



**RENO**  
REFRACTORIES, INC.

# ALUMINUM SOLUTIONS

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## Aluminum Melting Expertise

RENO Refractories, Inc. is a premier value provider to the aluminum industry. Our dedicated team comprises experts with diverse backgrounds in refractory applications and aluminum melting operations. Together, we offer comprehensive assessments of your operation and recommend the safest and most cost-effective refractory systems.

### Aluminum Furnace

RENO has the materials to make your melter or holder go the distance. If you are looking for a trouble free lining, then RENO has the answers. Through information gathering and partnering with the customer, we can custom tailor a refractory lining that is made just for your situation. RENO has all of the products needed to build a bulletproof aluminum melter or holder.

Summary of Furnace Area by Material Property Requirement

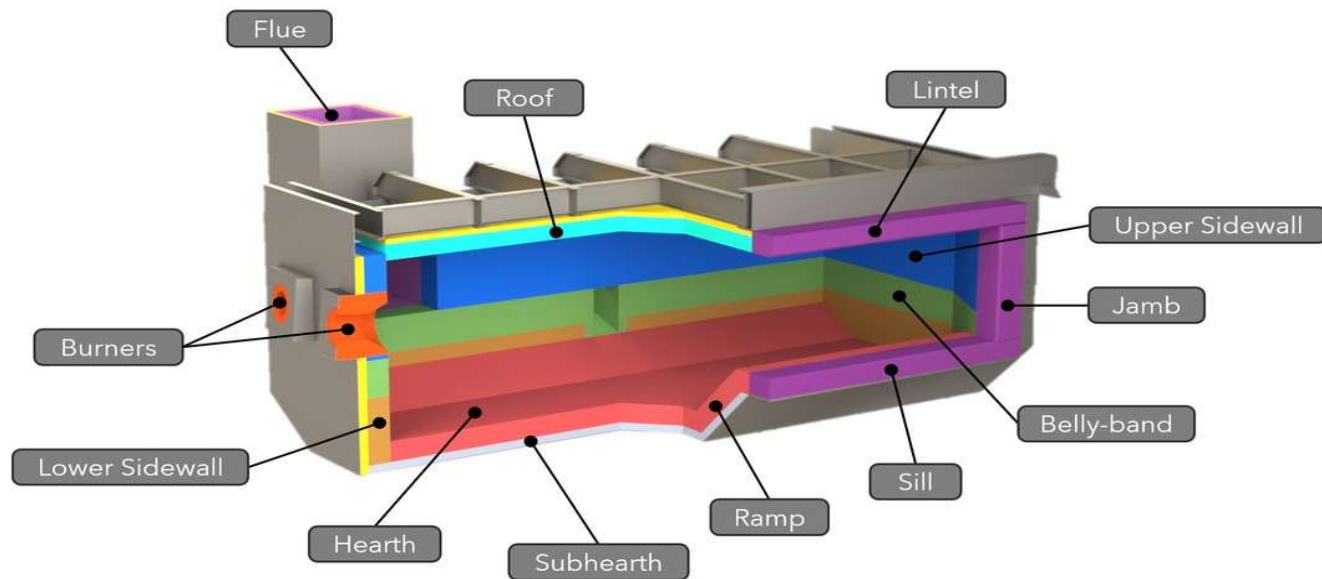
Standard Melting/ Holding Furnace	Non Wetting	High Hot MOR	High Abrasion Resistance	High Thermal Shock Resistance	Alkali Resistance	Corundum Resistance
Hearth	●	●	●			
Ramp/Sill	●	●	●			
Lower Sidewall	●	●	●			
Belly Band	●	●	●	●	●	●
Upper Sidewall				●	●	●
Roof				●	●	
Jambs/Lintels		●	●	●		

Summary of Products by Area and Grade

Area	Good	Better	Best	Specialized
Sub hearth		AluSHIELD Subhearth	AluSHIELD 45 QH	
Hearth	AluSHIELD 80 QH	AluSHIELD 6810 SC	AluSHIELD 5520 SC	AluSHIELD 757*
Ramp/Sill	AluSHIELD 80 QH	AluSHIELD 6810 SC	AluSHIELD 5520 SC	AluSHIELD 757*
Sidewall Insulation		AluSHIELD Lite 24-60	AluSHIELD Lite 80	
Lower Sidewall	AluSHIELD 80 QH	AluSHIELD 5520 SC	AluSHIELD 6810 SC	AluSHIELD 757*
Bellyband	AluSHIELD 80 QH	AluSHIELD 5520 SC	AluSHIELD 6810 SC	AluSHIELD 757*
Upper Sidewall	ASAP 50 LC	Reno NC 50	Reno NC 60	Reno Cast 65 XCLC**
Roof	ASAP 50 LC	Reno NC 60	Reno NC 50	Reno Cast 65 XCLC**
Roof Insulation			Reno Lite Cast 22	
Jambs/ Lintel	Bauxcast 7 AL	AluSHIELD 6810 SC	AluSHIELD 5520 SC	Reno Cast 65 XCLC**
Troughs	AluSHIELD 60 QH	AluSHIELD 50 FS	AluSHIELD 75 FS	AluSHIELD 5520 SC
Furnace Tools			Reno Guard AL	
Coatings			Coat It AL	
Patch/ Resurface	Liquibond 86	AluSHIELD Gun 2125X	MACH Gun 60 P	

\*Contains no silica fume

\*\*Precast



**Subhearth** - AluSHIELD Subhearth is a general purpose standard backup solution, whereas AluSHIELD 45 QH provides greater strength for a more durable hearth backup.

**Hearth** - Hearths require low permeability for non-wetting properties, high hot modulus of rupture (MOR), and excellent abrasion resistance. AluSHIELD 80 QH is a strong abrasive resistant 80% alumina material which effectively meet these requirements. For enhanced performance, AluSHIELD 6810 SC is a 68% alumina with 10% SIC product offering higher hot strength thus ensuring superior durability. AluSHIELD 5520 SC a 55% alumina 20% SIC content allows for a lower permeable surface for enhanced non-wetting, surpassing conventional expectations for demanding applications. Furthermore, for specialized needs, the ultra-low free silica AluSHIELD 757 variant offers maximum resistance to aluminum degradation, ensuring longevity and high performance when high purity alloy is processed.

**Ramp/Sill** - For the ramp and sill, demanding non-wetting behavior, high hot modulus of rupture (MOR), and superior abrasion resistance are needed, AluSHIELD offers a tailored range of solutions. AluSHIELD 80 QH with its strong abrasive resistant 80% alumina base provide a solid foundation with good performance in meeting these requirements. Stepping up, AluSHIELD 5520 SC offers even better capabilities. AluSHIELD 6810 SC stands out as the best options for top-tier performance. Additionally, AluSHIELD 757 provides a solution for specialized applications providing maximum resistance.

**Sidewall Insulation** - AluSHIELD Lite 24-60 is a solid option for heightened performance and reliability, offering enhanced features and capabilities. AluSHIELD Lite 80 is the best option, providing exceptional performance.

**Lower Sidewall** - For the lower sidewall, where non-wetting behavior, high hot modulus of rupture (MOR), and superior abrasion resistance are vital, AluSHIELD offers tailored solutions across different performance levels. AluSHIELD 80 QH delivers reliable performance. Progressing in capability, AluSHIELD 5520 SC enhances durability and resilience in this critical area. AluSHIELD 6810 SC with its more dense, less permeable structure is the optimal choice for exceptional performance that exceeds standard expectations. Additionally, AluSHIELD 757 provides a custom solution for specialized applications requiring maximum resistance.

**Bellyband** - The bellyband area requires non-wetting, high hot MOR, high abrasion resistance, high thermal shock resistance, and alkali & corundum resistance. AluSHIELD 80 QH is a solid option among the range of products available. However, for superior performance, AluSHIELD 5520 SC adds even better protection. AluSHIELD 6810 SC with its lower permeability and superior abrasion resistance is the best choice, offering unparalleled quality and reliability. AluSHIELD 757 also provides tailored solutions for specialized applications.

**Upper Sidewall** - Upper sidewalls require high thermal shock, alkali, and corundum resistances. ASAP 50 LC is a good choice, providing reliable performance in meeting these requirements. Stepping up in capability, Reno NC 50 exhibits better thermal resistance for better performance. Reno NC 60 is the best option, with greater alkali resistance, guaranteeing exceptional quality and reliability even under the most demanding conditions. Reno Cast 65 XCLC provides a more tailored solution for specialized applications.

**Roof** - Several options cater to different performance needs for roof sections necessitating high thermal shock and alkali resistance. Reno ASAP Pump 50 LC is a reliable choice, offering good performance in meeting these requirements. Reno NC 60 provides better performance. Reno NC 50 provides exceptional quality and reliability for aluminum furnace roof sections. Reno Cast 65 XCLC with HC-A needles also provides a more tailored solution for specialized applications.

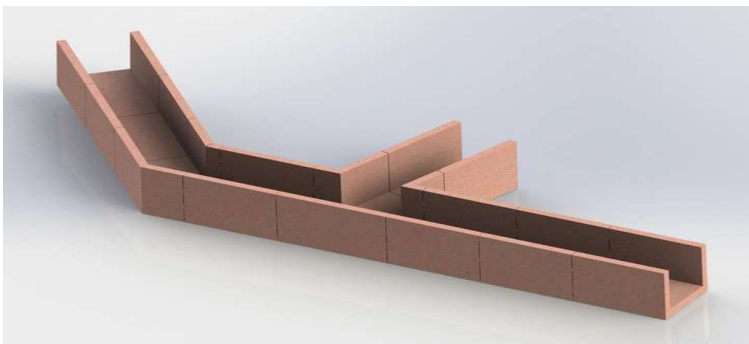
**Roof Insulation** - The right lightweight castable must be used to achieve the desired temperature. RENO suggests Reno Lite Cast 22 for a less dense option that can be gunned.

**Jambs/Lintels** – AluSHIELD 70 TSR offers reliable performance and meets the requirements for this area. AluSHIELD 6810 SC provides better performance. While AluSHIELD 5520 SC is the best choice for the utmost in material quality and performance, ensuring exceptional durability and thermal shock resistance. For lintels, Reno Cast 65 XCLC with HC-A needles also provides a solution for specialized applications.

**Patch/Resurface** - For patching applications, Liquibond 86 offers effective performance and is a fast turnaround cast option. Reno NC Gun 60 or AluSHIELD Gun 2125X provide better options with their enhanced features and durability. Mach Gun 60 P is the best product for the highest durability and effectiveness. These options offer superior patching capabilities, ensuring long-lasting repairs.

**Troughs** - AluSHIELD offers a range of suitable products to meet the requirements of non-wetting behavior, thermal shock resistance, and abrasion resistance for troughs. AluSHIELD 60 QH, offers reliable performance. AluSHIELD 50 FS also fulfills this criteria. For the best option, AluSHIELD 75 FS stands out as the top choice for even higher performance, providing enhanced durability for lasting life of troughs and launder systems. AluSHIELD 5520 SC provides a more tailored solution for specialized applications where impact and wear are an issue.

**Coatings** – Coat It AL is a durable surface coating to protect refractory with additional non-wetting features.



## PRECAST SOLUTIONS

Reno offers a comprehensive range of precast shapes meticulously designed to fulfill diverse aluminum industry needs. From the intricate contours of troughs to the robust structures required for big-block furnaces. Reno's precast capabilities ensure precision and reliability. With a keen focus on quality and innovation, Reno's solutions are tailored to withstand the demanding conditions of aluminum production, guaranteeing efficiency and longevity in operations.

- Shapes made by trained craftsmen in a controlled environment
- Furnace lining is 95% baked out at time of installation
- Easy to zone for problem areas
- Faster turnaround from demolition to production
- Consumable shapes are easy to change out on down days
- Shapes are easy to inventory - no weather concerns



Reno Guard is a precast refractory composite consisting of a slurry and stainless steel fibers. Current slurry compositions include the following:

- Reno Guard – our base workhouse mullite product used in a variety of applications.
- Reno Guard SiC – a 60% SiC containing product for extreme abrasion resistance.
- Reno Guard AL – our mullite slurry combined with non-wetting for molten aluminum applications.
- Reno Guard T – a tabular alumina slurry for higher temperature processes.

Reno Guard exhibits extremely high resistance to thermal shock, mechanical abuse and abrasion. It contains a steel internal structure so that it will easily bolt up to your existing structure replacing steel, iron and refractory.

	Reno Lite Cast 22 133200	Reno ASAP 50 LC 141500	Reno Cast 65 XCCLC 149700	Reno AluSHIELD 70 T5R 603170	Liquidbond 86 186100	MACH Gun 60 P 181400	Reno NC 50 180500	Reno NC 60 182000	Reno NC 70 183000	Reno AluSHIELD Subhearth 601000	Reno AluSHIELD Gun 2125X 601025	Reno AluSHIELD Lite 24-60 601060	Reno AluSHIELD Lite 80 601080
Typical Applications													
Subhearth										●			
Hearth													
Ramp & Sill													
Sidewall Insulation											●	●	
Lower Sidewall													
Belly Band													
Upper Sidewall		●	●				●	●	●				
Roof		●	●				●	●	●				
Roof Insulation	●												
Jamb & Lintel			●	●									
Troughs													
Patch / Resurface					●	●				●			
Tools													
Coatings													
Aluminum Resistance													
Corundum Resistance													
Alkali Resistance										N/A	Good	Poor	Poor
Density (lb/ft <sup>3</sup> ) after heating to 1500°F	55-60	140	158	165	166	145	150	160	165	130	138	62	77
Cold Crush Strength (psi) after heating to 1500°F	650	10,300	15,920	8,300	6,700	3,900	3,775	6,600	4,875	2,700	5,077	420	1,420
Thermal Cycle Change (%)	N/A	-63	-27	-25	+3	N/A	-25	-16	-16	N/A	N/A	N/A	N/A
Cold Modulus of Rupture (psi) after heating to 1500°F	150	1,900	3,360	2,186	1,200	825	825	1,325	1,125	600	795	100	375
Hot Modulus of Rupture (psi) at 1500°F	N/A	2,465	3,500	4,390	1,108	509	1,500	1,511	1,704	419	424	N/A	N/A
Abrasion Loss g/cc	N/A	8	6	7	8	13	11	11	9	N/A	N/A	N/A	N/A
Chemical Analysis, %:													
Al <sub>2</sub> O <sub>3</sub>	19 - 22	48.1	65-66	70	85	59 - 60	50 - 52	57 - 62	68 - 72	48.4	64.9	48.4	49.0
SiO <sub>2</sub>	42 - 47	47.5	29-31	25	2 - 3	28 - 30	46 - 47	38 - 42	24 - 26	40.6	29.5	37.4	37.0
TiO <sub>2</sub>		1.3	1.9	1.5		1.5	1.0 - 1.7	1.75 - 2.0	< 2	1.9	0.2	0.8	0.9
Fe <sub>2</sub> O <sub>3</sub>	1.5 - 2.0	0.9	1.0	0.8	< 1	< 1.0	0.7 - 0.9	0.75 - 1.0	< 1.50	0.6	1.2	0.7	1.0
CaO	27 - 30	1.4	1.7	1.9						6.4	1.8	7.6	8.1
MgO	< 0.5	0.1	0.1	0.1						0.1	0.1	0.3	0.2
Na <sub>2</sub> O + K <sub>2</sub> O	1.5	0.2	0.2	0.4		1.5			< 0.5	0.1	0.3	1.7	1.2
ZrO <sub>2</sub>													
SiC													
Other		0.4	0.4	2.1	3 - 4	4.6			< 0.25	2.1	2.0	3.1	2.0

● Good    ● Better    ● Best    ● Alternative Option    ● Specialized

	Reno AluSHIELD 45 QH 603045	Reno AluSHIELD 60 QH 603060	Reno AluSHIELD 65 QH 603065	Reno AluSHIELD 70 QH 603070	Reno AluSHIELD 80 QH 603080	Reno AluSHIELD 6810 SC 603625	Reno AluSHIELD 5520 SC 603650	Reno AluSHIELD 757 603575	Reno AluSHIELD 50 FS 604850	Reno AluSHIELD 75 FS 604875	Reno AluSHIELD NC 808 SC 604580	Reno Guard AL 158200	Coat It AL 439000
Typical Applications													
Subhearth	●												
Hearth		●	●	●	●	●	●	●					
Ramp & Sill		●	●	●	●	●	●	●					
Sidewall Insulation													
Lower Sidewall		●	●		●	●	●	●					
Belly Band				●	●	●	●	●			●		
Upper Sidewall													
Roof													
Roof Insulation													
Jamb & Lintel						●	●						
Troughs		●					●		●	●			
Patch / Resurface													
Tools												●	
Coatings													●
Aluminum Resistance		Excellent	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent		
Corundum Resistance								Good					
Alkali Resistance	Good	Fair	Fair	Fair	Good	Excellent	Good	Fair	Excellent	Excellent	Excellent		
Density (lb/ft <sup>3</sup> )	146	152	153	160	173	177	155	172	124	118	174	167	185
after heating to 1500°F													
Cold Crush Strength (psi)	8,112	10,825	15,870	13,815	> 15,000	13,197	11,275	5,471	6,800	7,450	11,550	N/A	N/A
after heating to 1500°F													
Thermal Cycle Change (%)	-50	-35	-29	-18	-15	-30	-25	-24	-10	-12	-16	N/A	N/A
Cold Modulus of Rupture (psi)	2,573	4,000	3,965	2,512	3,350	3,278	3,683	428	1,236	978	1,622	N/A	N/A
after heating to 1500°F													
Hot Modulus of Rupture (psi)	3,603	3,730	3,836	3,741	2,727	3,796	3,183	4,198	1,714	2,775	3,637	N/A	N/A
at 1500°F													
Abrasion Loss g/cc	6	4	5	5	5	4	5	3	17	12	5	N/A	N/A
Chemical Analysis, %:													
Al <sub>2</sub> O <sub>3</sub>	45.0	60.9	63 - 66	67 - 73	80.0	68.0	54.4	77.0	29.0	14.0	78.0	65-68	92.0
SiO <sub>2</sub>	46.0	34.4	30 - 33	23 - 25	13.0	12.5	20.2	10.0	66.0	82.0	8 - 9	24-26	7.7
TiO <sub>2</sub>	1.7	1.3	< 1.7	1.3	2.0	4.5	1.7	3.0	0.6	0.2	2 - 3		
Fe <sub>2</sub> O <sub>3</sub>	0.9	0.8	< 1.0	< 1.0	1.0	1.5	0.8	1.5	0.6	0.3		< 1.0	0.05
CaO	2.1	1.5	2.0 - 3.5	1.8	0.8	1.5		2.5	3 - 4	3.5	0.2	2-3	
MgO	0.1	0.1	< 0.2	0.1	0.1			< 0.3	0.1				
Na <sub>2</sub> O + K <sub>2</sub> O	0.7	0.2			0.3	< 0.25	0.4	< 0.3	0.1				0.17
ZrO <sub>2</sub>								7.5					
SiC						10.0	20.8				7.0		
Other	3.2	0.8			2 - 3	2.0	0.4		0.1			3	0.08

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***It is the mission of Reno Refractories, Inc.*** to investigate, develop, communicate and deliver valuable refractory products and services to our customers in North America. We have a responsibility to supply the best value in refractory technology by optimizing the profits and safety of our customers. We take pride in our reputation as a leader in these endeavors.

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