

### Bending & Forming Bus Conductor

Aluminum bus conductors can be formed by the same procedures and practices that are used for other metals. The most important factors governing to consider when bending bus conductor are:

1. The ductility of the conductor
2. The size and shape of the conductor
3. The method of bending
4. The bending equipment used

A metal must be ductile enough to allow stretching and compression to take place. Elongation alone is not a complete criterion for ductility. The ration of yield strength to tensile strength must also be taken into account. A combination of a high elongation value and a low ratio of yield strength to tensile strength provides the most satisfactory ductility.

The size and the shape of the bus conductor is another factor that must be taken into consideration. For example, in case of a tube, the sharpness of a bend depends not only on the diameter of the tube, but also on the ratio of wall thickness to the diameter. When making edgewise bends of rectangular bar, tests have shown that the radius (in terms of width of the bar) around which a bar can be bent satisfactorily depends not only on the ductility of the bar but also on its ratio of width to thickness.

Extruded, rolled, and sawed-plated bus bars can be bent flatwise at room temperature through an angle of 90 degrees to minimum inside radii.

Tubular conductors made alloys 6063-T6 and 6061-T6 are often bent to form turns and offsets. In these cases, specifications should require seamless pipe made by hollow ingot process (ASTM B241). Ideally, the ratio of tensile yield to tensile ultimate should not exceed 0.85. It is vital to specify that severe forming will be encountered and optimum heat treatments are required.

For substations, inside radii of five to seven times the nominal pipe size for ASA schedules 40 and 80 pipe of 6063-T6 and 6061-T6 alloys should produce satisfactory results with conventional bending tools.

#### Flatwise Bends for Rectangular Bus

Type of Bar	Alloy and Temper	Thickness in	Radius min. <sup>1</sup>
Extruded	6101-T6	0.125-0.375	2 x thickness
Extruded	6101-T6	0.376-0.500	2 1/2 x thickness
Extruded	6101-T61	0.125-0.500	1 x thickness
Extruded	6101-T61	0.501-0.749	2 x thickness
Extruded	6101-T61	0.750-1.000	3 x thickness
Extruded	6101-T61	1.001-1.625	4 x thickness
Extruded	6101-T63	0.125-0.375	1 x thickness
Extruded	6101-T63	0.376-0.500	1 1/2 x thickness
Extruded	6101-T63	0.501-1.000	2 1/2 x thickness
Extruded	6101-T64	0.125-0.750	1 x thickness
Extruded	6101-T64	0.751-1.00	2 1/2 x thickness
Extruded	6101-T65	0.125-0.500	1 x thickness
Extruded	6101-T65	0.501-0.749	2 x thickness

1. Applicable to widths up through 6 inches in the T6, T61, T63 and T65 tempers and to widths up through 12 inches for all other listed tempers. Blend radii for greater widths are subject to inquiry.

