

ZIRCAR

Ceramics, Inc.

Heritage of High Performance

May 8, 2018





History

- ZIRCAR Ceramics, Inc. 100 N. Main Street, Florida, New York 10921 USA
- 60 miles North West of New York City
- Incorporated June 2000 – 18 years old.
- Formerly Vacuum Formed Fiber Products Profit Center of **ZIRCAR Products, Inc.**
- ZPI – Originally Founded 1974 by **Bernie Hamling - Founder**



Bernie Hamling



What Happened To ZPI?

- 1974 Union Carbide Corp. sold patent rights to Bernie Hamling.
- Original products - Y_2O_3 stabilized ZrO_2 and other low-mass exotic refractory oxides - made via a “precursor” process.
- ZPI grew - 100 employees - \$20mm sales
- 2/3 of sales - ZrO_2 NiH Battery separator.
- 1998 - \$9mm sales. What to do?
- Tax-Free reorganization - split up!



ZIRCAR Ceramics, Inc.



- David P. Hamling - V/P
- Phil D. Hamling - President



Knowledge Through Experience

- Executive Management –
Approximately **75 Man Years** Combined Experience.
- Department Managers & Supervisors –
some with 25+ years Individual Experience



Third Generation Hamlings Joined ZCI Sept. 2011



- Phil Hamling - Sales
- Cole Hamling - Production



Assets - Buildings

- **Manufacturing**
 - Original ZIRCAR Products, Inc. Factory
 - In 2005 Expanded to 30,000 square feet
- **Administration & Engineering**
 - Original “150 year old Victorian Mansion” Offices
 - Built by family of William Henry Seward
- **2012 Acquired 203 Black Meadow Rd, Chester NY.**
 - 20,000 square feet
- **2018 BMR Expansion.**
 - Add 10,000 square feet
- **Total Area = Approx. 84,000 square feet**



Admin. & Engineering



- 100 N. Main Street



“Main Street” Manufacturing



- 110 N. Main Street



“BMR” Plant & Warehouse



- 203 Black Meadow Rd.





Assets – People

(As of May, 2018)



- **46 Full Time Employees**
 - 5 degreed Engineers



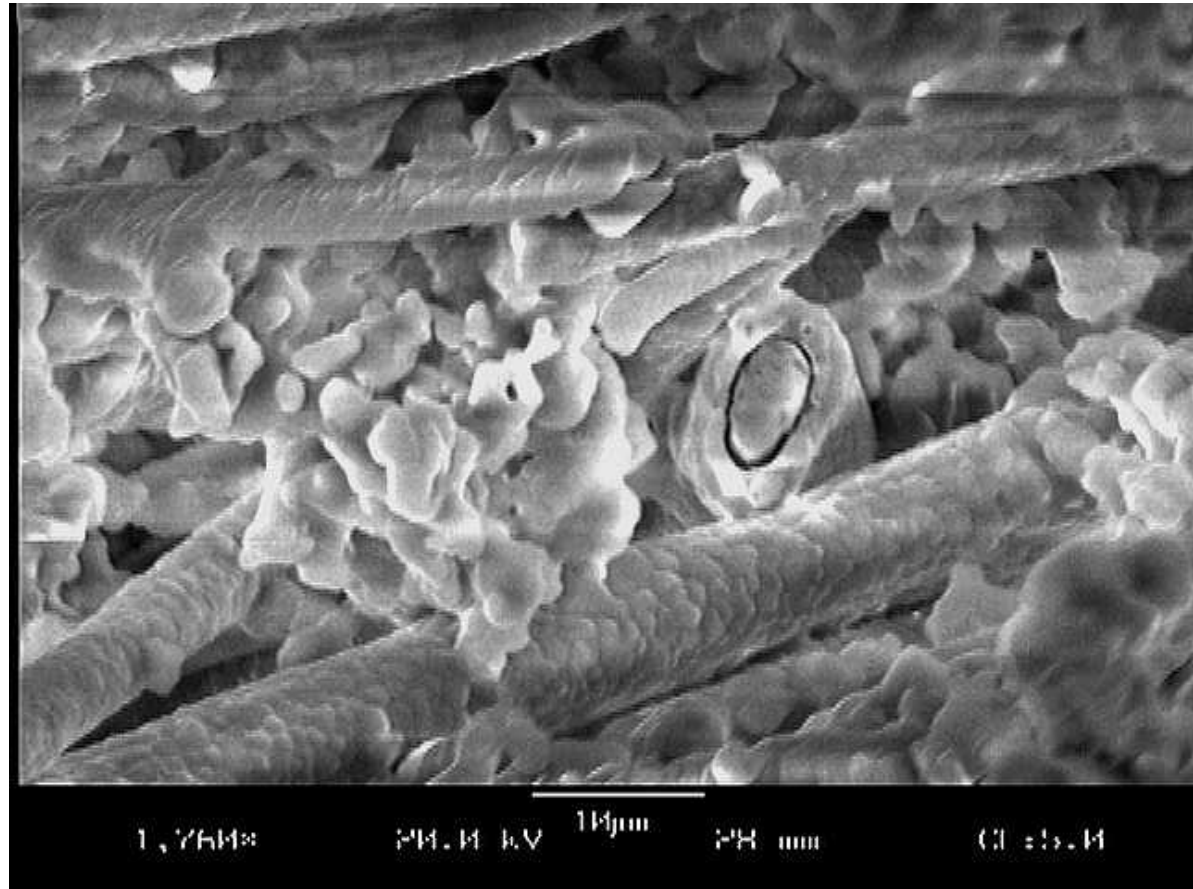
What does ZCI do?

- **Manufacture and Market Internationally**
- A wide range of high temperature ceramic fiber based thermal & electrical insulation products.
- Many other related products.



Heritage of High Performance

- **High Temperature Stability and Reliable Refractoriness** are possible only with **Properly Engineered & Combined** raw materials.
- This is our specialty!
- 40+ year history!



Top Markets Served

- OEM Furnace Builders
- Technical Ceramics Sintering
- Specialty Glass
- Aluminum Sheet Casting
- Electro Mechanical Devices
- Gov't & Corp. R&D
- OEM Analytical Instrument Manufacturer
- Pressed & Injection Molded Metal Powders
- High Temperature Fuel Cells
- Many More!!!!!!



Process Equipment

- Vacuum Forming
 - 7 complete forming systems *
 - 3 batch
 - 3 recirculating
 - 1 filter press
- Pressing
 - 4 Consolidation Presses
- Thermal Process Equipment
 - Humidity controlled Slow-Dry rooms.
 - Driers, batch to 400C
 - Kilns, Ovens & Furnaces, batch
 - 600C, 1330C, 1500C, 1700C, 1800C

Bulk Ceramic Fibers

Al_2O_3 – Polycrystalline
Alumina

50%+ Alpha

Uses to 1825C

Al_2O_3 - SiO_2 – Vitreous
Refractory Ceramic
Fiber

Uses to 1260C

AES – “Bio-Soluble”
Non-RCF Fiber

Uses to 1200C



Composition Al₂O₃ / SiO₂	Fiber Type ***	Binder System	Continuous Operating Temp. C
80% / 20%	ALBF	SiO ₂	1700 to 1825
85% / 15%	ALBF	SiO ₂	1650
59% / 41%	ASBF	SiO ₂	1420
35% / 65%	ASBF	SiO ₂	1260

Composition Al₂O₃ / SiO₂	Fiber Type ***	Binder System	Continuous Operating Temp. C
98.4% / 1.6%	ALBF	Al ₂ O ₃	1700
97% / 3%	ALBF	Al ₂ O ₃	1600
68% / 32%	ASBF	Al ₂ O ₃	1063

***ALBF = Polycrystalline Alumina, 96% Al₂O₃ 4% SiO₂, > 50% Alpha Al₂O₃

***ASBF = Vitreous Alumina Silica, 50% Al₂O₃ 50% SiO₂

Rigid Products

Standard Boards

Densities

0.26 to 0.80 g/cc
(16 to 50 pcf)

Sizes

Thickness

6 to 100 mm
(1/4 to 4 inch)

Width x Length

305mm x 457mm L
to 610mm x 2350mm
(12" x 18" to 24" x 96" inch)



Described In Detail at
www.zircarceramics.com



Custom Vacuum Forming

















Adding Value

Precision Machined Components

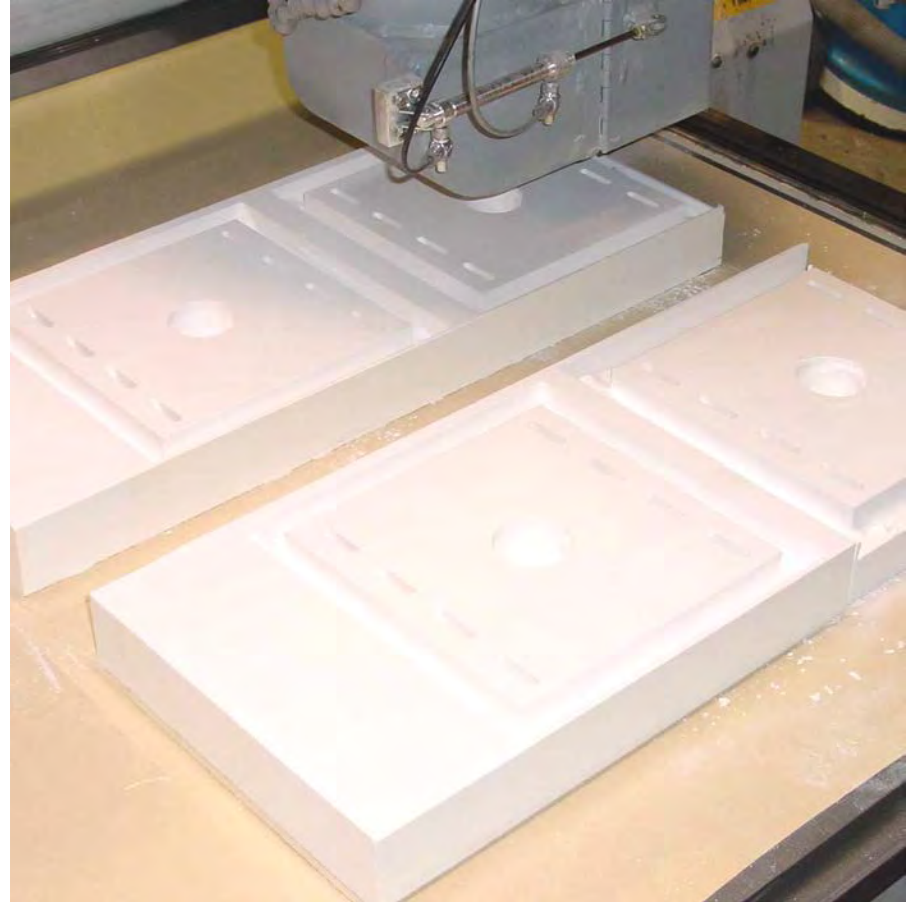
4 Modern CNC Router Tables

CNC Milling Machines

Lathes

Complete Compliment
of Finishing Equipment

Tight Tolerance
Machining





MultiCam MG

CAUTION
DO NOT OPERATE
WITHOUT LID
PROTECTION

CAUTION
DO NOT OPERATE
WITHOUT LID
PROTECTION

MultiCam
CNC Router

Value Added - Precision Machined Components

Fabricated From

Ceramic Fiber

Microporous Silica

Calcium Silicate

Others.

2 shifts per day

5 days per week.













Engineered Assemblies

Custom Insulation
Assemblies

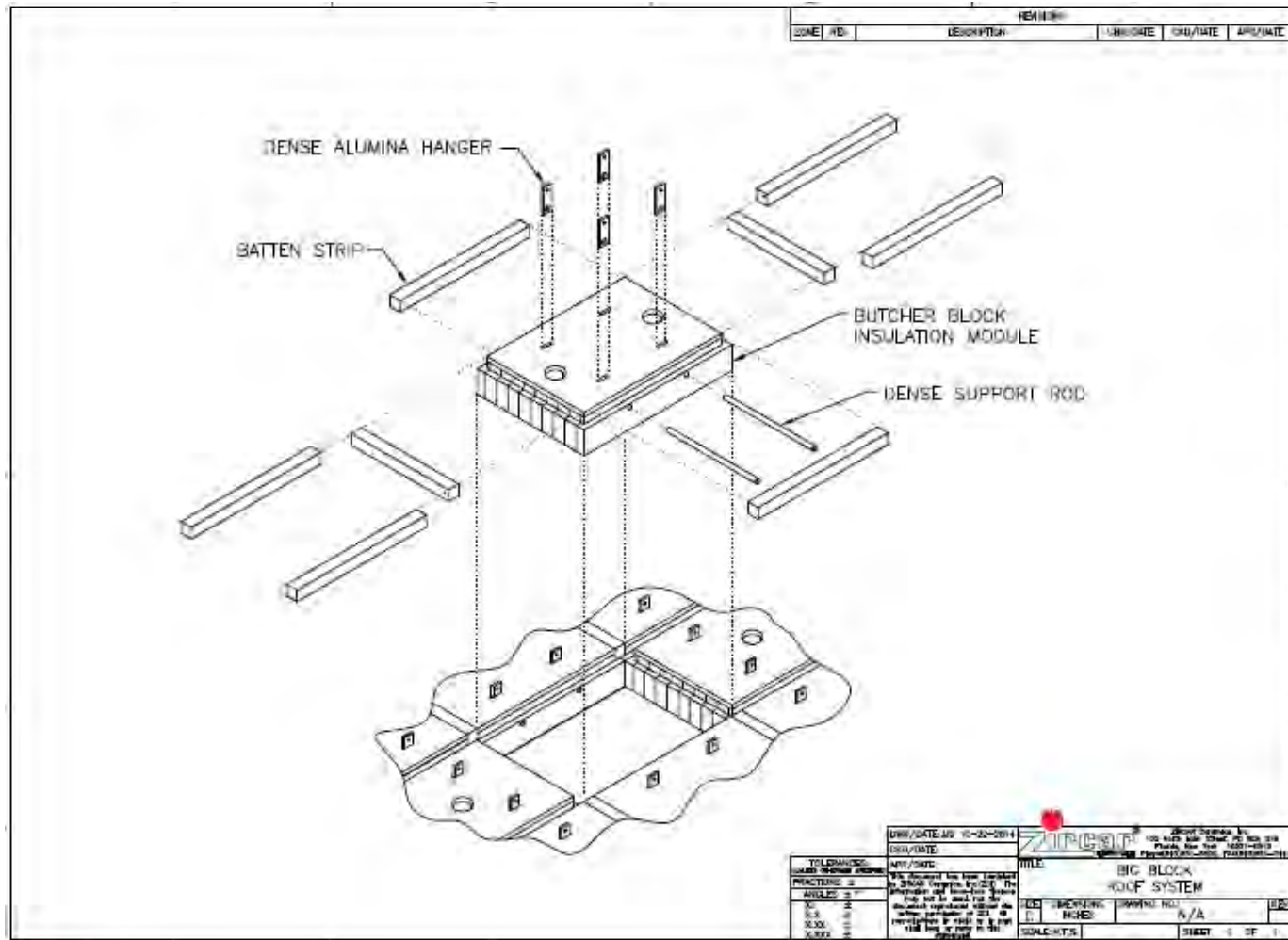
Heater Modules For
OEM Analytical
Equipment

OEM Furnace
Chamber Linings



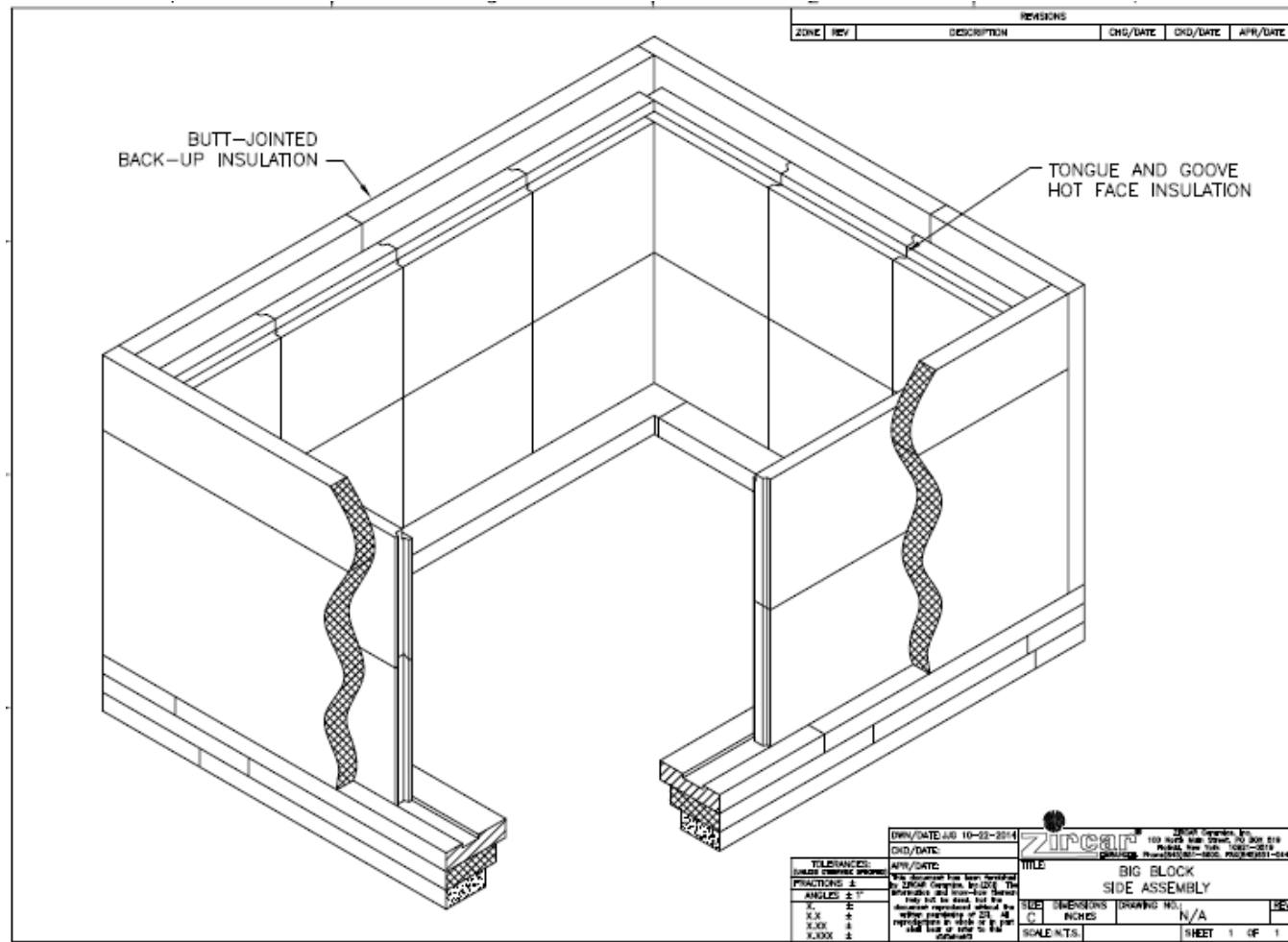


“Big Block” Insulation System

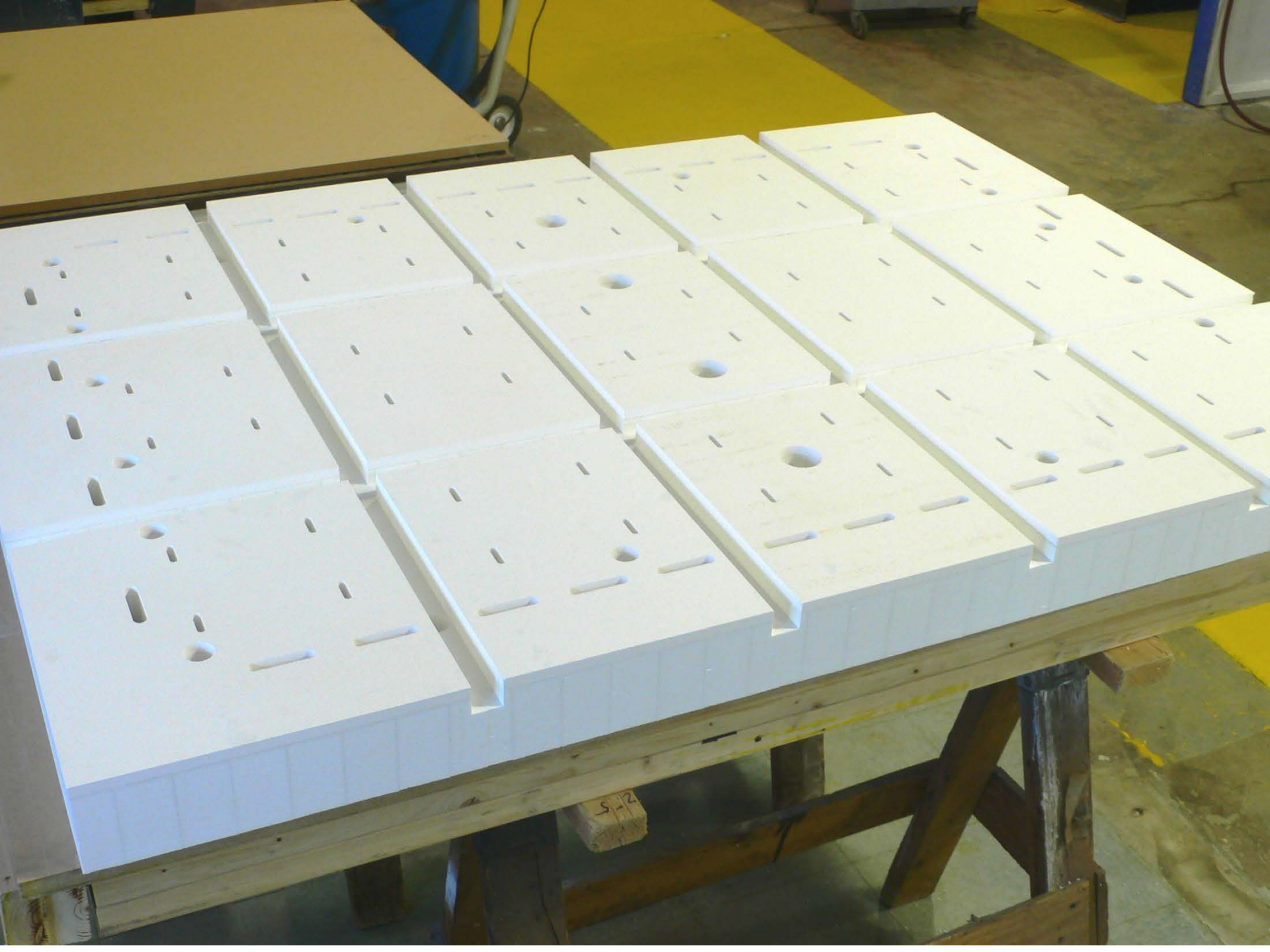


- Thick Butcher-block roof

“Big Block” Insulation System



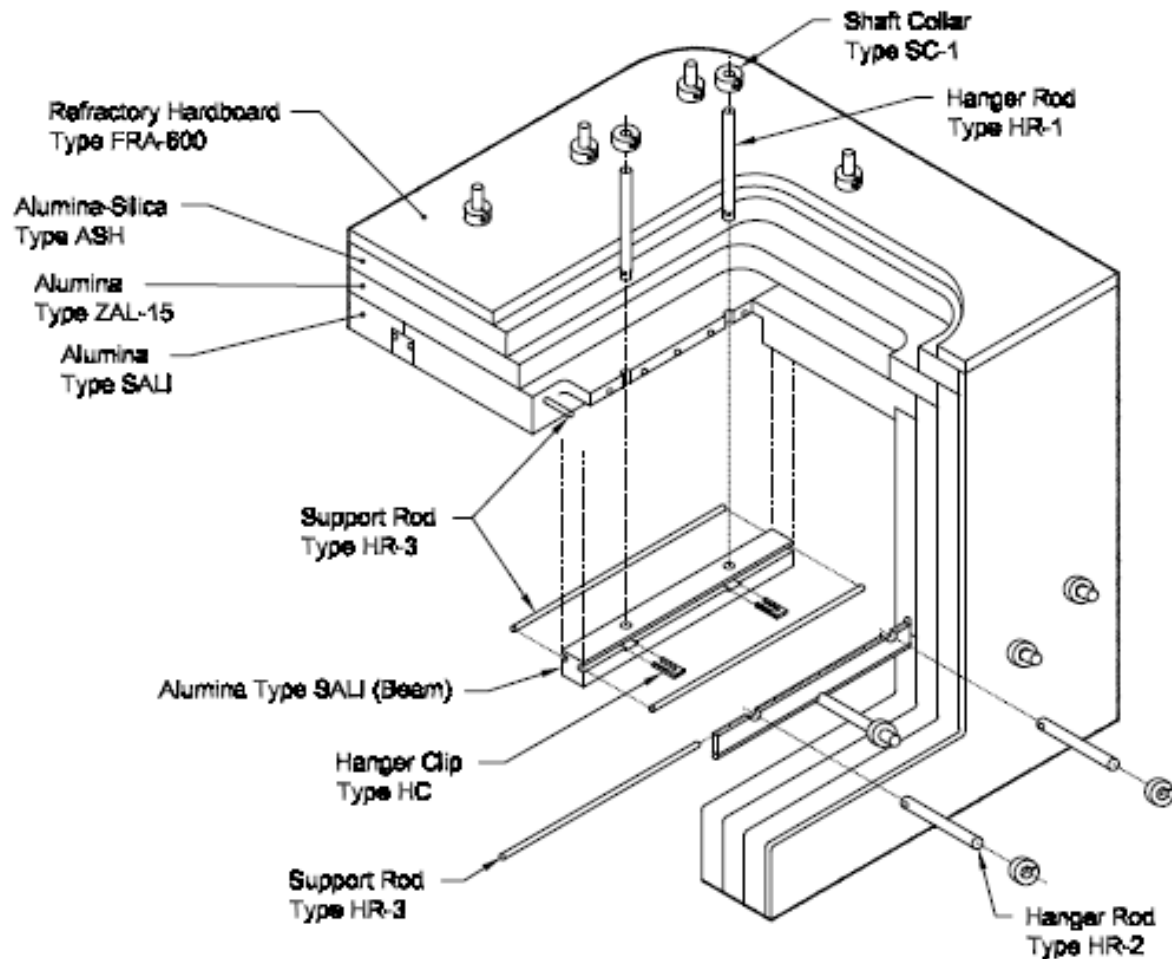
- Thick Tongue & Grooved walls







“FIM” Insulation System



- Reinforced Multi-Layer System

“FIM” Insulation System



- FIM Hanger Beam











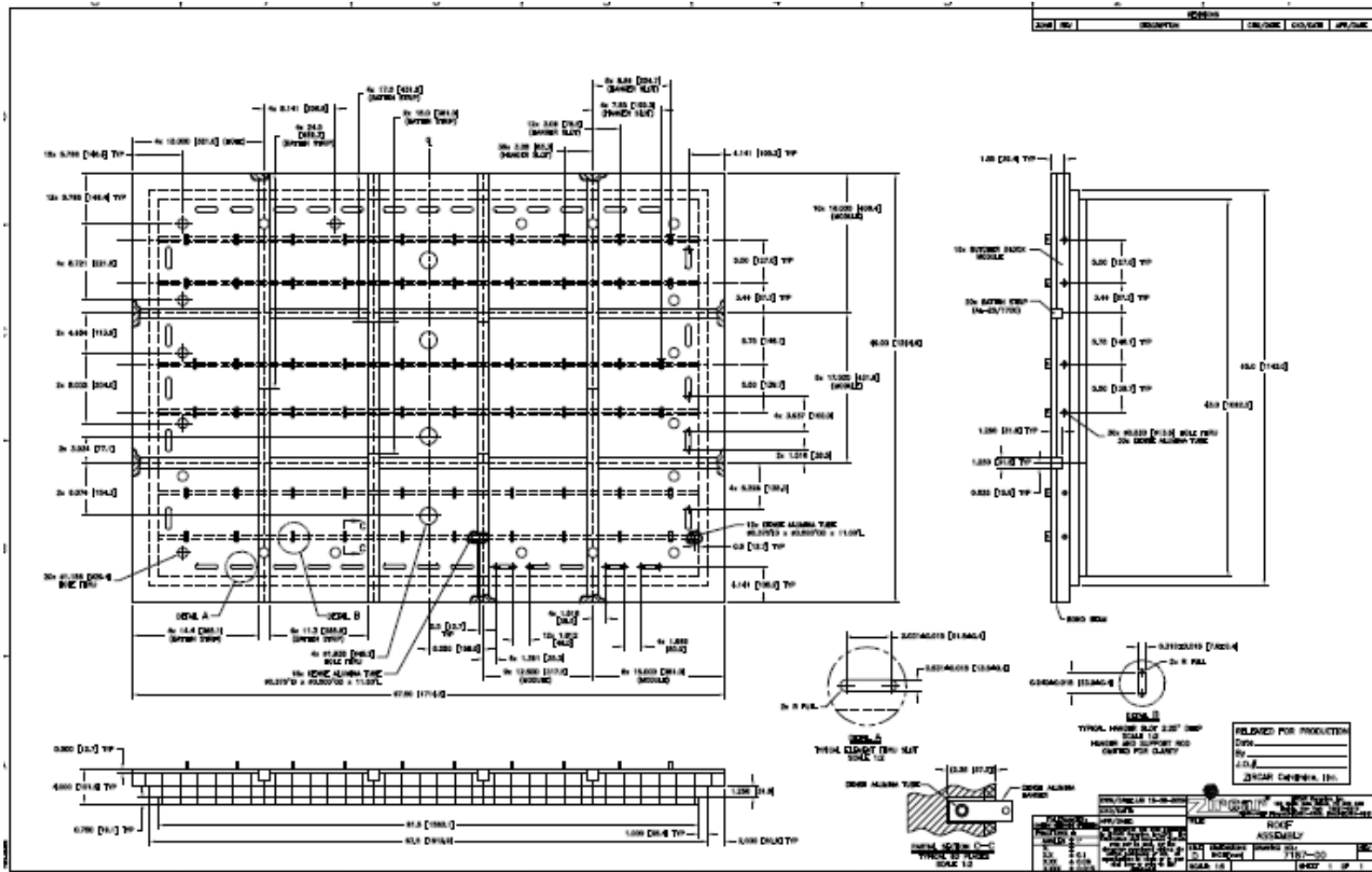



Zircar[®]
CERAMICS

Thermal Profile Calculations

Thermal Profile SALI-2 Big Block Roof							
<u>Layer #</u>	<u>Layer Thickness</u>	<u>Material Description</u>	<u>Hot Face Temperature °F(°C)</u>	<u>Intermediate Temperature °F(°C)</u>	<u>Cold Face Temperature °F(°C)</u>	<u>Temperature Drop</u>	<u>Heat Storage: BTU/Sq Ft of Wall</u>
1	3.5	SALI-2	3092 (1700)	2128 (1165)		35%	4723
2	0.5	BackerBoard C		1957 (1070)		6%	920
3	2	ECO-1200B			320 (160)	59%	771
							6414 Total
Ambient Temperature = 80°F							<u>Heat Loss: BTU/Sq Ft-hr</u>
Wind Speed = 0mph							704 Total
Emmistivity = 0.9							
Orientation = Wall							

CAD Drawings Provided



Lab & Small Production Furnace Rebuild Service



Lab Furnace Rebuild Kits

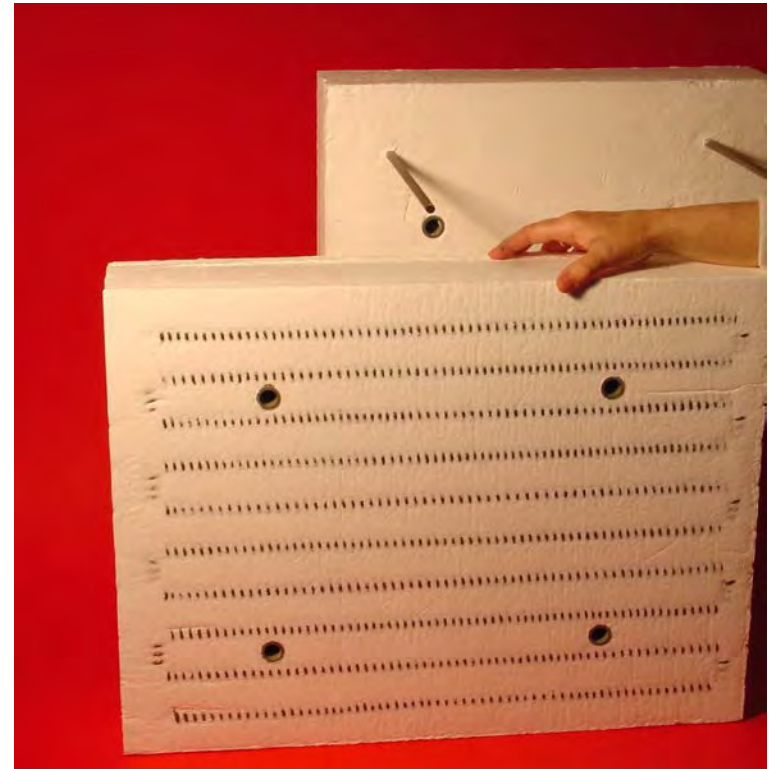




Fiber Insulated Heaters

**Ceramic Fiber and
FeCrAl Resistance
Wire. Using KA-1 and
APM wires
EXCLUSIVELY.**

- **TYPE FIH** – $16\text{KW}/\text{M}^2$
1100C Max Use Temp
- **TYPE RDI** – $23\text{KW}/\text{M}^2$
1300C Max Use Temp



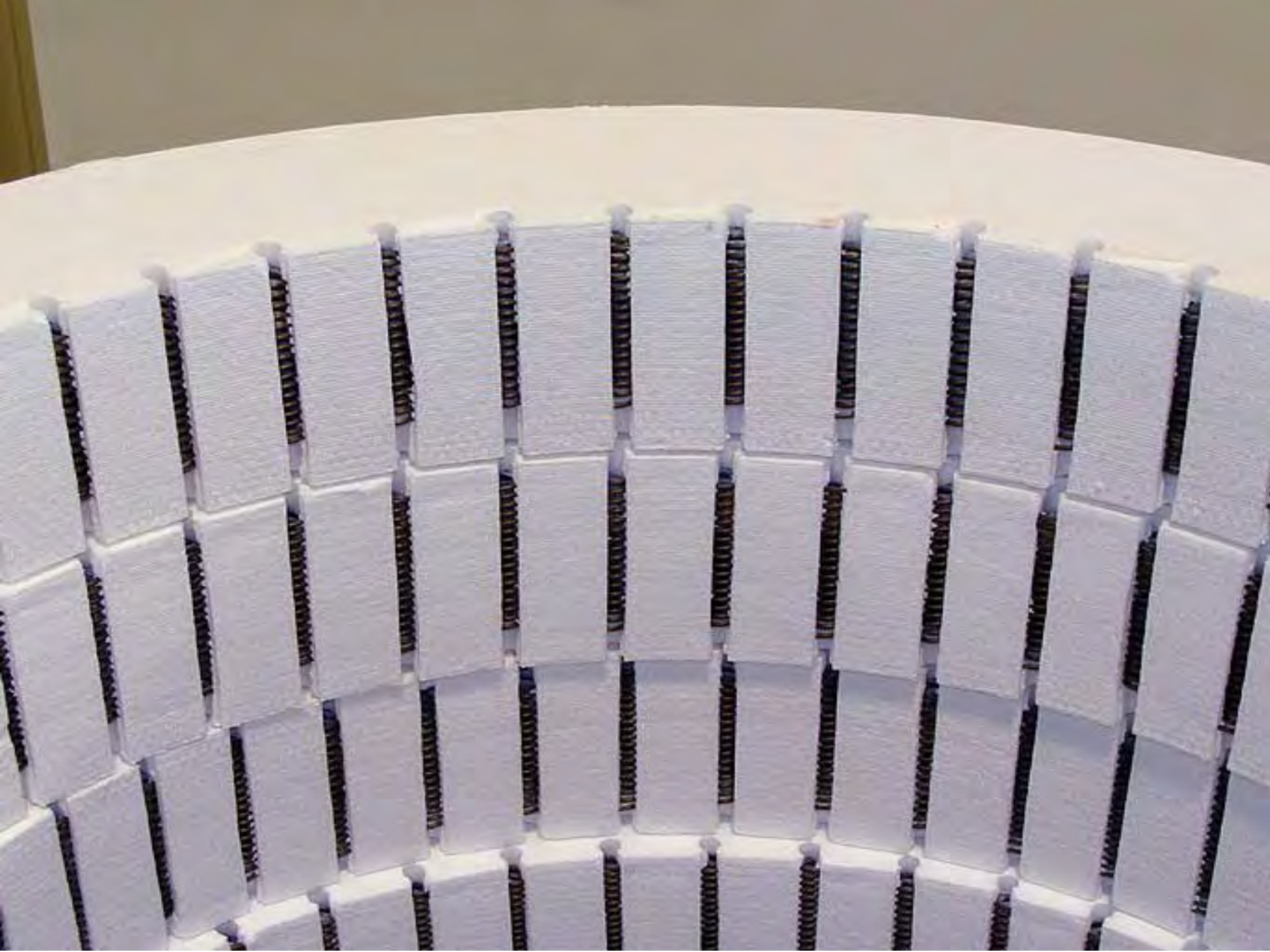
Custom
OEM &
End User
Fiber-
Insulated
Heaters &
Assemblies



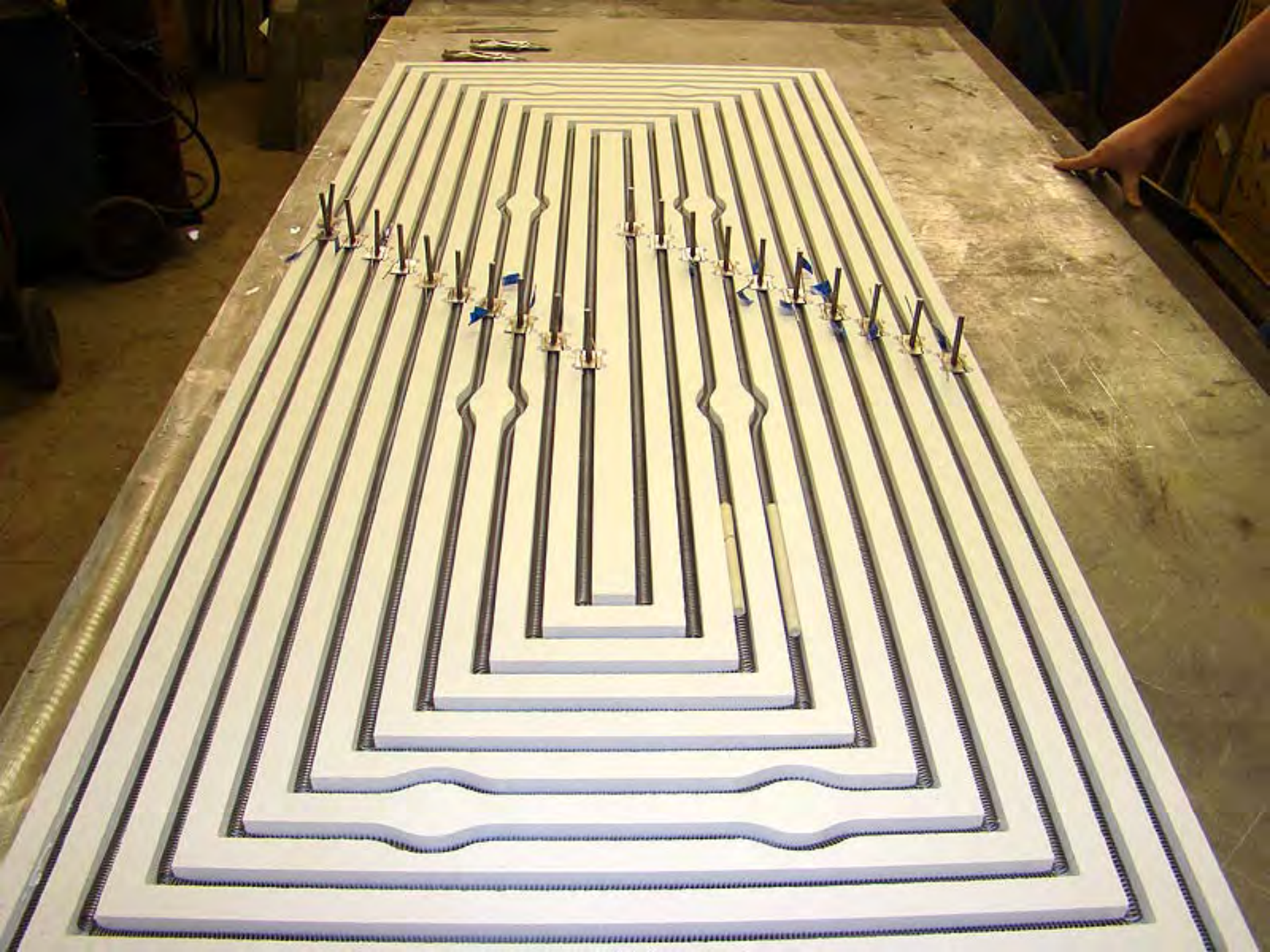


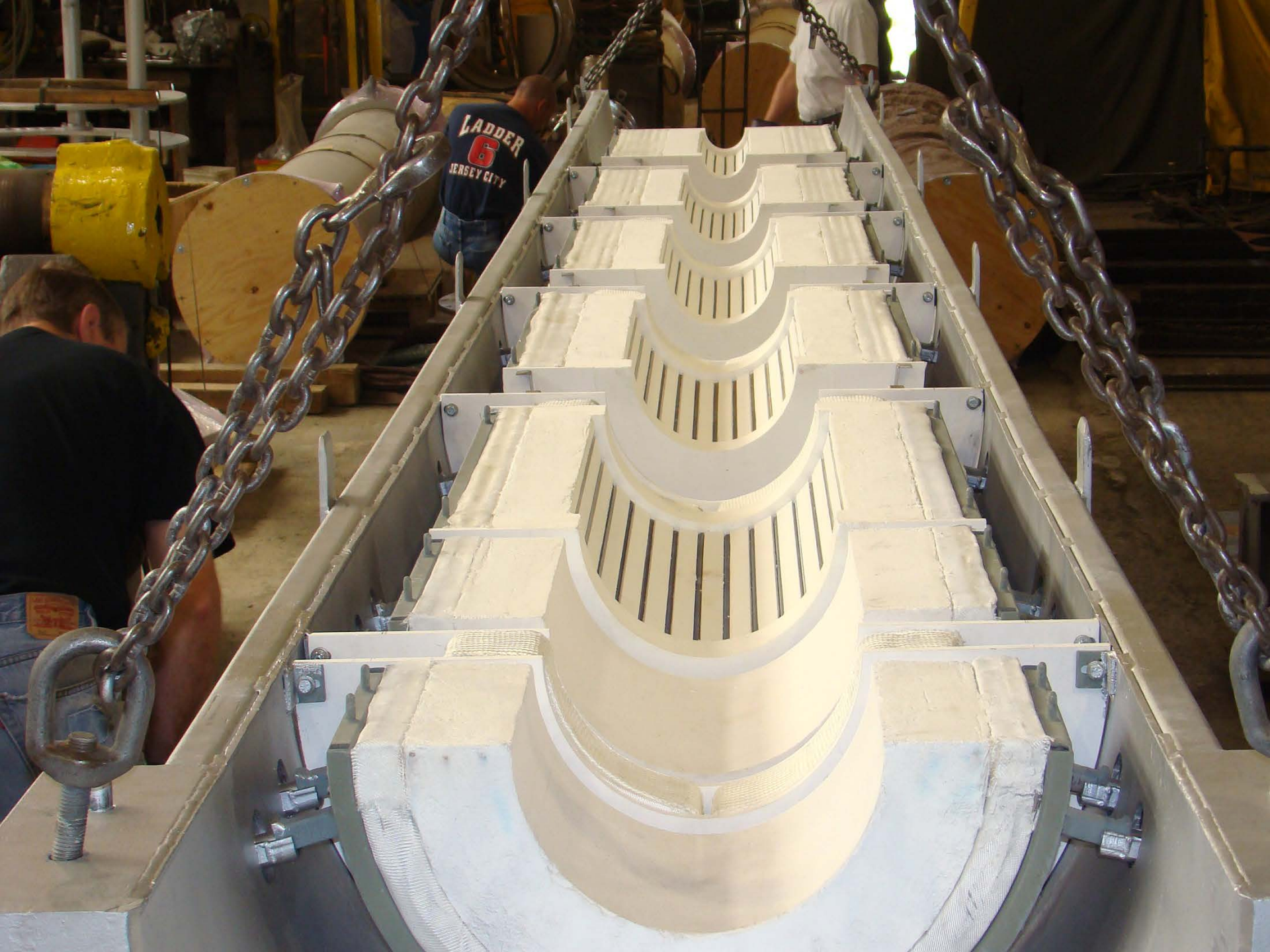


















Casthouse Consumables

Castertips For Aluminum Sheet Casting

Several
Densities

Wide Range
Of Sizes

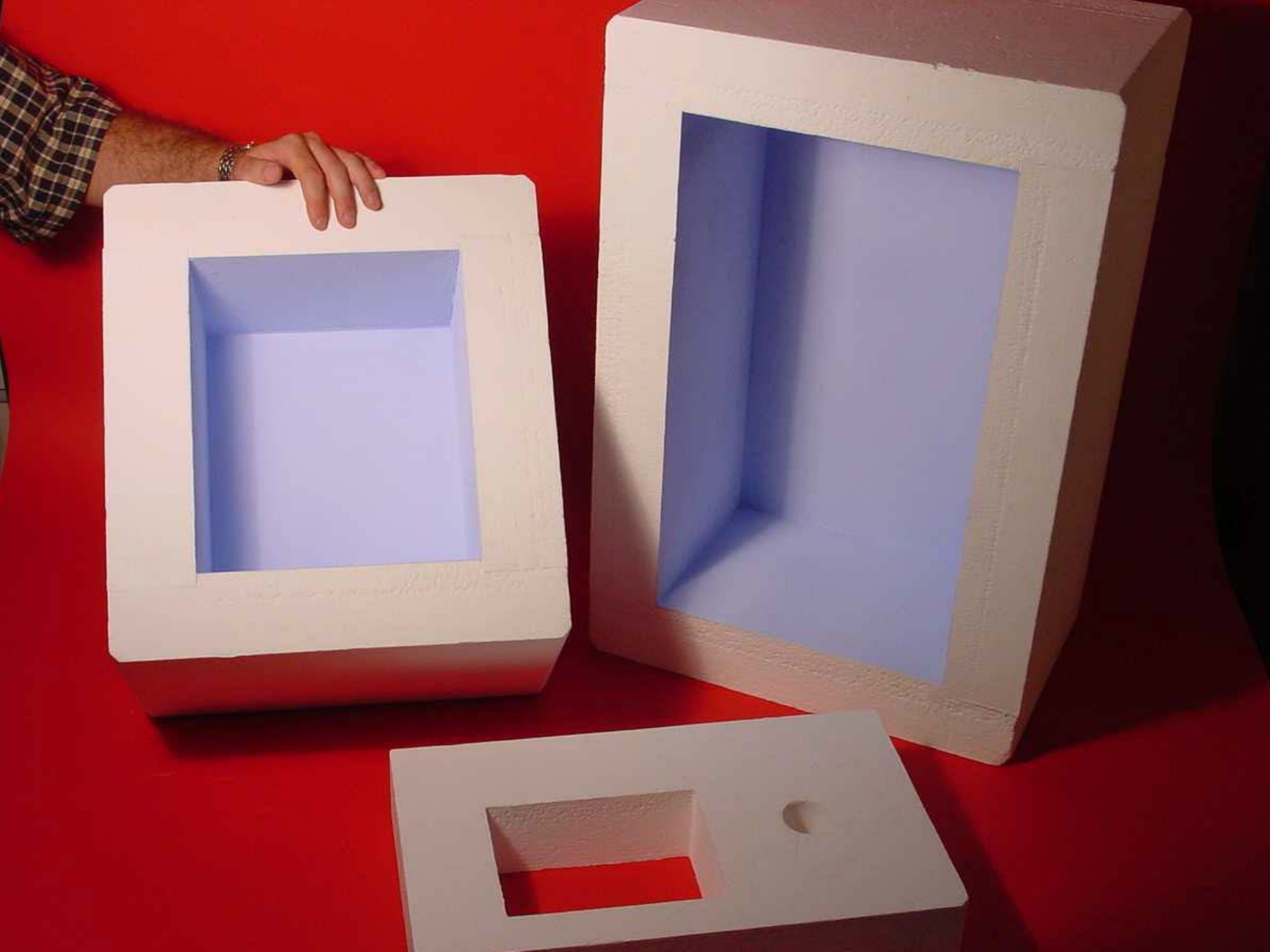
For Use On
All Makes of
Twin Roll
Casters













Flexible Products

Ceramic Fiber Sheet and Roll Products

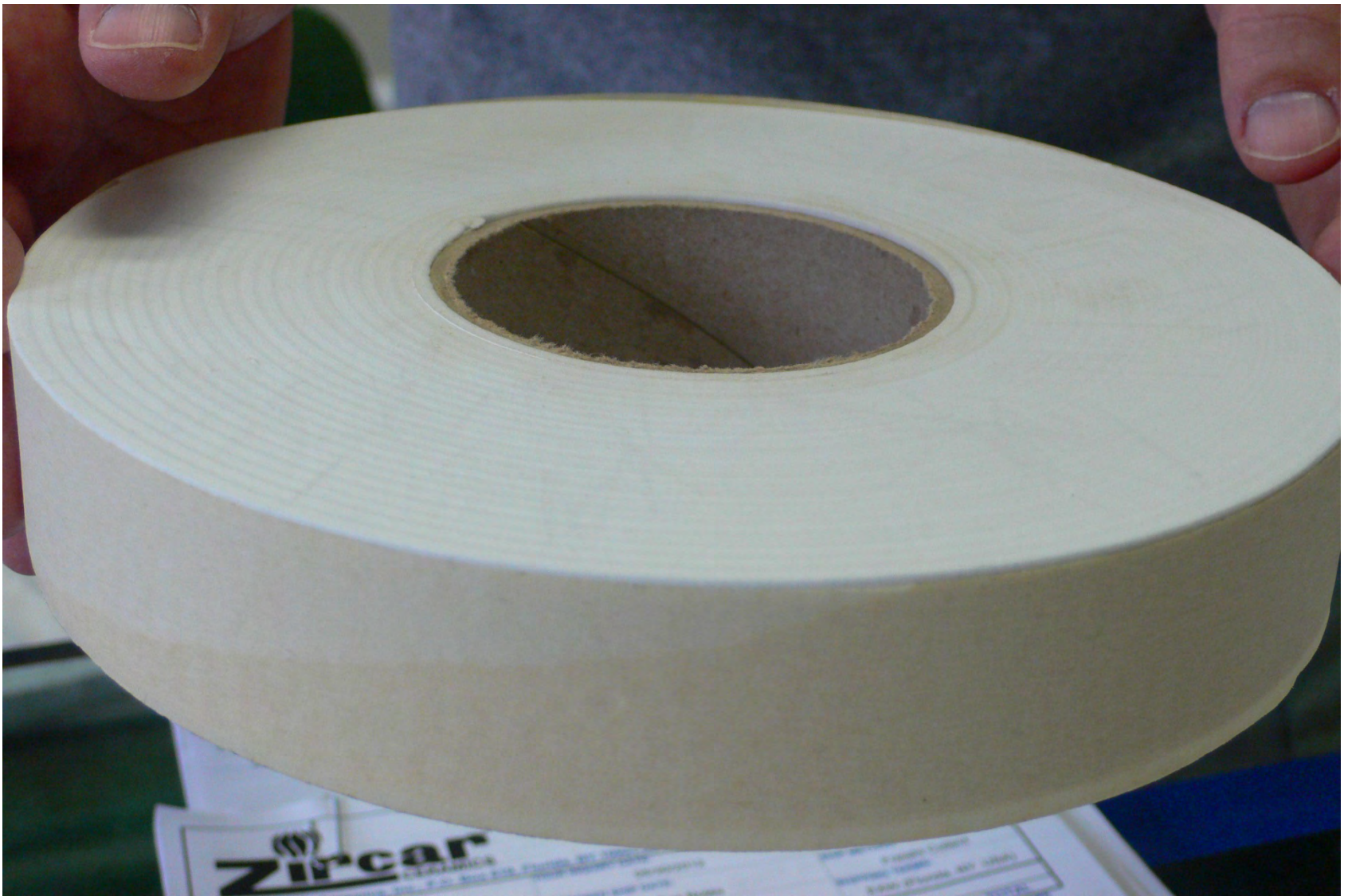
Al_2O_3 Blanket &
Papers

– 1650C Max Temp

Al_2O_3 – SiO_2 Blanket,
Papers & Textiles

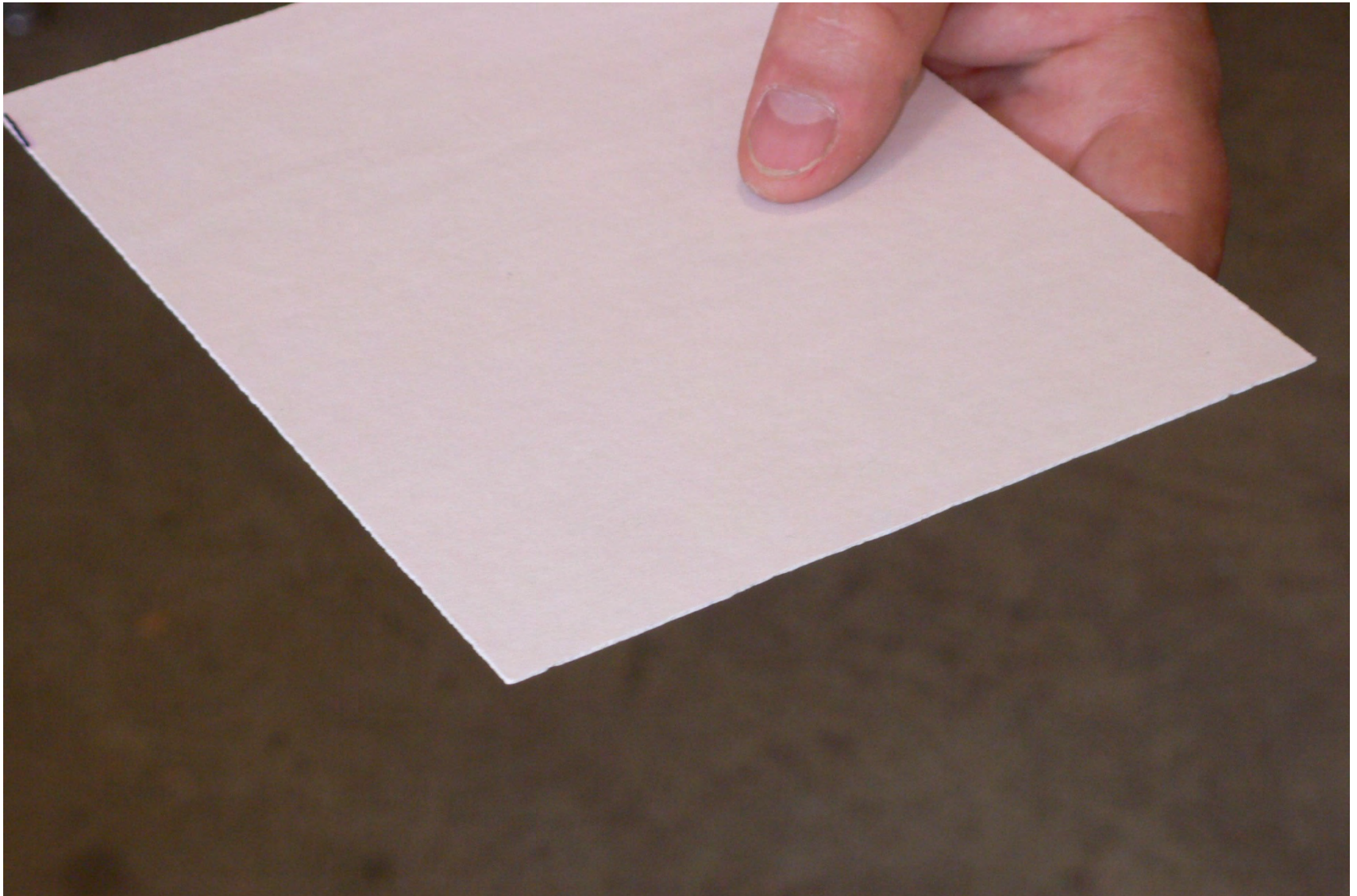
– 1260C Max Temp





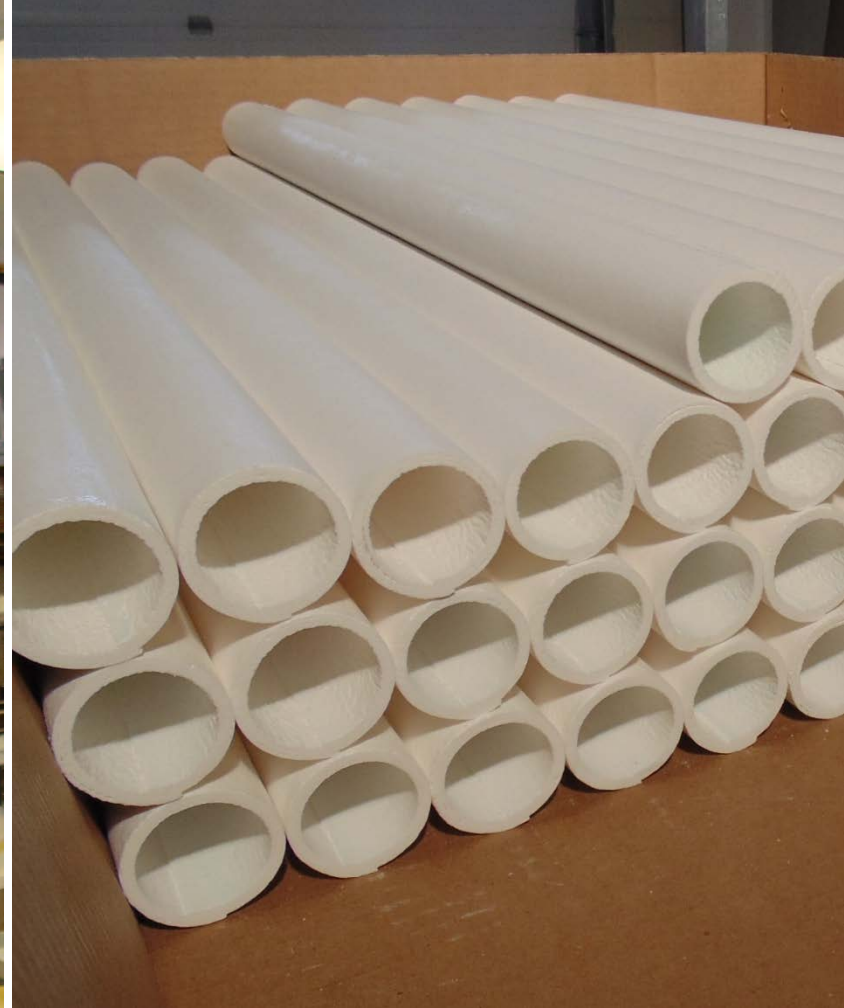
APA-1 Die-Cut or Slit





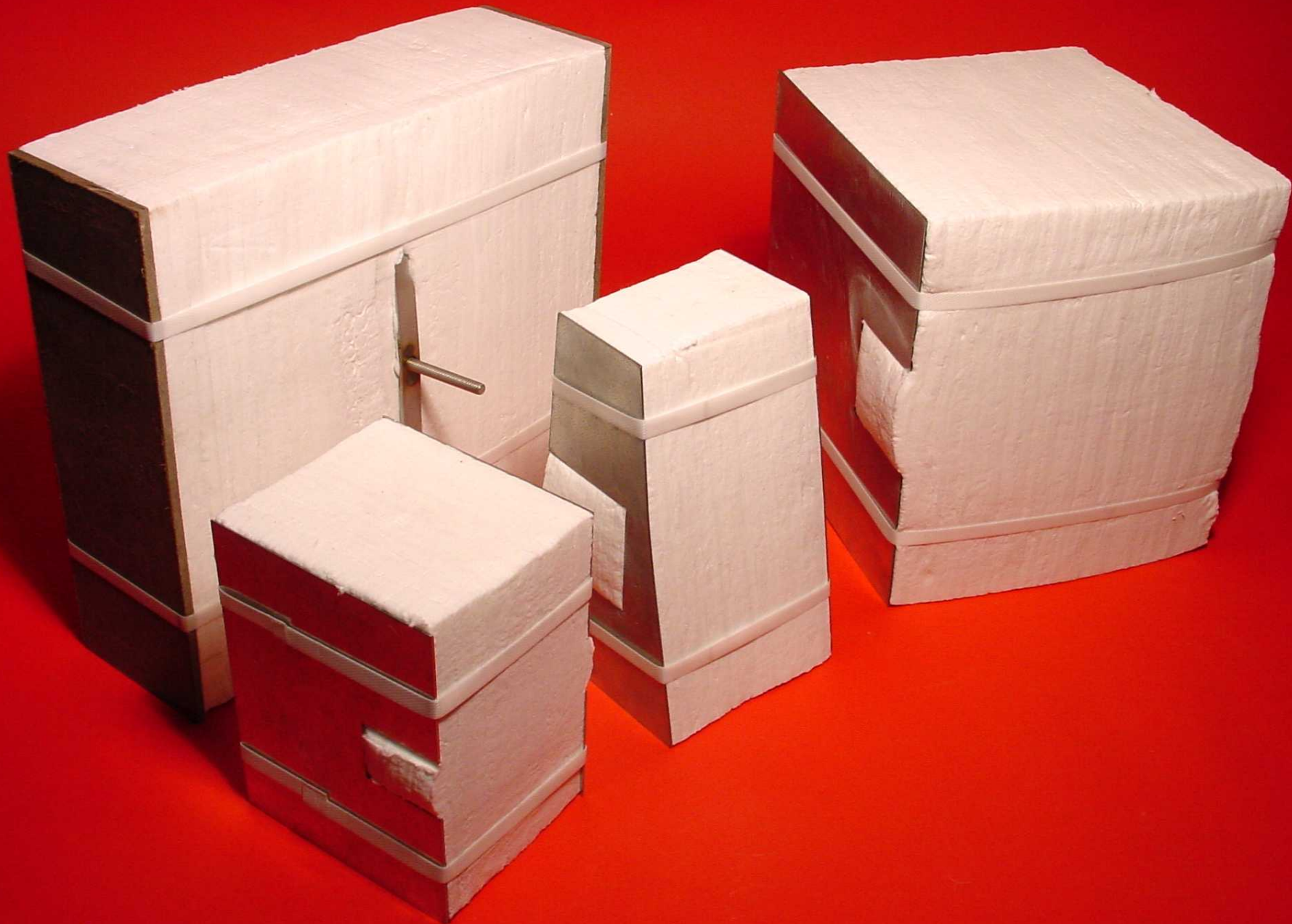
APA-3 Rigidized with Al_2O_3





- ALFLO - Rigidized with SiO_2







“PowerTube”
Al₂O₃
Textile
Composite



Particulate / Castable Products

Compositions

- Al_2O_3
- $\text{Al}_2\text{O}_3 - \text{SiO}_2$
- $\text{Al}_2\text{O}_3 - \text{CaO} - \text{SiO}_2$

Densities

- 1920 to 1217 kg/m^3
(120 to 76 pcf)






Zircar[®]
CERAMICS

“Bubble Alumina”





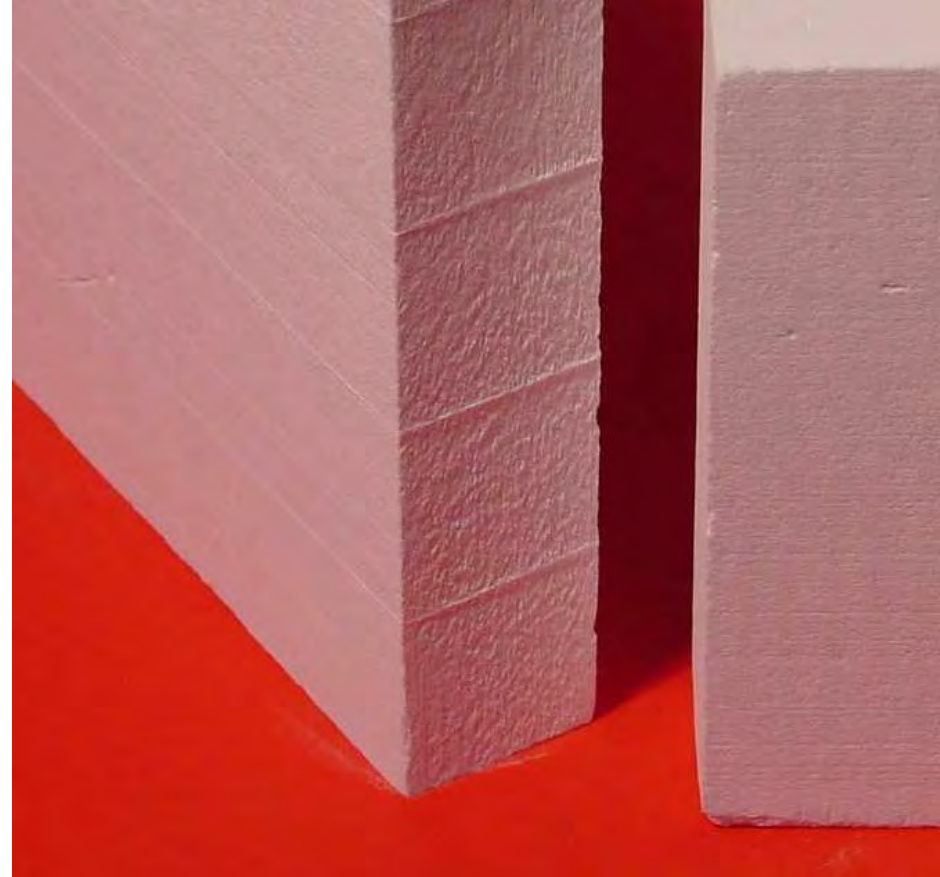


Cements And Rigidizers

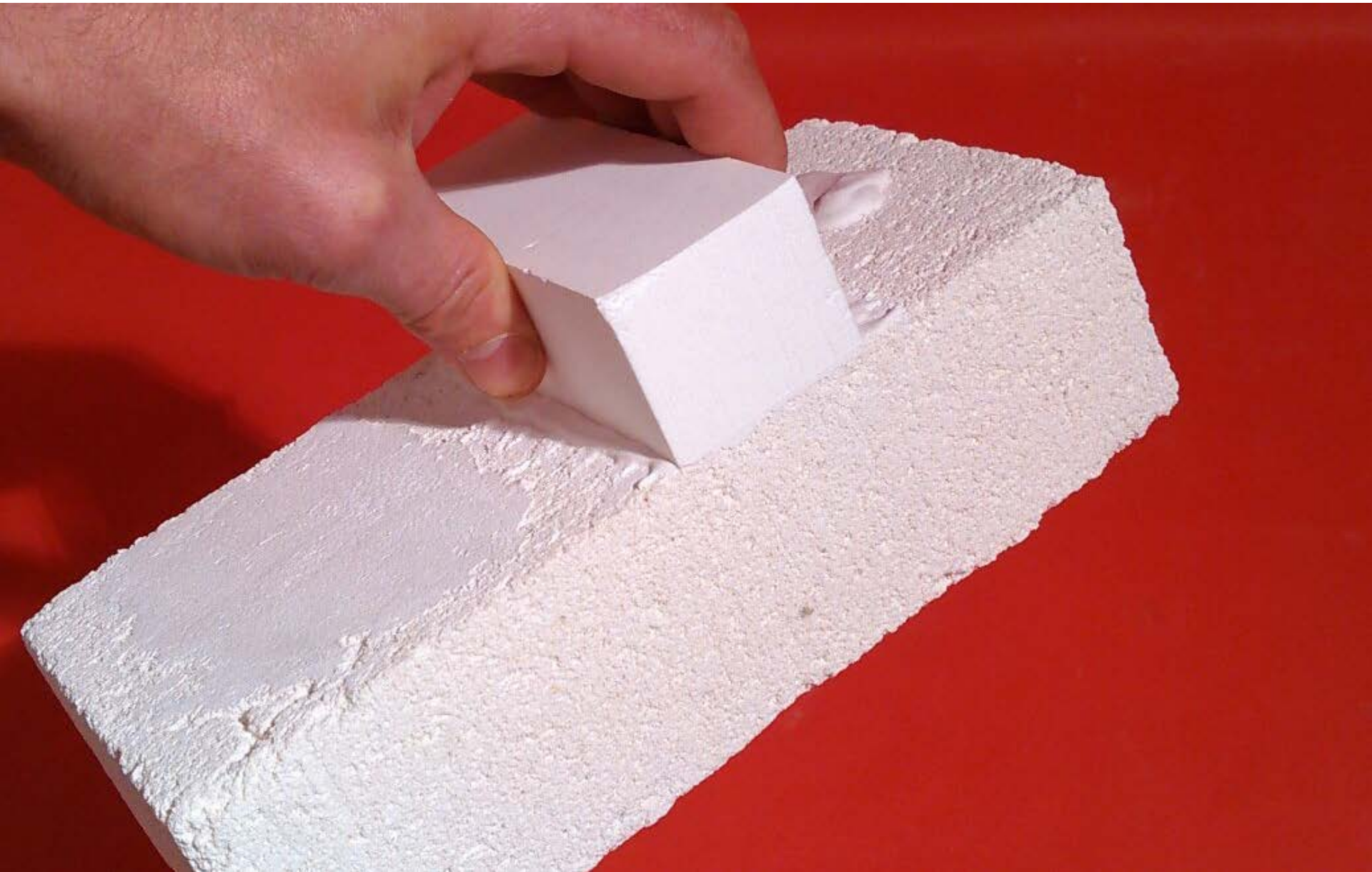
**High Temperature
Bonding and
Hardening Agents**

Compositions:

99+% Al_2O_3 ,
 $\text{Al}_2\text{O}_3 - \text{SiO}_2$
 SiO_2



New AL-CEM/XT and AL-CEM Super.



Moldable Products

High Temperature Pastes For Filling & Bonding

Temperature Ratings:

1700C

1260C



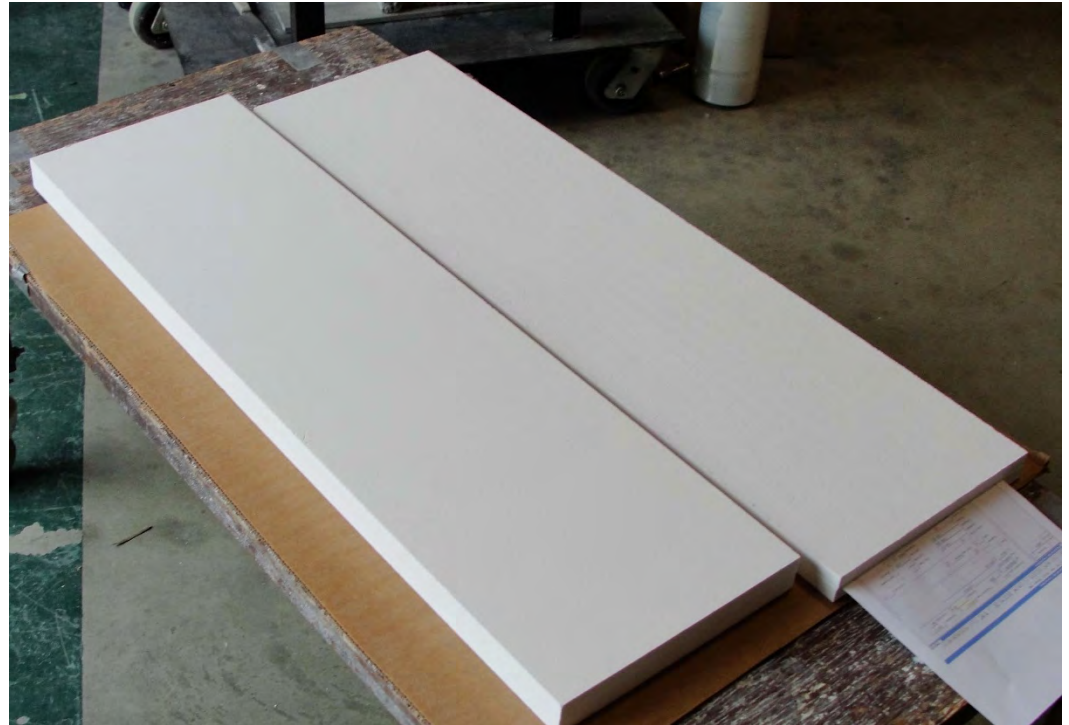
New Development PATI.

- An **exciting** Developmental product.
- Extending the high performance of SALI **1700+C** .
- Reinforced with high strength textile.
- **Microwave Transparent**



New Development High Density Boards

- RNKO
 - Developed as part of our AL Casthouse Products.
 - Premium Grade Spacer material.
 - Medium-High Density *
 - Higher Density is possible!



New Development High Density Boards

- **Backer Boards**
- 1100C, 1300C, 1600C varieties

		Backer Board with SiO₂-CaO-Mgo Soluble Fiber	Backer Board with Al₂O₃-SiO₂ RCF Fiber	Backer Board with Al₂O₃ Alumina Fiber
Theoretical Composition, wt%	% Al ₂ O ₃	45	64.2	80.3
	% SiO ₂	41.7	35.7	19.6
	% CaO	11		
	% MgO	1.6		
Density, Kg/m3 (pcf)		1426 (89)	1266 (79)	1458 (91)

Thank You

- For Complete Technical Details On All Of Our Products Please Refer To:

‘www.zircarceramics.com’

- Or Send An e-mail to:

‘sales@zircarceramics.com’

