



QC-10[®] *Better in Every Way*

QC-10[®] Ten, a number always reserved for describing the best. That is the way we feel about Alcoa's next generation of mold material. Aluminum has long been accepted as a mold making material for plastic injection and blow form molds. Now with Alcoa's QC-10[®], mold designers can expand their design options and take advantage of aluminum's unrivaled thermal and machining properties.

QC-10[®] represents Alcoa's newest proprietary alloy. Developed for its outstanding thick section strength characteristics, QC-10's high purity composition and quench insensitive microstructure allows minimal drop-off in strength from 8"-24" section thicknesses.

Alcoa's next generation QC-10[®] is higher in strength, stability, and durability. In addition, users will enjoy these cost saving benefits and productivity improvements:

- 20 - 30% improved cycle time
- 40% faster cutting speeds over that of steel.
- Faster finishing reduces polishing time
- Light weighting to QC-10 reduces equipment wear and equipment downtime.

QC-10[®] is fully wrought, eliminating porosity concerns, and stress relieved to minimize machining distortion. It is supplied tempered to exacting conditions, tailored for applications requiring additional strength or corrosion resistance.

When building your next mold, consider QC-10[®] in your design. You will realize that it is truly "Better in Every Way".

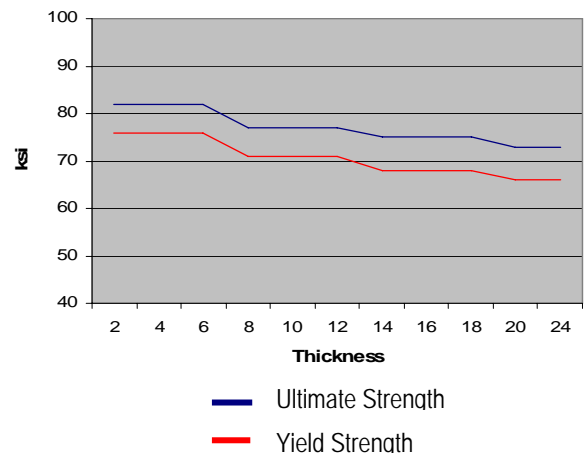


Mechanical Properties

Strength, typical	2-6"	8-12"	14-18"	>20"
Yield (ksi)	76	72	68	66
Ultimate (ksi)	82	77	74	72
Elongation (%)	10	8	6	3

YS, UTS, and elongation value at T/2 thickness (L/T direction)

Strength



Physical Properties

Parameter	Units	
<i>Thermal Conductivity</i>	Btu/ft/hr/ft ² /°F	92
<i>Coefficient of Thermal Expansion</i>	10 ⁻⁶ /°F	13.7
<i>Modulus of Elasticity</i>	psi	10.4E x 10 ⁶
<i>Density</i>	lb/in ³	0.103
<i>Specific Heat</i>	Btu/lb/°F	0.210
<i>Hardness at Center</i>	Brinell	150 - 170



Sizes & Tolerances

Standard Available Thickness: 1.576" – 24.0"
 Standard Width: 48.5" (gauge > 16.0") & 60.5"
 Standard Length: 96" – 144"

Thickness		
IN	mm	Width to 60.5 Inch
1.576-2.362	40.02-59.99	-0/+0.100 (-0/+2.54)
2.363-3.150	60.00-80.01	-0/+0.140 (-0/+3.3556)
3.151-3.937	80.02-100.0	-0/+0.190 (-0/+4.826)
3.938-6.000	100.1-152.4	-0/+0.250 (-0/+6.35)
6.01-24.00	152.7-610.0	-0/+0.340 (-0/+8.63)

Welding

Surface Preparation

1. Pre-weld cleaning and oxide removal is very important. Aluminum oxide melts at 3700°F (2035°C) while aluminum melts at 1200°F (650°C). The oxide can act as a barrier to adequate fusion between the weld and the parent metal.
2. Remove affected area (e.g. cracks, eroded surface and/or corners) by grinding or machining into sound parent metal. The removal of material should be carried out in a manner that avoids creation of sharp and/or other difficult to reach areas that later will need to be filled by welding.
3. Solvent clean and dry area to be welded.
4. Lightly abrade the affected area with a stainless steel brush.
5. Solvent clean and dry.
6. Repair by GTA arc welding.
7. Grind and buff the weld reinforcement(s) to right shape and finish.
8. Inspect visually and/or with the aid of dye-penetrant for weld soundness.

Pre-weld Preparation

1. There is no need to heat QC-10[®] parts before (preheat) or during arc welding

Welding

1. Repair should be with gas tungsten arc (GTA) welding or gas metal arc (GMA) processes. The best GTA weld process is by using 2319 filler wire. 5356 can be used, but with less success.
2. Minimize the weld heat when filling or welding QC-10[®] parts.

	Filler Wire	(Dia)	Average Welding Current (amps)	Welding Voltage
GMA	2319	1.20 mm (0.045")	240-255	24 – 27
	5356	1.20 mm (0.045")	250-270	25 – 28
GTA	2319	3.18 mm (0.125")	250-265	20 – 24
	5356	3.18 mm (0.125")	250-265	20 – 24

Notes:

1. Argon is used for shielding both processes
2. Electrode positive (reverse polarity) and AC mode were used during GMA and GTA welding, respectively.

The information contained in this document is for indicative purposes and in no way be considered binding to Alcoa or its subsidiaries. It is the user's responsibility to check the accuracy of the information, refer to experts in the mold making field, and refer to specialists and experts within Alcoa.