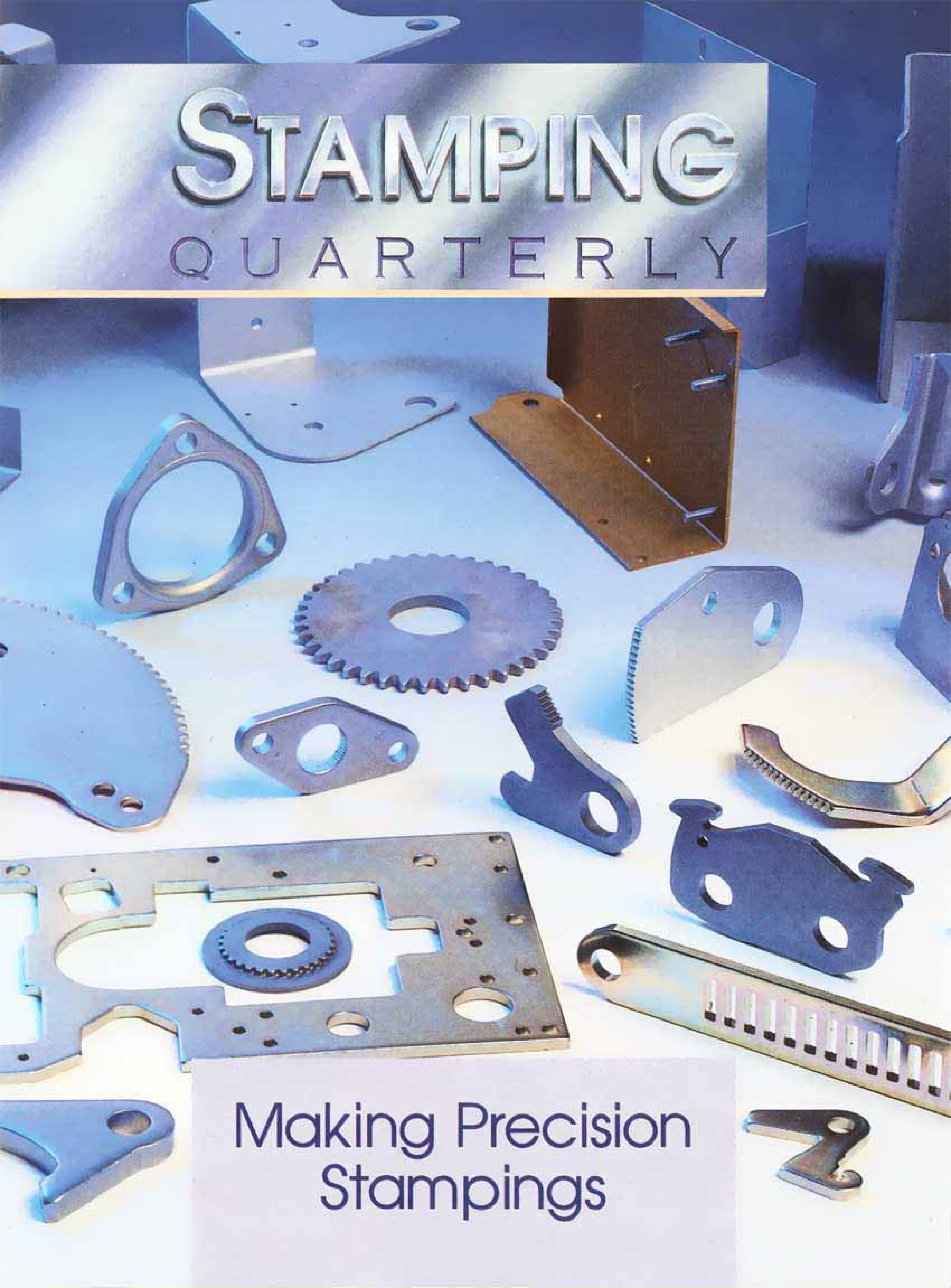
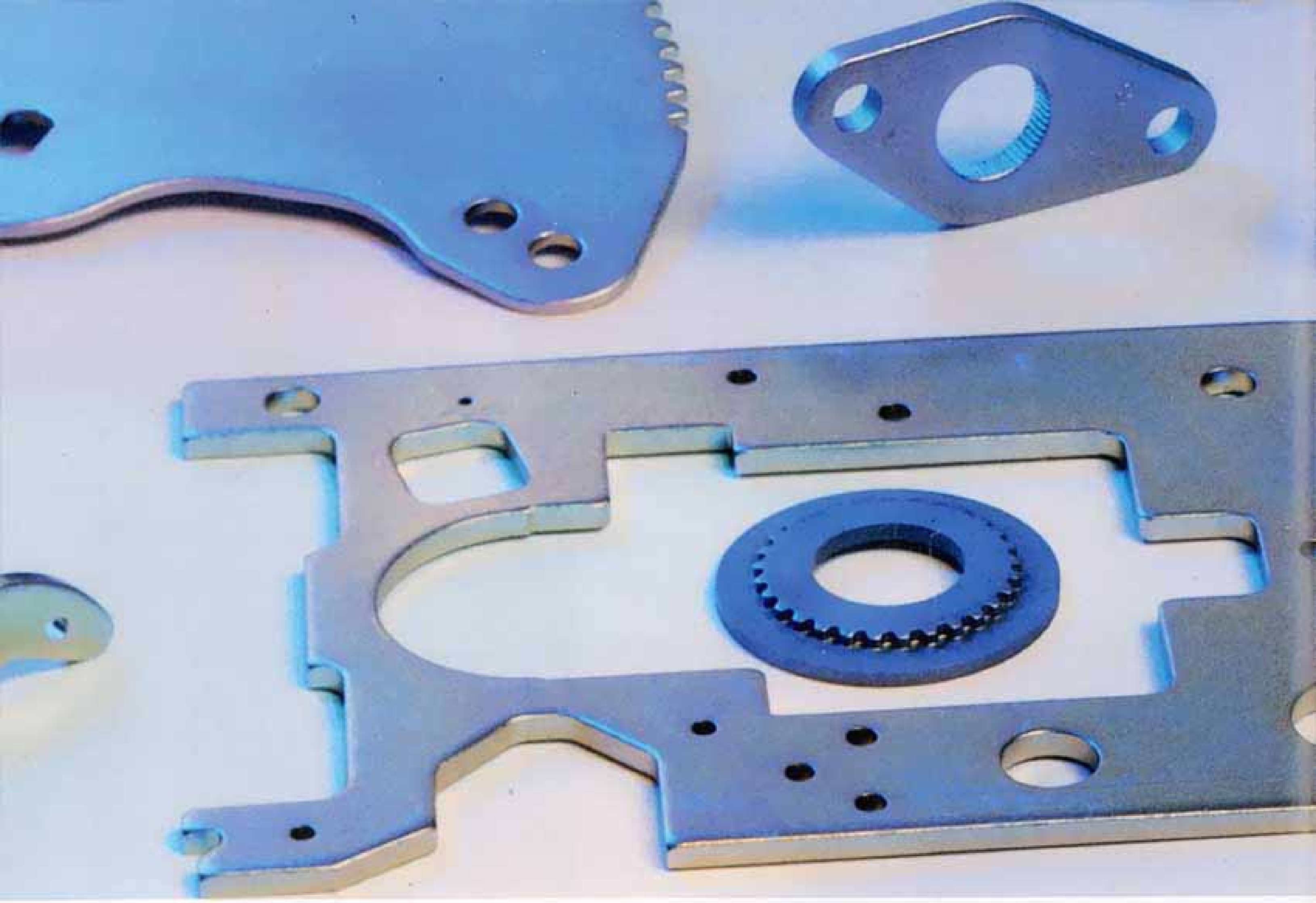
STAMPING QUARTERLY



Making Precision Stampings



Making precision stampings

A conventional single-action press with special tooling creates smooth, straight-edge stampings

A simple process, where parts can be made with the characteristics of fineblanking at low cost, producing smooth, straight-edge stampings is available to stamping professionals. The process uses a conventional single-action high speed hydraulic press with CNC controls. This stamping technology not only produces a smooth-edge part, but also eliminates many secondary operations. This technology is called grip flow.

The grip flow process is relatively simple. A stamping is "squeezed" from the parent material at a press rate of 10 to 60 parts per minute. This is accomplished by an almost zero clearance between the die and punch, the controlled press speed during the cutting sequence, and the retention of the stamping during the process. Since more than one part can be produced with each press stroke, production rates can be doubled, tripled and even quadrupled.

In general, the grip flow process requires less press tonnages than, for example, an equivalent fineblanking process. About 40 percent less tonnage is required because of the elimination of the fineblanking V-ring. Thus, smooth,

straight-edged parts can be made in smaller presses, thus reducing the cost of the machine required. Also, a press, when not using special grip flow tooling, can utilize conventional tooling.

The process can be used with any metal with good cold-working characteristics, although results may be more satisfactory with some materials than with others. Some examples are shown in the table of recommended materials (see **Figure 1**).

Stampings made with the grip flow process are often used where the hole and/or profile of the stamping require tight tolerances. The ability to put the smooth edge only where the customer requires it helps reduce the part cost.

For example, costs can be reduced by piercing drilled, reamed-like holes, while the rest of the part can be conventional or smooth-edged. When piercing small holes, the diameter of the hole can be as small as 40 percent of the material thickness.

Similar to fineblanking, the grip flow process can eliminate many secondary operations, such as shaving, broaching, drilling, reaming, countersinking, counterboring, milling and grinding. Dimensional tolerances can be held to 0.0005 inch, flatness to one-third to one-fifth of a conventional stamping, and the edge surface finishes to 32 rms.

This elimination of secondary operations, in addition to placing the smooth-edge in only the required areas instead of the entire part, will help reduce part costs by increasing the production rate.

With the grip flow process, the depth of the countersink can be equal to the material thickness. A countersink on both sides can also be achieved through a progressive compound die, with no flatness distortion.

The grip flow process can be adapted to progressive tooling because the slugs go through the die and out the bottom of the press automatically, similar to that of a conventional progressive tool. This ability to pass slugs through the tool eliminates the separation operation of parts from slugs. Multistation progressive dies can be utilized because of the ability to design large press beds.

The process can nest parts close together due to the elimination of the V-ring, which fineblanking has, giving a more cost-effective utilization of the material.

Materials Suitable for Grip Flow Process Using Single-Action Hydraulic Press

Mild Steel No. 3,4,5 Hardness	Excellent
Mild Steel No. 1,2 Hardness	Good
Spring Steel to 0.50% Carbon	Excellent (if run with annealed stock)
Spring Steel to 0.70% Carbon	Good
Spring Steel to 0.95% Carbon	Fair
Stainless Steel, Annealed	Good
Copper & Brass Alloys	Excellent
Aluminum	Excellent

Figure 1

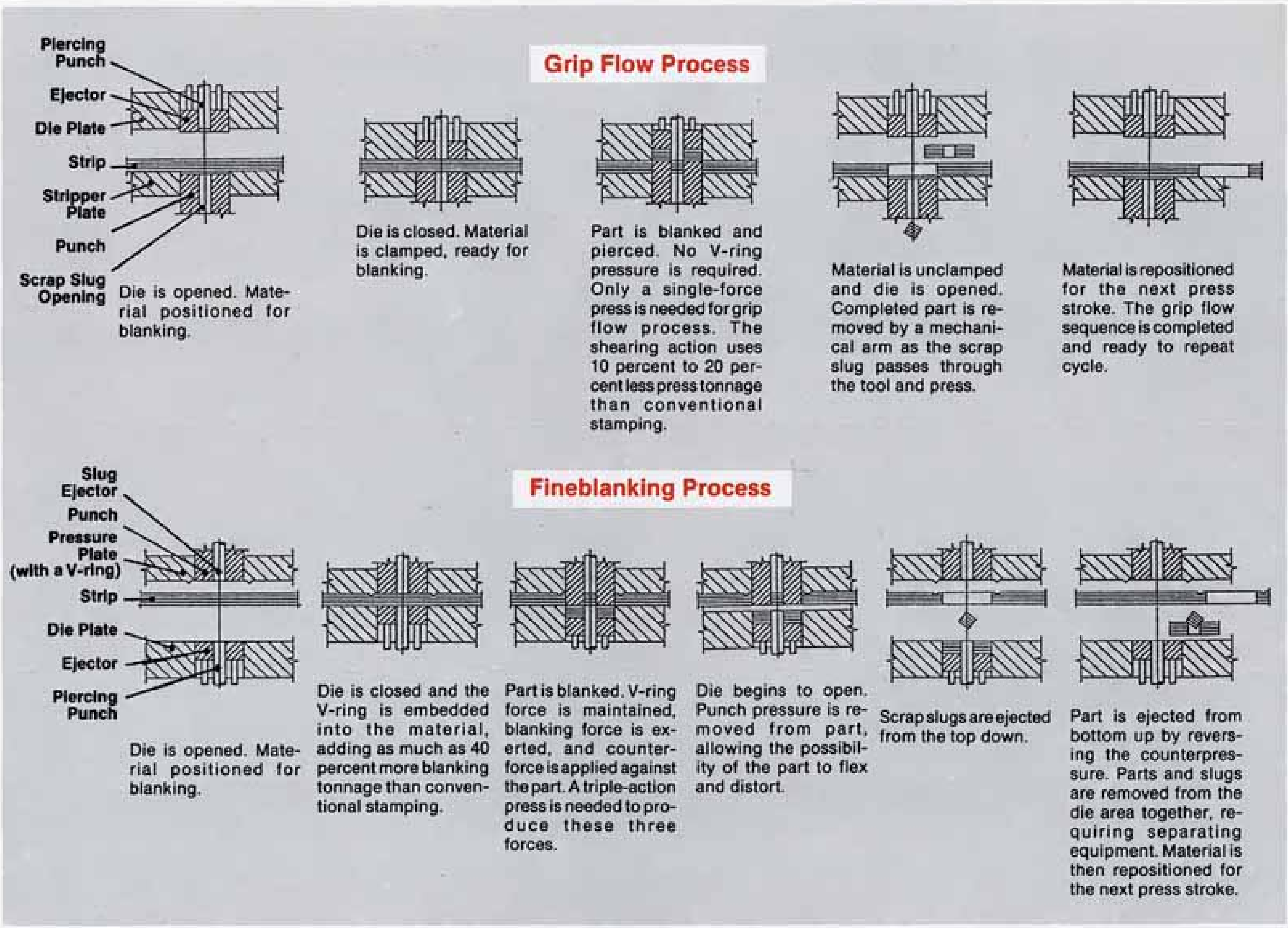


Figure 2

Characteristics

The CNC control simplifies press operation, allowing the operator to regulate the ram force, speed, the duration of the hold-down pressure, and the release force. The press can be tuned to suit the die. The press used for the process has a stroke adjustment of 0.5 inch to 10 inches, with full tonnage throughout the stroke range.

The presses are mounted on a flat floor, normally a 6- to 8-inch slab is sufficient, with no pit requirements. This process is quiet and shock-free, operating at less than 85 D.B.A. and with less vibration than a conventional press.

The grip flow process provides full tool safety, where an operator does not have to monitor the press. The press will automatically stop if there is a misfeed, if a punch breaks, if a part is not ejected, etc. Quick tool change is a standard feature with this process.

Another feature of the grip flow process is that the parts ejector is mechanical and does not require a booth enclosure, compared to, for example, an air blow-off parts ejector. With air blow-off, the oil lubricant is vaporized, which necessitates the inclusion of an oil mist collector and a booth enclosure.

The grip flow parts show a minimal amount of burr which can be removed by standard vibratory deburring equipment.

Die roll, inherent in stamping is less with the grip flow process than with conventional stampings. When the customer requires, the die roll can be eliminated along selected edges by using progressive die stations.

Flatness is obtainable because the part is always clamped and confined within the die cavity. Because of this clamping of the part during the blanking process, flatness is normally one-third to one-fifth of a conventional stamping (see **Figure 2**).

Work hardening of edges does not take place in the grip flow process. When a subsequent forming operation is performed in a grip flow progressive die, cracks or breaks do not occur along the formed edges.

How Does It Stack Up?

Part characteristics of the grip flow process using a conventional press with grip flow tooling are the same as fineblanking including radii on corners; diameters of holes and slots; projections; bends; surface imprints; offset forms; and extrusions. Using the grip flow process, a single-action press is utilized, whereas with fineblanking, a highly specialized triple-action press must be utilized. Tool maintenance procedures to machine the V-ring are needed with the fineblanking process, whereas they are not needed with the grip flow process.

The information presented in this article was prepared by Terry Tarasevich, Ebway Corporation, Ft. Lauderdale, Florida.