

FASTENING & ASSEMBLY 101

The Extrusion Name Game

Different manufacturers tend to use the word “extrusion” in different ways. You may have heard the terms cold extrusion, backward extrusion, forward extrusion, impact extrusion, and contained extrusion. Is there really a difference between all of these? “All extrusions fall under the cold forming 'umbrella', since they are all created using a series of dies and punches to form shapes without scrap material,” explains Gary Shattuck, applications engineer at Textron Fastening Systems. “Different tooling allows for different capabilities, but the overall concept is basically the same.”

How Are Extrusions Made?

Here are some basic definitions you need to know to understand extrusions:

Forward extrusions: The metal blank is forced into a die opening smaller than the initial wire diameter, causing a decrease in the wire diameter but an increase in length. Many shapes are possible, from rounded shanks to squared-off, hex or other angular geometries.

Backward extrusions: a punch smaller than the wire diameter is forced into the blank, causing the material to flow backward around the punch, forming cylindrical holes. Blind and through holes are possible.

The terms **impact extrusion** and **contained extrusion** are used to describe results of both the forward and backward extrusion processes. The names come from the fact that the cut-off blank is completely contained inside the die prior to extrusion.

The cold forming process also can create **upsets**, which are heads or shapes that are larger than the wire diameter. Both upsets and extrusions can be performed on one component using one piece of equipment.

Cold extrusion is often used to describe any forward or backward extrusion process that has been engineered to go beyond the scope of older cold forming processes, in order to create a thinner wall thickness or other advanced shapes. It reflects improved tooling technology, not a separate process.

Extrusion metal forming, also called Sukosim® sheet extrusion, combines these cold forming technologies with conventional metal stamping ([see article in past issue](#)). Extruded tapped parts that would normally have been cold formed separately, like nuts, are formed at the same time as the rest of the stamped component. Different material thicknesses within the same component are also possible. This eliminates separate assembly (including welding) and tapping operations and increases the strength of the component.

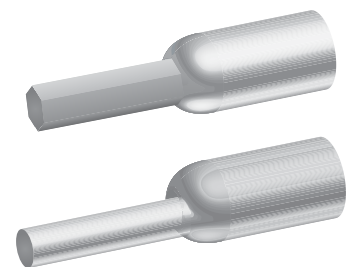
Not So Different After All

All extrusions are produced in similar cold forming processes. The only difference are the shape, sizes and number of dies and punches used to create a specific part. The resulting size, thickness, shape, etc. are dependent on the wire material and performance requirements of the component.

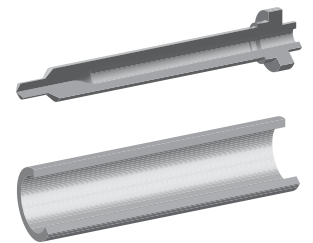
So, the next time you are discussing a component with someone, if a different extrusion term pops up, you'll know you're both still talking about the same thing. Instead, concentrate on whether this technology can meet your fastening needs.



Some simple extrusions



Above: Symmetrical and asymmetrical forward extrusions. Below: blind and through-hole backward extrusions.



Some simple upsets



Example of what Sukosim® technology can create.



Extrusions can come in an almost infinite variety of shapes, especially when joined with secondary processes.