

### QC-10<sup>®</sup> Mold Plate and Forged Block

Specifically designed for production injection molds, QC-10 offers greater strength, stability, and durability than any other 7000 series aluminum mold alloy on the market. Its improved alloy composition provides outstanding through thickness strength and hardness while its quench insensitive microstructure allows provides minimal strength drop-off and unequalled machinability.

#### Application

QC-10 is an excellent mold material choice for production tooling applications in numerous industries such as automotive, consumer electronics, and industrial products. QC-10 machines faster than steel and can be electrical discharge machined, polished, and textured.

#### Faster Machining

A high hard type of aluminum mold material, QC-10 machines 8-10 times faster than steel for rough milling. With high speed spindles, rough machining of QC-10 can occur at cutting rates of 20,000 rpm and feeds of 0.325 mmpt Alcoa's Signature Stress Relief cold work technology gives QC-10 consistent strength through the middle of block, differentiating it from other aluminum alloys. In one case, a mold maker was able to reduce mold manufacturing lead time by 40% due to the dramatic increase in roughing speeds over P20 steel.

#### Faster Cycle Time

Outstanding thermal conductivity is the key to faster cycle times. QC-10 conducts heat nearly 5 times faster than tool steel, reducing molding cycle times by 20-50%. Reduced cycle time increases productivity. Since QC-10 heats and cools more efficiently than tool steel, resins process more efficiently yield less warp concerns in the molded part.

#### Lower Piece Price

By offering reduced mold cycle time of 20-50%, QC-10 tooling has clear cost advantages for manufacturers. As much as 50% of the cost of an injection molded part is cycle time. Cutting cycle time increases production and decreases piece-price costs. One manufacturer has reported producing 5 days production rate in 4 days using QC-10, therefore opening up capacity to begin new jobs.

#### Proven Durability

Today many QC-10 molds have delivered in excess of 500,000 shots and in some cases approaching that ever important number of 1,000,000. Of course, proper maintenance routines must be fully adhered to assure a lifetime of reliable mold service. Nobody enjoys having to fix molds, but in case repairs are needed, Alcoa has developed a proprietary weld repair wire to match the chemical composition. Consult with an Alcoa Technician about repair techniques.

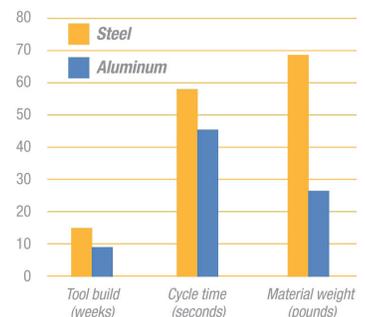


Consumer Electronics

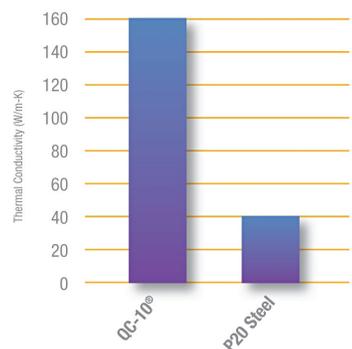
#### Compared to mold steel:

- >> 8-10 x faster machining
- >> 20-50% cycle time reductions
- >> Up to 50% lower piece price
- >> Proven Durability

Aluminum molds are more efficient than steel molds



QC-10 THERMAL PROPERTIES



**Consumer Electronic Case Study:**

Product Description: LCD TV back cover

Resin: High Impact Polystyrene

Part Weight: 1.31 kg

Quantity: 200,000 units



Machining time Mold Part	QC-10	P20, min	Improvement
Cavity	45 hours	54 hours	16%
Core	30 hours	54 hours	44%

Mold Material	QC-10	P20	Improvement
Cycle Time, seconds	29	58	50%
Product on per 1.1 hour shift	1350 Pcs	680 Pcs	98.5%

**Mechanical Properties**

Strength Inches		1-6	8-12	14-18	>20
Strength Millimeters		50-150	150-300	300-450	>450
Yield	KSI	70-74	72	68	66
	MPA	483-510	500	470	455
Ultimate	KSI	77-79	77	74	72
	MPA	530-545	530	510	500
Elongation (%)		4-11	8	6	3

YS, UTS, and elongation values at center (L/T direction)

**Physical Properties**

Parameter	Units	
Thermal conductivity	BTU/°F	92
	W/m-K	160
Coefficient of thermal expansion	10 <sup>-6</sup> /°F	13.7
	10 <sup>-6</sup> /°C	24.7
Modulus of elasticity	psi	10.4E x 10 <sup>-4</sup>
	GPA	70
Density	lb/in <sup>3</sup>	0.103
	g/cm <sup>3</sup>	2.85
Specific heat	Btu/lb/°F	0.210
	J/g/°C	.844
Hardness at center	Brinell	150-170

**Availability**

QC-10 is available in select dimensions:

Thickness	Width	Length
1"-6" (25-150mm)	36.5" (927mm)-100" (2540mm)	144" (3660 mm)-515" (13081mm)
7"-10" (178-250mm)	60.5" (1520mm)	144" (3660 mm)
12" (305mm)	60.5" (1520mm)	127" (3225 mm)
14" (355mm)	60.5" (1520mm)	109" (2768 mm)
16" (406mm)	60.5" (1520mm)	96" (2438 mm)
18" (457mm)	48" (1232mm)	100" (2540 mm)
20" (508mm)	48" (1232mm)	100" (2540 mm)

Additional dimensions available. Please contact your Alcoa sales representative for details.

**About Alcoa Mold and Tooling Products**

Since 1987, Alcoa has been delivering outstanding mold products beginning with QC-7. Today, with QC-10, Alcoa is working jointly with mold makers and molders using a collaborative design approach to challenge conventional practices and provide innovative solutions that deliver greater value.

Interested in opportunities presented by QC-10? Visit [www.alcoaqc10.com](http://www.alcoaqc10.com)

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