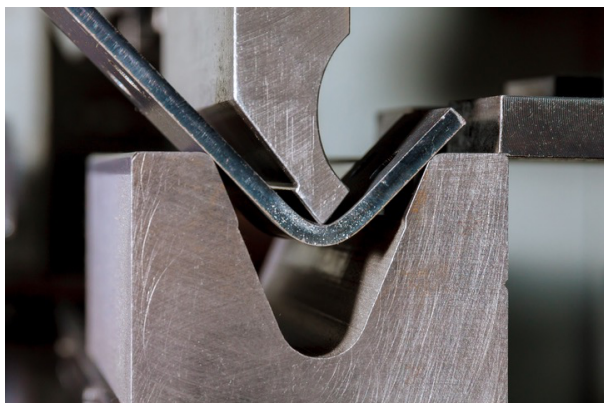


Fabrication Corner

Bending – Alloy or Temper



Don't forget the temper when it comes to optimising the bending ability of an aluminium alloy. Temper is as important as the alloy.

For non-heat-treatable 3xxx and 5xxx alloys, O-temper is the easiest temper to bend in.

6xxx, 2xxx and 7xxx heat-treatable alloys should if possible be bent in T4 condition as this has a lower yield strength. However, there is a drawback. Yield strength in the T4 condition varies over time due to natural ageing, a slow hardening process that occurs over time. T4 material that is older will be harder.

Although the variation in yield strength is small over short times, this might cause springback variation in some bending processes. So, in some cases, bending in T6 could be a better option.

Four favourite bending alloys:

3003 In most cases, this is probably the best alloy for bending. You get average strength, very good cold workability and high elongation. 3003 also offers one of the biggest differences between yield and tensile strength.

5052 You get high elongation (not as high as 3003, however) and a solid difference between yield and tensile strength. You also get high strength when compared with other non-heat-treatable grades and outstanding corrosion behaviour. When annealed, it beats the 3003 alloy in formability.

5083 Not far behind 5052 comes this one, its big brother, and a classic alloy for marine applications with good corrosion resistance and weldability. There is some variation with regard to temper, but if you chose H111, H112 or O temper you should be fine.

6061/6082 These are versatile heat-treatable alloys which, when annealed, offer a satisfactory difference between yield and tensile strength, and good elongation. Their bending ability will decrease, however, when you move to T4 and T6 tempers. Recommendation - bend in T4 condition and then heat treat to T6 if this is possible.