Advanced specialised alloys for today’s moulding technologies
As the undisputed world leader in aluminium alloy products, Alcoa is uniquely placed in terms of expertise and resources to develop advanced specialised alloys for aerospace, marine, transport, construction, industrial and engineering applications.

Among the many plate products and cast forging stock manufactured for export worldwide from the Alcoa Europe Kitts Green mill is a comprehensive portfolio of ultra-high performance alloys optimised for plastic mould tooling: the Alumec range.

Alumec products are specifically engineered to maximise the operational advantages of using aluminium alloys for today’s moulding technologies, including injection moulding, RIM, structural foam moulding, vacuum forming, blow moulding and rubber moulding.

For our clients throughout the world, the business benefits of switching to Alumec are borne out by decades of experience: superior machinability, ease of handling and optimum product quality. Using the same exacting manufacturing standards as employed in supplying aerospace materials, Alumec provides the reassurance of exceptional consistency in terms of quality, reliability and performance. Together with significant cost savings throughout the production lifecycle from initial machining to eventual disposal, these operational advantages combine to deliver a significant competitive edge over both steel and generic aluminium alloy alternatives.
Engineered for maximum profitability

Using Alumec moulds rather than steel substantially reduces production costs in several ways:

**Faster and less costly fabrication**

Being so much easier to machine, Alumec moulds can typically be made in a third of the time of a steel equivalent, with corresponding savings in fabrication costs. (Ancillary components such as fittings, pillars and bushes are cost neutral, as conventional steel components can be used.)

**Lower operational costs**

Alumec moulds weigh anything up to 60% less than steel equivalents, so they’re easier to handle and stock, and exert less strain on your process machinery. As well as extending press life in this way, specifying Alumec also reduces your expenditure on tooling, machinery set-up, mould maintenance and ongoing consumables.

**Massive productivity gains**

The thermal conductivity of aluminium being many times higher than steel means that Alumec moulds can cut moulding cycle times – and therefore increase output – by between 30 and 50%.

**Faster turnaround**

Using Alumec products also saves time in both design and production because less complex cooling systems are required.

High performance surface finish
Superior machinability and finishing

With metal removal rates at least four times greater than steel, Alumec has excellent machinability and is easy to spark and wire erode. High performance surface finishes are equally simple to achieve with a wide range of processes including chemical nickel, hard chrome and hard anodising. EDM polishing and photo-etching deliver more uniform results compared to steel, and the consistently reliable microstructural integrity of Alumec alloys allows first class mirror finishes to be obtained for optically critical applications.

Higher product quality

Superior thermal conductivity allows an Alumec mould to cool more evenly, minimising risk of distortion in the moulded part. Together with lower capital and production costs, total product consistency and a substantially faster time to market, this marked quality gain clinches the business case for choosing Alumec.

Alumec materials – main characteristics

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The right alloy for your process

Specifically designed for precision mould applications, the Alumec range has been developed to combine high strength and mechanical stability with outstanding machinability. Over the three decades since the brand’s introduction, new Alumec alloys have been developed to satisfy the enhanced performance requirements of specific moulding technologies, such as improved weldability and resistance to stress corrosion or sustained high temperatures.

For the specifier, this gives the reassurance of knowing that the performance characteristics of an Alumec mould will exactly match process requirements every time, with all that implies in terms of reliable long-term operation. Alumec alloys are supplied fully heat treated, with no further treatment required.

Alumec 100

• derived from advanced aerospace technology
• highest strength Alumec product combined with excellent machinability, durability and stability
• improved toughness
• improved corrosion resistance
• even better through thickness hardness consistency than Alumec 89
• easily repair welded with gas tungsten arc (GTA) or gas metal arc (GMA) welding processes using 2319 filler wire. Alternatively, 5356 can also be used

Sizes: plate thickness up to 305mm

Applications: higher volume injection moulding application requiring superior wear resistance and polishability

Alumec 99

• increased resistance to cooling channel corrosion and stress corrosion cracking
• higher strength than Alumec 79 and 7075-T651
• excellent through thickness hardness consistency
• easily repair welded

Sizes: plate thickness up to 305mm

Applications: processes requiring prolonged use, such as blow moulding
Alumec 89
• even higher strength than Alumec 79, with excellent machinability and stability
• even better through thickness hardness consistency than Alumec 79
• easily repair welded
Sizes: plate thickness up to 305mm and round bar up to 200mm diameter
Applications: more demanding injection and blow moulding applications requiring superior wear resistance and polishability

Alumec 79
• high strength with excellent machinability and stability
• greater through thickness hardness consistency than 7075-T651
• more sustainable strength than 7075-T651 (especially in thick sections)
• easily repair welded
Sizes: plate thickness up to 305mm, and round bar up to 200mm diameter
Applications: injection moulding, simple thermoplastics and blow moulding

Alumec HT
• retains strength at mould temperatures up to 180°C (unlike most aluminium alloy mould materials)
• minimal variation in mechanical properties across the thickness range
• good through thickness hardness consistency
Sizes: plate thickness up to 305mm
Applications: rubber moulding
Online technical support

The Alumec User Guide is a comprehensive technical support package for the Alumec range, with detailed information about the performance and characteristics of each product to help you select the right one for your application. In addition to a selection of case studies demonstrating the benefits of Alumec moulds in various applications, you’ll find a useful problem solving section. Further additions include additional information and guidance on mould design and usage with Alumec alloys.

Access is easy – all you have to do is register online at our secure site at www.alumecuserguide.com. Alternatively, email us at alumec@alcoa.com or contact your nearest Alcoa office or distributor.

Although especially developed for moulding applications Alumec is frequently used in industrial applications for its strength, machinability and polishability.