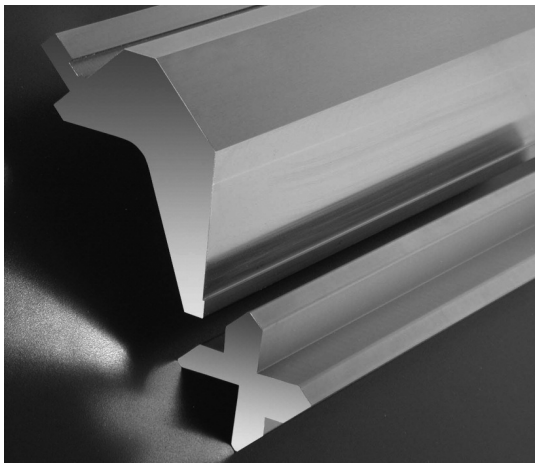
FAB SUPPLY INCORPORATED



press brake tooling

and accessories

ISO 9001:2008 REGISTERED FIRM

630-691-8665
1-866-322-8665
www.fabsupplyinc.com

Procedures

Preliminary Steps

(BEFORE INSERTION OR REMOVAL OF DIES)

To prevent operator injury and/or damage to your press brake, it is essential to follow the proper die-change procedures as outlined in your press brake manufacturer's operation manual.

Die Insertion

(AFTER FOLLOWING PRELIMINARY STEPS ABOVE)

NEVER PLACE HANDS BETWEEN DIES WHEN INSERTING DIES. When using bending type dies that are equipped with tongues, insert them from the side of the machine. Loosen all ram clamps and die holder set screws. First insert the lower die approximately its full length, allowing it to remain extended past the end of the bed by several inches. Check the distance remaining between the ram and the lower die to determine if the upper die can be properly inserted. Adjust the shut height as required so that the distance remaining will permit placement of the upper die on the lower die, with the tongue of the upper die almost fully (but loosely) engaged into the ram clamp.

The upper die can now be carried to the machine and set to rest in the extended portion of the lower die with the tongue guided into the slot.

After this alignment and partial insertion of the upper die has been made, support the upper die and push the upper die in to line up with the lower die. Now push the set of dies to the center of the machine for balanced machine loading.

Run the adjustment down so that the dies touch but do not "stall out" the adjustment motor. This will force the upper tongue into full engagement.

Tighten the ram clamps and the set screws in the lower holder. Run up the adjustment to accommodate at least twice the stock thickness.

Start the machine and cycle the brake to the top of its stroke.

Die Setting

(AFTER FOLLOWING PRELIMINARY STEPS ABOVE)

Insert a sample sheet and form a part.

Readjust the ram as required.

Approach the setting slowly.

It may be necessary to form several sample sheets before making an acceptable part.

This procedure will avoid the possibility of adjusting dies too closely, resulting in overloading the machine, and will avoid the possibility of jamming the machine at the bottom of the stroke.

Over-adjustment of the ram is to be avoided.

Where deflection becomes a problem, the dies should be shimmed to compensate for machine deflection or crowned toward the center of the machine.

It is not necessarily true that bringing the adjustment down might improve the part.

If the die is already bottoming out in some places, additional adjustments will merely increase the deflection of the machine and may make the part worse rather than improve the part.

Die Removal

(AFTER FOLLOWING PRELIMINARY STEPS)

NEVER PLACE HANDS BETWEEN DIES WHEN REMOVING DIES.

Check remaining distance between upper and lower die.

Run adjustment of ram down to reduce this clearance to several thousandths.

Unclamp the upper ram clamps and the lower die holder set screws.

Adjust ram upward slightly and check to be certain that the upper die will remain resting in the lower die. If it does not, the ram clamp may require further loosening. When a hook tongue is used, be certain the upper die is not hanging from the hook.

If further adjustment is required to permit removal, adjust ram upward so that the die is loose but well confined.

With the upper die tongue partially disengaged and guided in the loosened ram clamp, push both upper and lower die a short distance out of the end of the machine. Push with the hands placed on end of dies, never between.

Position die table (if used for small dies) or sling at end of machine, adjusted to proper height to accept the upper die.

Push upper die over table or into double sling with part of the die remaining in ram.

Secure die from falling from table or reposition each sling to allow complete removal of die without falling.

If both dies are removed together and stored as a set, it is advisable to use a sling to prevent falling of upper die from lower die. As a precaution, use steel band loops around the set, or straps to hold them in engagement.

Tonnage Requirements

The tonnage requirement is determined by the quality of the bend and whether it is a true air bend or whether some die bottoming takes place.

To the extent that bottoming takes place, the tonnage will increase correspondingly. Bottoming tonnage can be quite high. Accurate determination of bottoming tonnage can only be done by instrumentation and measurement.

Increased tonnage always results in increased frame deflection or "gapping."

Safety Warning

We do all we can to supply dies that will form material to your specification. Since we have no control over how the dies are actually put to use, it must be understood that it is the user who has the responsibility of making certain that a proper application with due regard to safety in operation is followed. Safety and industrial standards must be considered to insure that point of operation protection is effective.

Our dies are never intended to be used in equipment without means provided for preventing hands or other parts of the body from entering or remaining in the die space at any time.

When using brake die tooling, compliance with all safety requirements as outlined by the American National Standards Institute Bulletin A.N.S.I. #B11-3 as well as other local, state and federal standards which may apply, should be adhered to. A copy of A.N.S.I. #B11-3 may be obtained from American National Standards Institute Inc. at 1430 Broadway, NY, NY 10018.

FAB SUPPLY INCORPORATED

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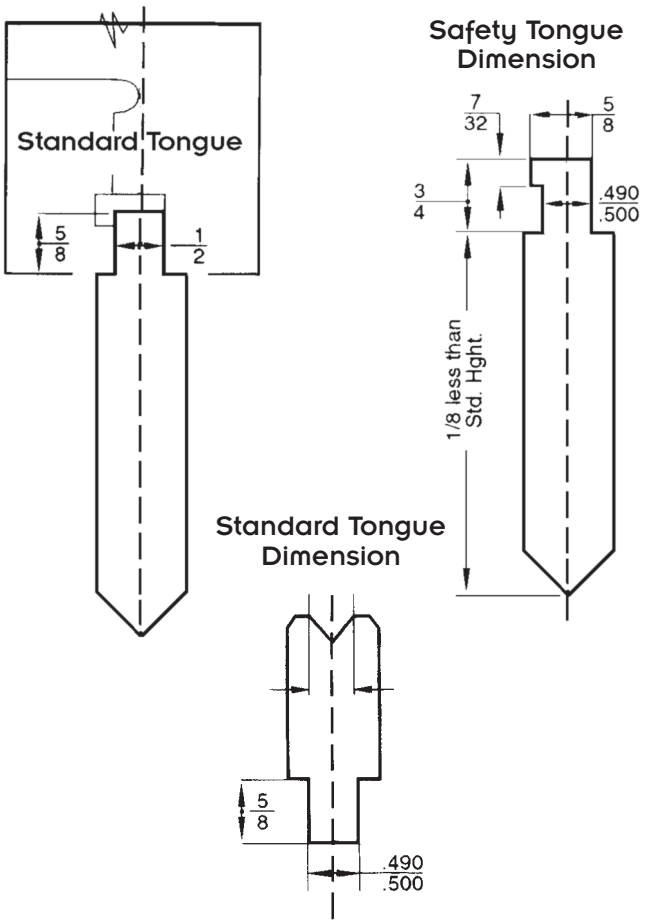

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How to Order

GENERAL PURPOSE DIES
Specify the tools by catalog numbers, gauge to be formed, die openings and length required.

SPECIAL DESIGN DIES
Submit detailed drawings or sample parts, along with anticipated production volume. Specify make, model and tonnage capacity of the press brake to be used.

All special application dies are tested prior to shipping. It is recommended that the customer furnish actual production material for try-out purposes. This will eliminate forming variations related to material inconsistencies.

SAFETY TONGUE
Safety tongues are recommended when the punches are segmented, or where weight and/or stripping pressure will create significant downward pull. The addition of a safety tongue to a standard tool will usually reduce the net height by 1/8".

MATERIAL
FAB Supply standard dies are made from pre-hardened brake die steel. This material has an excellent combination of strength, durability and wear-resistance, heat-treated to a mean 285 brinell. FAB Supply reserves the right to substitute alternative bar sizes for those shown in the catalog when necessary.

OPTIONAL FLAME HARDENING
Flame hardening can significantly increase the longevity of the tool's forming surfaces in high-wear applications.

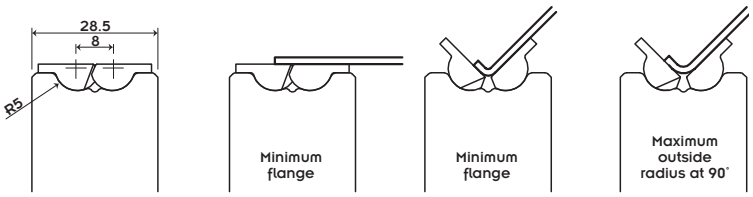
POLISHED FINISHES
Die surfaces can be polished, for an additional fee, to minimize marking and reduce drag.

RECONDITIONING SERVICE
Reworking or resurfacing your existing dies is available for a nominal fee. Please schedule reconditioning services in advance to minimize turn-around time.

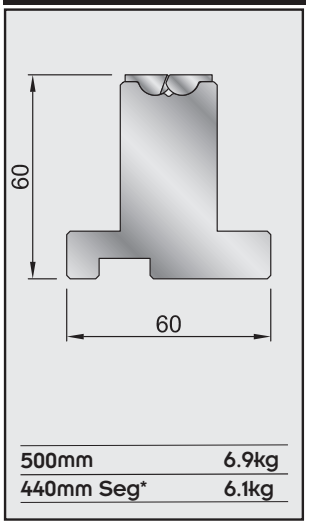
Rolla-V Dies

MODEL 1

- Maximum material thickness: 1.50mm (.059")
- Maximum outside radius @ 90˚: 4.4mm (.173")
- Minimum outside flange: 3.0mm (.118")
- Maximum bend angle (included): 40˚
- Tonnage capacity 100 t/m (35 tons/foot)

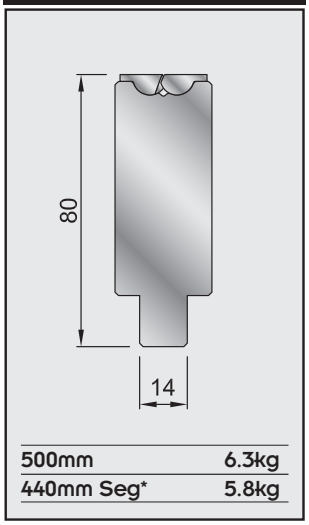


RVP60-1



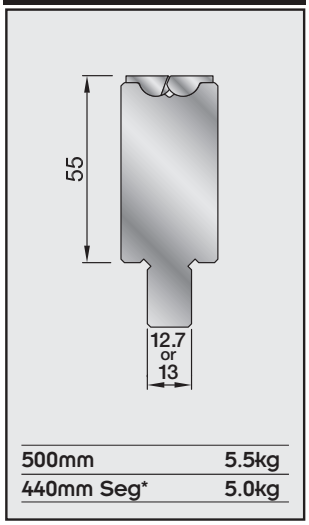
500mm	6.9kg
440mm Seg*	6.1kg

RVS80-1



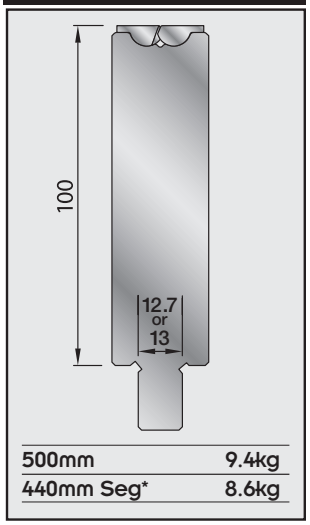
500mm	6.3kg
440mm Seg*	5.8kg

RVT55-1



500mm	5.5kg
440mm Seg*	5.0kg

RVT100-1

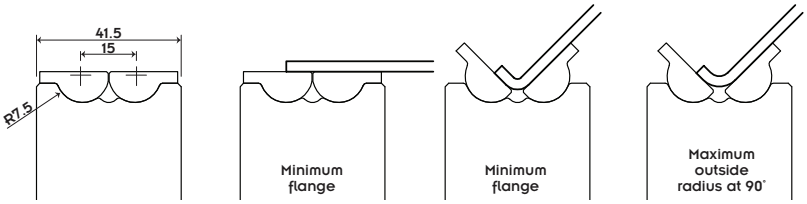


500mm	9.4kg
440mm Seg*	8.6kg

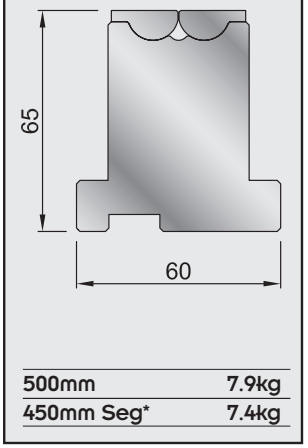
*440mm sectionalized sets include the following lengths: 200mm, 100mm, 50mm, 30mm, 25mm, 20mm, and 15mm

MODEL 2

- Maximum material thickness: 3.40mm (.135")
- Maximum outside radius @ 90˚: 9.0mm (.354")
- Minimum outside flange: 8.5mm (.335")
- Maximum bend angle (included): 59˚
- Tonnage capacity 150 t/m (50 tons/foot)

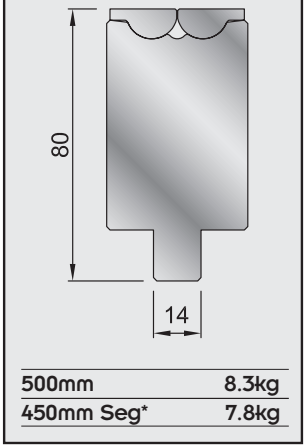


RVP65-2



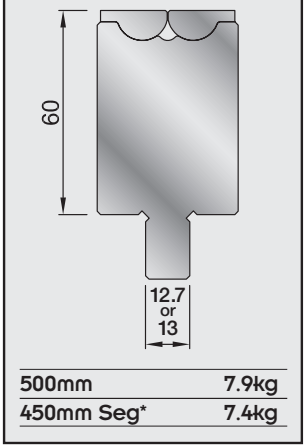
500mm	7.9kg
450mm Seg*	7.4kg

RVS80-2



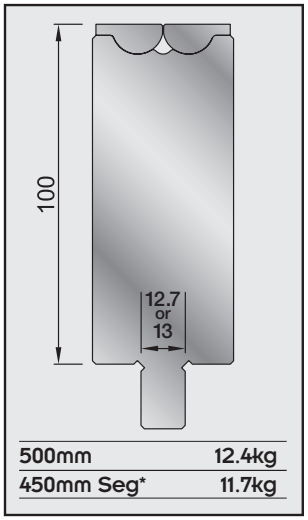
500mm	8.3kg
450mm Seg*	7.8kg

RVT60-2



500mm	7.9kg
450mm Seg*	7.4kg

RVT100-2



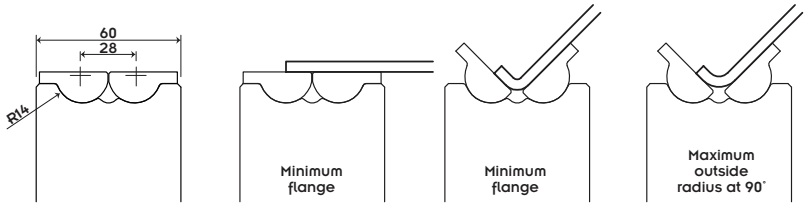
500mm	12.4kg
450mm Seg*	11.7kg

*450mm sectionalized sets include the following lengths: 200mm, 100mm, 40mm, 35mm, 30mm, 25mm, and 20mm

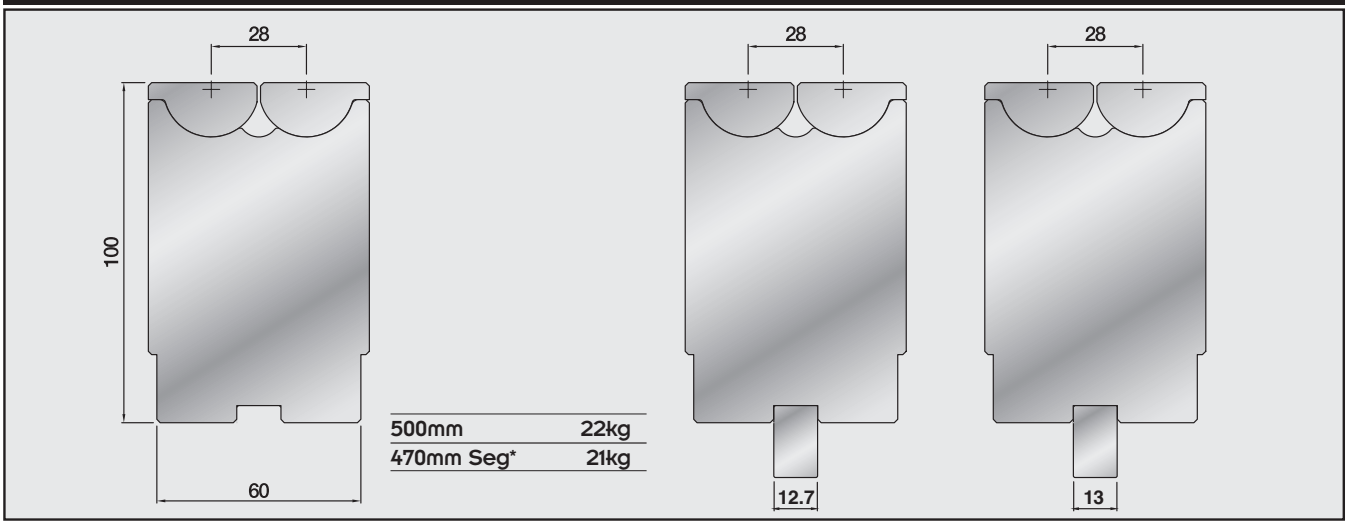
Rolla-V Dies

MODEL 2.5

- Maximum material thickness: 5.00mm (.197")
- Maximum outside radius @ 90˚: 15.0mm (.590")
- Minimum outside flange: 16.8mm (.661")
- Maximum bend angle (included): 55˚
- Tonnage capacity 250 t/m (84 tons/foot)



RVM100-2.5

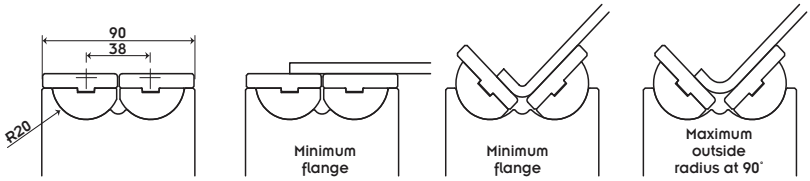


500mm	22kg
470mm Seg*	21kg

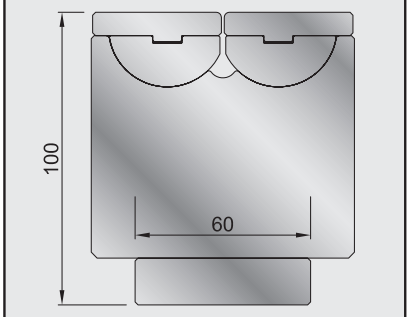
*470mm sectionalized sets include the following lengths: 200mm, 100mm, 50mm, 45mm, 40mm and 35mm

MODEL 3 (GENERATION 2)

- Maximum material thickness: 6.35mm (.250")
- Maximum outside radius @ 90˚: 18.0mm (.709")
- Minimum outside flange: 22.5mm (.886")
- Maximum bend angle (included): 50˚
- Tonnage capacity 250 t/m (84 tons/foot)

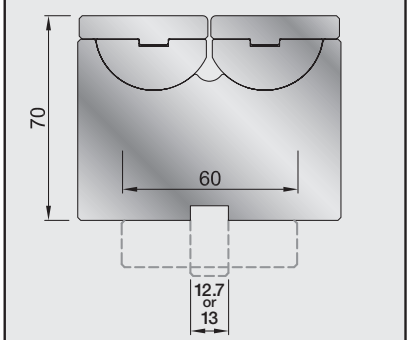


RVP100-3



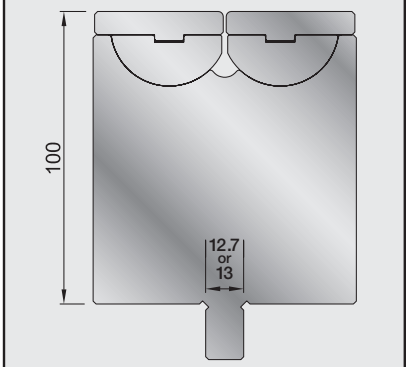
500mm	28.8kg
455mm Seg*	26.2kg

RVM70-3



500mm	20.6kg
455mm Seg*	18.7kg

RVT100-3



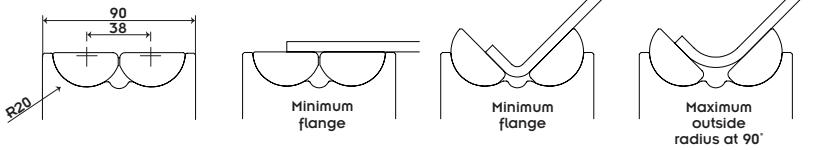
500mm	30.9kg
455mm Seg*	28.5kg

*455mm sectionalized sets include the following lengths: 200mm, 100mm, 60mm, 50mm, and 45mm

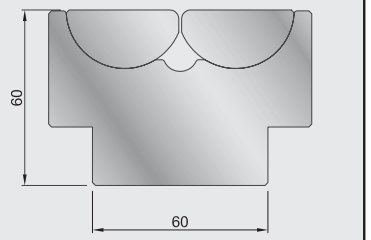
Rolla-V Dies

MODEL 3 (GENERATION 1)

- Maximum material thickness: 8.0mm (.315")
- Maximum outside radius @ 90˚: 23mm (.906")
- Minimum outside flange: 24.3mm (.956")
- Maximum bend angle (included): 75˚
- Tonnage capacity 250 t/m (84 tons/foot)

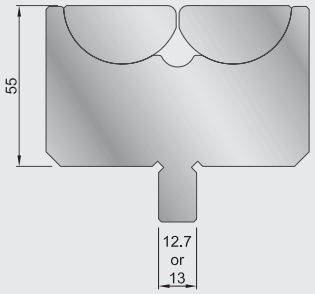


RVP60



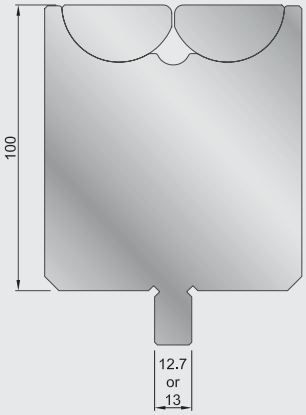
500mm	28.8kg
455mm Seg*	26.2kg

RVT55



500mm	20.6kg
455mm Seg*	18.7kg

RVT100

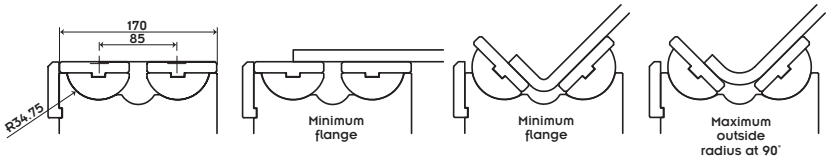


500mm	30.9kg
455mm Seg*	28.5kg

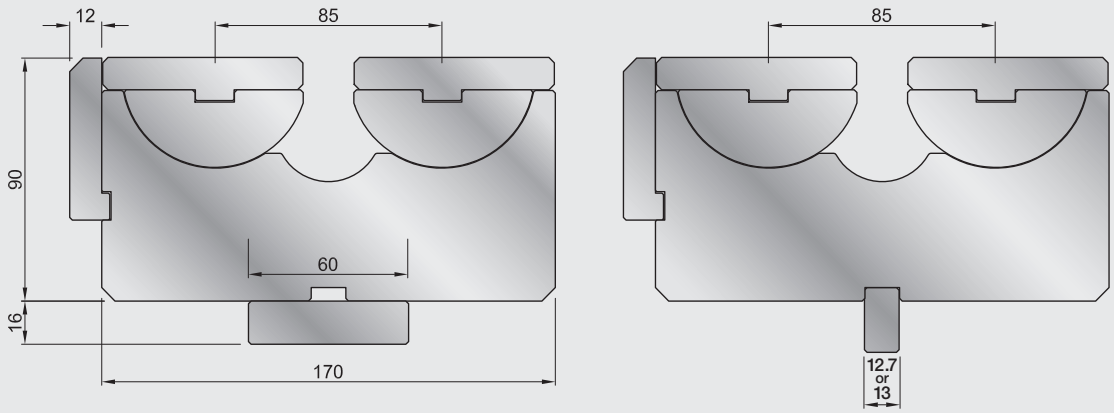
*455mm sectionalized sets include the following lengths: 200mm, 100mm, 60mm, 50mm, and 45mm

MODEL 4

- Maximum material thickness: 12.70mm (.500")
- Maximum outside radius @ 90˚: 40mm (1.575")
- Minimum outside flange: 55.0mm (2.16")
- Maximum bend angle (included): 75˚
- Tonnage capacity 300 t/m (101 tons/foot)



RVM90-4



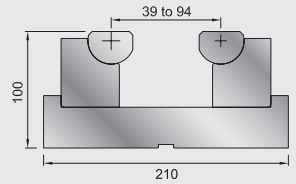
500mm	56.6kg
200mm	22.7kg

FAB SUPPLY INCORPORATED

Adjustable Rolla-V Dies

RVPV3 Adjustable

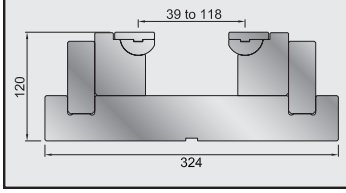
- Maximum material thickness: 12.7mm (.500")
- Maximum outside radius @ 90˚: 45mm (1.772")
- Maximum bend angle: 180˚
- Tonnage capacity 250 t/m (84 t/ft)



1000mm	100 kg
500mm	50 kg
200mm	20 kg

RVHD3 Adjustable

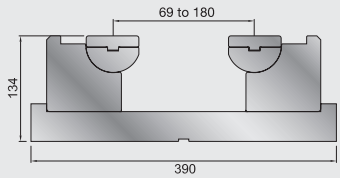
- Maximum material thickness: 16mm (.630")
- Maximum outside radius @ 90˚: 65mm (2.560")
- Maximum bend angle: 180˚
- Tonnage capacity 350 t/m (118 t/ft)



1000mm	196 kg
500mm	98 kg
200mm	38.1 kg

RVPV4 Adjustable

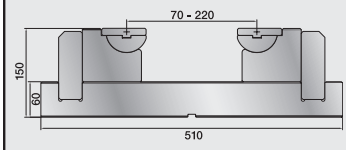
- Maximum material thickness: 30mm (1.18")
- Maximum outside radius @ 90˚: 95mm (3.740")
- Maximum bend angle: 180˚
- Tonnage capacity 350 t/m (118 t/ft)



1000mm	260 kg
500mm	130 kg
200mm	52 kg

RVHD4 Adjustable

- Maximum material thickness: 35mm (1.378")
- Maximum outside radius @ 90˚: 135mm (5.315")
- Maximum bend angle: 180˚
- Tonnage capacity 400 t/m (134 t/ft)



1000mm	400 kg
500mm	200 kg
200mm	80 kg

APPLICATION AND TECHNICAL DATA

	Material thickness	Minimum outside flange	Maximum tool load	Maximum outside radius at 90°	Maximum bend angle (included)
Model 1 Equivalent V size 7.2mm (.284") Maximum recommended thickness 1.5mm (2.0mm thickness is possible)*	.090mm (.036") 1.20mm (.048") 1.50mm (.059")	3.0mm (.118") 3.9mm (.153") 4.2mm (.165")	100t/m 35t/ft 100t/m 35t/ft 100t/m 35t/ft	4.4mm (.173") 4.4mm (.173") 4.4mm (.173")	40° 35° 35°
Model 2 Equivalent V size 13.9mm (.547") Maximum recommended thickness 3.4 mm (4.0mm is thickness possible)*	1.90mm (.074") 2.90mm (.105") 3.00mm (.118") 3.40mm (.135")	8.5mm (.335") 8.8mm (.347") 9.3mm (.366") 9.3mm (.366")	150t/m 50t/ft 150t/m 50t/ft 150t/m 50t/ft 150t/m 50t/ft	9.0mm (.354") 9.0mm (.354") 9.0mm (.354") 9.0mm (.354")	59° 46° 47° 47°
Model 2.5 Equivalent V size 25mm (1") Maximum recommended thickness 5mm (6.35mm thickness is possible)*	2.50mm (.090") 3.00mm (.118") 4.00mm (.157") 5.00mm (.197")	16.8mm (.665") 17.0mm (.669") 17.1mm (.673") 17.3mm (.681")	250t/m 84t/ft 250t/m 84t/ft 250t/m 84t/ft 250t/m 84t/ft	15.0mm (.590") 15.0mm (.590") 15.0mm (.590") 15.0mm (.590")	46° 46° 47° 55°
Model 3 Gen 2 Equivalent V size 33mm (1.30") Maximum recommended thickness 6.35mm (8.0mm thickness is possible)*	4.00mm (.157") 4.80mm (.189") 6.35mm (.250")	22.5mm (.886") 22.5mm (.886") 22.5mm (.886")	250t/m 84t/ft 250t/m 84t/ft 250t/m 84t/ft	18.0mm (.709") 18.0mm (.709") 18.0mm (.709")	47° 50° 50°
Model 3 Gen 1 Equivalent V size 36mm (1.42") Maximum recommended thickness 8.0mm	4.00mm (.157") 4.80mm (.189") 8.00mm (.315")	24.3mm (.956") 25.4mm (1.00") 26.5mm (1.043")	250t/m 84t/ft 250t/m 84t/ft 250t/m 84t/ft	23.0mm (.906") 23.0mm (.906") 23.0mm (.906")	75° 75° 75°
Model 4 Equivalent V size 85mm (3.35") Maximum recommended thickness 12.7mm	6.35mm (.250") 9.52mm (.375") 12.70mm (.500")	55.0mm (2.16") 55.0mm (2.16") 55.0mm (2.16")	300t/m 101t/ft 300t/m 101t/ft 300t/m 101t/ft	40.0mm (1.575") 40.0mm (1.575") 40.0mm (1.575")	75° 75° 75°

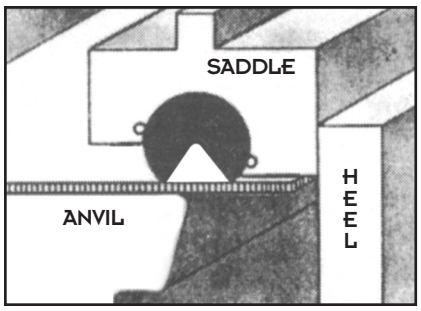
*Contact Fab Supply for instructions prior to attempting.

All tools must be used in compliance with all safety requirements as outlined by the American National Standards Institute Bulletin A.N.S.I #B11-3 as well as other local, state, and federal standards which may apply. www.fabsupplyinc.com

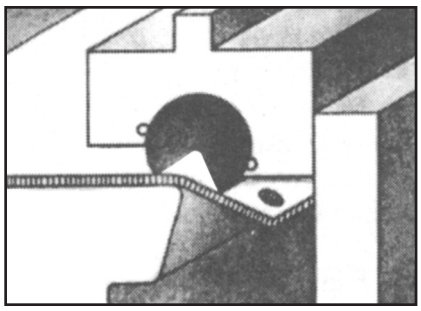
Rotary Benders

FAB SUPPLY INCORPORATED

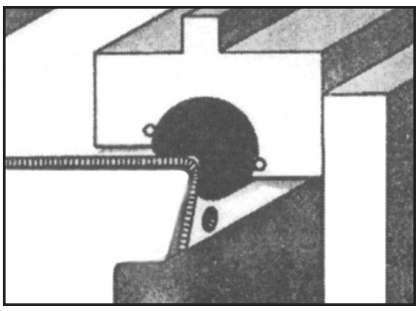
For Press Brakes & Punch Press Applications



Clamp
Material is securely clamped without other holddowns. No skidding.



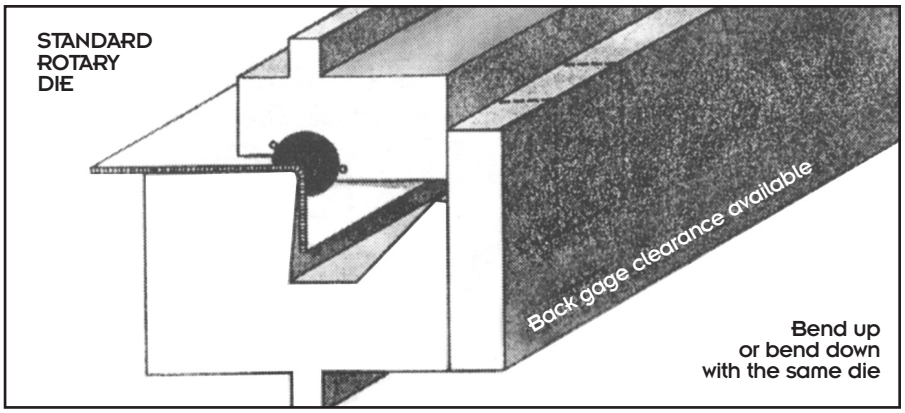
Bend
The sheet always stays level. Faster bending with improved safety and consistency.



Overbend
Rotor bends beyond 90˚ to allow for springback. Overbend rotors can bend to 120˚ in one press stroke.

Increase Your Productivity and Quality

- No part "whip up"...safer material handling
- Mar-free bending with the Delrin® rotor option
- Built-in gaging or CNC automatic gaging
- Improved part consistency and precise radii control
- Reduced tonnage requirements in most cases



STANDARD ROTARY PRESS BRAKE DIES			
CATALOG NO.	ROTOR DIA.	MATERIAL THICKNESS	FLANGE LENGTHS (Standard Die)
RB-1	1"	22GA (.030") to 14GA (.075")	7/16" to 2"
RB-2	1-1/2"	13GA (.089") to 11GA (.120")	5/8" to 2"
RB-3	2"	10GA (.134") to 8GA (.164")	13/16" to 2"
THICKER MATERIALS AND SPECIALS BY QUOTATION			

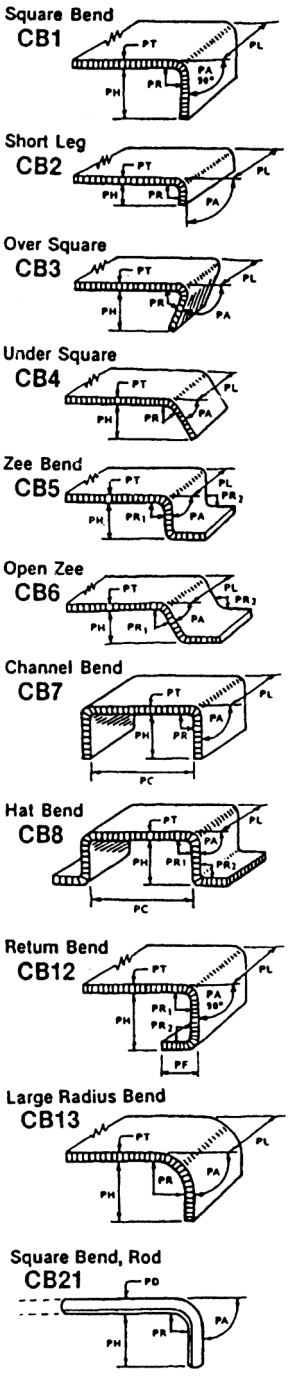
FAB SUPPLY INCORPORATED

Rotary Benders

For Press Brakes & Punch Press Applications

BEND TYPES

Specifiable by CB# and Part Dims.

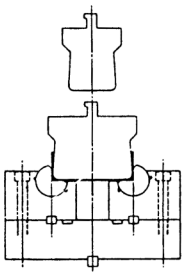


Proven COST EFFECTIVE on these Applications:

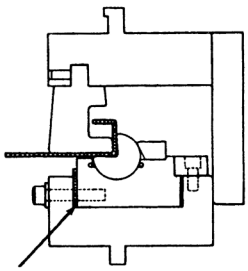
1 MAR-FREE BENDING
Most dies can be equipped with Delrin® rotors to bend pre-finished and stainless steels without tool marks.

2 BEND SHORT FLANGES on the ends of large sheets with no part whip-up. Operators run more parts safely with less scrap…even on heavy gauge material.

3 ONE-HIT CHANNEL DIES
Adjustable channel die shown.

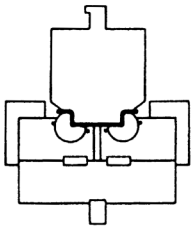


4 QUICK CHANGE DIES
Anvil sections easily changed in the press for special applications.



NOTE: Run different part thicknesses by shimming here.

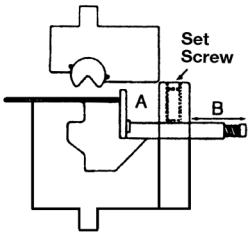
5 HAT BENDS OR OFFSETS



6 BUILT-IN GAGES or specify clearances for automatic gages.

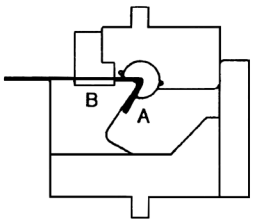
PELICO GAGE SHOWN

A) Gage rotates as die closes, spring returns gage each time.
B) Gage is adjustable.



7 COMPLETE HEMMING DIES

A) Bend part to 120°
B) Flatten to 180°



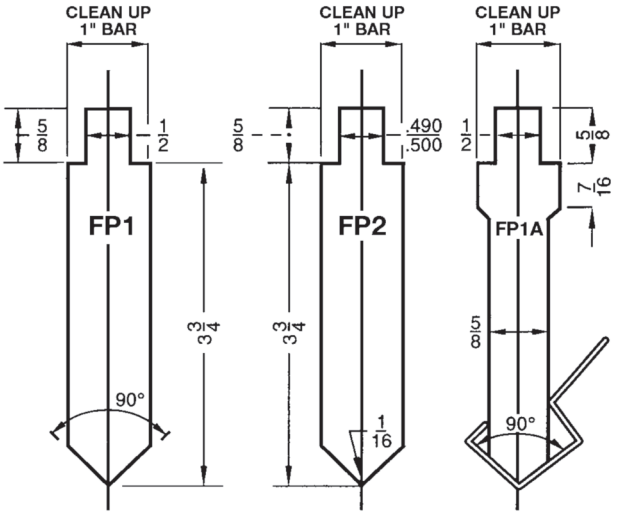
Let us quote your application
Families of parts are often satisfied with one die designed for your needs.

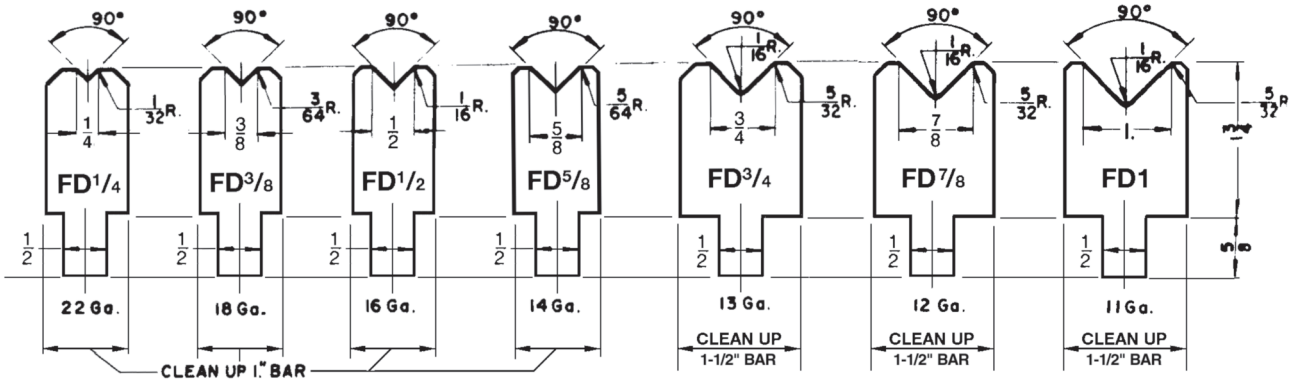
90° Forming Punches & Dies

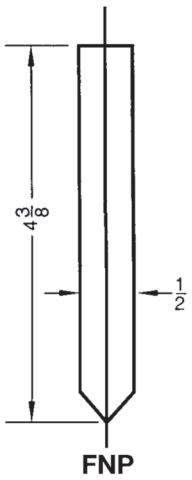
Standard and Special Configuration Tools

The tools depicted in this catalog represent our standard general-purpose profiles and a variety of special-application dies. The standard profiles generally are available from stock for immediate delivery.

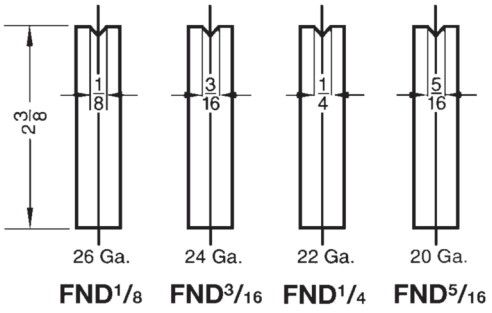
Upon request, standard profiles are easily modified to meet special forming requirements. Please refer to index page for information on safety tongues and additional services.



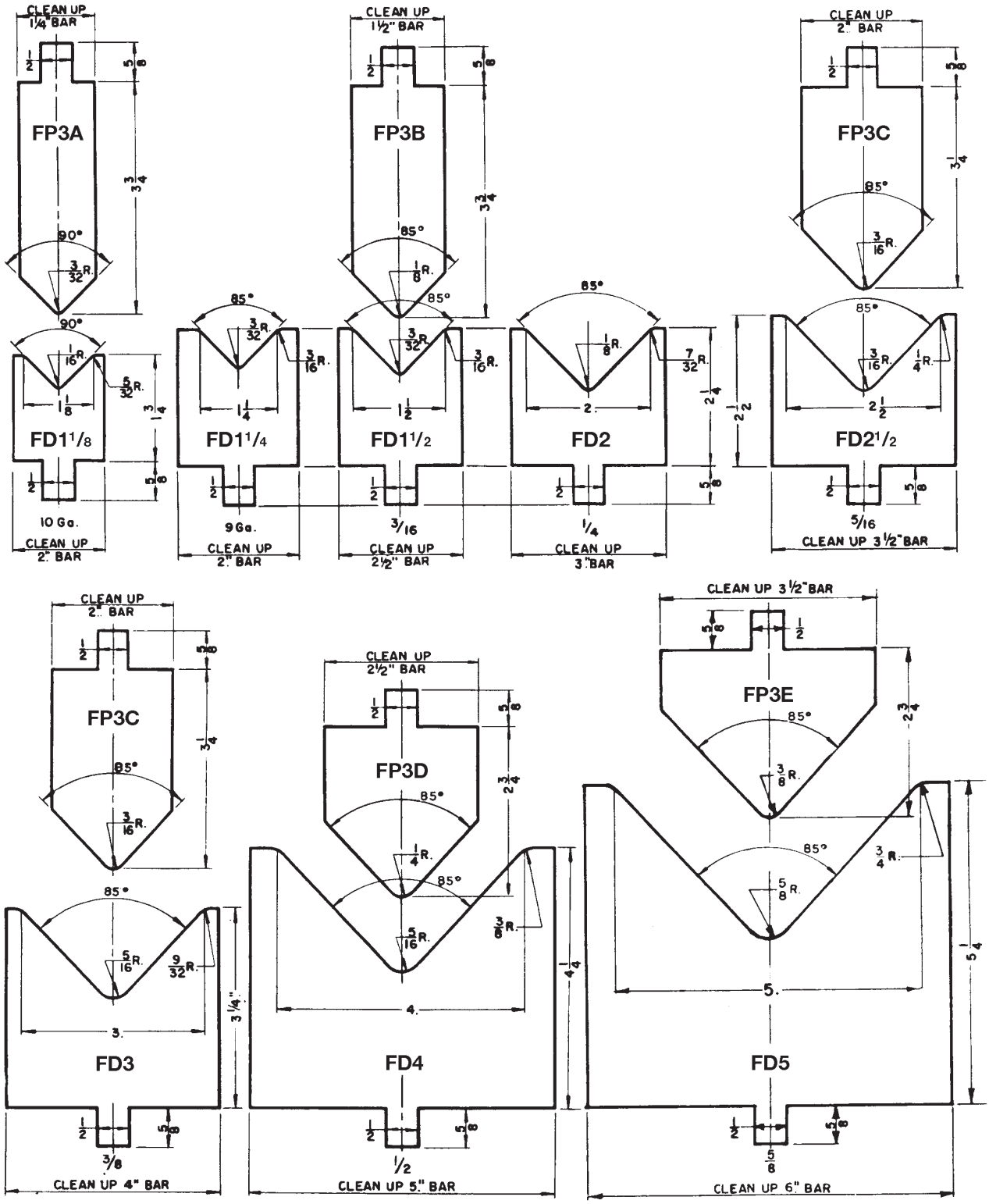




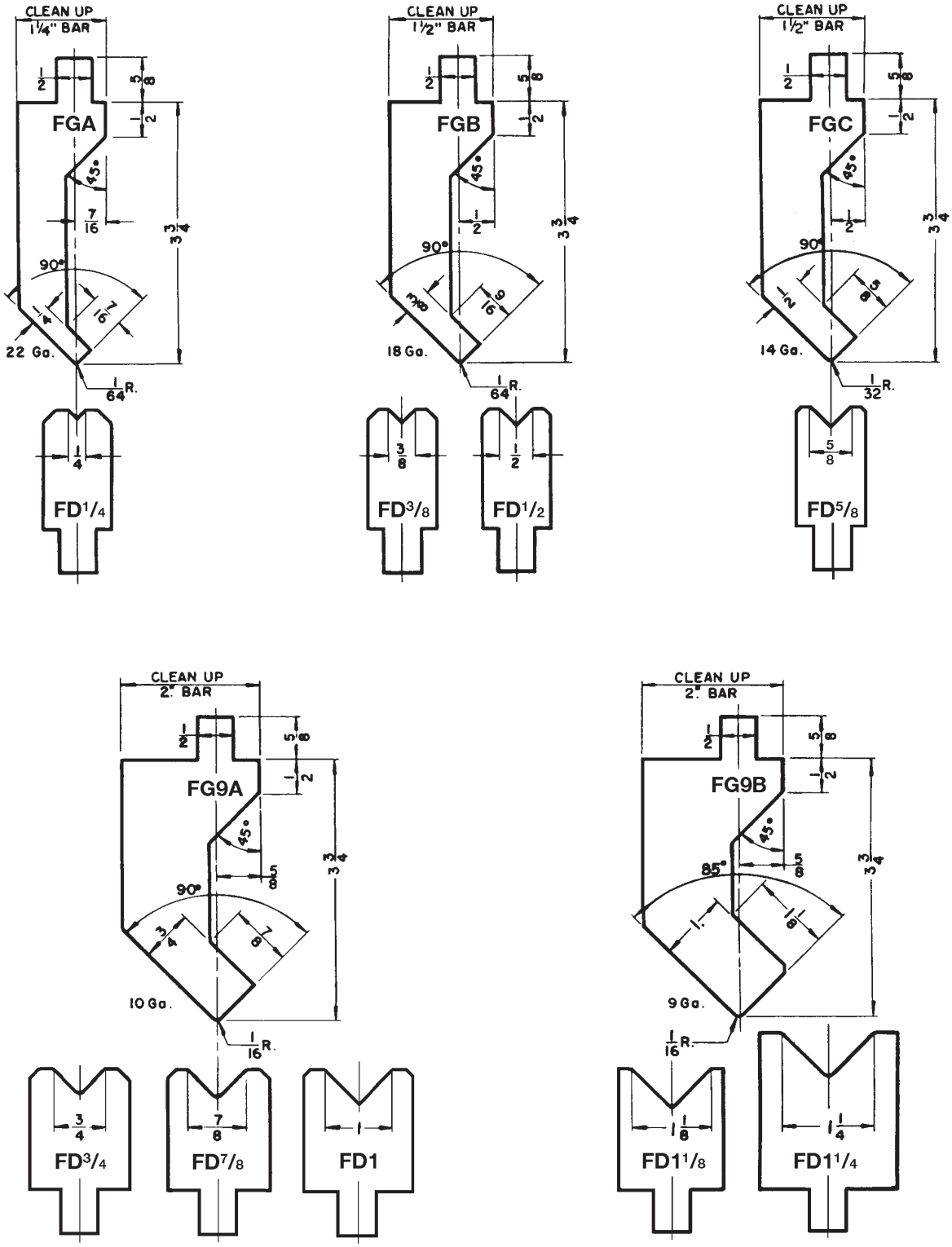
FNP punch and **FND** dies are not recommended for high production or where the punch is cut into sections; however, they are economical tools for light sheet metal forming.



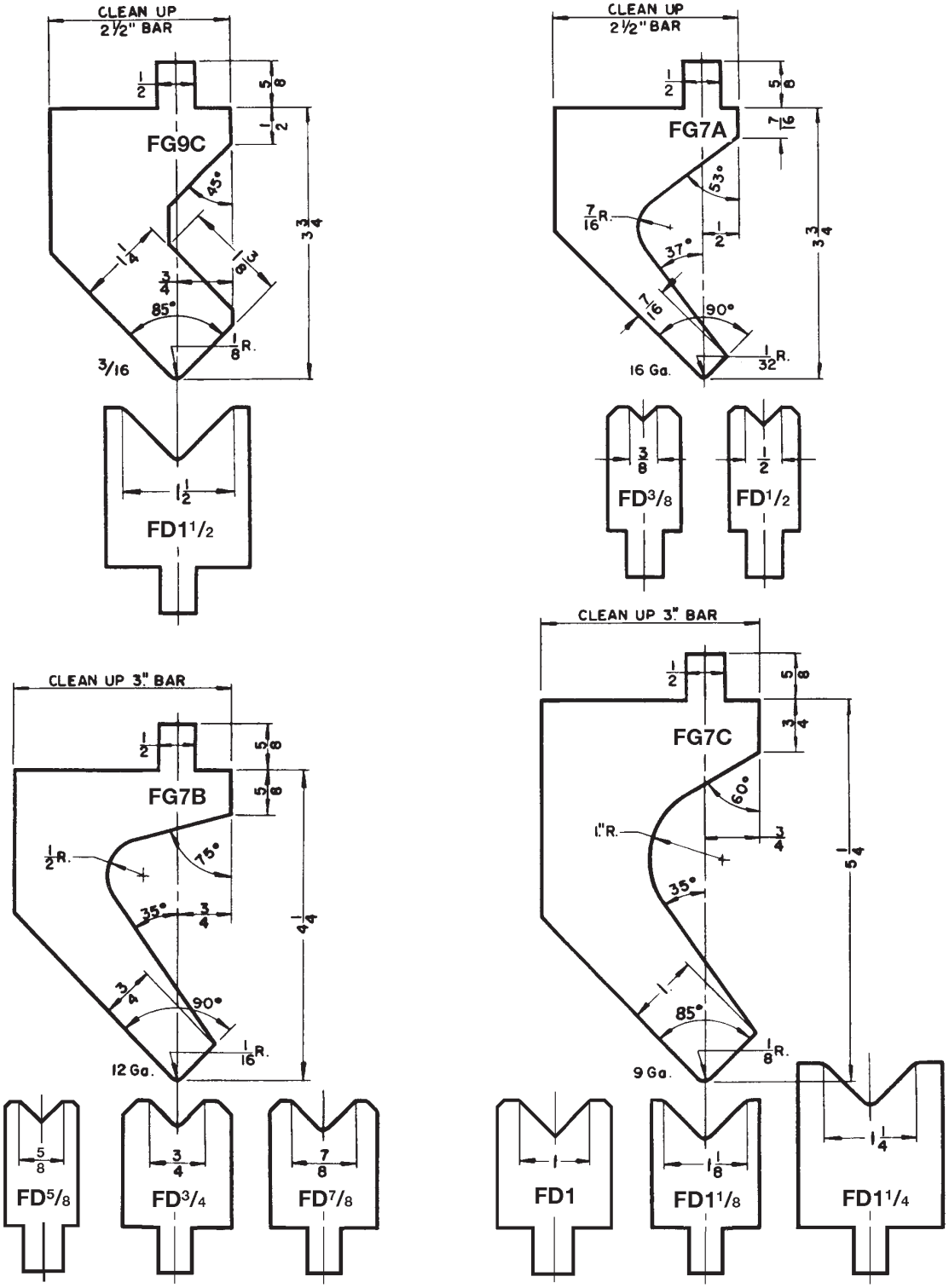
85° & 90° Forming Punches & Dies



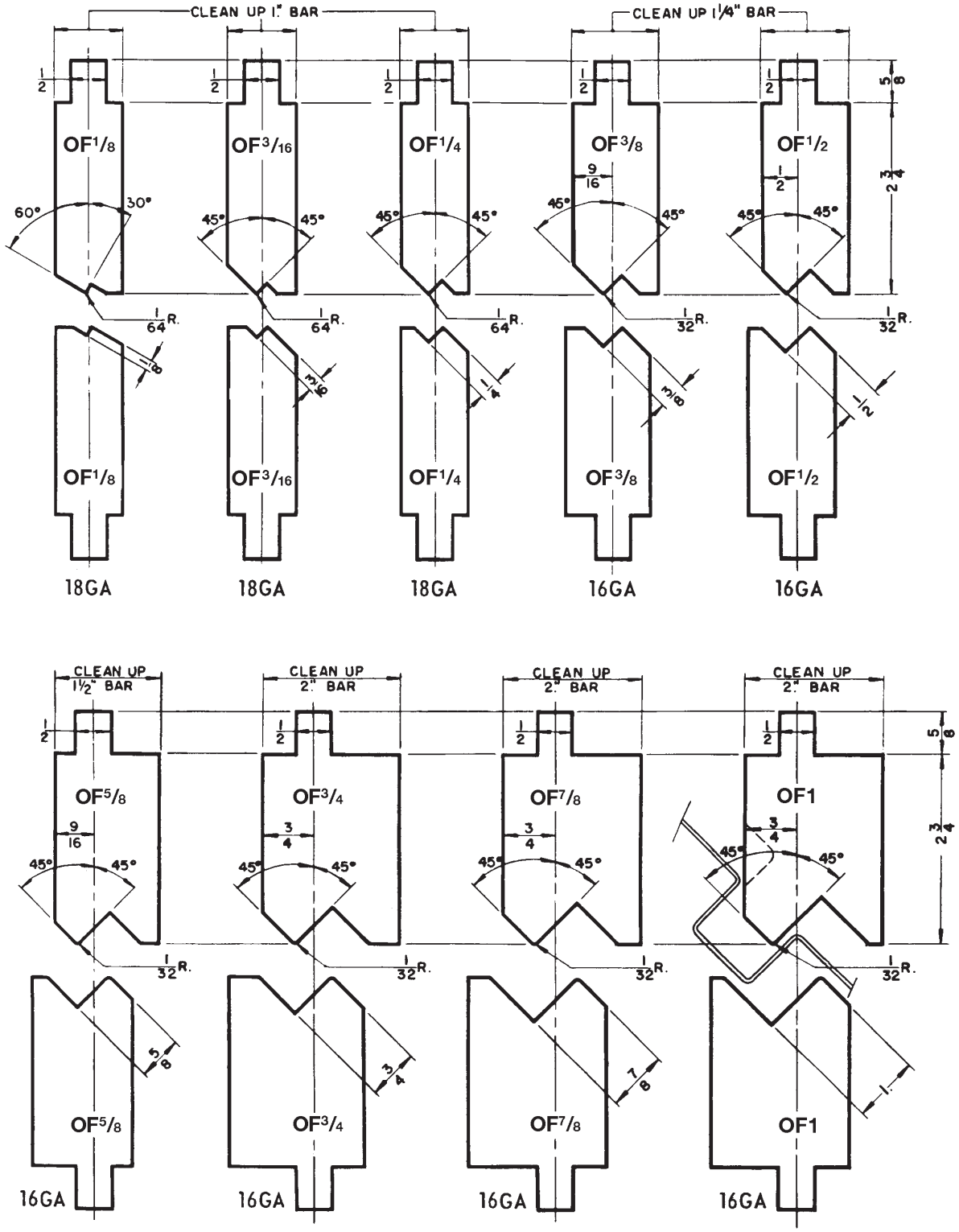
Gooseneck Punches



Gooseneck Punches

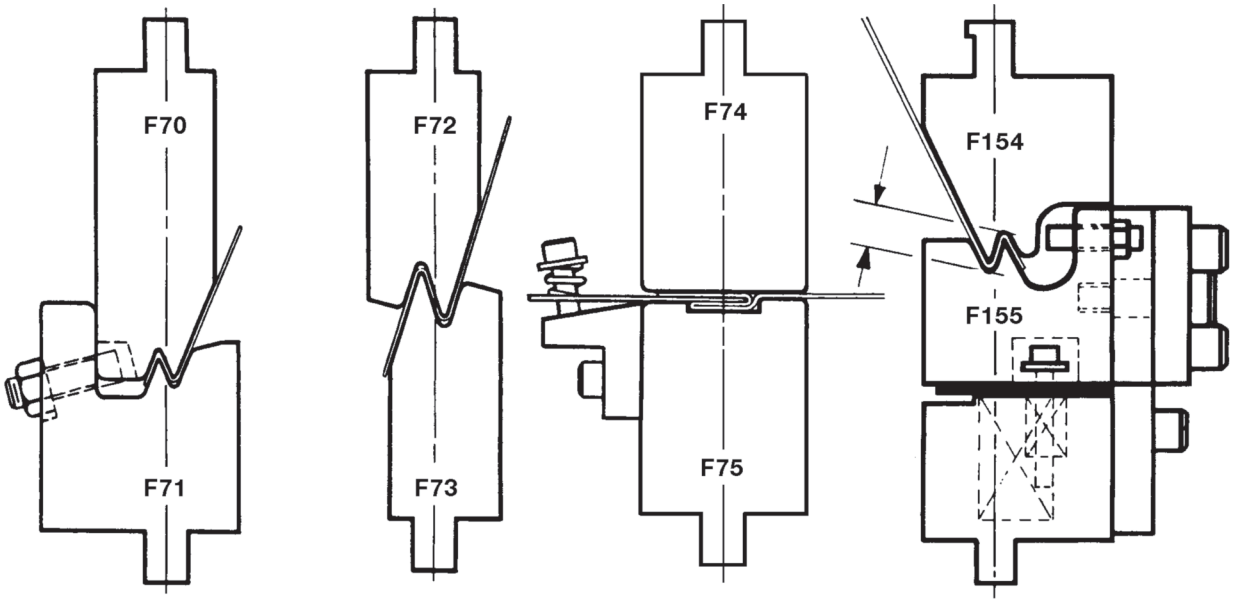


Offset Dies



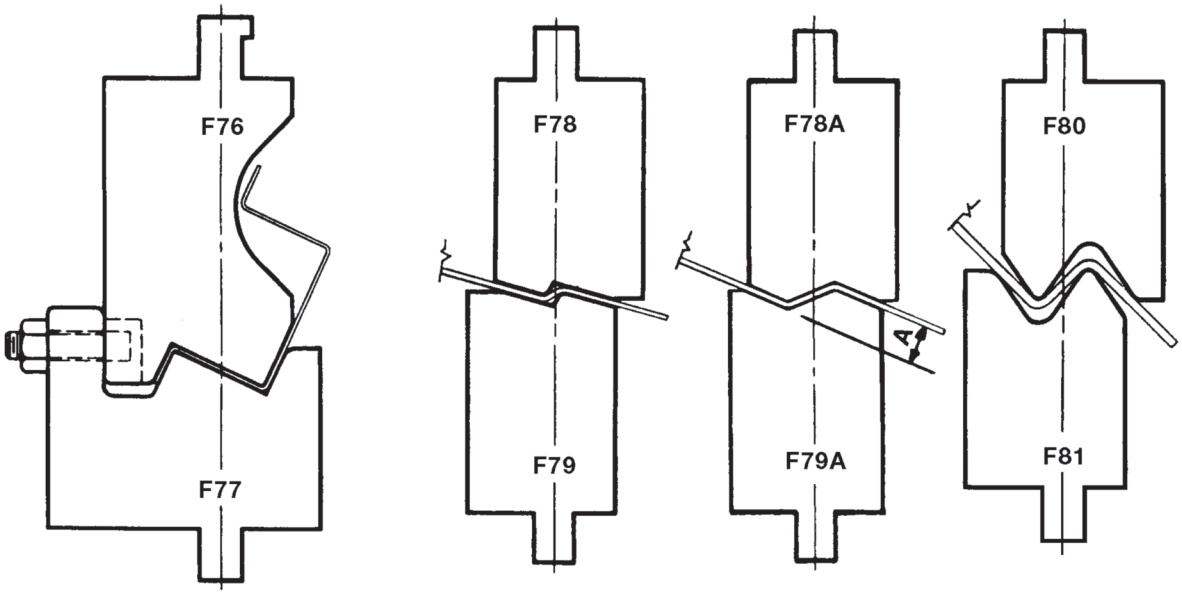
Heavy-duty offset dies for thicker materials can be produced upon request.

Lock Seam, Cleat Forming & Offset Dies



When forming an acute-angle offset at the edge of a sheet, the **F70-F71** set has the least tendency to spread. Capacity should be limited to 20 ga.

Die sets **F72-F73** and **F74-F75** produce a Pittsburgh lock seam in two strokes. The die sets can be used side by side if press has sufficient length or they can be combined into a three-high die set **(F154-F155)** to produce the lock seam in two stokes with one handling.

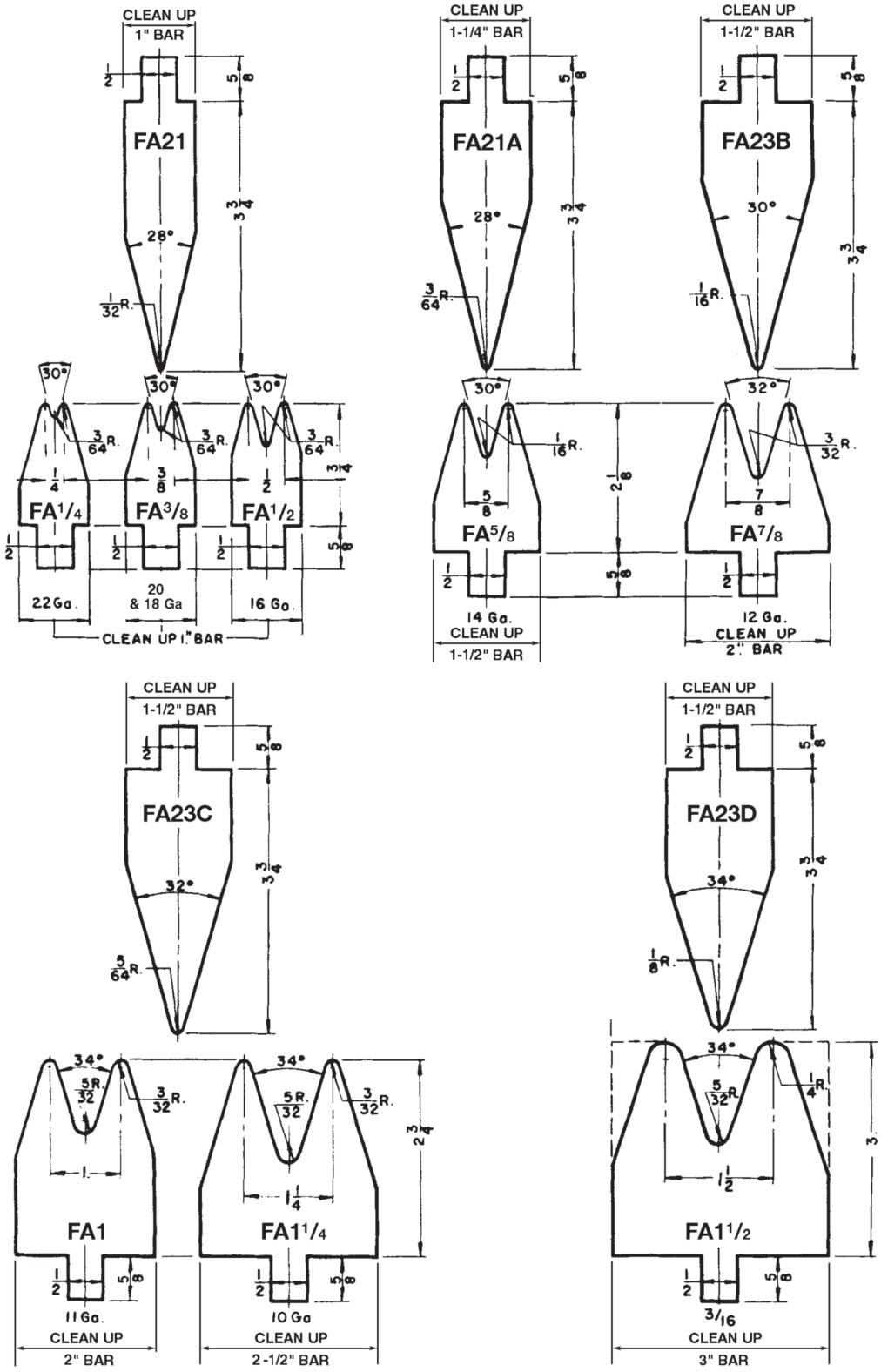


When forming large offsets, the best results are obtained with a die set such as the **F76-F77**. The forming angle is tipped to prevent bowing of the offset web.

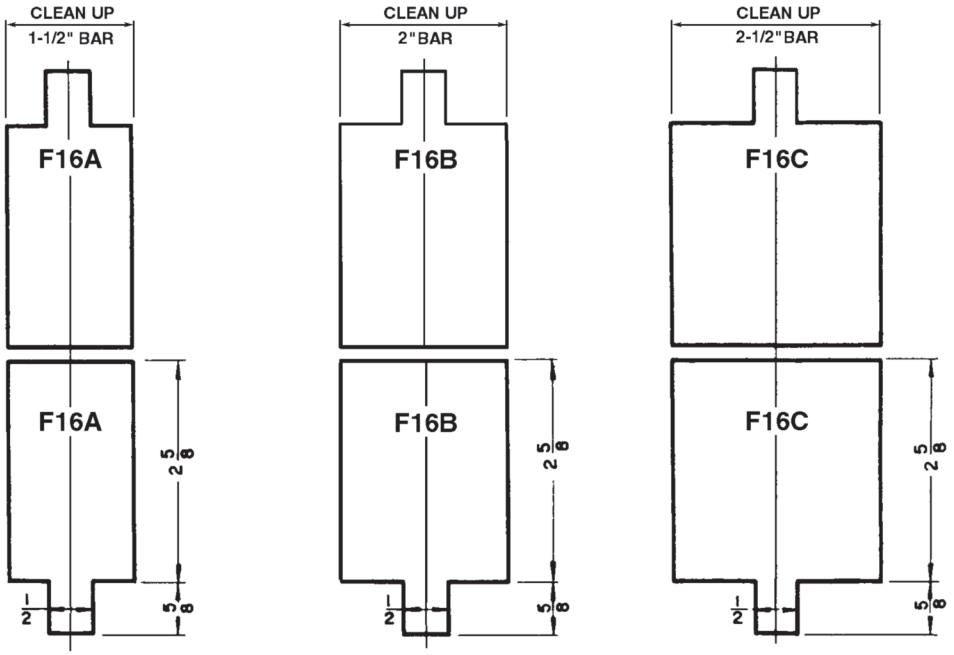
When forming a shallow open-angle offset in the middle of a sheet, the **F78-F79** set is recommended. Large radii and maximum relief help reduce press brake requirements. Dies **F78A-F79A** are used to bottom form open-angle offsets.

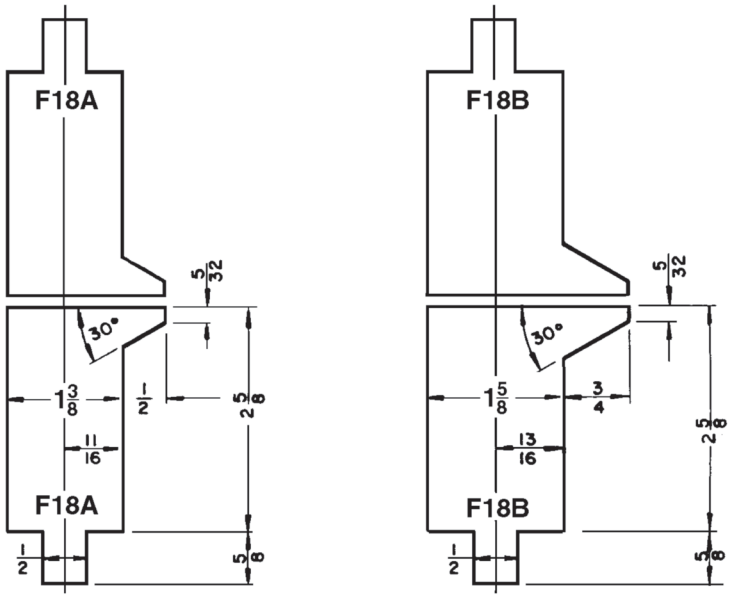
If press brake capacity will not permit a bottoming offset operation, comparatively good results can be obtained by air forming with the **F80-F81** set. Some accuracy will be lost. Heavy-duty offset bottoming-type dies are available in die numbers **F80A-F81A** (not shown).

Acute Forming Punches & Dies

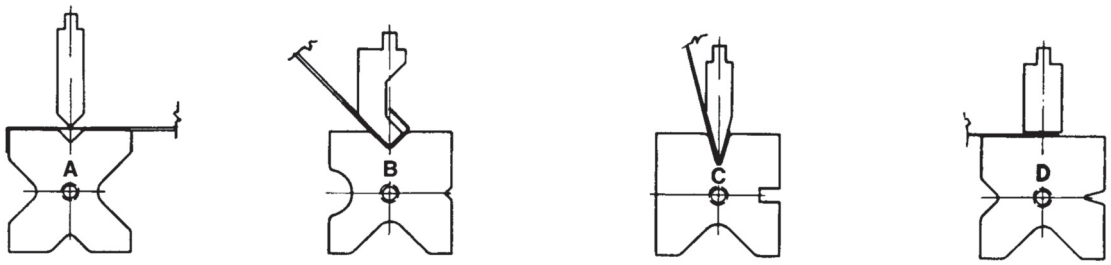


Flattening Dies





Three- & Four-Way Dies & Holders

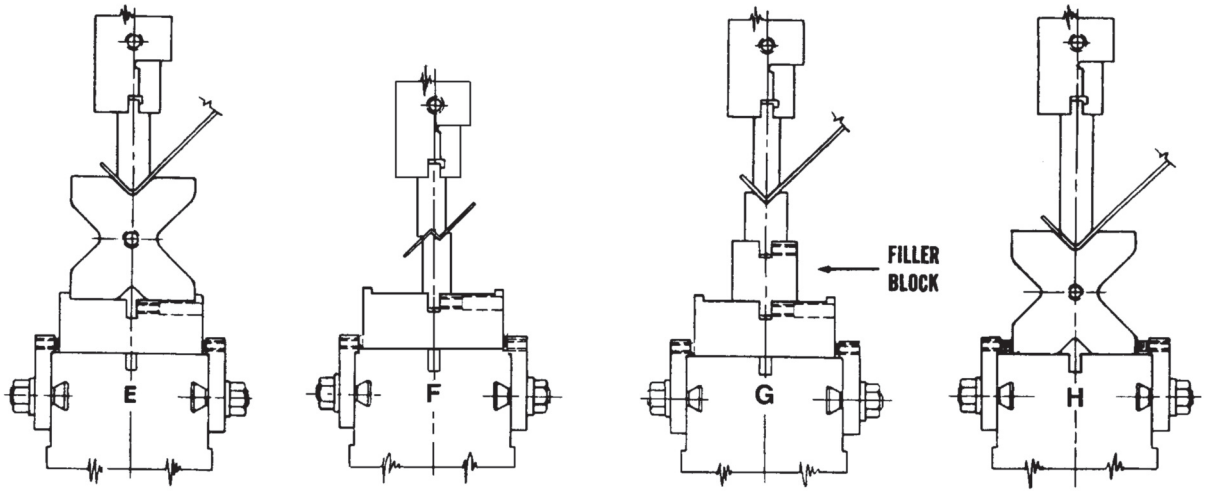


Multiple openings can be machined into a single steel bar. These dies are typically used to replace single-vee dies and can significantly reduce die-change time.

NOTE: Unless specified, all three-way dies are furnished with the smallest vee opening at 60 degrees.

Die No.	Block Size	3 Die Openings		
3V22	2.25"	.50"	.75"	1.00"
3V27	2.75"	.75"	1.125"	1.50"
3V32	3.25"	1.00"	1.50"	2.00"
3V37	3.75"	1.125"	2.00"	2.50"
3V42	4.25"	1.00"	2.00"	3.00"
3V47	4.75"	1.25"	2.00"	3.00"
3V52	5.25"	1.50"	2.50"	3.50"
3V57	5.75"	1.50"	2.50"	4.00"
3V67	6.75"	1.50"	3.00"	5.00"
3V77	7.75"	2.00"	3.50"	6.00"
3V10	10.00"	2.50"	4.00"	8.00"
3V12	12.00"	3.00"	6.00"	10.00"

Die No.	Block Size	4 Die Openings			
4V22	2.25"	.50"	.75"	1.00"	1.25"
4V27	2.75"	.625"	.875"	1.125"	1.50"
4V32	3.25"	.75"	1.00"	1.50"	2.00"
4V37	3.75"	.875"	1.125"	2.00"	2.50"
4V42	4.25"	1.00"	1.50"	2.00"	3.00"
4V47	4.75"	1.00"	1.25"	2.50"	3.00"
4V52	5.25"	1.125"	1.50"	3.00"	3.50"
4V57	5.75"	1.25"	2.00"	3.00"	4.00"
4V67	6.75"	1.50"	2.50"	3.50"	5.00"
4V77	7.75"	2.00"	3.00"	3.50"	6.00"
4V10	10.00"	2.50"	3.50"	4.00"	8.00"
4V12	12.00"	3.00"	4.00"	5.00"	10.00"



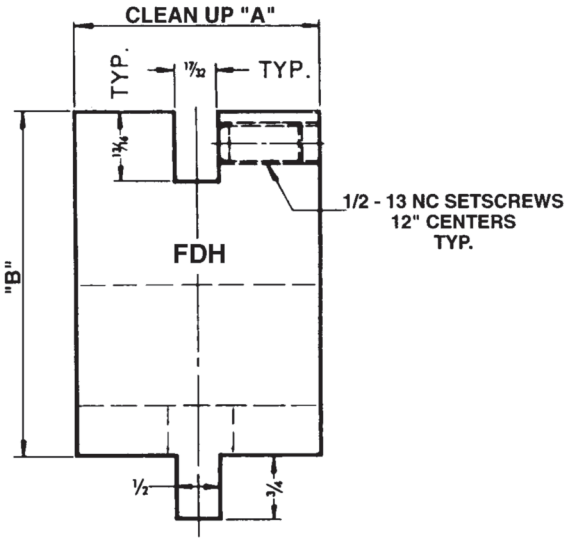
A four-way die held by a combination die holder is shown in the illustration. General-purpose dies can be substituted for the four-way when it is removed.

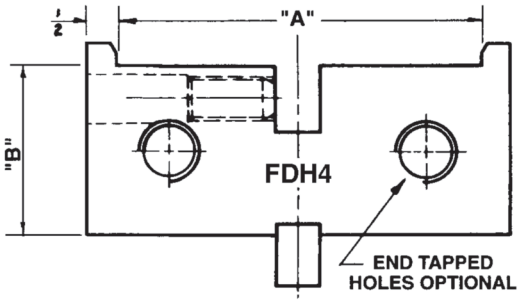
A general-purpose die can be used directly over a combination die holder provided the press has sufficient stroke (or ram adjustment).

A filler block may be required when the combination holder is low and the press does not have sufficient stroke (or ram adjustment) to close the tool set.

The four-way die can be set directly on the bed of the press if it does not have sufficient open height. This practice is not recommended, due to the potential for damage or wear of the bed surface.

Die Holders & Filler Blocks





Conventional Die Holders / Filler Blocks

No.	A	B
FDH-A	2"	1-1/2"
FDH-B	2"	2"
FDH-C	2"	3"
FDH-D	2"	4"
FDH-E	2"	5"
FDH-F	3"	1-1/2"
FDH-G	3"	2"
FDH-H	3"	3"
FDH-I	3"	4"

No.	A	B
FDH-J	3"	5"
FDH-K	4"	2"
FDH-L	4"	3"
FDH-M	4"	4"
FDH-N	4"	5"
FDH-O	5"	2"
FDH-P	5"	3"
FDH-Q	5"	4"
FDH-R	5"	5"

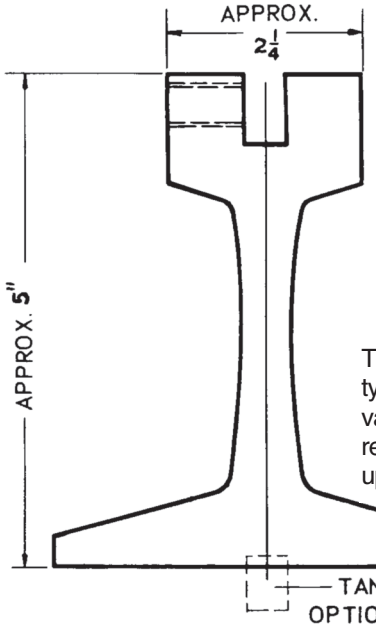
All die holders can be furnished in any length up to 24 ft. in mild steel or prehardened brake die steel.

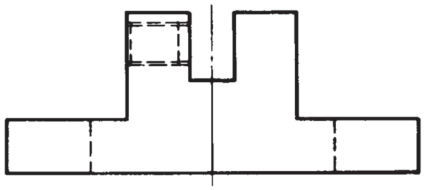
Three- and Four-Way Combination Die Holders

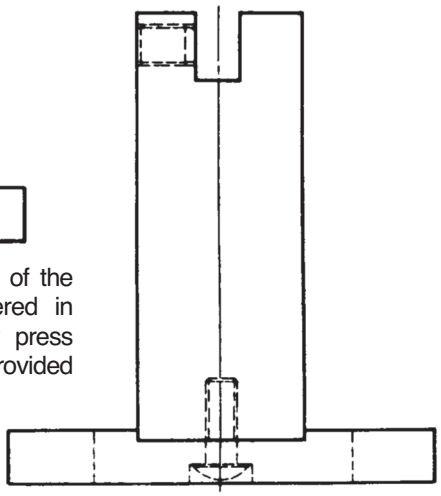
No.	A	B
FDH4A	2-1/4"	3-1/4"
FDH4B	2-1/4"	4-3/4"
FDH4C	2-3/4"	3-1/4"
FDH4D	2-3/4"	4-3/4"
FDH4E	3-1/4"	3-1/4"
FDH4F	3-1/4"	4-3/4"
FDH4G	3-3/4"	3-1/4"
FDH4H	3-3/4"	4-3/4"
FDH4I	4-1/4"	3-1/4"
FDH4J	4-1/4"	4-3/4"

No.	A	B
FDH4K	4-3/4"	3-1/4"
FDH4L	4-3/4"	4-3/4"
FDH4M	5-1/4"	3-1/4"
FDH4N	5-1/4"	4-3/4"
FDH4O	5-3/4"	3-1/4"
FDH4P	5-3/4"	4-3/4"
FDH4Q	6-3/4"	3-1/4"
FDH4R	7-3/4"	3-1/4"
FDH4S	10"	3-1/4"
FDH4T	12"	3-1/4"

Any die holder 4" high or over can be furnished with half moon burnouts for mounting.



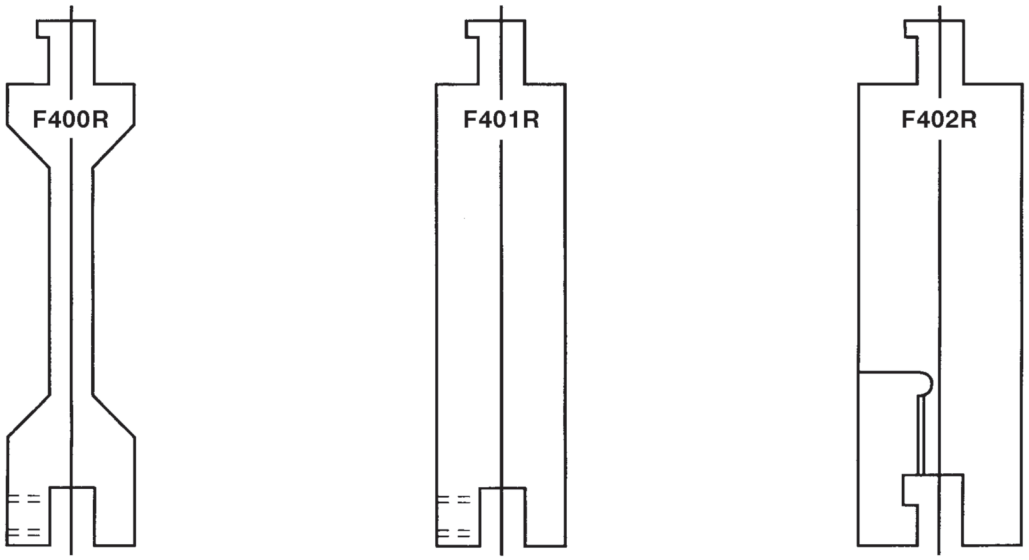




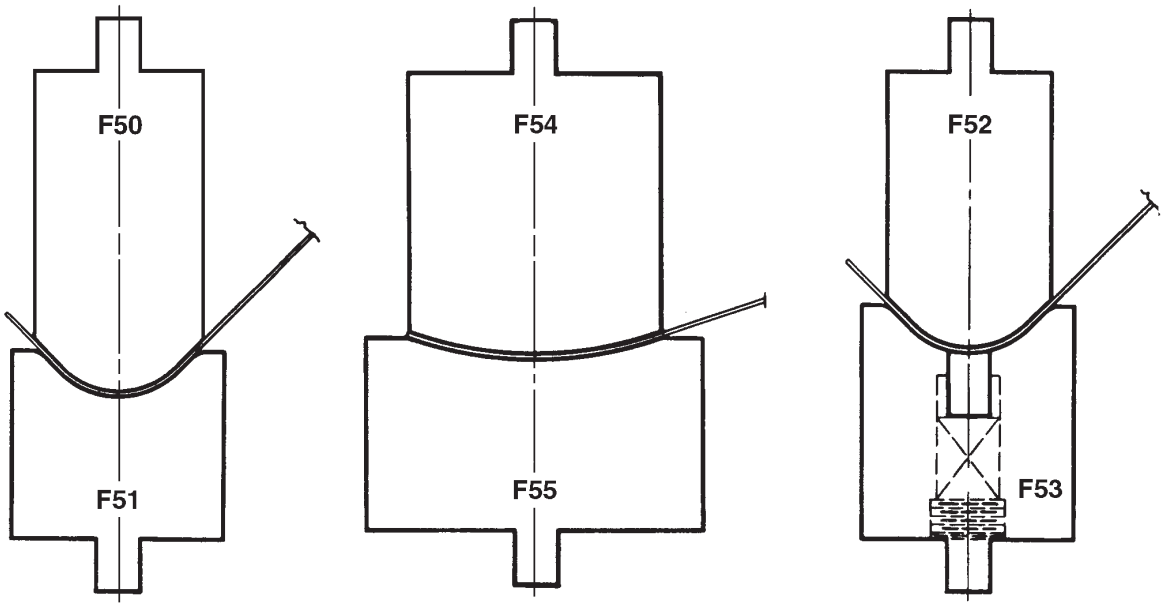
The die holders shown represent some of the types available. These items are offered in various sizes and shapes to suit any press requirement. Fastening means will be provided upon request.

Ram Adapters & Radius Forming Dies

Ram Adapters



Ram adapters are mounted to the press brake ram and are used to fill the die space if ram adjustment or stroke is insufficient. Ram adapters can be made any height or width to suit conditions and may be cut into sections for use in box forming.

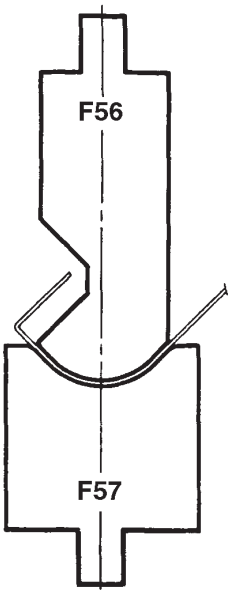


The **F50-F51** set is a form fitting radius die set with spring-back allowance built in. It is manufactured to form a specific type and thickness of material for maximum accuracy.

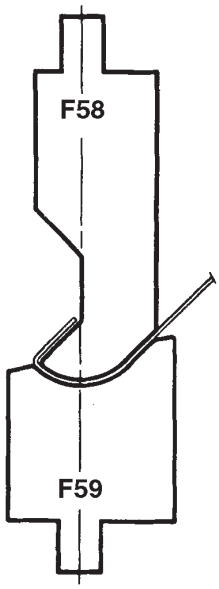
The **F54-F55** set is used to radius the edge of a sheet prior to a rolling operation, thus eliminating the flat ends normally encountered.

On light gauges, where kinking is a problem, the **F52-F53** set is recommended. The spring pad will prevent premature break-down of stock.

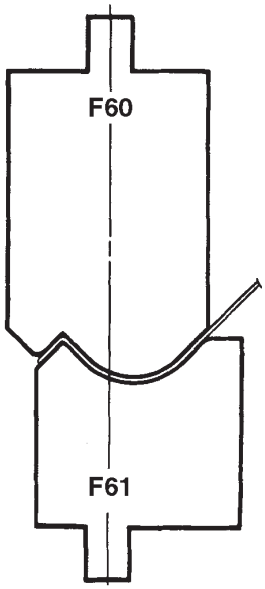
Radius Forming Dies



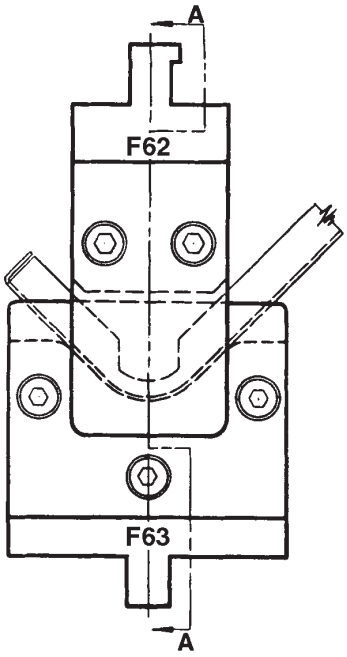
Forming a radius on a sheet having a pre-formed return flange is accomplished by the **F56-F57** die set provided there is a short flat distance between the return flange and end of radius.

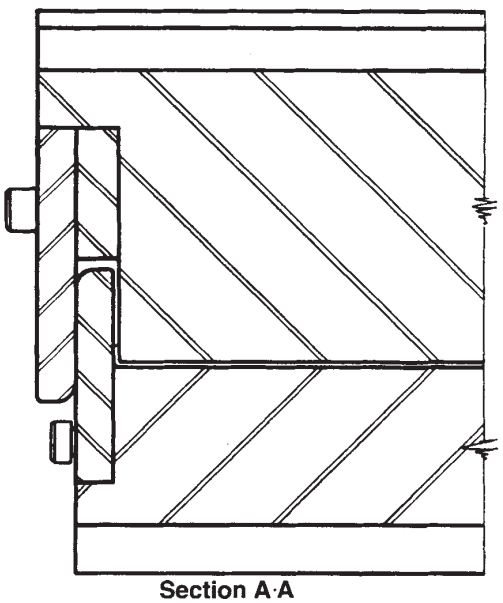


The **F58-F59** set must be used when the return flange starts at the end of the radius. The return flange must be pre-formed to an angle less than 90 degrees.



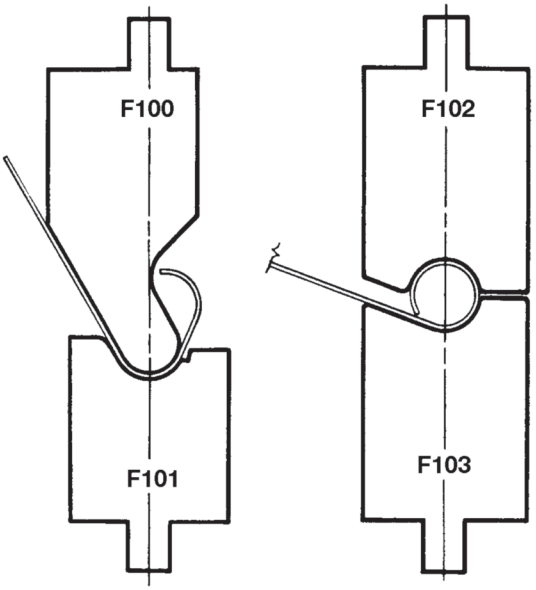
Out-turned flanges on radius bends can be formed with the **F60-F61** radius set in one stroke if springback is not too great.



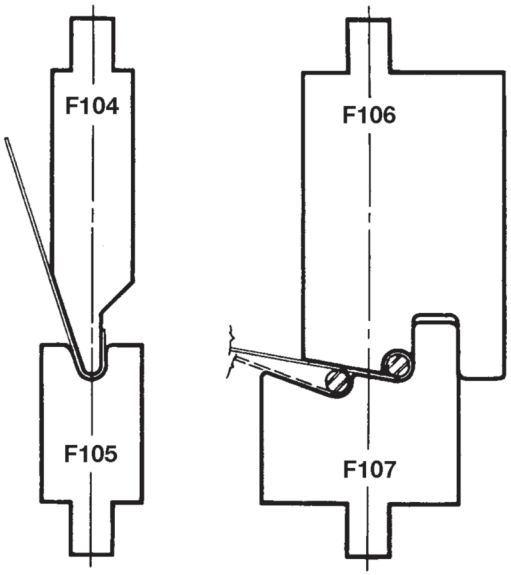


When forming a radius on a sheet that has up-turned flanges on the ends, the **F62-F63** set is necessary. Female die has wiper plates on each end to hold the flanges square and prevent them from wrinkling during the forming operation. Length of punch and die must be held closely and consideration should be given to the difference in springback between the center and the ends of the workpiece.

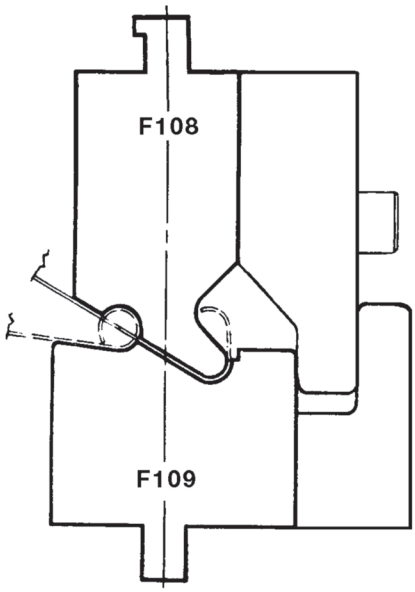
Curling Dies



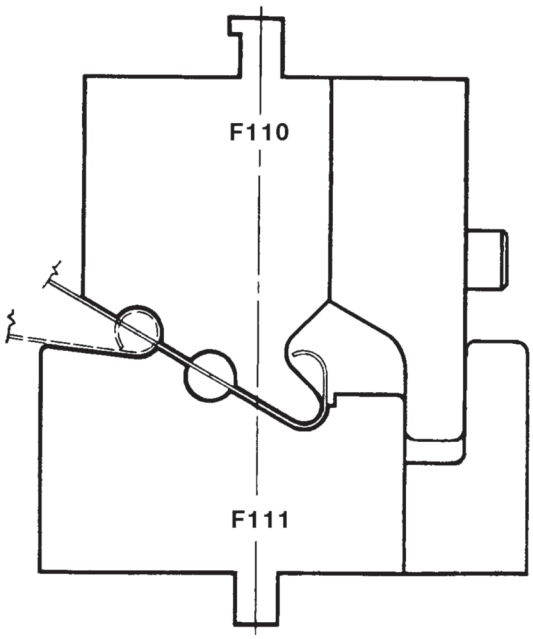
Closed curls of 1/2" inside diameter and larger can be produced with die sets **F100-F101** and **F102-F103** in three strokes. Open curls up to 200 degrees can be produced in die set **F100-F101** alone, in 2 operations.



Die sets **F104-F105** and **F106-F107** form a curl over a wire core or mandrel in 3 operations. There may be a slight flat on the curl along the closing edge for sets shown on this page.

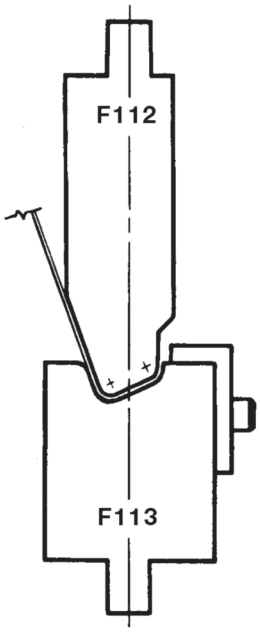


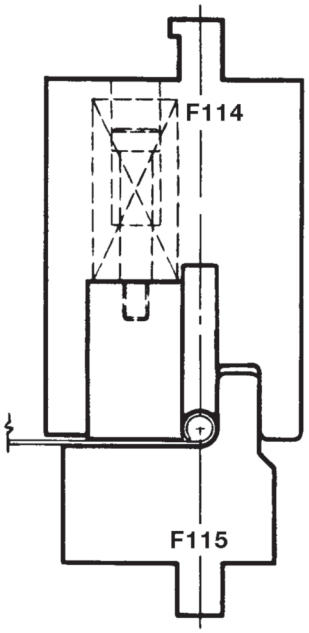
An off-center curl is completed in 3 strokes in die set **F108-F109**. Curls may range in size from 1/4" diameter to 3/4" diameter in 16 gauge and lighter stock. This type of curling die can be furnished without heels; however, we do not recommend this practice.

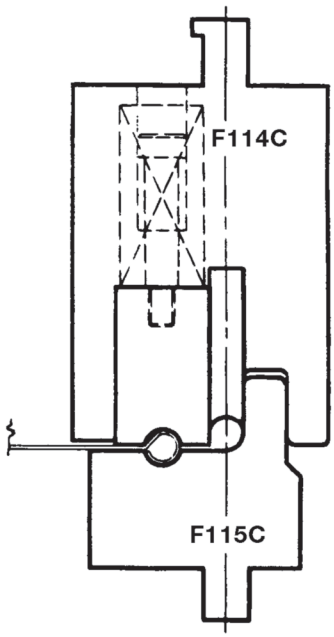


Off-center curls are performed in 3 strokes in die set **F110-F111** and on-center curls in 4 strokes. On-center curls will not be perfectly round unless a mandrel is used in the last operation. Curls may range in size from 1/4" inside diameter to 3/4" inside diameter in 16 gauge and lighter. The range can be increased slightly if a mandrel is used.

Curling Dies

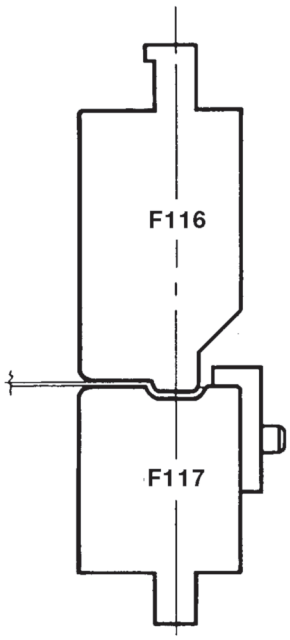


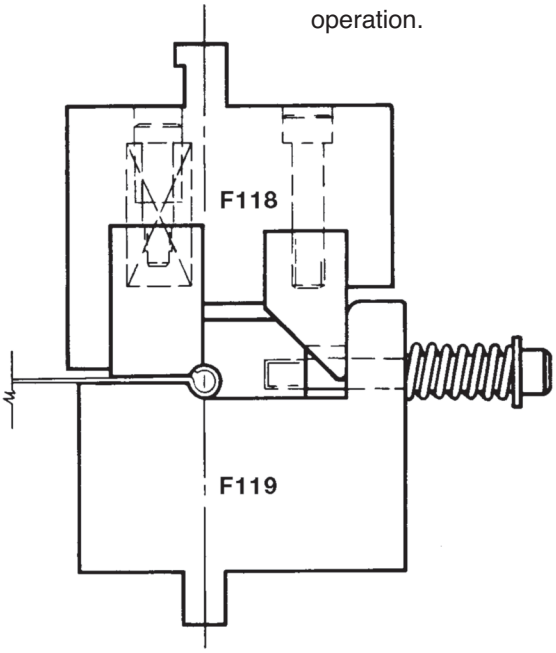




Die sets **F112-F113** and **F114-F115** produce the tightest and roundest curl that can be formed in two strokes within the range of 3/16" to 3/4" inside diameter. Dies can be mounted side by side for progressive forming if the press has sufficient length. In forming heavy gauge material, it is advisable to add a tool steel insert.

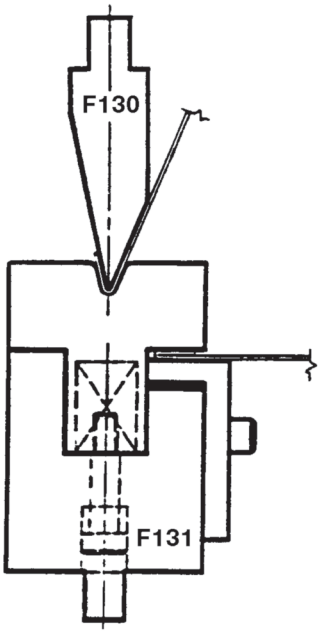
Die set **F114C-F115C** produces an on-center curl in an extra stroke. The roundness of the on-center curl becomes somewhat distorted unless a mandrel is used in the last operation.

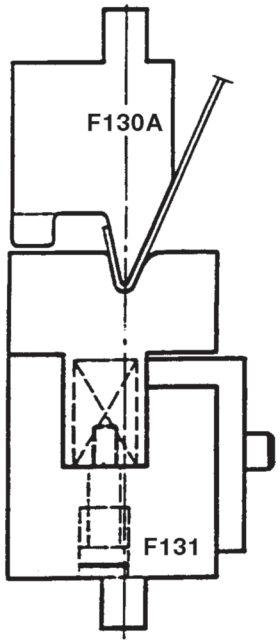




Die sets **F116-F117** and **F118-F119** should be considered when a highly accurate on-center curl is desired. These dies may be used to produce a curl from 1/4" to 1/2" inside diameter in light gauge material. A minimal flat appears on the lead edge and the sheet remains relatively flat during the forming operation. The sheet to be formed must be wide enough to provide for a reasonable amount of stock to extend in front of the die sets for safe feeding of the part.

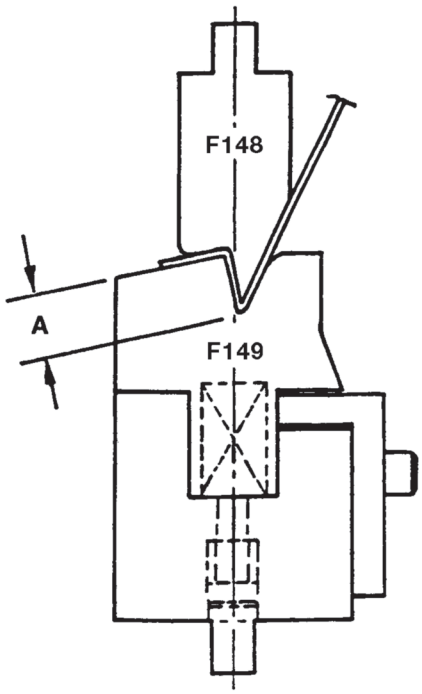
Standing Seam & Hemming Dies



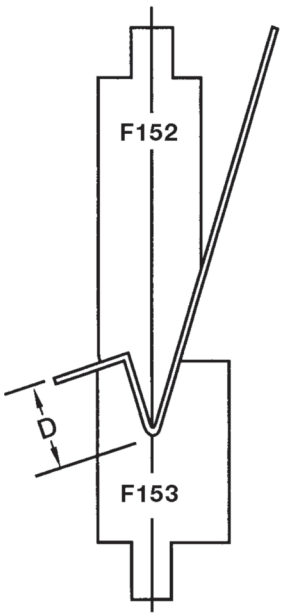


The **F130-F131** set is a three-high hemming die set recommended for 18 gauge and lighter mild steel. Shimming under the adjustment angle on lower section will allow production of an open or closed hem. The **F130A** is shown with an equalizing back heel for higher production and heavier material.

Dies **F34** and **F35** offer an inexpensive alternative for hemming 18 gauge and lighter material. This set will require two strokes to bend and close the hem.

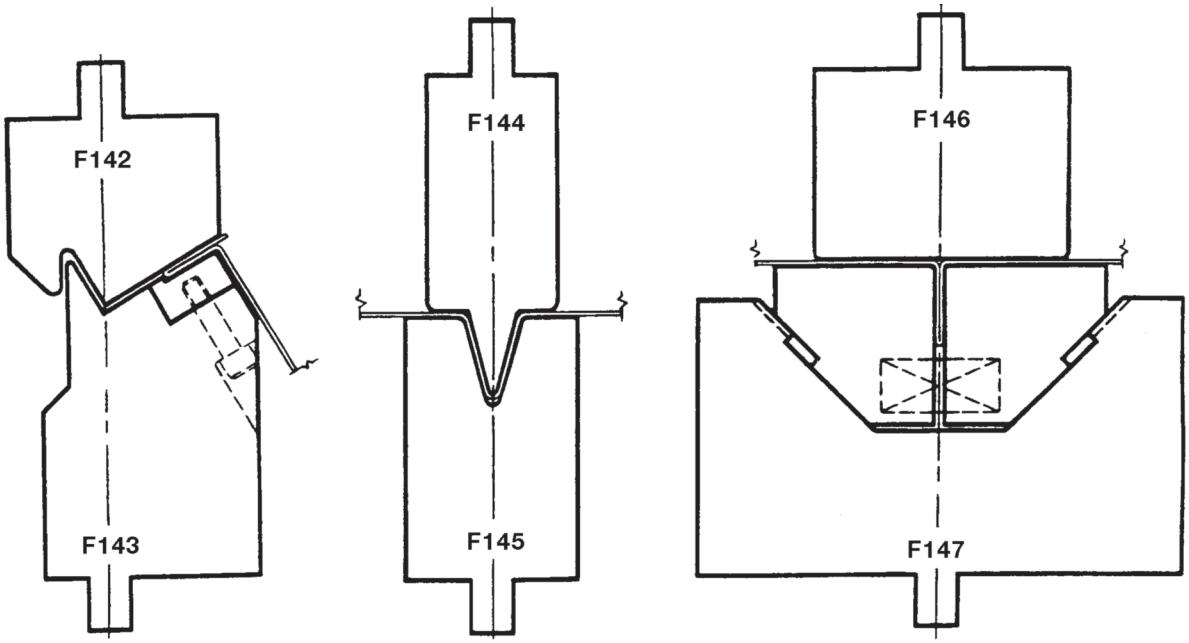


The **F148-F149** set is used to form a standing seam in two operations. The top station forms an acute angle offset, which is subsequently closed at the lower level.



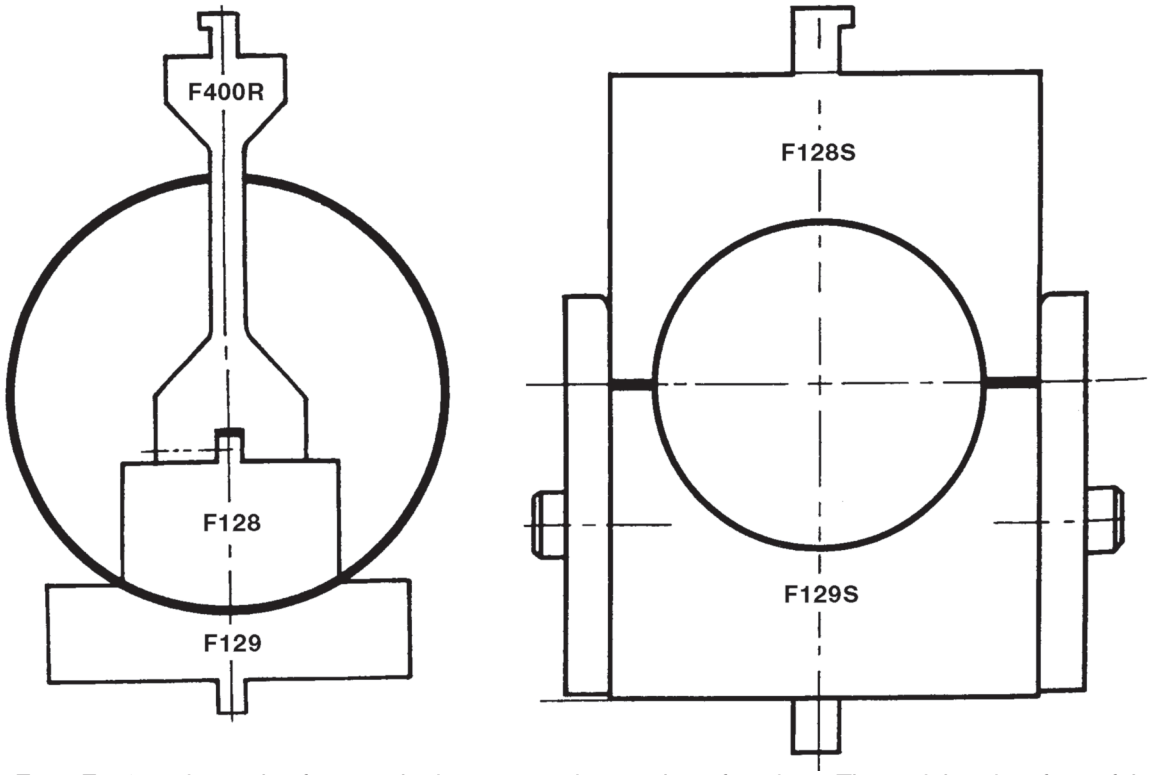
A standing seam can be made with the **F152-F153** set. The acute angle is subsequently flattened in another die and operation.

Standing Seam & Tube Form Dies



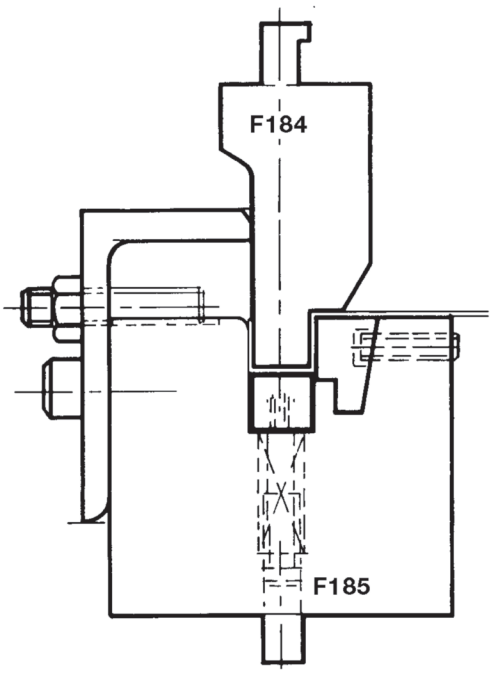
The **F142-F143** set is usually used to form seams over 1/2" high. Tightness of the seam is controlled by shimming under the adjustable anvil.

Double-flange standing seams are formed in the **F144-F145** and **F146-F147** sets in two operations. The first operation is performed in die set **F144-F145** and the closing operation in die set **F146-F147**. Die sets can be produced with matched shut heights for progressive forming if the press brake has sufficient length.

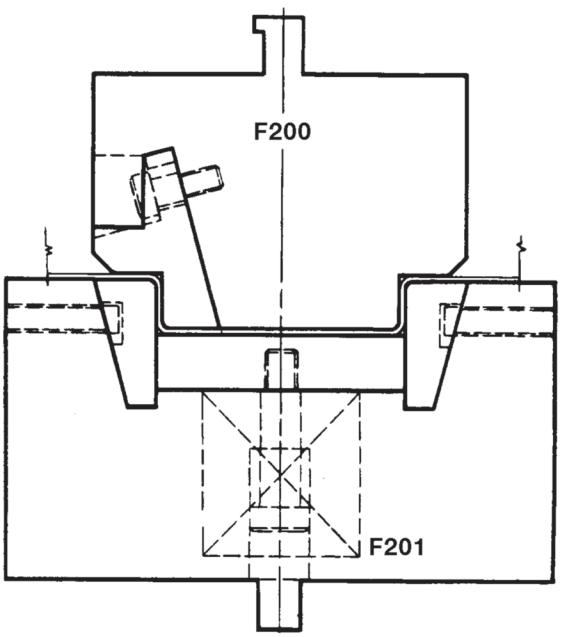


The **F128-F129** set is used to form a tube in a successive number of strokes. The peripheral surface of the form may show evidence of this. To accommodate the required height, a No. **F400R** adapter must be used. The **F128S-F129S** set is normally furnished about two feet long. The pre-formed tube is fed thru the die from left to right, sizing the part in two-foot increments. Any length of part can be sized in this manner.

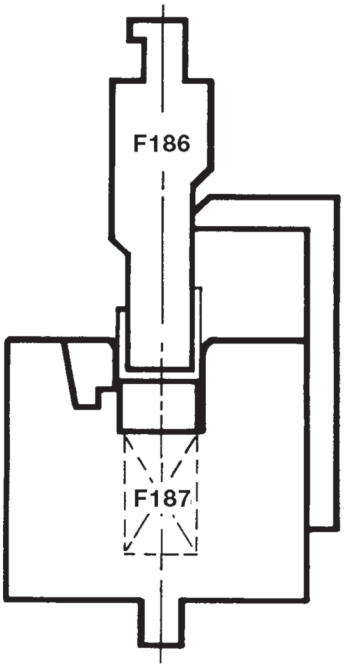
Channel Dies



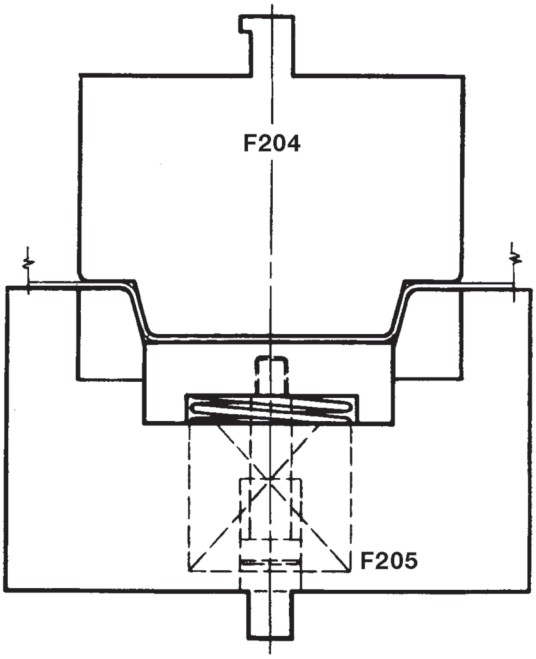
A semi-hat-shaped channel can be formed on the edge of a sheet with the **F184-F185** set. The release wedge and hook stripper assure positive part removal.



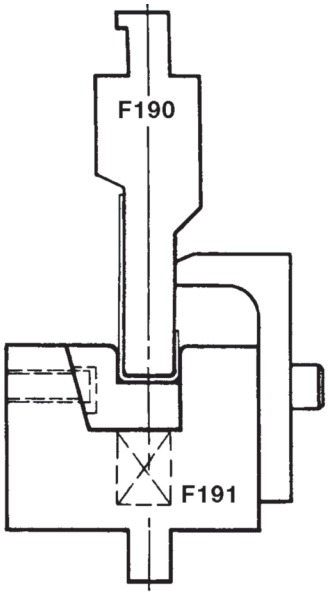
The **F200-F201** set forms four square bends in one stroke. The spring pad in the die keeps the web flat. Release wedges in the punch and die permit easy removal of the part.



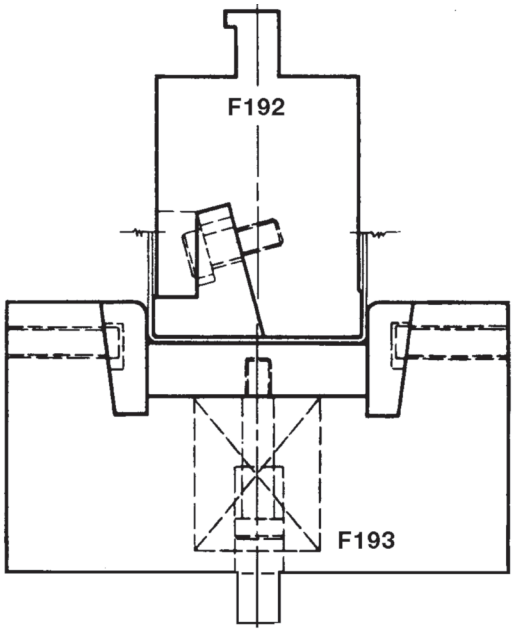
The **F186-F187** set can be used to form flat-bottomed channels in one stroke. Stripping is assured with release wedges and hook strippers.



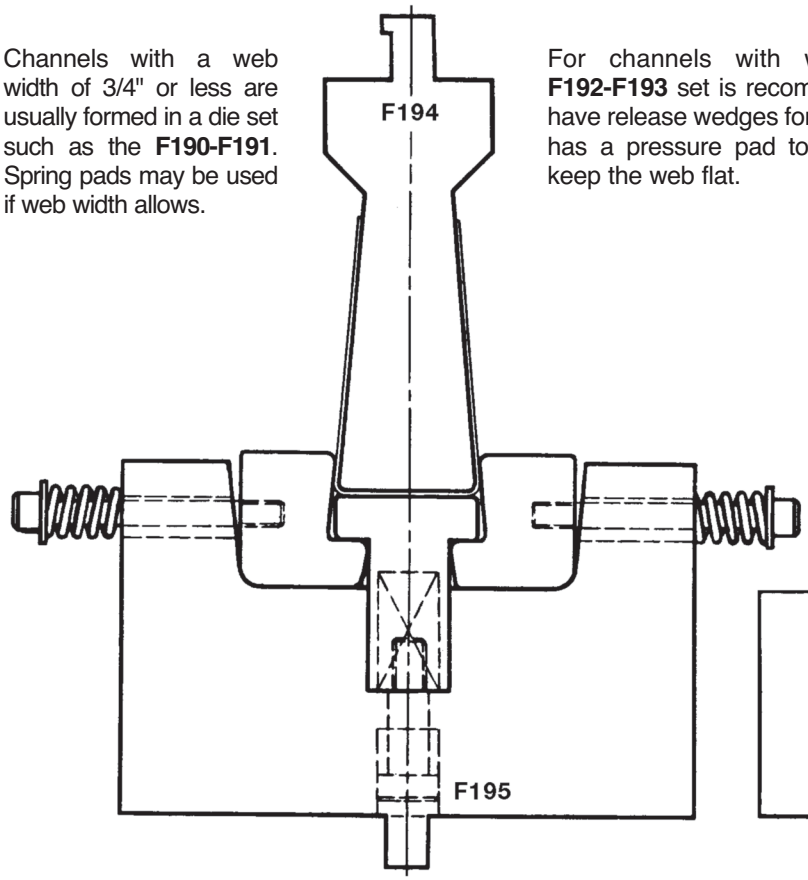
By tapering sides of the channel, the design of the **F204-F205** set is simplified and the cost reduced. A pressure pad in the lower die holds the material against the punch and maintains web flatness. It also serves to eject the part.



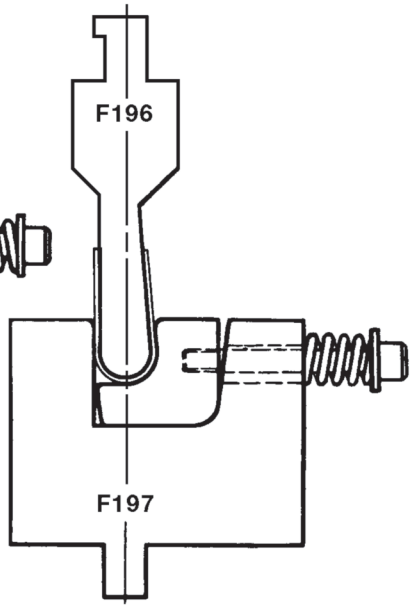
Channels with a web width of 3/4" or less are usually formed in a die set such as the **F190-F191**. Spring pads may be used if web width allows.



For channels with web width over 3/4," the **F192-F193** set is recommended. Both punch and die have release wedges for quick removal of part. The die has a pressure pad to help maintain accuracy and keep the web flat.

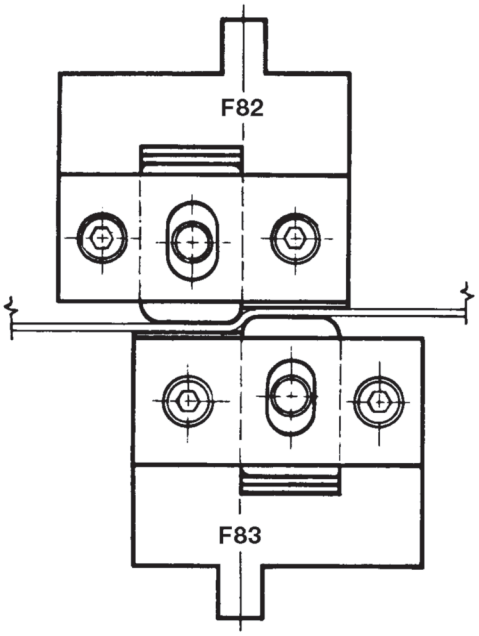


When considerable material springback is encountered in channel forming and over-bending is necessary, the **F194-F195** set is recommended. The spring pad actuates the rocker inserts, causing over-bending near the bottom of the stroke.

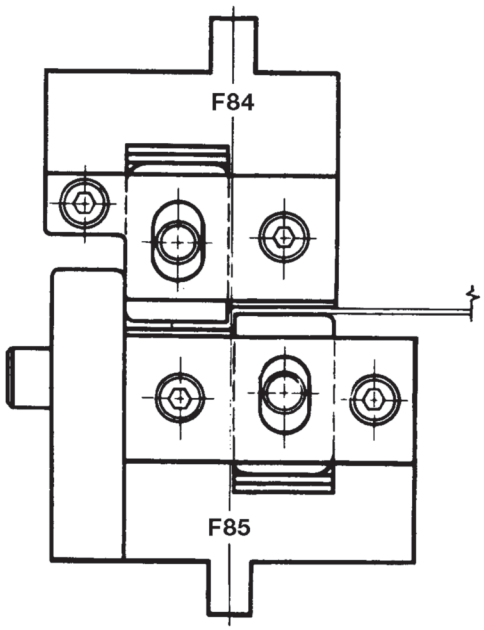


Small U channels with little springback can be formed in one stroke in the **F196-F197** set. The rocker insert over-bends the shape to compensate for springback.

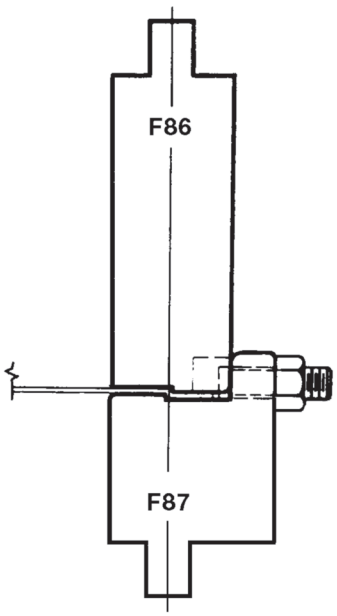
Offset & Joggle Dies



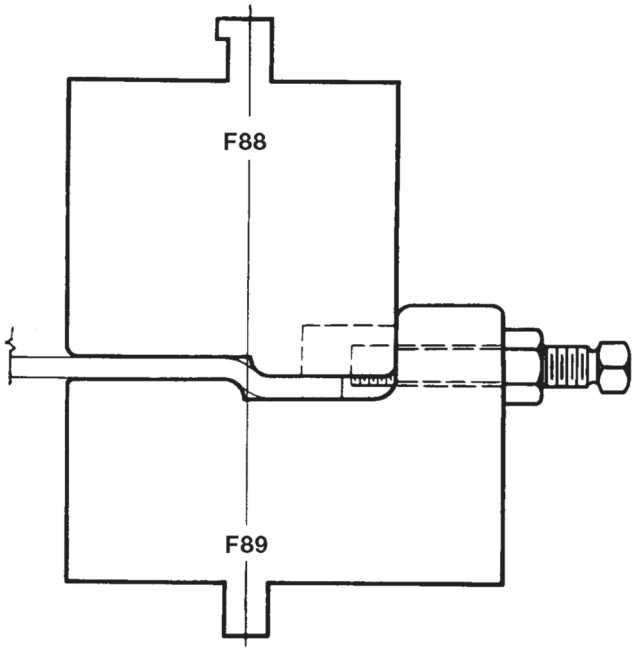
Open-angle offsets up to 5/16" can be produced using the **F82-F83** set. Shimming behind reversible blocks changes the depth of the offset. Rotation of the blocks changes the radius. Each corner has a different radius to allow for various material thicknesses.



If the offset is 1" or less from the edge, the **F84-F85** set can be used. This die set has a back-up leader to minimize spreading, resulting in sharper offsets.

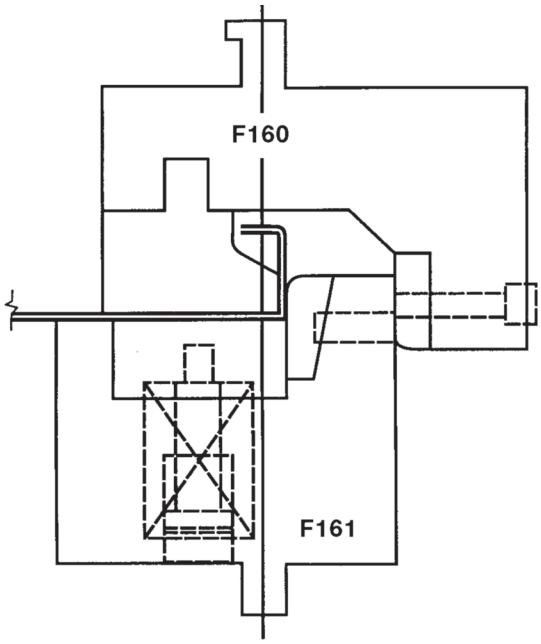


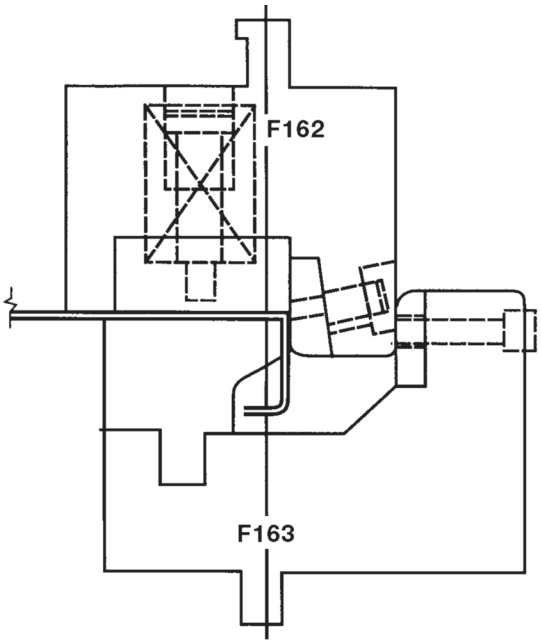
Material-thickness offsets are performed on the **F86-F87** set. When necessary, a back-up leader and gauging are provided.



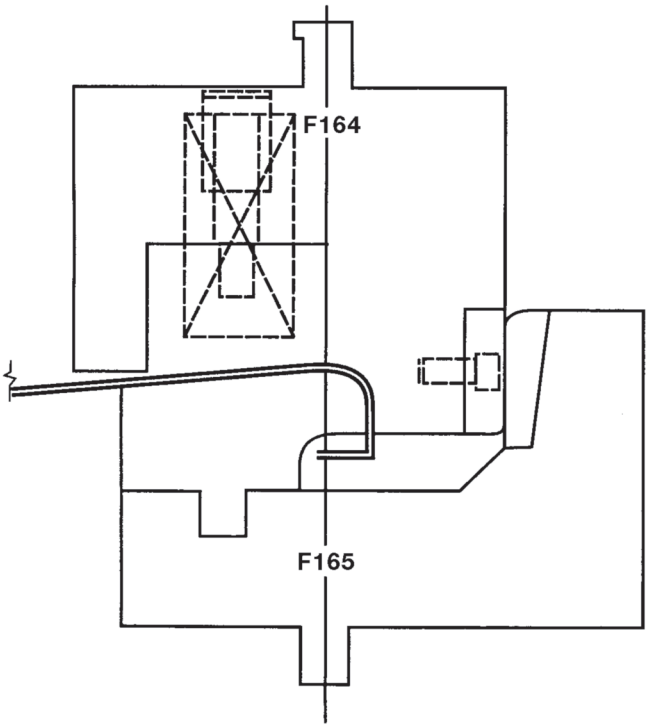
On heavier gauge stock, material-thickness offsets will always be of the open-angle form similar to **F88-F89** because the outside radii are too large for the depth of the form.

Wiping Dies

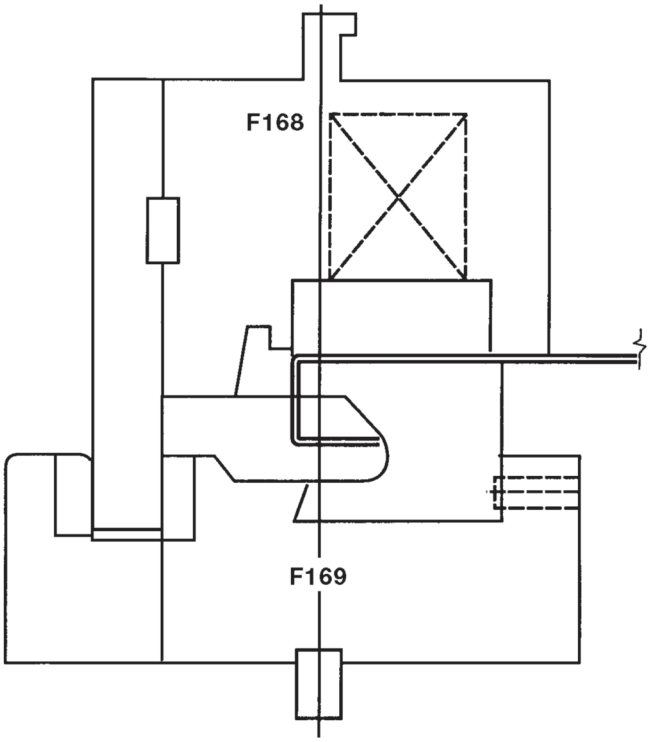




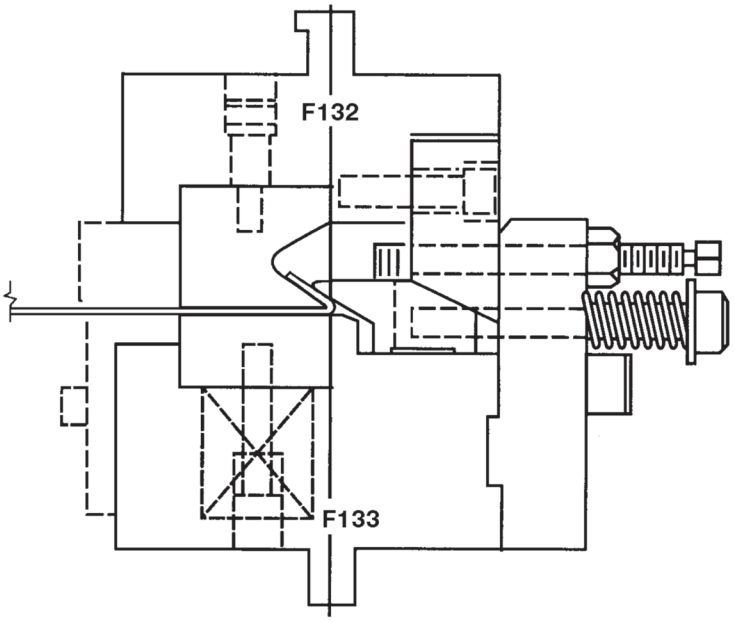
For high-production flanging operations, the **F160-F161** or **F162-F163** set is recommended. These dies hold the sheet flat while wiping a 90 degree flange either up or down. Back gauging can be easily fitted to the **F160-F161** set, although the sheet will move approximately 1/2" down with the spring pad. The sheet does not move down when using die set **F162-F163**; however, front gauging is best suited for this operation. Maximum capacity recommended for the illustrated dies is 16 gauge, although heavier construction will allow forming up to 12 gauge.



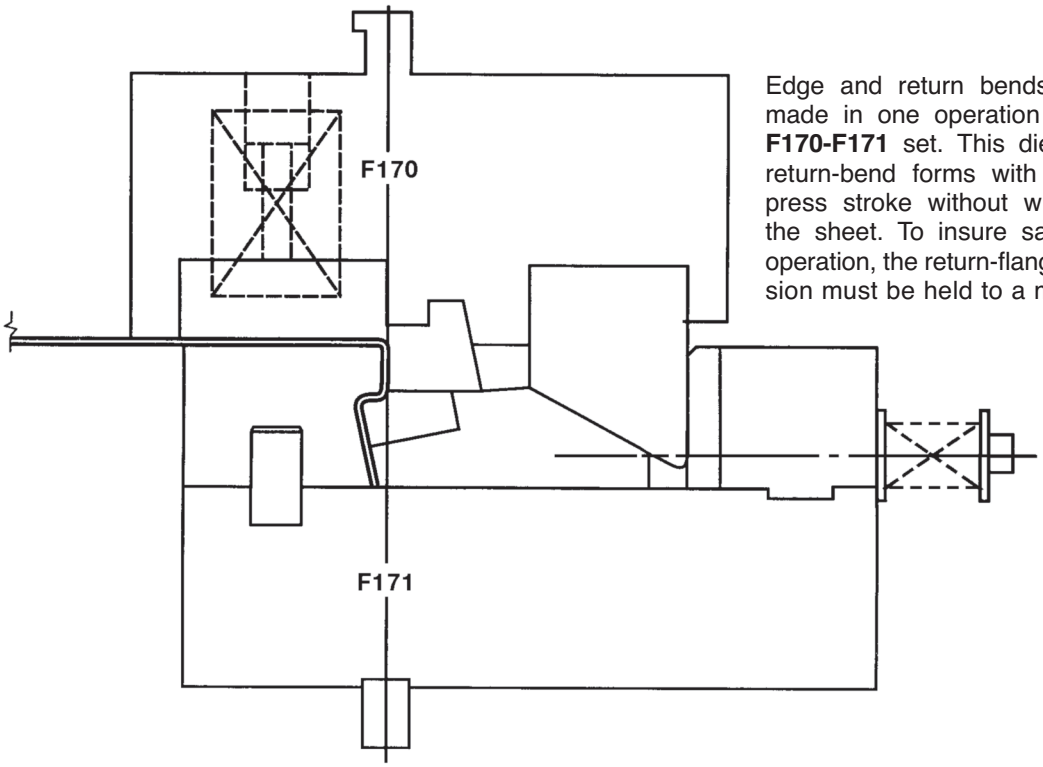
When wiping a radius on the edge of a sheet, the **F164-F165** set is recommended. Overbend allowance is built into the die set to compensate for springback. Maximum capacity for the die set shown above is 16 gauge.



The **F168-F169** set is designed to produce closed-flange forms. When the die opens, the heel travels up, making it possible to remove the formed sheet.



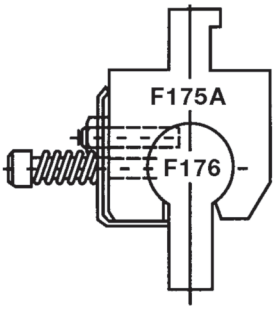
The **F132-F133** set eliminates whip-up and is highly recommended for high-production hemming of large sheets. The initial operation (shown above) produces the acute bend. The second operation flattens the hem between the punch anvil and the spring-loaded pad in the die. This set is normally used to form 20 gauge and lighter material. It can be modified to form 18 gauge by extending the punch anvil and adding an adjustable forming angle. Maximum hem length is 3/4".



Edge and return bends can be made in one operation with the **F170-F171** set. This die permits return-bend forms with a single press stroke without whip-up of the sheet. To insure satisfactory operation, the return-flange dimension must be held to a minimum.

Rocker Dies

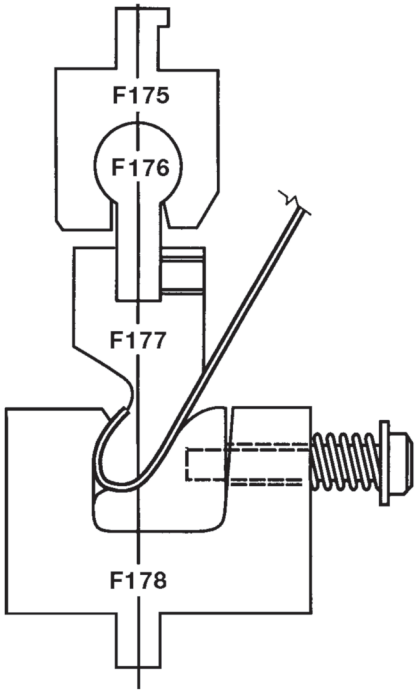
Rocker dies are designed to produce multi-form shapes such as U channels, edge channels and contour shapes in a single stroke. Rocker dies are typically limited to 16 gauge and lighter material.

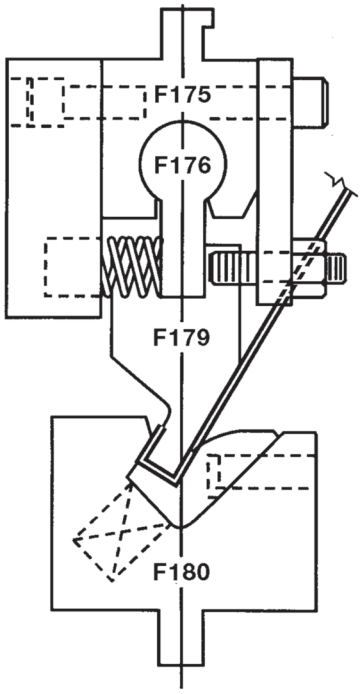


Flush rocker **F175A** is used when projected ends shown below would interfere with formed flanges.

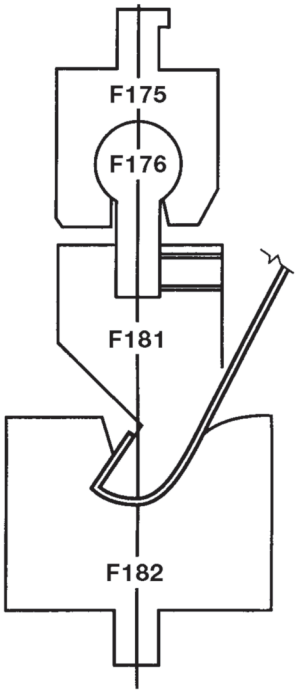
The **F175-F176** knuckle assembly allows for movement of the punch, resulting in better alignment with and release from the bottom die. This assembly can be used with any of the punch profiles shown below.

The **F177-F178** set forms a U channel in one stroke. Springback allowance is built into the die set.



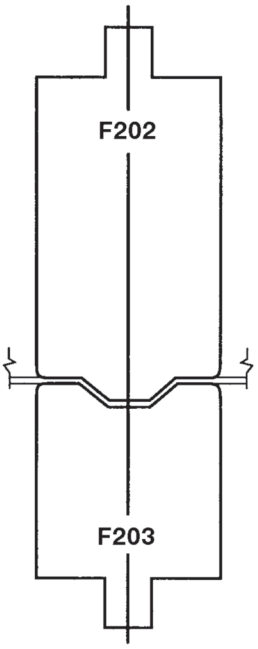


The **F179-F180** set produces a square channel in one stroke. If excess material is trapped in the die, some irregularity may be noticed in the bottom of the channel.

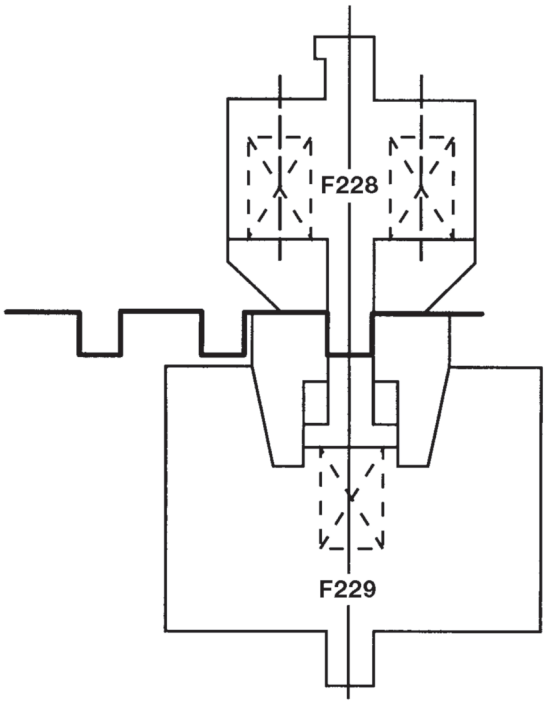


The **F181-F182** set produces a radius bend and return flange in one stroke. This set is not recommended for a radius larger than 1".

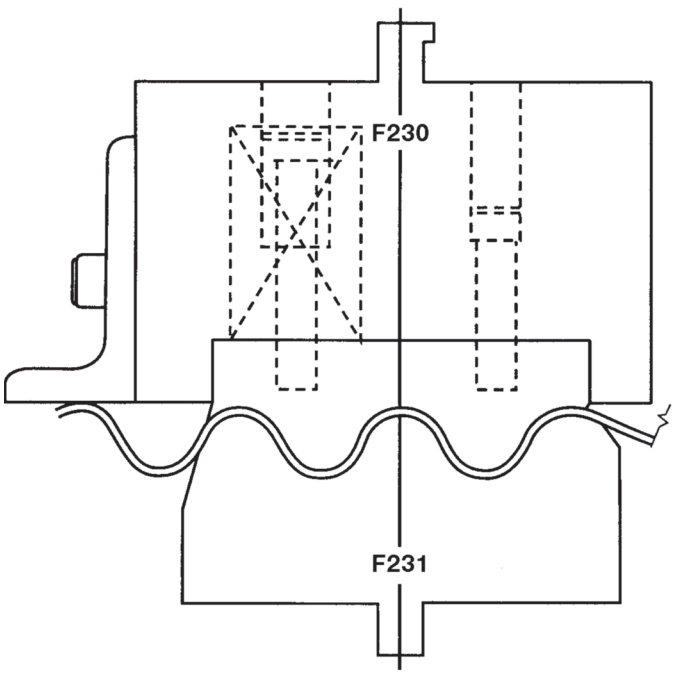
Corrugating Dies

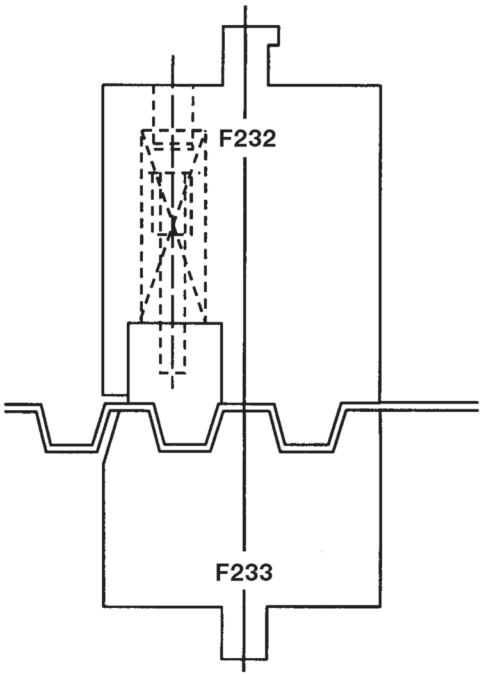


Small open-hat channels can be produced in the **F202-F203** set. The channel depth must be shallow to avoid trapping excess material between the punch and die, causing irregularities of shape.



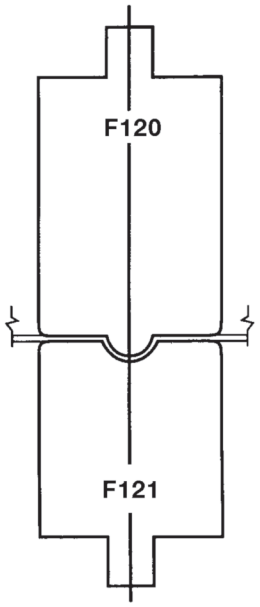
To form accurate corrugations in light-gauge materials, the **F228-F229** set can be used. Spring-pressure pads assure positive stripping and release wedges prevent marring of the formed material.



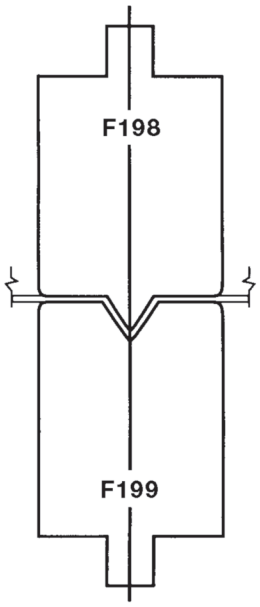


For high production, continuous corrugating, and where consistent accuracy is necessary, the **F230-F231** or **F232-F233** set is recommended. The **F230-F231** is for continuous radius corrugating and die set **F232-F233** is for continuous angular corrugating. After the first operation, the spring-loaded pad locates the sheet and the dies become self-gauging.

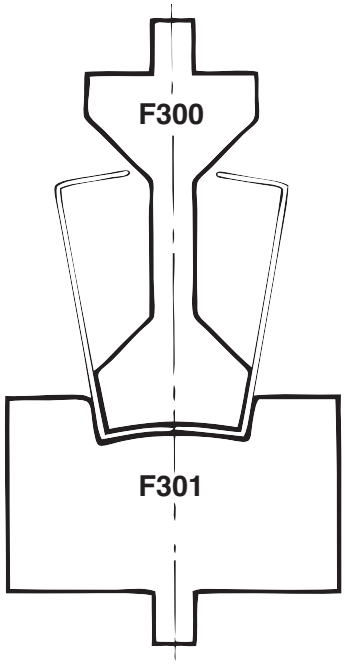
Special Application Dies

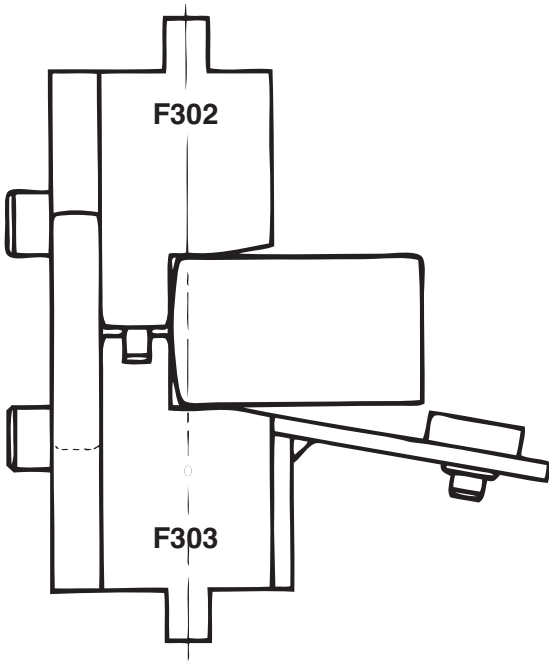


The **F120-F121** set can be used to increase the rigidity of a flat sheet by forming one or more ribs. Overbend allowance is built into the set to allow for springback.



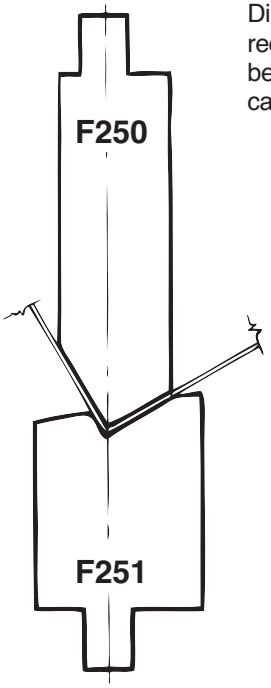
The **F198-F199** set produces a V rib in one stroke. For heavy-gauge metals, the die can be relieved to reduce the tonnage, but some accuracy will be lost.





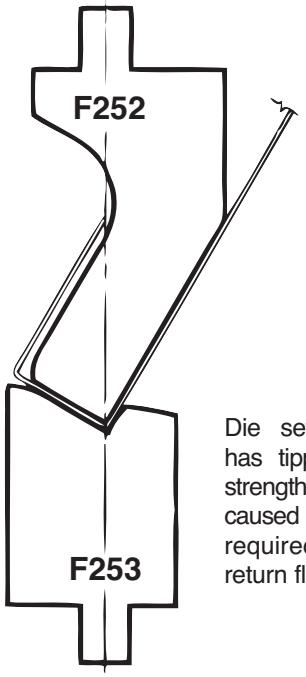
In making rectangular tubes, die sets **F300-F301** and **F302-F303** are often used as a progressive combination. A slight curvature can be expected on the formed side but, whether it is convex or concave, can be controlled in the forming. Die set **F302-F303** has its own locating gauge so the operator does not have to hold the part during the closing operation. This gauge also prevents the part from slipping out of the dies. With metals having large springback, the closed edges will open considerably. If the seam is to be welded closed, a welding jig or fixture will be necessary.

Special Application Dies

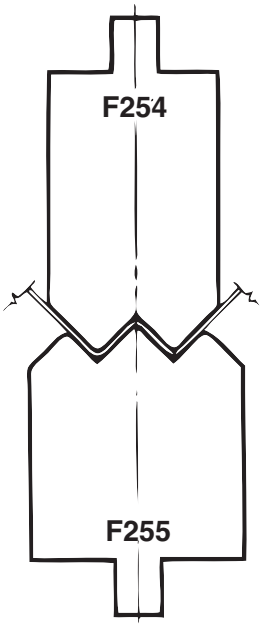


Die sets **F250-F251** and **F252-F253** are recommended for 18 gauge and lighter because of the side thrust on punch caused by tipped forming angle.

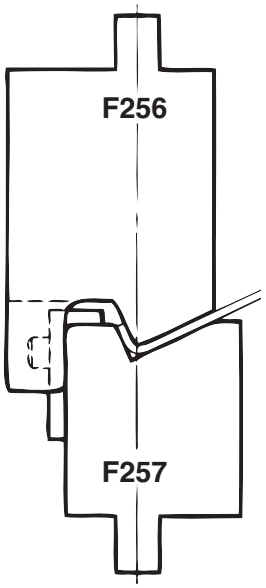
Die set **F250-F251** has a tipped forming angle to minimize sheet whip up and provide ram clearance on deep channel forming done in two strokes.



Die set **F252-F253** has tipped angle to strengthen gooseneck caused by clearance required for deep return flange.

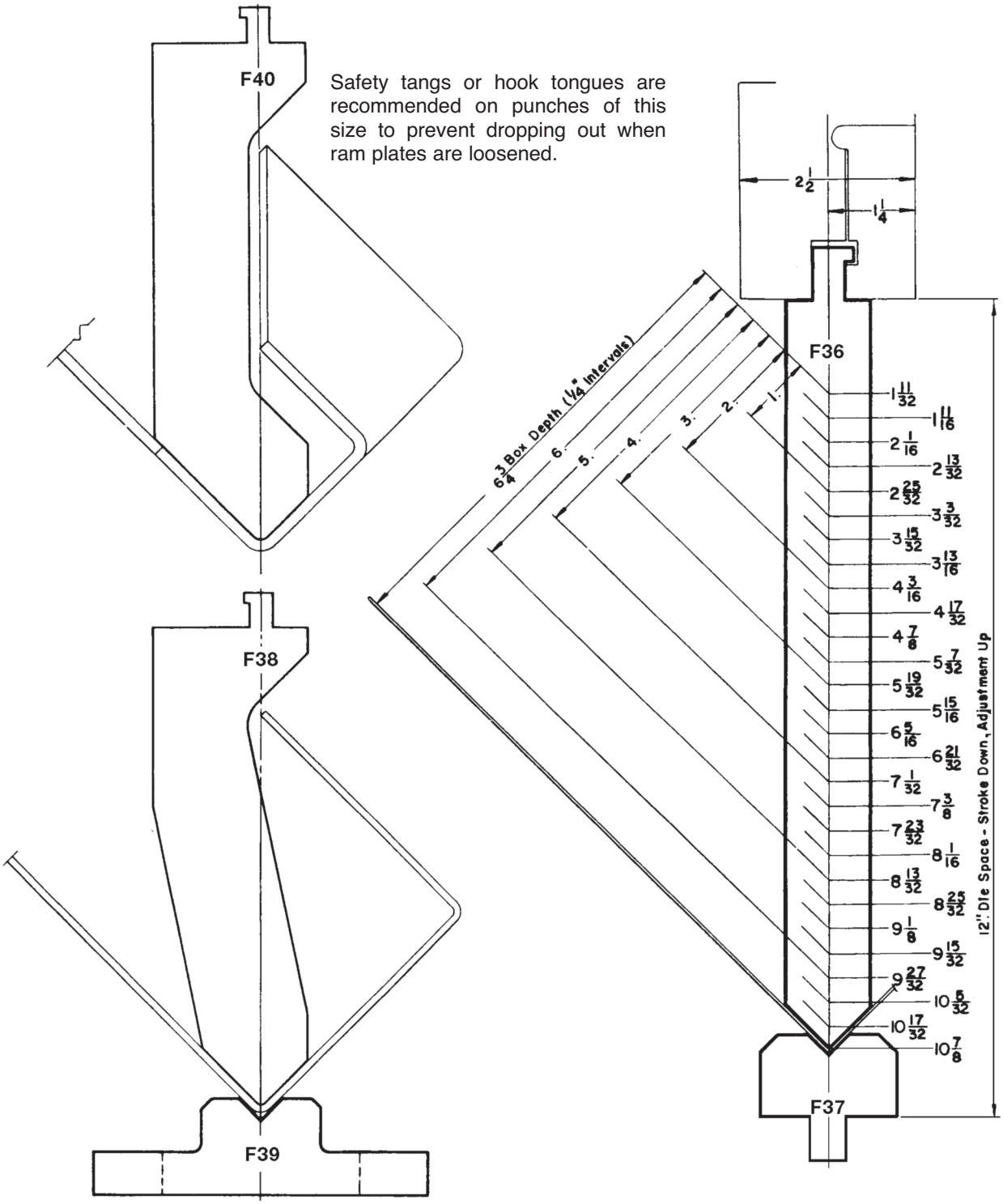


Die set **F254-F255** forms three bends in one stroke. Consult our engineering department for tonnage requirements.



When flange on 90 degree bend is too short to permit forming on standard vee dies, die set **F256-F257** is recommended. Forming angle is tipped and dies are heeled to prevent spreading.

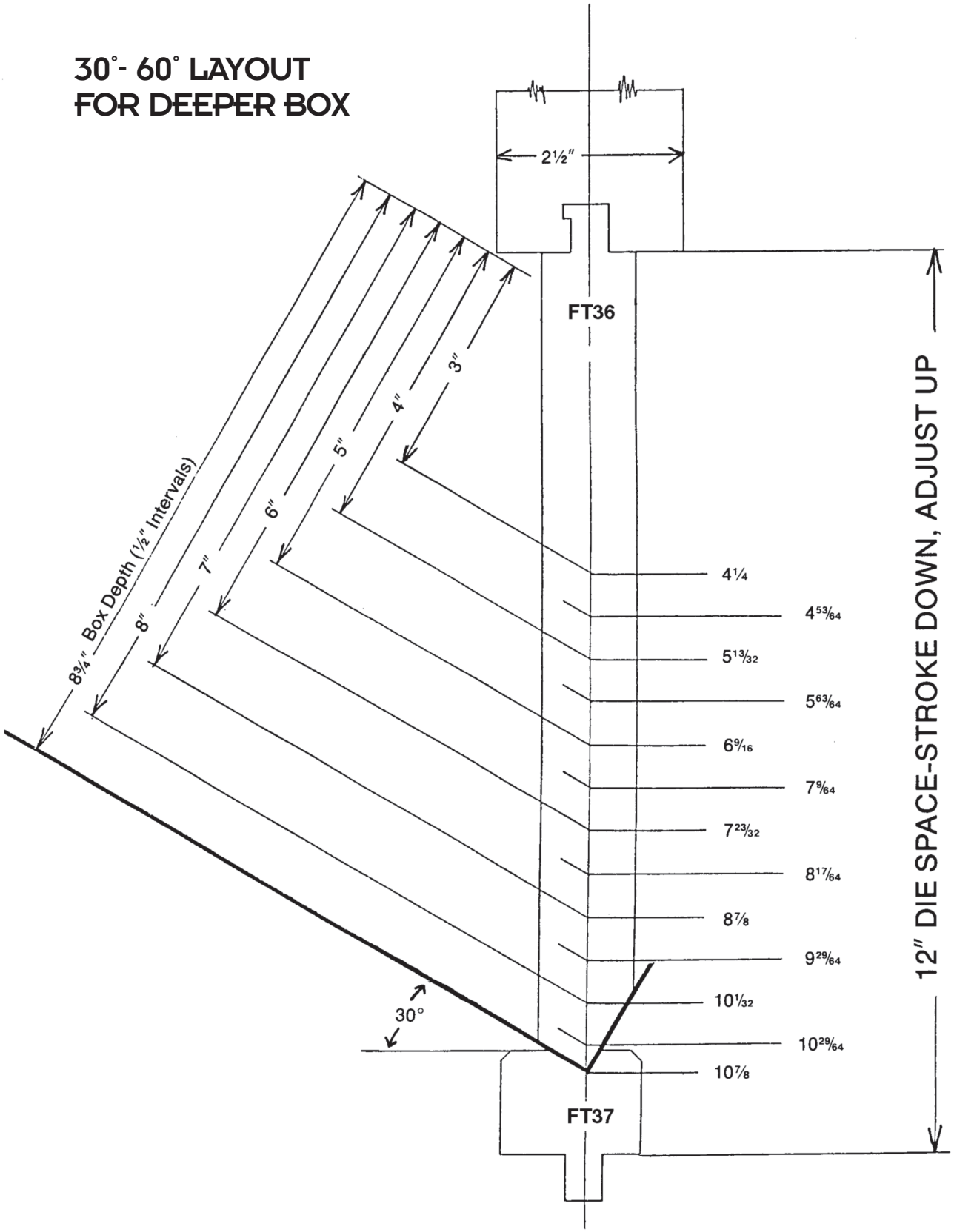
Box Forming Dies



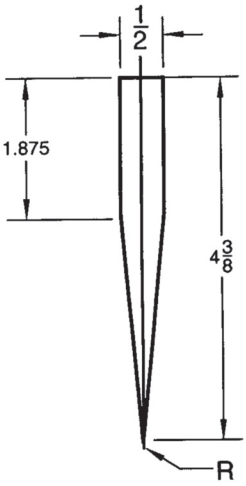
The special gooseneck punches shown above may be used to form boxes and channels with long return legs. Die **F39** can be fastened directly to press bed.

When forming a four-sided box, the punch must be tall enough to prevent the preformed sides from striking the ram.

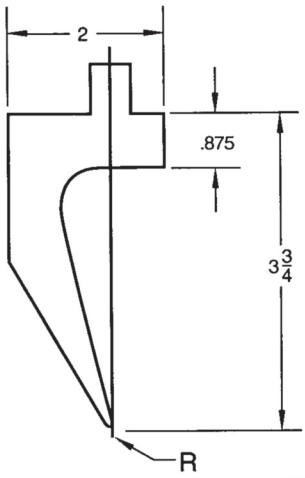
Tipped-Angle Box Forming Dies



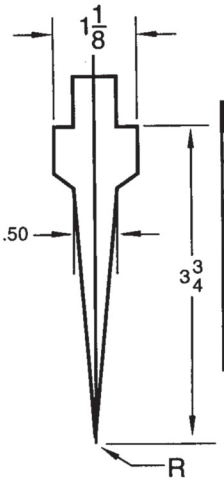
Aircraft Form Punches



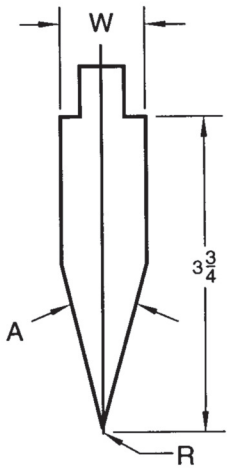
TOOL #	R
AF100	.031"
AF101	.062"
AF102	.093"
AF103	.125"
AF104	.156"
AF105	.187"
AF106	.218"
AF107	.250"



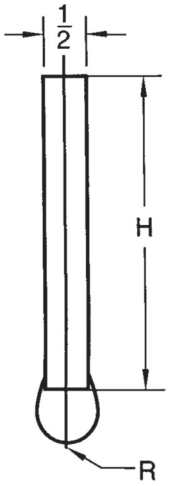
TOOL #	R
AF130	.062"
AF131	.093"
AF132	.125"
AF133	.156"
AF134	.187"
AF135	.218"
AF136	.250"
AF137	.312"
AF138	.375"
AF139A	.437"
AF139B	.500"
AF139C	.625"



TOOL #	R
AF110	.031"
AF111	.062"
AF112	.093"
AF113	.125"
AF114	.156"
AF115	.187"
AF116	.218"
AF117	.250"

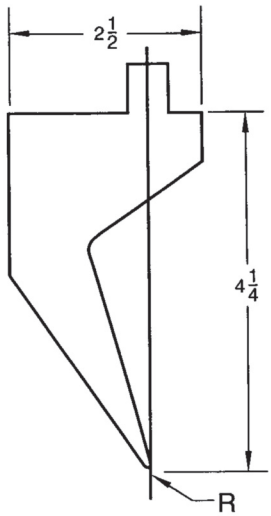


TOOL #	W	R	A
AF140	1-1/8"	.031"	25
AF141	1-1/8"	.062"	24
AF142	1-1/8"	.094"	23
AF143	1-1/8"	.125"	21
AF144	1-1/8"	.156"	20
AF145	1-1/8"	.187"	18
AF146	1-1/8"	.218"	16
AF147	1-1/8"	.250"	14
AF148	1-1/8"	.312"	11
AF149	1-1/8"	.375"	6
AF150	1-1/4"	.437"	min.
AF151	1-1/4"	.500"	min.
AF152	1-1/2"	.562"	min.
AF153	1-1/2"	.625"	min.
AF154	2"	.750"	min.



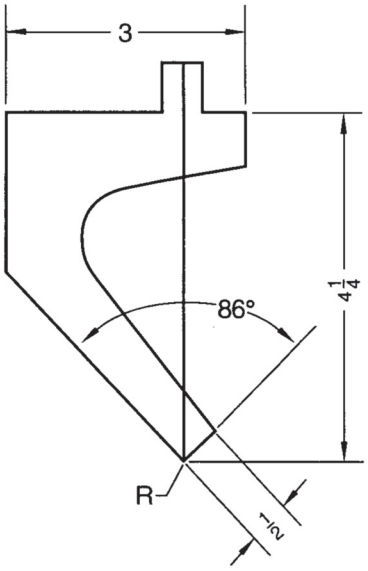
TOOL #	H	R
AF120	3-3/4"	.375"
AF121	3-5/8"	.437"
AF122	3-1/2"	.500"
AF123	3-3/8"	.562"
AF124	3-1/4"	.625"
AF125	3"	.750"
AF126	2-3/4"	.875"
AF127	2-1/2"	1.0"

NOTE: All widths are nominal except stem punches.

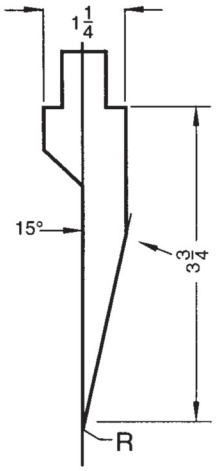


TOOL #	R
AF160	.062"
AF161	.093"
AF162	.125"
AF163	.156"
AF164	.187"
AF165	.218"
AF166	.250"
AF167	.375"
AF168	.500"

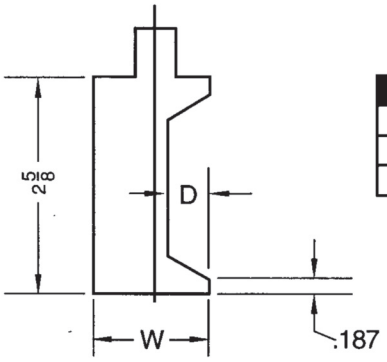
Aircraft Form Punches & Dies



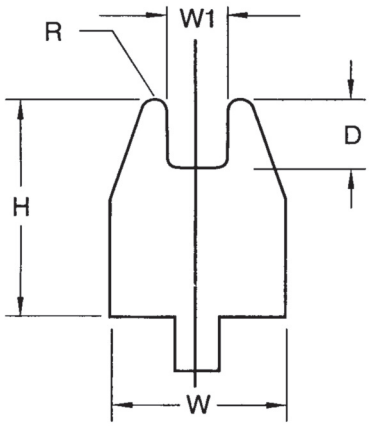
TOOL #	R
AF170	.031"
AF171	.062"
AF172	.093"
AF173	.125"
AF174	.156"
AF175	.187"
AF176	.218"
AF177	.250"



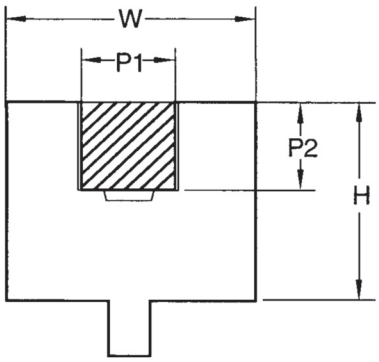
TOOL #	R
AF180	.031"
AF181	.062"
AF182	.093"
AF183	.125"
AF184	.156"
AF185	.187"
AF186	.218"
AF187	.250"



TOOL #	W	D
AF190	1-1/2"	1/2"
AF191	2"	3/4"
AF192	2-1/2"	7/8"



Urethane Type Dies



Die No.	W	H	P1	P2
AFD1	3"	2-1/4"	1"	1"
AFD2	5"	3-7/8"	2"	2"
AFD3	6-1/2"	3-7/8"	3"	3"

Aircraft-style tooling is designed and manufactured to provide significant forming advantages over standard conventional tooling. The ***Aircraft*** profiles are precision planed to enhance air-forming accuracy. In addition, they are highly polished to minimize marking. ***Aircraft*** punches are well suited for use with urethane pad dies.

TOOL#	W	H	W1	D	R
AF200	1"	1-3/4"	.125"	.187"	.062"
AF201	1"	1-3/4"	.187"	.250"	.062"
AF202	1"	1-3/4"	.250"	.312"	.062"
AF203	1"	1-3/4"	.312"	.375"	.062"
AF204	1-1/4"	1-3/4"	.375"	.437"	.078"
AF205	1-1/4"	1-3/4"	.437"	.500"	.093"
AF206	1-1/2"	1-3/4"	.500"	.562"	.093"
AF207	2"	2-1/4"	.625"	.750"	.125"
AF208	2"	2-1/4"	.750"	.875"	.125"
AF209	2-1/2"	2-1/4"	.875"	1.0"	.156"
AF210	2-1/2"	2-1/4"	1.0"	1.25"	.156"
AF211	3"	2-1/4"	1.12"	1.25"	.156"
AF212	3"	2-1/4"	1.25"	1.50"	.156"
AF213	3-1/2"	2-3/4"	1.50"	1.50"	.187"
AF214	4"	3-1/4"	2"	1.75"	.187"

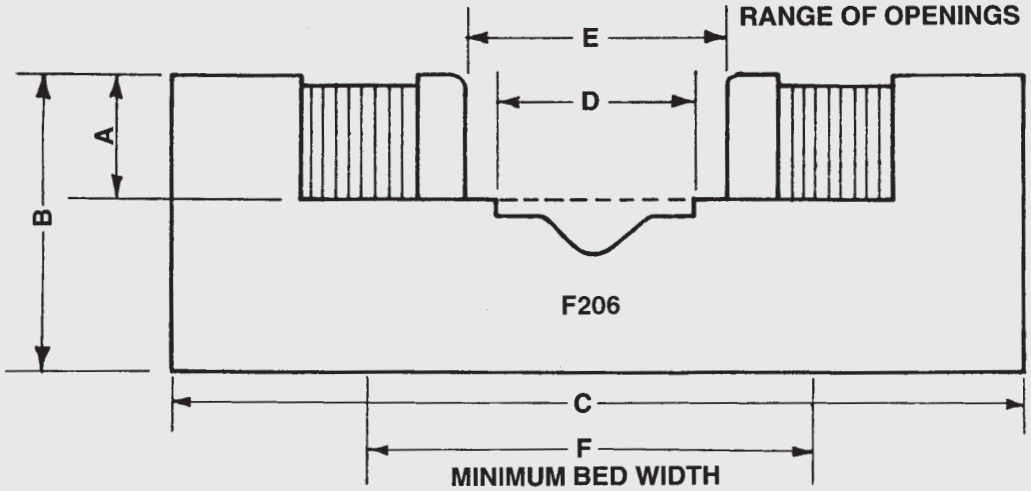
VEE-LOCK® Adjustable Dies

Fab Supply's **VEE-LOCK® Adjustable Dies** significantly outperform standard shim-style adjustable dies in both productivity and durability. Their unique design allows them to provide a high level of functionality in a wide variety of forming applications. Unlike the shim-style adjustable dies that require the operator(s) to lift shims in and out of the tool to change the opening, the **VEE-LOCK® Adjustable Die** simply requires the operator to loosen the stripper bolts. As the stripper bolts are loosened, the saddle blocks are automatically lifted, thereby disengaging the locking channels at the bottom of the saddle from those located in the base plate. The saddle blocks, which glide on cam rollers, can then be moved easily and safely into the appropriate position. Once positioned, simply tightening the stripper bolts will re-engage the locking mechanism, and the die will be ready for use.

Fab Supply's VEE-LOCK® Adjustable Dies can be furnished with a variety of side block movement and clamping options. These dies also can be designed to withstand severe over bends and exceptionally high tonnage applications.

Adjustable Dies, Squaring Arms & Die Film

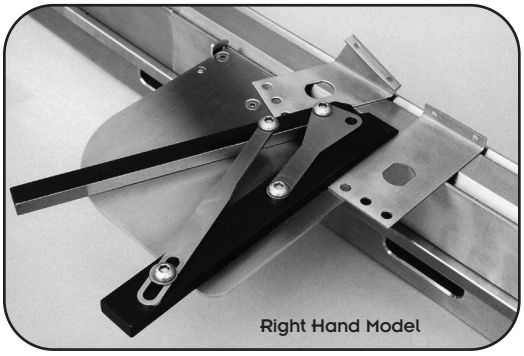
Shim-Style Adjustable Dies



Die No. **F206** could be considered to be one of the most versatile additions to a press brake. With this type of tool, openings can be arranged from 1/4" to 15". Spacers are provided to produce the required opening. Slotted spacers allow for easy removal to change the die opening. When not in use, spacers are positioned at sides of the die block. These dies can be furnished in solid lengths or sectioned for easier handling.

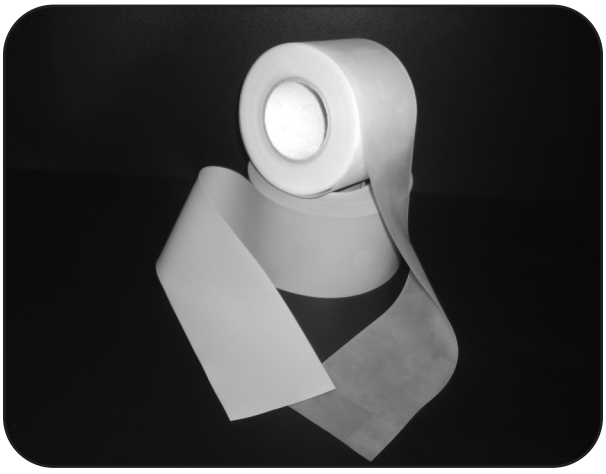
Die No.	A	B	C	D	E	F
F206-1	1-5/8"	2-7/8"	8"	NONE	1/4"-3-1/2"	3-1/8"
F206-2	2-1/4"	4-1/8"	12"	NONE	1/2"- 5"	5"
F206-3	2-7/8"	5-3/4"	16-1/4"	3-1/4"	3"-8"	8"
F206-4	3-1/4"	7"	9-1/2"	4-1/4"	4"-10"	10"
F206-5	4-1/4"	10"	22-3/4"	5-1/4"	5"-12"	12"
F206-6	6-3/4"	10-1/2"	28"	7-3/4"	8"-15"	15"

Magnetic Squaring Arm and angle guage



- Attaches magnetically for instant setup
- Allows small parts to be formed safely - hands free
- Equipped with angle attachment for tapered flanges
- Attaches to die face with no intrusion into the forming area
- Available in both left and right hand models
- Both sides of the squaring arm can be used simultaneously

Die Film



- Eliminates die marking and cross-metal contamination.
- Fab Supply's die film is available in a wide variety of widths and thicknesses to suit virtually any application.

Tonnage Estimate Factors

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Use the fomula below to estimate required tonnage for multiple bends in mild steel on a press brake.

Multiply Metal Thickness by Factor = Tons Per Foot

FACTORS FOR ESTIMATING TONNAGE			
SHAPE	Description	Airform	Bottoming
	Vee Die	60	150
	Wiping	—	250
	Offset	150	300/600
	Material Thickness Offset	300	600
	Channel	225	300
	Vee Rib	200	600
	W Die	300	600
	Open Hat Channel	300	450
	Square Hat Channel	—	600
	Perform Curl	—	300
	Perform Curl	—	200
	Close Curl	—	300
	Radius	—	180/300
	Hem	150	420
Shape Considerations		Large Radii Angle Angle Variation Concave or Convex Sides	Material Thickness Radii Minimum Angle Variation Maintain Flatness

Additional factors for other materials:

Stainless Steel	(18-8 Annealed) Type 304	1.55
Aluminum	3303-H14 (1/2 Hard)	.35
	5052-H34 (1/2 Hard)	.65
	6061-T6	.75
Brass	70/30 (1/2 Hard)	1.10

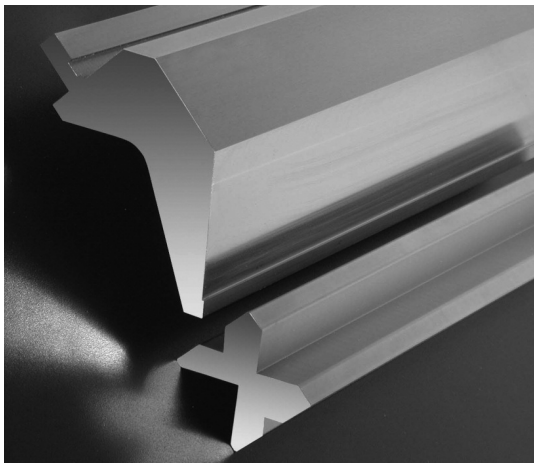
Air Bending Tonnage Chart

The figures shown in bold print signify die openings equal to eight times the material thickness. These are recommended for average applications and will yield an inside radius equal to approximately 15% of the die opening. Required bending tonnage varies directly with the tensile strength of the material. Conversion factors for materials other than mild steel are available.

V		4mm 5/32"	6mm 1/4"	7mm 9/32"	8mm 5/16"	10mm 3/8"	12mm 1/2"	14mm 9/16"	16mm 5/8"	18mm 11/16"	20mm 3/4"	25mm 1"	32mm 1-1/4"	40mm 1-1/2"	50mm 2"	63mm 2-1/2"	80mm 3"	100mm 4"	125mm 5"	160mm 6"	200mm 8"	250mm 10"
MF		0.110	0.165	0.193	0.220	0.276	0.331	0.397	0.454	0.510	0.567	0.709	0.945	1.181	1.476	1.860	2.362	2.953	3.789	4.850	6.063	7.579
IR		0.026	0.039	0.046	0.052	0.066	0.079	0.092	0.105	0.118	0.131	0.164	0.210	0.262	0.328	0.413	0.525	0.656	0.820	1.050	1.312	1.640
GAUGE	DECIMAL	Tons required per linear foot using air bend dies with these "V" die openings																				
20	.036	5.3	**3.7**	3.1	2.6	2.1	1.8															
18	.048		6.7	5.9	4.7	**3.8**	2.8	2.5	1.9													
16	.060				7.6	6.1	**5.1**	4.1	3.6	3.2	2.8											
14	.075					11.1	8.1	6.9	**5.6**	4.9	4.2	3.0										
12	.105						15.1	13.1	11.1	9.3	7.5	5.4	4.1									
11	.120								15.9	13.1	9.9	**7.2**	5.1	3.9								
10	.135										11.9	9.1	6.3	4.8	3.1							
3/16	.188											24.1	14.9	**10.9**	7.6	5.8						
1/4	.250												30.1	20.1	**13.9**	10.6	8.6					
5/16	.313													36.1	25.1	**18.1**	12.9	10.1				
3/8	.375														37.9	28.1	**19.9**	14.9	11.1			
1/2	.500															52.1	39.1	**29.9**	21.9	16.1		
5/8	.625																70.1	52.1	**38.1**	27.1	19.9	15.1
3/4	.750																	92.0	68.0	**53.0**	36.3	27.0
1	1.0																			112.0	76.0	56.0

TONNAGES REQUIRED FOR AIR BENDING MILD STEEL (with tensile strength of 60,000 lbs. psi).
For wider or narrower openings in same stock, refer to the numbers left or right of the recommended tonnage. Bending pressures required for other materials shown below are compared to 60,000 psi tensile mild steel shown on chart.

Soft Brass .....50% of pressure listed
Soft Aluminum.....50% of pressure listed
Aluminum Alloy (Heat treated) .....same as steel
Stainless Steel.....50% more than steel
Chrome Molybdenum.....100% more than steel



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