








Types of Extrusions

-  A solid symmetrical shape whose cross-section is round
-  A solid symmetrical shape which has rounded or sharp corners
-  A hollow symmetrical shape with a uniform wall
-  Any extruded shape other than a hollow or semihollow extruded shape
-  A shape whose cross-section partially encloses a void

Gap Width

-  CLASS I
Equal Tongue Ratio
-  CLASS II
Unequal Tongue Ratio

Minimum gap width is 0,030 inch.

Classes of Hollow Extrusions




-  CLASS I
Shape with a round void
-  CLASS 2
Shape with a single void that is not round
-  CLASS 3
Shape with multiple voids

figure 4-55 basic extrusion types

4.2.4 Extrusions

Direct Extrusion

In *direct extrusion*, a round, heated billet is placed in a chamber of a large press and is forced through a die by a hydraulic ram, forming a long profile shape.

Shapes formed can be solid, semihollow, or hollow. Any profile is possible to meet a large variety of design requirements. Extrusions have revolutionized the design and manufacturing of many products, in part because most extrusion materials are relatively inexpensive.

The Aluminum Extrusion Council (aec.org) and the Extrusion Technology Foundation created an aggressive program to recognize design professionals as well as design students for their creative use of extrusions in product design. A seemingly endless array of new product concepts seem to flow from this rather economical production process.

The Utility Rail by Humanscale, Inc. is an excellent use of the extrusion process that provides a flexible, clear workspace by organizing the monitor, personal lighting, and wire management. The Utility Rail uses the advantageous physical properties of aluminum, ease of finishing, and the inherent strength of an extrusion.



figure 4-56. extrusions (courtesy Minilex)

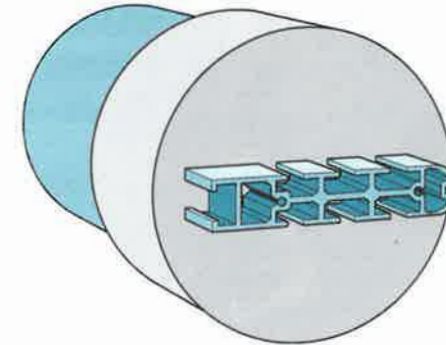


figure 4-57. basic concept of the extrusion process

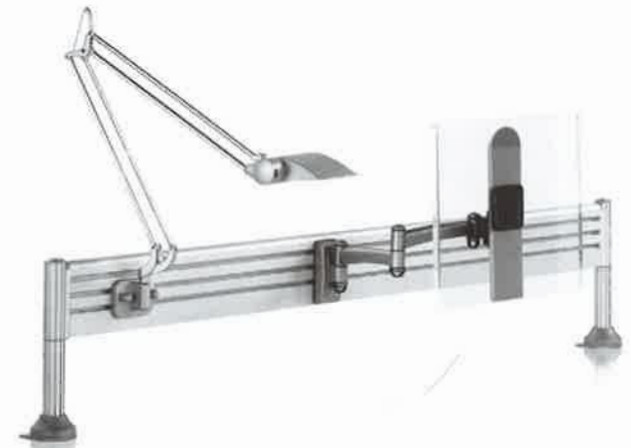


figure 4-58ab. Utility Rail (courtesy Humanscale Design Studio)

Impact Extrusions

In *impact extrusion*, a large forge press is used to form small- to medium-sized parts, with thin walls and no draft. A blank is placed in a die and is struck by a plunger causing the material to become plastic. It is extruded upward between the plunger and the die wall or forward forming a variety of short shapes, including thin-walled symmetrical containers. The part is then ejected.

There are three basic types of dies for impact extrusion forward, reverse, and combination. Parts can be extruded aluminum, copper, and brass alloys. The characteristics of the impact extrusion process are: no draft is required, there can be varying wall thickness, with precision tolerances and increased part strength. High production rates are possible with low tooling costs, but with limits in size in diameter and in lengths of up to 24".

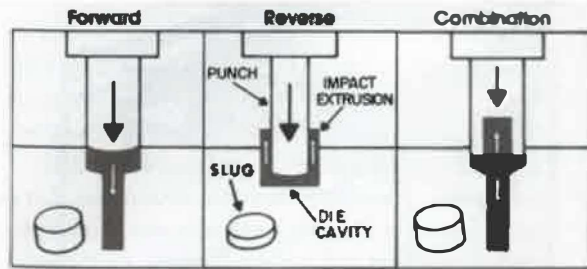


figure 4-59. schematic drawing of impact extrusion, showing both forward and reverse extrusion

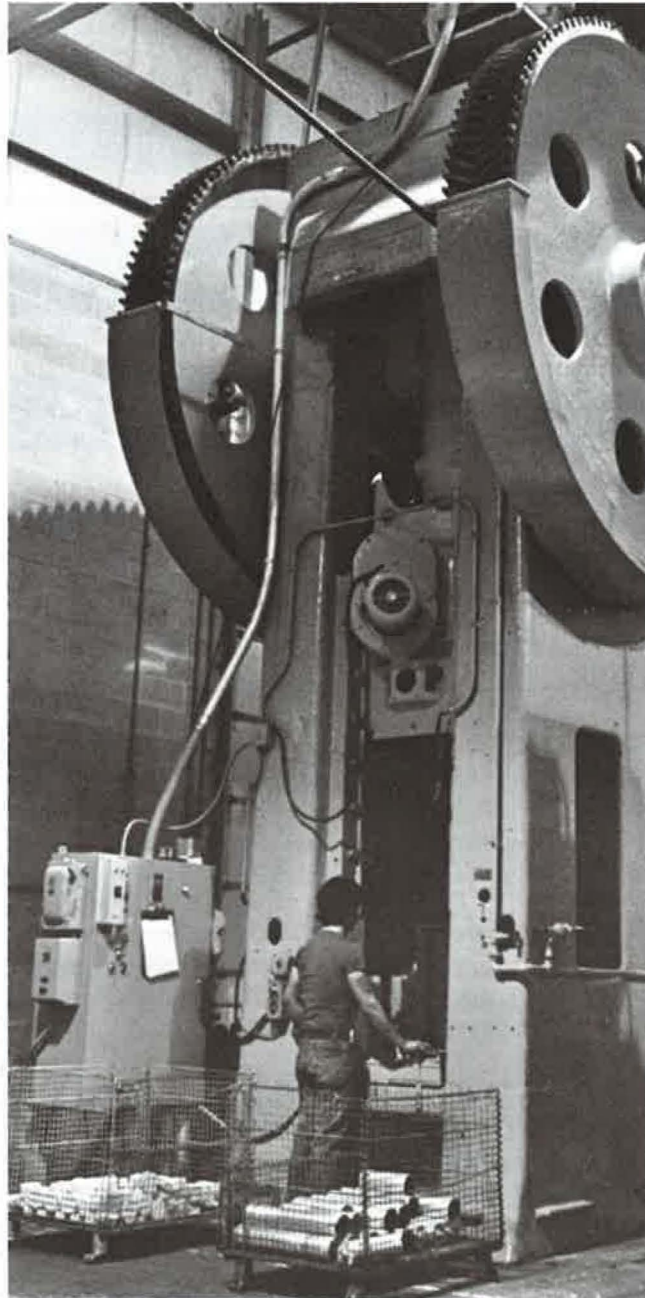


figure 4-60. metal impact extrusion machine (courtesy Metal Impact Corp.)

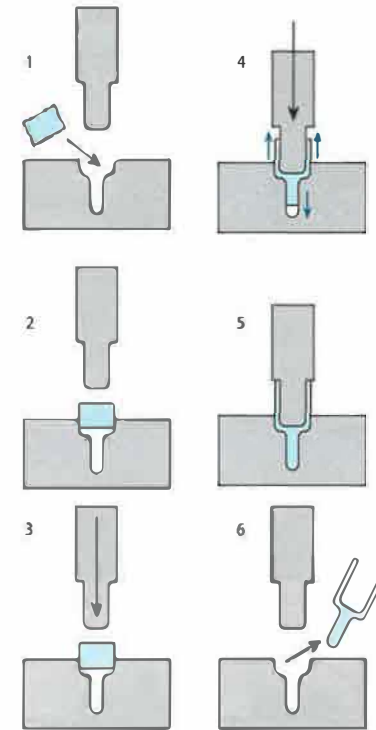


figure 4-61. aluminum impact extrusion



figure 4-62. aluminum impact extrusions (courtesy Metal Impact Corp.)