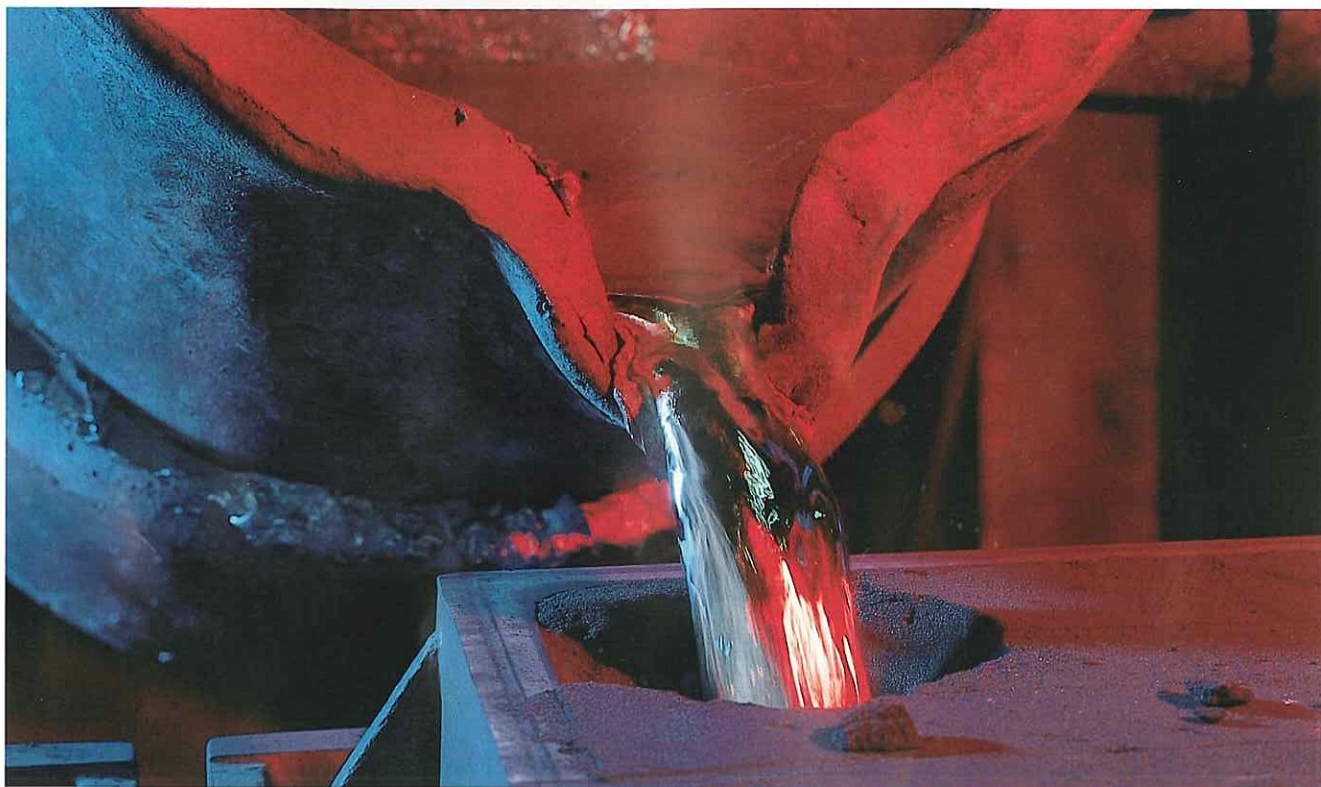




**ALUTIT Aluminum Titanate –
advanced ceramics
for the nonferrous
molten metal industry**

ALUTIT – the ultimate in thermal resistance



On the one hand, you have aggressive melts, thermal loads in excess of 1.000 °C, and temperature gradients of several hundred degrees. On the other, there is the need for maximum process reliability, plant availability, energy efficiency, and melt purity. The result is a requirement profile that is more than a match for conventional materials.

To reconcile these demands, we have developed ALUTIT – a ceramic material that distinguishes itself by a unique combination of thermal and physical properties. High-purity aluminum oxide and titanium oxide are combined into a micro-porous material via a precision-controlled reaction sintering process. A structure characterized by a microfine system of fissures gives ALUTIT its unique performance characteristics:

- Low thermal conductivity
- Low thermal expansion
- Excellent thermal shock behavior
- Good corrosion resistance
- Outstanding temperature resistance
- No or little wetting by most molten metals

This combination of features makes ALUTIT ideal for all applications involving the handling of liquid nonferrous metals (e.g., aluminum, magnesium, zinc, tin, brass, gold). Particularly in (low) pressure die-casting of aluminum, where ALUTIT is used for riser tubes and nozzles, this product has given outstanding results.

ALUTIT – prime performance for the molten metal industry

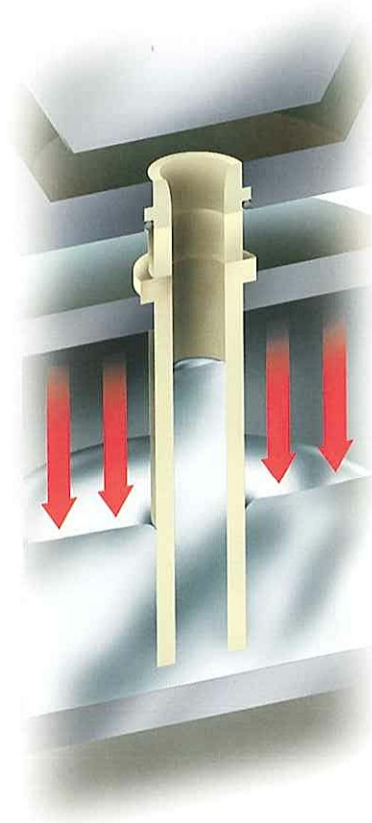
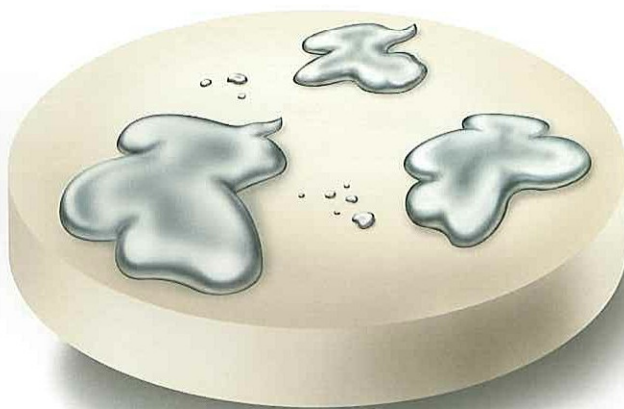
Compelling benefits

Cast iron is less costly, to be sure – at least at the purchasing stage. But with its specific range of performance characteristics, ALUTIT offers a number of convincing benefits. It is the sum of these application advantages that tips the scales in its favor:

- Due to their outstanding thermal shock resistance, ALUTIT components can be directly exposed to the molten metal – without any preheating.
- The anti-wetting properties of ALUTIT prevent metal adhesion, simplify cleaning, and extend operating periods between cleaning cycles.
- With its low thermal conductivity, ALUTIT will contribute significantly to the energy efficiency of your casting process, reduce melt temperature gradients, and provide valuable solidification delay (e.g., in sprue pin areas).



- The high resistance of ALUTIT to chemical attack by nonferrous molten metals increases component service life and will therefore boost your plant efficiency, while simultaneously enhancing product quality due to the absence of decomposition products degrading the metal.
- ALUTIT has a specific gravity that is only about one-half that of gray cast iron, resulting in obvious handling benefits.



ALUTIT application example: Riser tube for an aluminum low pressure die-casting process

ALUTIT for high versatility

The potential of ALUTIT is not limited to the manufacture of riser tubes or nozzles for use in low pressure aluminum die-casting. Its versatility makes it suitable for all nonferrous molten metal handling, conveying, and proportioning processes. Applications range from sprue tips, nozzles, hot top rings and feeder plugs to slide valve plates, insulating rings, break-rings, and thermocouple sheaths.



Typical dimensions

	ø Flange dia.	ø Outside dia.	Wall thickness	Length
Riser tube I	100 mm	60 mm	15 mm	500 mm
Riser tube II	130 mm	100 mm	20 mm	1.000 mm
Riser tube III	130 mm	100 mm	20 mm	1.250 mm
Protection tube, one-end closed	–	24 mm	5 mm	up to 1.250 mm

	ø Outside dia.	ø Inside dia.	Height
Ring I	90 mm	60 mm	10 mm
Ring II	220 mm	180 mm	30 mm
Ring III	360 mm	300 mm	80 mm

ALUTIT plus our experience – a successful combination

Our application engineers are experts in all matters related to the use of ceramic components in the molten metal industry. Please do not hesitate to draw on their support to exploit fully the benefits of ALUTIT. In designing your application, it will help to bear in mind that ALUTIT is a ceramic, and therefore brittle material. It must not be exposed to impact loads during assembly and cleaning operations. Where ALUTIT is used in metal components, different thermal expansion behavior is another important aspect. To avoid stress levels that may result in component failure, the use of a suitable sealant is mandatory.

ALUTIT component size ranges

Maximum dimensions

	Diameter	Length
Tubes	max. 200 mm	max. 1.500 mm
Rings	up to 360 mm**	

** larger diameters available upon request

	ø Outside dia.	ø Inside dia.	Height
Nozzle I	6 mm	1,9 mm	8 mm
Nozzle II	50 mm	37,5 mm	50 mm
Nozzle III	120 mm	80 mm	48 mm

ALUTIT S or ALUTIT T

Superior strength or thermal shock stability

If you are not sure which material will give optimum results in your specific process environment, ask us for advice. ALUTIT is available in two types, designed for different requirement profiles:

- ALUTIT S is optimized for strength and is used mainly in riser tubes.
- ALUTIT T offers unsurpassed thermal shock resistance and is used primarily in components subject to high thermal loads, e.g., as hot top rings, break rings, and nozzles.



Property	Unit	ALUTIT S strength optimized	ALUTIT T thermal shock optimized
Density	g/cm ³	3,35	3,35
Porosity	%	12,5	12,5
Average pore radius	nm	100	> 200
Bending strength	MPa	40	25
Modulus of elasticity	GPa	20	17
Thermal expansion 20 – 600 °C	10 ⁻⁶ K ⁻¹	< 1	< 1
Thermal conductivity 20 °C	W/mK	1,5	1,5
Thermal Shock (maximum air/ fluid temperature gradient)	°C	700	> 1.000

