

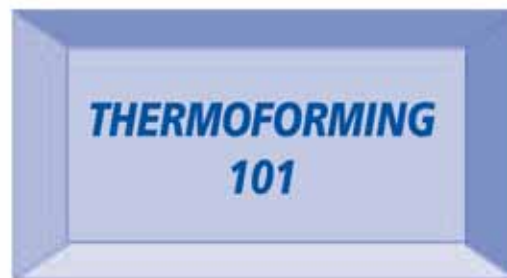
COLLECTING THIN-GAUGE PARTS

Thin-gauge forming operations generate many, many parts per hour. And these parts need to be rapidly and accurately collected or colated. It is here that the mechanical engineer or technologist shines. It is difficult in this short tutorial to discuss all the collection methods currently in vogue. Instead a simple cataloging is in order.

Parts Separated from the Web on the Mold

Trim-in-place was discussed in the trimming tutorial. Basically, the part is held against the mold surface during forming by the trimming knife. When the part is fully formed and rigidified, the trimming knife severs the part from the web. The severing can be of two types – complete, so that the part is free from the web, or partial, with several tabs holding the part to the web.

If the part is completely separated from the web, it must somehow be removed from the mold cavity before the next forming step can initiate. One technique involves a robotic “picker” that shuttles into the mold cavity. The picker typically may have fingers with vacuum tips that secure the formed parts to the fingers. Another design uses a mold that rotates to dump the parts into bins below the sheet plane. Air blow-back is sometimes used in conjunction with the rotating mold to ensure that the parts are blown free of the individual mold cavities. Although rocker or “to-and-fro” molds have been used, three- and four-sided rotary molds seem to offer the fastest dump time. The key to quality part collection lies in successful emptying of all mold cavities, each time, every time.



Tabbed Parts Removed in Stacker

If the parts have been “tabbed” and remain with the web, a second station, usually called a stacker, is needed to push the part away from the web. While both “up-stackers,” meaning that the parts are pushed into collectors from below, and “down-stackers,” meaning that the parts are pushed into collectors from above, are used, up-stackers are

easier to manually unload and so are more popular. The key to rapid and accurate stacking is the strength of the tab. If the tab is too strong, the pusher can damage the part before the part separates from the web. If the tab is not strong enough, the part may be hanging free of the web and the pusher can damage the part this way.

Stackers and the ancillary collection sleeves or channels work best if the parts have ample draft so that they nest easily in the collection devices.

Parts Removed From Flat-Bed In-Line Trim Presses

Parts that are trimmed when lying in the horizontal plane need to be collected either in the “up” direction or “down” direction. Since these trim presses tend to be massive forging-type presses, collection can be difficult.

Parts Removed From Canopy Trim Presses

In canopy presses, the trimming step is usually followed immediately by the separation step. The pusher forces the trimmed part from the web onto a horizontal or slightly inclined collection table. Each subsequent part pushes the previous parts across the table. Counting and collecting are easier with canopy trimming operations than with most of the other techniques. In fact, these tasks are often done manually. The key to quality trimming with canopy presses is the positive push of the part into the collection devices.

The Effect of Part Geometry on Trimming Methods

For deeply drawn cylindrical parts with substantial draft, such as cups, in-press up-stackers or the rotating mold dumping techniques with ancillary cup orienters offer advantages over other methods. For shallow draft parts such as plates, down-stacking has an advantage. Rectangular and odd-shaped parts can be easily collected on near-horizontal tables from canopy trim presses. Lidded containers, where the lid is of shallow draw and the container has a deep draw, are always difficult to collect and colate. Horizontal tables seem to be favored. The robotic shuttle offers good versatility for trim sets with several different shapes and depths of draw. In many instances, with complex trim sets, hand sorting and stacking from a catch bin may be the only solution.

Keywords: Tabbing, rotating mold, up-stack, down-stack, collection table