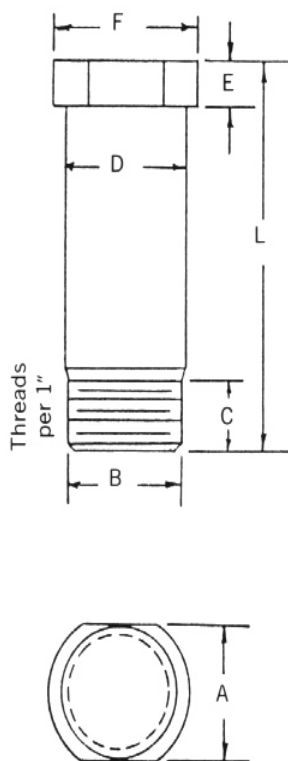


IW903

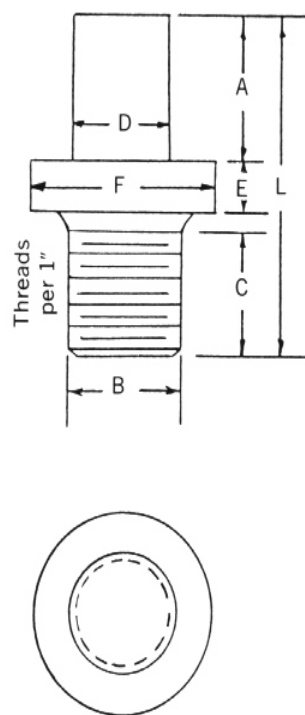
The punch stems shown are the types our long experience has indicated to be the most widely used; however, when desired, we can furnish special types of stems to meet particular requirements. When ordering, please provide figure number and dimensions as indicated on sketch or furnish us with a sketch of the stem you require. Please send sample stem, if available.



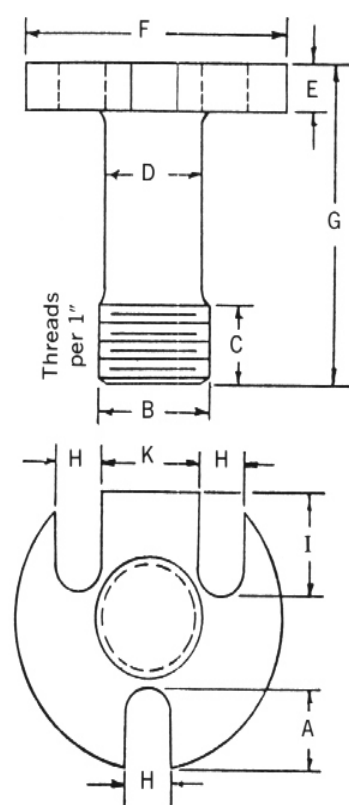
IW904



IW905



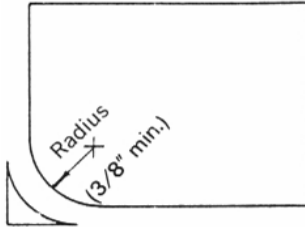
IW906



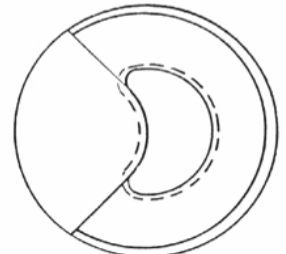
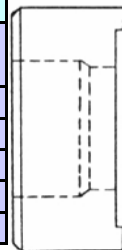
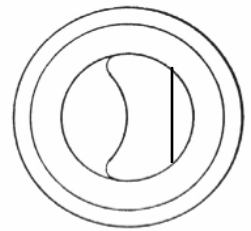
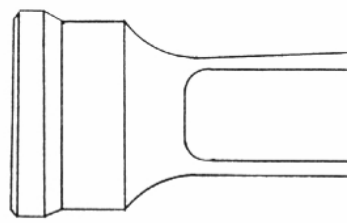
IW907

SPECIAL APPLICATION TOOLS

CORNER RADIUS Tooling is used for punching corner radii on up to 1/4" mild steel. Die has a built in guide to locate material.

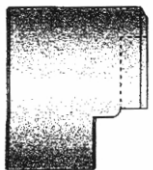
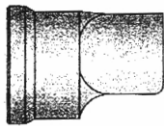
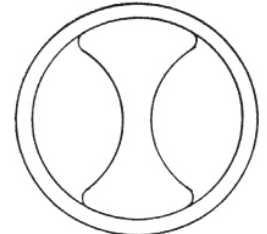
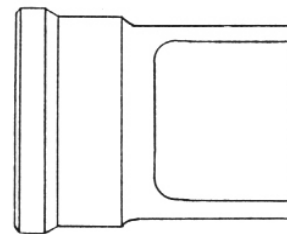
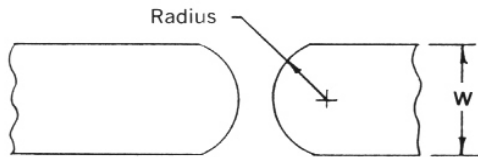


Standard Sizes						
Radius	IW 16	IW 20	IW 26	IW 55	IW 59	IW 62
3/8	•	•	•	•	•	•
7/16	•	•	•	•	•	•
1/2		•	•		•	•
9/16			•			•
3/4			•			•

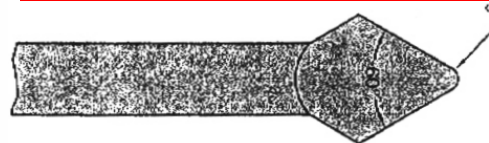


TRIM & PART (Lattice)

This type of punch is designed to shear bar stock and round both ends in one operation. When ordering, please specify figure number, radius required, flat bar width and thickness.

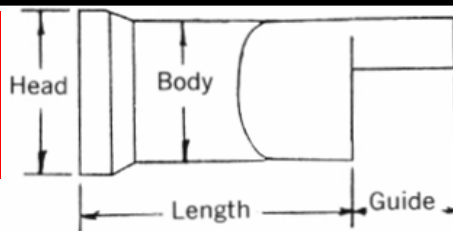


PICKET TOOL



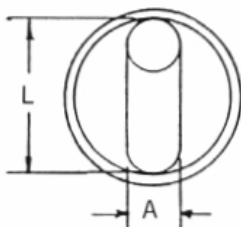
Picket tooling generates a 60 degree picket on square tubing. When ordering please specify figure number, tubing square size and wall thickness.

RIPPING AND HEELED EDGE NOTCHING

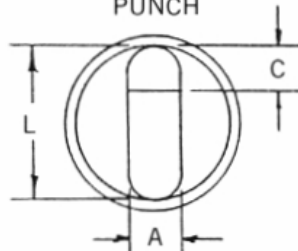


Heel or Guide is 1/8-1/4" longer than material thickness. Heel or guide should not be used for piercing.

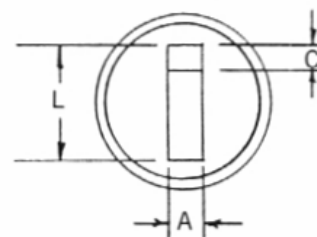
OBLONG RIPPING PUNCH



OBLONG HEEL PUNCH

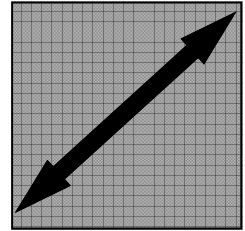


RECTANGULAR HEEL PUNCH



Diagonals of Common Square & Rectangles

	0.125	0.156	0.187	0.218	0.250	0.281	0.312	0.343	0.375	0.406	0.437	0.469	0.500
.125	0.177	0.200	0.225	0.252	0.280	0.308	0.337	0.366	0.395	0.425	0.455	0.485	0.515
.156	0.200	0.221	0.244	0.269	0.295	0.322	0.349	0.378	0.406	0.435	0.465	0.494	0.524
.187	0.225	0.244	0.265	0.288	0.313	0.338	0.364	0.391	0.419	0.447	0.476	0.505	0.534
.218	0.252	0.269	0.288	0.309	0.332	0.356	0.381	0.407	0.434	0.461	0.489	0.517	0.546
.250	0.280	0.295	0.313	0.332	0.354	0.376	0.400	0.425	0.451	0.477	0.504	0.531	0.559
.281	0.308	0.322	0.338	0.356	0.376	0.398	0.420	0.444	0.469	0.494	0.520	0.547	0.574
.312	0.337	0.349	0.364	0.381	0.400	0.420	0.442	0.465	0.488	0.513	0.538	0.563	0.590
.343	0.366	0.378	0.391	0.407	0.425	0.444	0.465	0.486	0.509	0.532	0.556	0.581	0.607
.375	0.395	0.406	0.419	0.434	0.451	0.469	0.488	0.509	0.530	0.553	0.576	0.600	0.644
.406	0.425	0.435	0.447	0.461	0.477	0.494	0.513	0.532	0.553	0.575	0.597	0.620	0.644
.437	0.455	0.465	0.476	0.489	0.504	0.520	0.538	0.556	0.576	0.597	0.619	0.641	0.664
.469	0.485	0.494	0.505	0.517	0.531	0.547	0.563	0.581	0.600	0.620	0.641	0.663	0.685
.500	0.515	0.524	0.534	0.546	0.559	0.574	0.590	0.607	0.625	0.644	0.664	0.685	0.707



	0.531	0.562	0.593	0.625	0.656	0.687	0.718	0.750	0.781	0.812	0.843	0.875	0.906	0.937	0.968	1.000
.125	0.546	0.576	0.607	0.657	0.668	0.699	0.730	0.760	0.791	0.822	0.853	0.884	0.915	0.946	0.977	1.008
.156	0.554	0.584	0.614	0.644	0.675	0.705	0.736	0.766	0.797	0.827	0.858	0.889	0.920	0.950	0.981	1.012
.187	0.563	0.593	0.623	0.653	0.683	0.713	0.743	0.773	0.803	0.834	0.864	0.895	0.925	0.956	0.987	1.017
.218	0.575	0.604	0.633	0.662	0.692	0.722	0.751	0.781	0.811	0.841	0.872	0.902	0.932	0.963	0.993	1.024
.250	0.587	0.616	0.644	0.673	0.702	0.732	0.761	0.791	0.820	0.850	0.880	0.910	0.940	0.970	1.000	1.031
.281	0.601	0.629	0.657	0.685	0.714	0.743	0.772	0.801	0.830	0.860	0.889	0.919	0.949	0.979	1.009	1.039
.312	0.616	0.643	0.671	0.699	0.727	0.755	0.784	0.813	0.841	0.871	0.900	0.929	0.959	0.988	1.018	1.048
.343	0.633	0.659	0.686	0.713	0.741	0.769	0.797	0.825	0.854	0.882	0.911	0.940	0.969	0.999	1.028	1.057
.375	0.650	0.676	0.702	0.729	0.756	0.783	0.811	0.839	0.867	0.895	0.923	0.952	0.981	1.010	1.039	1.068
.406	0.669	0.694	0.719	0.745	0.772	0.799	0.826	0.853	0.881	0.909	0.936	0.965	0.993	1.022	1.051	1.079
.437	0.688	0.713	0.738	0.763	0.789	0.815	0.841	0.868	0.895	0.923	0.950	0.978	1.006	1.035	1.063	1.092
.469	0.709	0.732	0.737	0.781	0.806	0.832	0.858	0.884	0.911	0.938	0.965	0.993	1.020	1.048	1.076	1.104
.500	0.730	0.753	0.776	0.800	0.825	0.850	0.876	0.901	0.928	0.954	0.981	1.008	1.035	1.063	1.090	1.118

	0.531	0.562	0.593	0.625	0.656	0.687	0.718	0.750	0.781	0.812	0.843	0.875	0.906	0.937	0.968	1.000
.531	0.751	0.774	0.797	0.820	0.844	0.869	0.894	0.919	0.945	0.971	0.997	1.024	1.051	1.078	1.105	1.132
.562	0.774	0.796	0.818	0.841	0.864	0.888	0.913	0.938	0.963	0.988	1.014	1.040	1.067	1.093	1.120	1.147
.593	0.797	0.818	0.840	0.862	0.885	0.908	0.932	0.957	0.981	1.006	1.032	1.057	1.083	1.110	1.136	1.163
.625	0.820	0.841	0.862	0.884	0.906	0.929	0.953	0.976	1.001	1.025	1.050	1.075	1.101	1.127	1.153	1.179
.656	0.844	0.864	0.885	0.906	0.928	0.950	0.973	0.997	1.020	1.044	1.069	1.094	1.119	1.144	1.170	1.196
.687	0.869	0.888	0.908	0.929	0.950	0.972	0.995	1.017	1.041	1.064	1.088	1.113	1.138	1.163	1.188	1.214
.718	0.894	0.913	0.932	0.953	0.973	0.995	1.016	1.039	1.062	1.085	1.108	1.132	1.157	1.181	1.206	1.232
.750	0.919	0.938	0.957	0.976	0.997	1.017	1.039	1.061	1.083	1.106	1.129	1.152	1.176	1.201	1.225	1.250
.781	0.945	0.963	0.981	1.001	1.020	1.041	1.062	1.083	1.105	1.127	1.150	1.173	1.197	1.220	1.245	1.269
.812	0.971	0.988	1.006	1.025	1.044	1.064	1.085	1.106	1.127	1.149	1.171	1.194	1.217	1.241	1.264	1.288
.843	0.997	1.014	1.032	1.050	1.069	1.088	1.108	1.129	1.150	1.171	1.193	1.216	1.238	1.261	1.285	1.308
.875	1.024	1.040	1.057	1.075	1.094	1.113	1.132	1.152	1.173	1.194	1.216	1.237	1.260	1.282	1.305	1.329
.906	1.051	1.067	1.083	1.101	1.119	1.138	1.157	1.176	1.197	1.217	1.238	1.260	1.282	1.304	1.327	1.350
.937	1.078	1.093	1.110	1.127	1.144	1.163	1.181	1.201	1.220	1.241	1.261	1.282	1.304	1.326	1.348	1.371
.968	1.105	1.120	1.136	1.153	1.170	1.188	1.206	1.225	1.245	1.264	1.285	1.305	1.327	1.348	1.370	1.392
1.000	1.132	1.147	1.163	1.179	1.196	1.214	1.232	1.250	1.269	1.288	1.308	1.329	1.350	1.371	1.392	1.414

	1.031	1.062	1.093	1.125	1.156	1.187	1.218	1.250	1.281	1.312	1.343	1.375	1.406	1.437	1.468	1.500
.125	1.039	1.070	1.101	1.132	1.163	1.194	1.225	1.256	1.287	1.318	1.350	1.381	1.412	1.443	1.474	1.505
.156	1.043	1.074	1.105	1.136	1.167	1.198	1.229	1.297	1.291	1.322	1.353	1.384	1.415	1.446	1.477	1.508
.187	1.048	1.079	1.110	1.149	1.171	1.202	1.233	1.264	1.295	1.326	1.357	1.388	1.419	1.450	1.479	1.512
.218	1.054	1.085	1.115	1.146	1.177	1.208	1.238	1.269	1.300	1.331	1.361	1.392	1.423	1.454	1.485	1.516
.250	1.061	1.092	1.122	1.152	1.183	1.214	1.244	1.275	1.305	1.336	1.367	1.398	1.428	1.459	1.490	1.521
.281	1.069	1.099	1.129	1.160	1.190	1.220	1.251	1.281	1.312	1.342	1.373	1.403	1.434	1.465	1.495	1.526
.312	1.078	1.108	1.138	1.168	1.198	1.228	1.285	1.288	1.319	1.349	1.380	1.410	1.441	1.471	1.502	1.532
.343	1.087	1.117	1.146	1.176	1.206	1.236	1.266	1.296	1.327	1.357	1.387	1.417	1.448	1.478	1.508	1.539
.375	1.097	1.127	1.156	1.186	1.216	1.245	1.275	1.305	1.335	1.365	1.395	1.425	1.455	1.486	1.516	1.546
.406	1.108	1.138	1.180	1.196	1.226	1.255	1.285	1.314	1.344	1.374	1.404	1.434	1.464	1.494	1.524	1.554
.437	1.120	1.149	1.178	1.207	1.236	1.266	1.295	1.324	1.354	1.384	1.413	1.443	1.473	1.503	1.533	1.563
.469	1.131	1.161	1.190	1.219	1.248	1.277	1.306	1.335	1.364	1.394	1.423	1.453	1.482	1.512	1.542	1.572
.500	1.146	1.174	1.203	1.231	1.260	1.288	1.317	1.346	1.375	1.405	1.434	1.463	1.492	1.522	1.552	1.581

	1.031	1.062	1.093	1.125	1.156	1.187	1.218	1.250	1.281	1.312	1.343	1.375	1.406	1.437	1.468	1.500
.531	1.160	1.188	1.216	1.244	1.272	1.301	1.329	1.358	1.387	1.416	1.445	1.476	1.503	1.533	1.562	1.591
.562	1.175	1.202	1.230	1.258	1.286	1.314	1.342	1.371	1.399	1.428	1.457	1.486	1.515	1.544	1.573	1.602
.593	1.190	1.217	1.244	1.272	1.300	1.328	1.356	1.384	1.412	1.441	1.472	1.498	1.526	1.555	1.584	1.613
.625	1.206	1.233	1.260	1.287	1.314	1.342	1.370	1.398	1.426	1.454	1.482	1.510	1.539	1.568	1.596	1.625
.656	1.222	1.249	1.275	1.302	1.329	1.357	1.384	1.412	1.440	1.467	1.495	1.524	1.552	1.580	1.609	1.637
.687	1.239	1.266	1.292	1.318	1.345	1.372	1.399	1.427	1.454	1.482	1.509	1.537	1.565	1.593	1.622	1.650
.718	1.257	1.283	1.309	1.335	1.361	1.388	1.415	1.442	1.469	1.496	1.524	1.552	1.579	1.607	1.635	1.663
.750	1.275	1.301	1.326	1.352	1.378	1.405	1.431	1.458	1.485	1.512	1.539	1.566	1.594	1.621	1.649	1.677
.781	1.294	1.319	1.344	1.370	1.395	1.421	1.448	1.474	1.500	1.527	1.554	1.581	1.609	1.636	1.664	1.691
.812	1.313	1.338	1.363	1.388	1.413	1.439	1.465	1.491	1.517	1.544	1.570	1.597	1.624	1.651	1.679	1.706
.843	1.332	1.357	1.381	1.406	1.431	1.454	1.482	1.508	1.534	1.560	1.587	1.613	1.640	1.667	1.694	1.721
.875	1.352	1.376	1.401	1.425	1.450	1.472	1.500	1.526	1.552	1.577	1.604	1.630	1.656	1.683	1.710	1.737
.906	1.391	1.415	1.438	1.462	1.486	1.511	1.535	1.560	1.585	1.611	1.636	1.662	1.688	1.714	1.740	1.767
.937	1.394	1.417	1.441	1.464	1.489	1.513	1.538	1.563	1.588	1.613	1.638	1.664	1.690	1.690	1.742	1.769
.968	1.415	1.438	1.461	1.485	1.523	1.533	1.557	1.581	1.606	1.631	1.657	1.682	1.708	1.733	1.759	1.786
1.000	1.436	1.459	1.482	1.505	1.529	1.553	1.577	1.601	1.625	1.650	1.675	1.700	1.726	1.751	1.777	1.803

	1.031	1.062	1.093	1.125	1.156	1.187	1.218	1.250	1.281	1.312	1.343	1.375	1.406	1.437	1.468	1.500
1.031	1.458	1.481	1.503	1.526	1.549	1.573	1.596	1.620	1.645	1.669	1.694	1.719	1.744	1.769	1.795	1.820
1.062	1.481	1.503	1.525	1.547	1.568	1.593	1.617	1.641	1.664	1.689	1.713	1.739	1.763	1.788	1.813	1.838
1.093	1.503	1.525	1.547	1.569	1.592	1.614	1.638	1.661	1.687	1.709	1.733	1.759	1.781	1.806	1.831	1.856
1.125	1.526	1.547	1.569	1.591	1.613	1.636	1.659	1.682	1.705	1.729	1.753	1.778	1.801	1.825	1.848	1.875
1.156	1.549	1.568	1.592	1.613	1.635	1.657	1.680	1.702	1.726	1.749	1.773	1.797	1.821	1.845	1.869	1.894
1.187	1.573	1.593	1.614	1.636	1.657	1.679	1.703	1.724	1.747	1.770	1.793	1.817	1.841	1.865	1.889	1.913
1.218	1.596	1.617	1.638	1.659	1.680	1.702	1.724	1.746	1.768	1.791	1.814	1.837	1.861	1.885	1.909	1.933
1.250	1.620	1.641	1.661	1.682	1.703	1.724	1.746	1.768	1.790	1.813	1.835	1.858	1.882	1.905	1.929	1.953
1.281	1.645	1.664	1.685	1.705	1.726	1.747	1.768	1.790	1.812	1.834	1.857	1.879	1.902	1.926	1.949	1.973
1.312	1.669	1.689	1.709	1.729	1.749	1.770	1.791	1.813	1.834	1.856	1.878	1.901	1.922	1.947	1.968	1.993
1.343	1.694	1.713	1.733	1.753	1.773	1.793	1.814	1.835	1.857	1.878	1.900	1.923	1.945	1.967	1.989	2.014
1.375	1.719	1.739	1.759	1.778	1.797	1.817	1.837	1.858	1.879	1.901	1.923	1.945	1.967	1.989	2.012	2.035
1.406	1.744	1.763	1.787	1.801	1.821	1.841	1.861	1.882	1.902	1.924	1.945	1.967	1.989	2.010	2.033	2.056
1.437	1.769	1.788	1.806	1.825	1.845	1.865	1.885	1.905	1.926	1.947	1.968	1.989	2.010	2.033	2.054	2.078
1.468	1.795	1.813	1.831	1.848	1.869	1.889	1.909	1.929	1.949	1.968	1.991	2.012	2.033	2.054	2.077	2.099
1.500	1.820	1.838	1.856	1.875	1.894	1.913	1.933	1.953	1.973	1.993	2.014	2.035	2.056	2.078	2.099	2.121

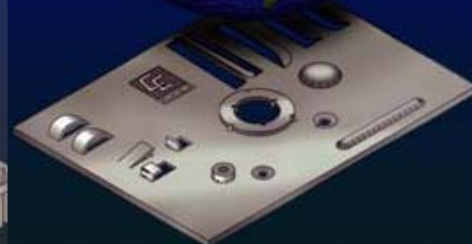
HEXAGON DIAGONALS													
Hexagon-Size	0.250	0.281	0.312	0.343	0.375	0.406	0.437	0.468	0.500	0.531	0.562	0.593	0.625
Diagonal	0.289	0.325	0.361	0.397	0.433	0.469	0.505	0.541	0.577	0.613	0.649	0.686	0.722He
Hexagon-Size	0.656	0.687	0.718	0.750	0.781	0.812	0.843	0.875	0.906	0.937	0.968	1.000	1.031
Diagonal	0.758	0.794	0.830	0.866	0.902	0.938	0.974	1.010	1.046	1.082	1.118	1.155	1.191
Hexagon-Size	1.062	1.094	1.125	1.156	1.187	1.218	1.250	1.281	1.312	1.343	1.375	1.406	1.437
Diagonal	1.227	1.263	1.299	1.335	1.371	1.407	1.443	1.479	1.516	1.552	1.588	1.624	0.722
Hexagon-Size	1.468	1.500	1.531	1.562	1.593	1.625	1.656	1.687	1.750	1.812	1.875	1.937	2.000
Diagonal	1.696	1.732	1.768	1.804	1.840	1.876	1.912	1.949	2.021	2.093	2.165	2.237	2.309

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