



DeeTee FORGES YET AHEAD IN SEARCH OF EXCELLENCE

ROLL DESIGN TIPS



SELECTION OF DESIGN

In our continuous quest for unparalleled quality, service and reliability, we turn our cumulative expertise in the field of TUBE, PIPE and SECTION MILL ROLLS. We design and manufacture variety of rolls keeping just one thing in mind, to provide high quality, wear resistant and accurately machined rolls that ensure cost efficiency and customer satisfaction. Our emphasis is on longer runs of same size without rolls getting worn out.

TUBE MILL ROLLS are used in forming sheets/plates of various thicknesses to form tubes and pipes of different diameters ranging from 4 mm to 600 mm. But-various factors should be taken into consideration before proceeding for the design. These are : Material, Tube O.D., Thickness, Tensile Strength and Hardness. There are three basic designs for rolls :

Design on COPRA-Software:

Now a days we design rolls on **German Copra-Software**, latest in the field of designing rolls & roll profiles. You are able to create a forming flower optimising loading on stands and changes in the flower can be made as per customer requirement. Then roll set profiles are made. You are at liberty to change different parameters of rolls before actually drawing rolls on paper. All types of rolls for sections and tubes can be designed on COPRA- Software. At DeeTee, we use this software, extensively.



Single Radius Design



Edge Forming Design



W-Forming Design



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DeeTee stands for total quality movement

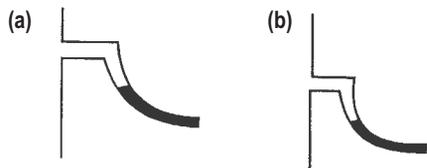
SINGLE RADIUS DESIGN

Single Radius Design is the oldest. In general, it is presumed that tube is being made from C. R., Mild Steel.

The gauge should be within a certain ratio of wall thickness to the diameter of tube which is commonly known as T/D ratio. An ideal ratio of 3% to 8% is good for the single radius design. For 1.5" Dia Tube, thickness between 18G and 10G is most suited.

$\frac{1.500'' \text{ Dia. Tube} \times 03\%}{(0.045'' \times 25.4)}$	$\frac{1.500'' \text{ Dia. Tube} \times 08\%}{(0.12'' \times 25.4)}$
$= 1.143 \text{ mm (18G)}$	$= 3.04 \text{ mm (10G)}$

Only one set of breakdown rolls would be used and adjustment of the top breakdown rolls would be required. If the T/D ratio is not between 3% to 8% then it would be subjected to common abuse.



- (a) If the top roll is designed for 0.03" gap, the thicker strip say 0.15" will have an uneven bending.
- (b) If the top roll is designed for 0.15" gap, the thinner strip say 0.03" will have buckling of edges.

Of course, a winning combination of a skillful operator, excellent rolls and superb mill alignment could make it possible to run M.S. tube with a T/D ratio as low as 1% to as high as 13% with a conventional design. But, adoption of this practice is not advisable as the precise conditions under which it would function could be very complex and demanding.

EDGE FORMING DESIGN

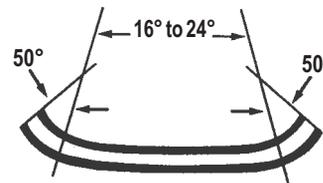
This design is basically used for very low and very high T/D ratio i.e. lower than 3% and higher than 8%.

Raw Material, Hardness & Tolerance

1. The best recommended raw material is AISI-D2 (C=1.55%, Cr=11.5%, Mo=0.7%, V=0.8%). we also manufacture rolls from AISI-D3 (C=2.0%, Cr: 12.0%).
2. For nominal Bore Pipes, Squeeze Rolls are recommended from Hot Die Steel.
3. Hardness should be kept -58/60 HRC for Forming Rolls and 59/61 HRC for Sizing Rolls.
4. Rolls' face to bore should be perpendicular within 0.03 mm in general.
5. Roll run out should be limited within 0.05 mm on root diameter.
6. Good quality rolls shall produce good tube.
7. For detailed tolerances, please refer News Views-10.

Tools WHICH LAST LONGER - Slitting Line Tooling, Tube/Section Mill Rolls, Tube Cut Off Knives, Cold Rolling Mill Rolls, Leveller Rolls, Fins, Steel Centers, Chipper Knives, Friction Saws, Shear Blades, H.S.S. Saws & C.T. Saw Bodies.

Non-ferrous materials such as aluminium, brass, titanium etc. can be rolled. It is essential to point out here that there is a certain degree of elasticity in these materials. Thus, due to 'Spring Back' action, correct edge forming radius becomes very critical.

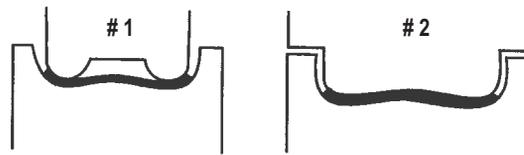


The angle of Edge Form design is determined by the number of breakdown passes. The skelp edge is formed at approximately 50° with the centre radius encompassing 16 to 24 degrees.

Unlike conventional design, we cannot run a wide range of gauges with Edge Form design. It becomes absolutely necessary to change the first top roll for different gauges.

W-FORMING DESIGN

This design could be used on any type of material and is an alternative to the more common Edge Form design, though a bit expensive one.



It gives more edge formation of the skelp approximately 70° as compared to 50° in the standard edge form. Tube in any adverse circumstances can be welded with this design though its running is little more skill full.

Tube straightening machine rolls

For good straightening, tubes should have line contact with rolls. This is possible by generating hyper bolic profile on rolls. DeeTee specialises in generating hyper bolic profile on tube straightening machine rolls.