



## INSURAL\* ATL

Insulating refractory ladle linings for aluminium and zinc

VESUVIUS



# INSURAL insulating refractories

for highest quality demands

## INSURAL ladle linings

INSURAL ATL insulating ladle linings are suitable for aluminium and zinc foundries. They are supplied ready for use, to transport molten aluminium and zinc alloys. A variety of shapes and sizes are available up to a maximum of 2 tonnes for both standard and non-standard steel ladle shells.

INSURAL ladle linings are made from a strong, lightweight and non-wetting refractory material with excellent insulation properties. INSURAL 140 refractory is used for the walls and the more wear resistant silicon carbide for the base.

Supplied as ready for use units, they require only a brief pre-heating following installation to remove any possible moisture pick-up. After this, further pre-heat before use is only necessary if the ladle has remained empty and cold over fairly prolonged periods.

INSURAL ATL linings should always be used in combination with INSURAL 10 backing material. This will keep the lining in place in the steel shell. The space between the steel shell and the lining should be approximately 25 mm, to leave sufficient space for the backing.

The ladle lining is bedded on to a layer of INSURAL 10 material approximately 25 mm in thickness. Level the material and insert the lining, ensuring that it is placed in the centre of the steel shell. Further INSURAL 10 material is poured between the sides of the liner and the ladle shell, finishing off with some INSURAL 800 mastic to seal the top. Heat is supplied to the base to initiate an exothermic reaction and hardening of the backing material.

Transport ladles lined with INSURAL ATL linings are especially well suited for degassing with FDU devices.

INSURAL 10 components



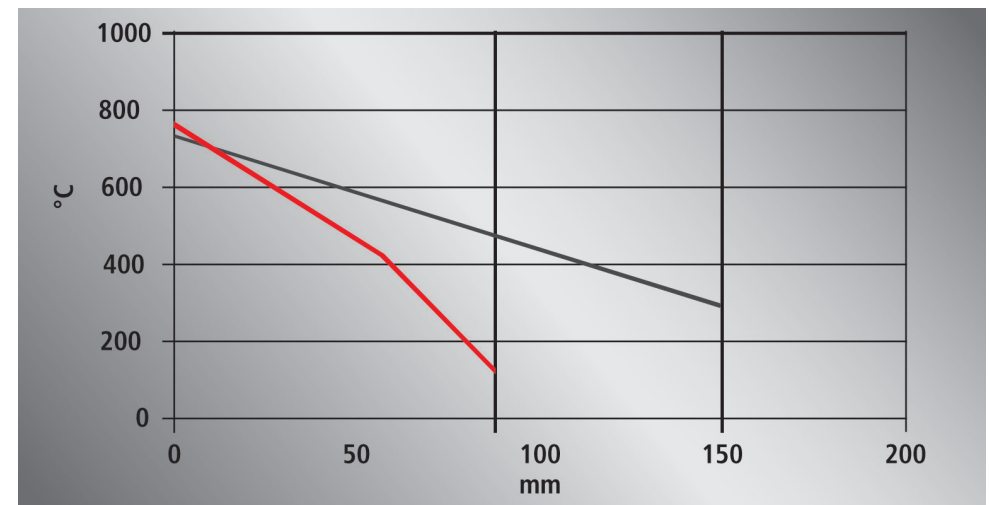
### Heat transfer calculation

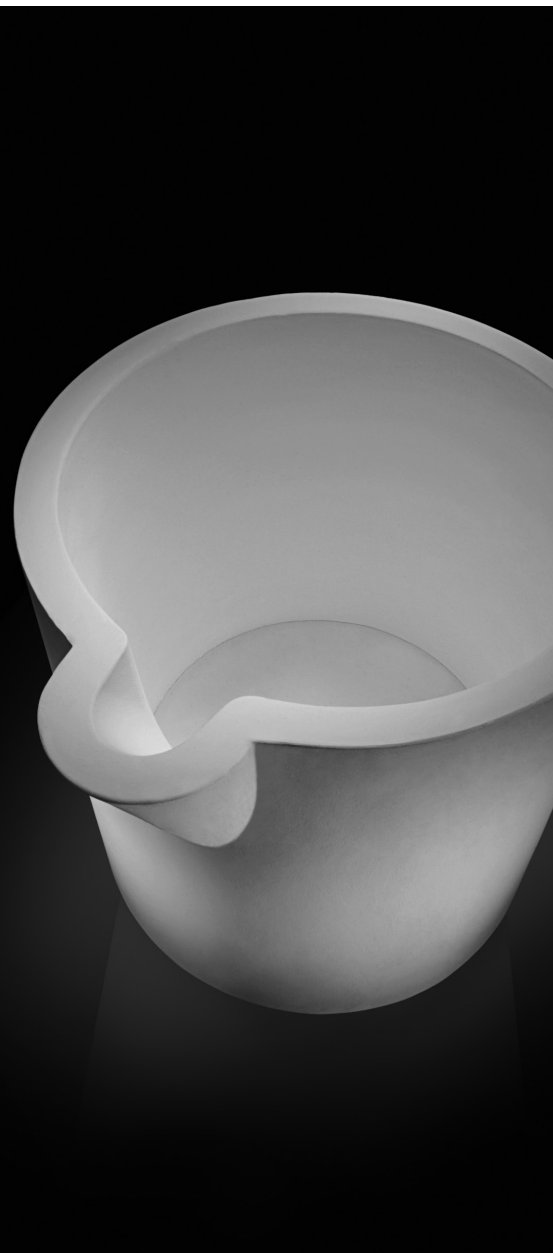
The excellent insulating properties of INSURAL refractories become obvious when comparing it to a standard refractory concrete with regards to heat transfer. Despite the relatively small wall thickness of the INSURAL lining, the external wall temperature is significantly lower. Given rising energy costs, this is a strong argument for using INSURAL ladle lining.

Layer	Thickness	Material	Thermal conductivity	Boundary temperature
No.	mm		W/mk	°C
1	150	Refractory concrete	3,140	741
2	0		1,000	308
1	60	INSURAL 140	0,460	747
2	30	INSURAL 10	0,300	410
3	0		1,000	152

Refractory concrete  
Wall thickness: 150 mm  
Heat loss: 9069 W/m<sup>2</sup>  
Boundary temperature: 308 °C

INSURAL refractory  
Wall thickness: 90 mm  
Heat loss: 2583 W/m<sup>2</sup>  
Boundary temperature: 152 °C





### Metal cleanliness

INSURAL ATL ladle linings are precast and supplied fully fired. The non-wetting properties ensure that aluminium skull formation is reduced and simple to remove, preventing cross contamination between metal transfers. Oxide build-up is avoided reducing the risk of hard inclusions in the melt.

Furthermore, traditional linings frequently require the melt to be superheated to offset temperature loss, promoting oxide formation and higher dissolved hydrogen levels.

The use of CERAMOL\* 258G or TERRACOTE 7667 refractory coatings can further improve the ladle lining cleanliness.

### Metal treatment

More and more foundries are using central melting and carrying out metal treatment in the transfer ladle so that casting can begin quickly after transfer. For such foundries insulation and temperature loss is an important issue. An INSURAL ATL lining system will only have a temperature loss of around 3°C per minute.



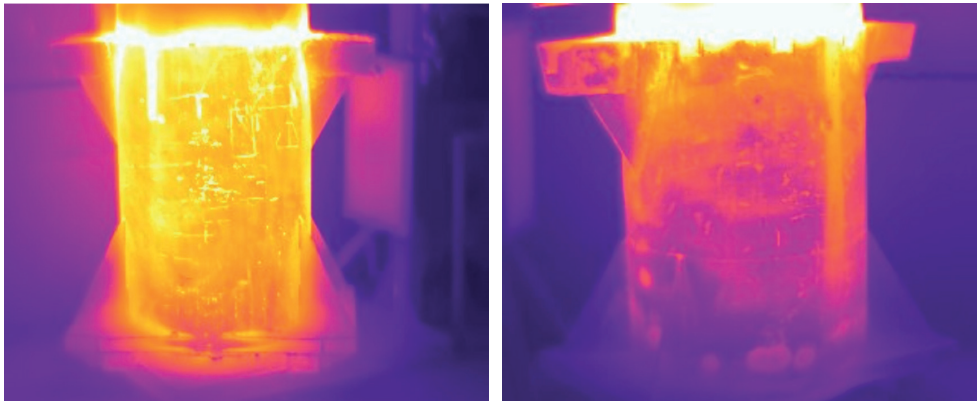
### Metal treatment

INSURAL ATL linings do not suffer from thermal shock. Preheating is only required on first use or after prolonged periods of inactivity.

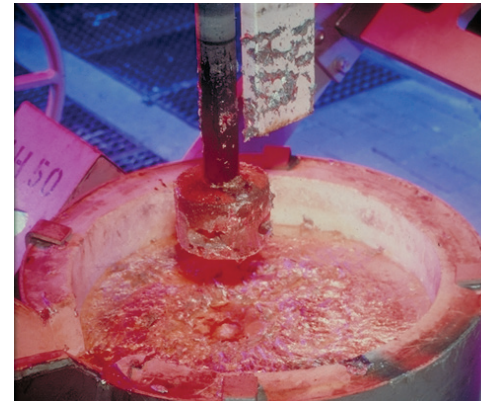
INSURAL ATL transfer ladles are available in sizes up to 2 tonnes and with larger ladles significant impact is experienced on filling. This impact will often be focused on the same position every time so the ladle bottom can erode. Larger INSURAL ATL ladles are supplied with silicon carbide wear plates to avoid this erosion.

In spite of this, with proper handling, ladle lifetimes of several months are not uncommon.

Infrared image of ladle in use shows significantly higher levels of energy emitted with traditional refractory linings (1st) compared with INSURAL ATL (2nd)



High insulating properties of INSURAL ATL facilitate full metal treatment in the transfer ladle

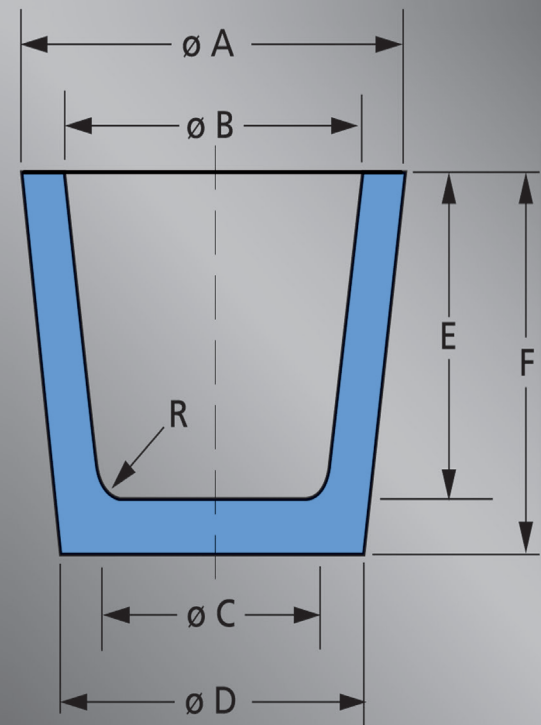


INSURAL ATL coated with TERRACOTE 7667 after several months use



# INSURAL ATL

transport ladle dimensions



Type	No	A	B	C	D	E	F	R	Vol. (dm <sup>3</sup> )	Kg Al 90 % filled
ATL 15	I 611.2	250	210	150	185	245	265	0	5	14
ATL 30	I 547.2	293	235	195	250	335	363	25	12	27
ATL 40	I 582.2	300	250	210	250	418	450	40	17	39
ATL 48	I 552.2	375	305	220	260	330	350	40	18	40
ATL 65	I 615.2	400	365	255	285	350	390	0	26	60
ATL 100 SB	I 550.1	470	394	335	405	394	462	0	41	93
ATL 110 SB	I 616.1	469	399	260	345	430	510	20	37	83
ATL 140 SB	I 496.1	485	420	360	420	470	560	0	56	126
ATL 201 SB	I 617.1	545	480	445	515	440	530	0	73	165
ATL 200 SB	I 543.1	565	490	450	540	470	550	0	78	176
ATL 300 SB	I 490.1	574	510	445	540	585	700	0	105	236
ATL 400 SB	I 491.1	732	634	535	680	605	725	0	162	365
ATL 401 SB	I 619.1	680	580	485	630	730	850	0	163	366
ATL 500 SB	I 618.1	895	785	695	840	570	690	0	245	550
ATL 600 SB	I 492.1	750	670	535	680	855	975	0	244	548
ATL 800 SB	I 493.1	908	808	695	840	730	850	0	324	729
ATL 1000 SB	I 494.1	920	830	695	840	880	1000	0	402	904
ATL 1300 SB	I 873.1	930	830	710	860	1150	1275	0	535	1205
ATL 1400 SB	I 1131.1	990	890	810	950	1010	1135	20	573	1289
ATL 1800 SB	I 1270.1	1100	1000	900	1050	1200	1275	20	845	1900
ATL 2000	I 1026.2	1190	1077	1058	1190	970	1050	100	935	2000
ATL 2250	I 1280.2	1180	1080	1056	1180	1284	1374	100	1000	2250

# INSURAL ATL ladle linings

quick and easy installation



Easy removal of old lining



Levelling of INSURAL 10 material at the bottom of the ladle



Inserting ATL lining in the steel shell



Filling the gap between steel shell and ATL with INSURAL 10 material



Space for INSURAL spout



INSURAL 800 mastic is applied to the spout



Steel shell around the spout is covered with INSURAL 800 mastic



The gap is filled with the rest of the backing material up to the top, it is compacted and sealed with a layer of INSURAL 800 mastic of approx. 15 mm



Before external heating, venting holes are pierced into the INSURAL 10 refractory layer

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