

Types of steel Beam sections

Structural steel beams and girders are available in three shapes: standard or “S” beams, wide flange or “W” beams, and pile or “H” beams.

Standard beams are specified by a letter callout, S, then the nominal web height in inches, then the per-foot weight in pounds. Most come in lightweight versions and some of the larger beams are available in several intermediate weights. Standard beams have tapered flanges whereas wide-flange beams have parallel flanges.

“H” beams will often have flanges and webs of equal thickness while the flanges of “S” and “W” beams are thicker than the webs. “H” beams are commonly driven into the soil to provide foundation piling. They can be built-up from separate pieces. “S” and “W” shapes are typically hot-rolled as single pieces. Beams are typically available in lengths up to 60 ft.

On a semantic note, while all girders are beams, not all beams are girders. In construction, the girder is identified as the primary load-carrying member, with the beams loading to it.

Tees

Tees are steel beams cut longitudinally through their webs, resulting in a single full flange and a half-deep web. They are available in the same shapes as full-size beams: “S” and “W.” The designation identifies the type, “ST,” followed by the nominal web depth in inches, followed by the shape, “I” or “WF.”

Channels

Channels have single webs flanked by upper and lower flanges, with the webs oriented off to the side and the flanges projecting perpendicularly to the webs, much like half a beam except the web is full thickness. The channel flanges have the same taper as standard beams – approximately a 16-2/3 % slope. Lengths of up to 20 and 40 ft. are common for bar sizes, with structural size usually available as 60 ft. lengths. Channels are not ordinarily applied as beams but the flat faces allow them to be bolted up to other flat faces.

Angles

Angles are “L” shaped in section with equal- or unequal-length, tapered legs. Their use as beams is strongly discouraged unless they are doubled up and connected in a manner approximating a tee. Angles have many applications, however, and are used as bracing, for trusses, etc.

Hollow Structural Sections (HSSs)

HSSs, or Hollow Structural Sections, are rectangular, square, elliptical, or circular in section, and the rectangular shapes are commonly used for welded frames where the loads act upon the structure in several directions. Circular HSSs, sometimes called round structural tubing, differs from pipe in the fluid-carrying sense (which is covered by different standards) but is used for load-bearing columns, etc. such as Lally columns. These shapes all start as welded rounds, with the square and rectangular tubing put through additional forming to create final products with heavy radii at their corners.