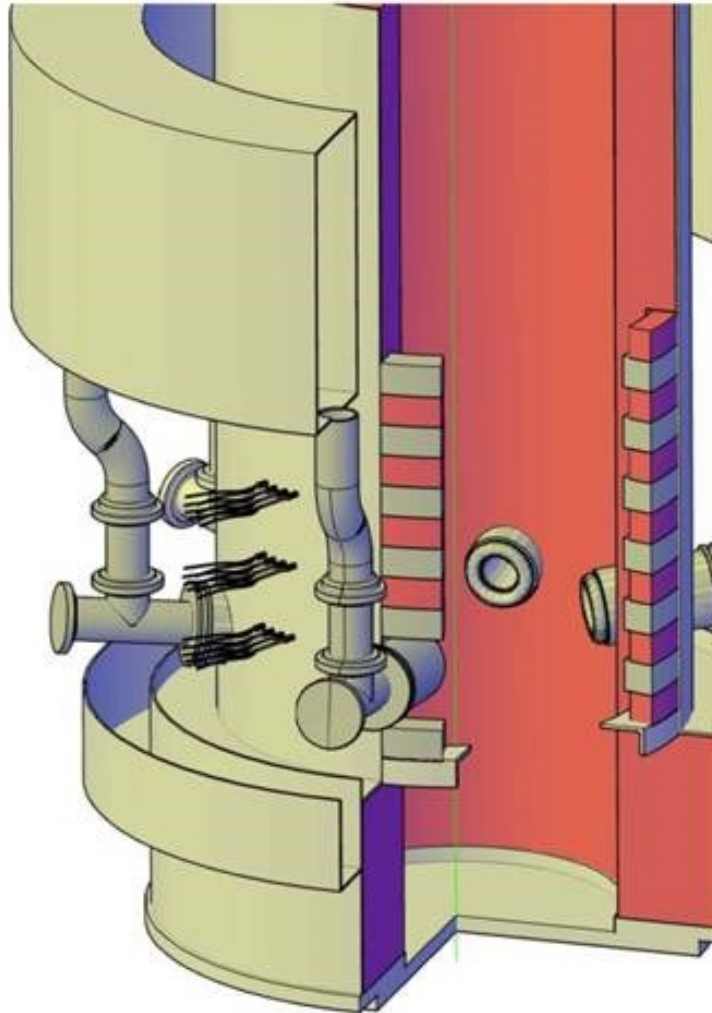


Allied Mineral Technical Services, LLC.



Cupola Melt Zone Technology



AMTS Technology

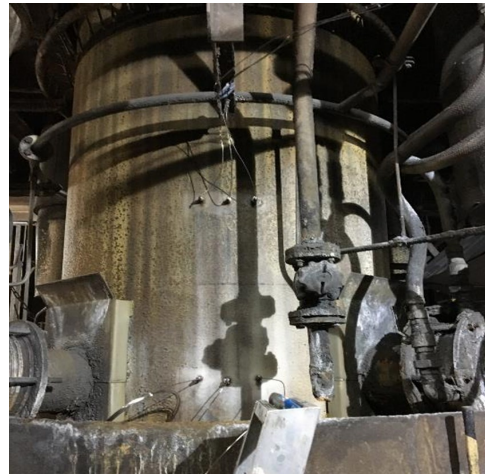


About AMTS:

Allied Mineral Technical Services, (AMTS) offers technical assistance in the critical areas of Blast Furnaces, Hot Blast Stoves and Cupolas. The AMTS team has decades of experience in the industry and the support of Allied Mineral Products, a worldwide leader in refractory technology and production.

Technology Benefits

- **Savings** - AMTS melt zone technology reduces the amount of refractory lining material and improves your maintenance schedule.
- **Defer Shell Replacement** - Maintaining refractory in the melt zone defers shell replacement by 3 to 5 years.
- **Coke reduction** - A stable melt zone diameter will reduce coke requirements and provide a more consistent melt process.
- **Increased production rate** - A balanced cupola operates more efficiently and produces iron at a consistent temperature and chemistry.



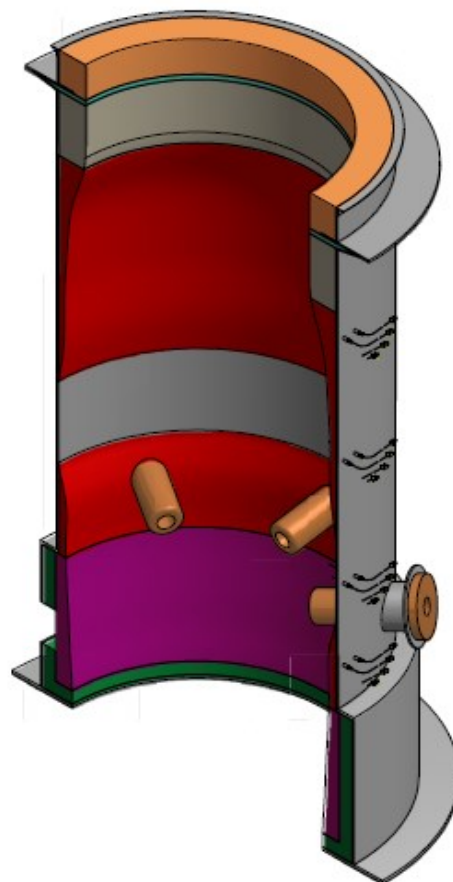
Melt Zone Monitoring

AMTS Engineering and Design Services

- Data collection analysis
- Melt Zone monitoring and modeling
- Failure diagnostics of melt zone
- Problem analysis and integrated solutions
- Comprehensive engineering design capability
- Advanced refractory and cooling systems

AMTS Field Services

- Emergency responsiveness
- Placement of data collection equipment
- On-site supervision and assistance for:
 - Installation
 - Core drilling
 - Grouting
 - Maintenance
- Refractory properties and behavior
- Analysis of melt practices
- Training on best practices



Melt Zone Thermocouples Aligned with Wear Pattern

Refractory Solutions



Hotface Monolithic Products

Area	Products	Comments
Melt Zone	STACKGUN 90	High alumina, low-clay gun refractory
	STACKGUN 85 SiC	85% silicon-carbide, low-clay gun refractory
	CW GUN 519	Silicon-carbide based gun refractory
	DuraLast	Medium Conductivity Brick — Nitride Bonded SiC
	DuraMeltz®	High Conductivity Brick

Key Products

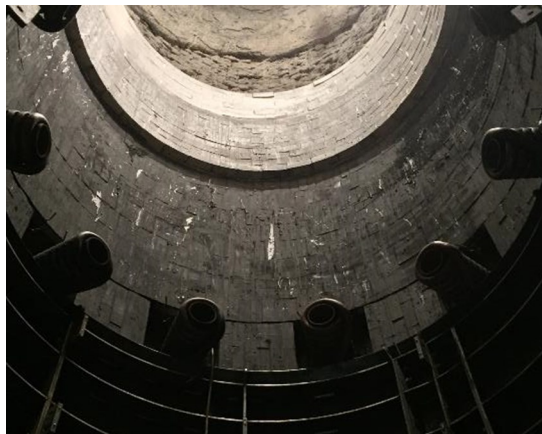
Area	Products	Comments
Preheat Zone	STACKCRETE ®608	Mullite based, silicon-carbide shotcrete
	STACKCRETE®62/65	Alumina based, abrasion resistant shotcrete
	GUNCAST®28 LI	Abrasion resistant gun mix
	DuraLast	Medium Conductivity Brick — Nitride Bonded (NB) SiC



DuraMeltz® - Melt Zone
High Conductivity Brick



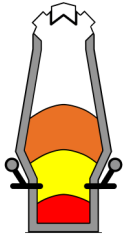
DuraMeltz® Melt Zone shotcreted with Allied
Mineral Product Monolithic



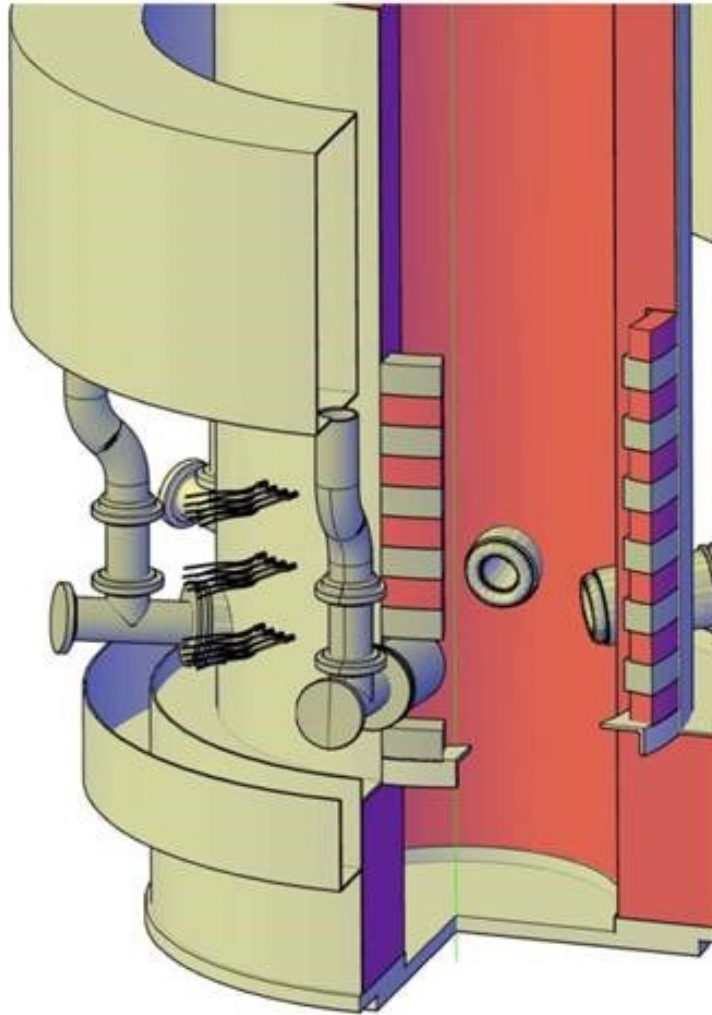
DuraLast NB SiC - Melt Zone
Medium Conductivity Brick



DuraLast NB SiC - Upper or Lower Stack



Allied Mineral Technical Services, LLC.



Cupola Cooling Separator/Siphon Technology



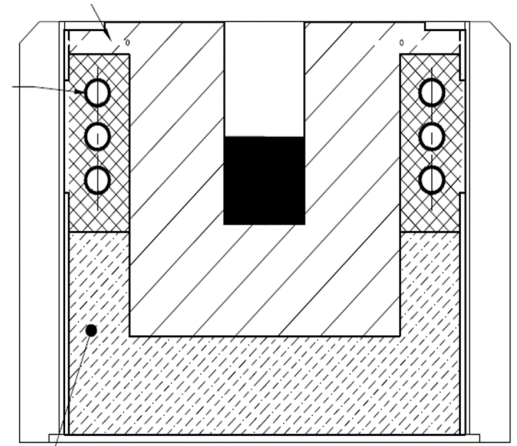


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Technology Benefits

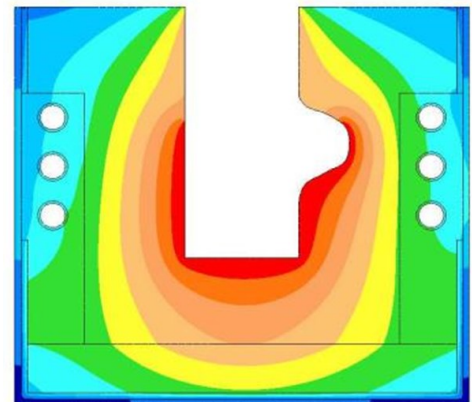
- **Savings** - AMTS separator cooling technology reduces the amount of refractory lining material and improves your maintenance schedule.
- **Iron Separator Savings Example** - 10 to 15% refractory savings at 30 tons/hr, 20 hours/day at 5 days/week.
- **Rear Slagger** - Extended rear slagger from 3 to 5 weeks. 66% improvement.



Air Cooling

AMTS Engineering and Design Services

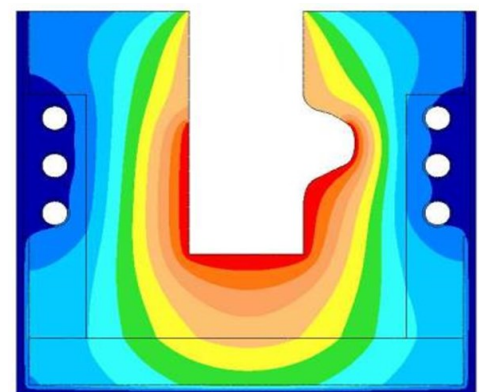
- Data collection analysis
- Monitoring and modeling
- Failure diagnostics of melt zone
- Problem analysis and integrated solutions
- Comprehensive engineering design capability
- Advanced refractory and cooling systems



Thermal Modeling
Non-Air Cooled Iron Separator

AMTS Field Services

- Emergency responsiveness
- Placement of data collection equipment
- On-site supervision and assistance for:
 - Installation
 - Grouting
 - Maintenance
- Refractory properties and behavior
- Analysis of melt practices
- Training on best practices



Thermal Modeling
Air Cooled Iron Separator

Refractory Solutions



Hotface Monolithic Products

Area	Products	Comments
Iron Separator	RAM 469	Resin Bonded High Alumina Graphitic Silicon Carbide Ramming Mix
	RAM 135	Resin Bonded High Alumina Graphitic Silicon Carbide Ramming Mix
	V Cast @418	Ultra-low cement, alumina-based castable with additions of SiC & C
	VCast @425	Ultra-low cement, alumina-based castable with additions of SiC & C
	VCast @720	Ultra-low cement, alumina-based castable with additions of SiC & C

Cold Face Monolithic Products

Area	Products	Comments
Iron Separator	Insulation Board	Insulation Board
	VCast @SL80	Low-moisture, ultra-low cement, SiC based castable with a C addition
	Tuff-Flo 80 SiC	80% SiC, low-cement castable
	MatriPump60	Mullite-based low cement castable



Internal Air Cooling



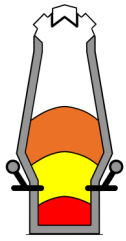
External Air Cooling



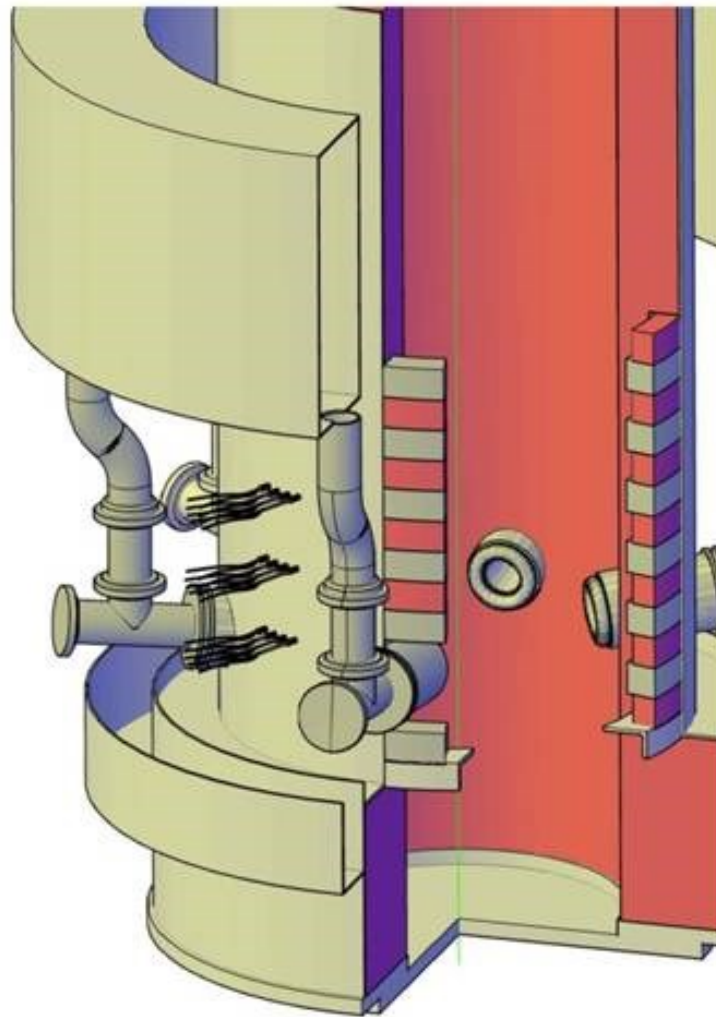
Slag Hole Cooling



Slag Hole Cooling



Allied Mineral Technical Services, LLC.



Cupola DuraMeltz Taphole Cooling Technology



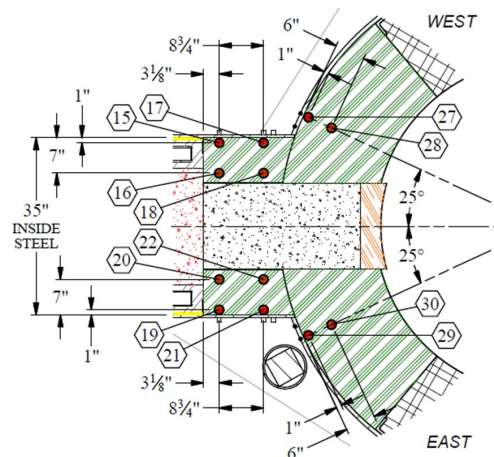


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Technology Benefits

- **Savings** - AMTS taphole technology reduces the amount of refractory lining material and improves your maintenance schedule.
- **Campaign Extension** - AMTS taphole technology reduces the frequency of repair. Number of bottom drops or stops can be reduced.
- **Refractory Savings** - AMTS taphole technology reduces the amount of refractory lining material and improves your maintenance schedule.



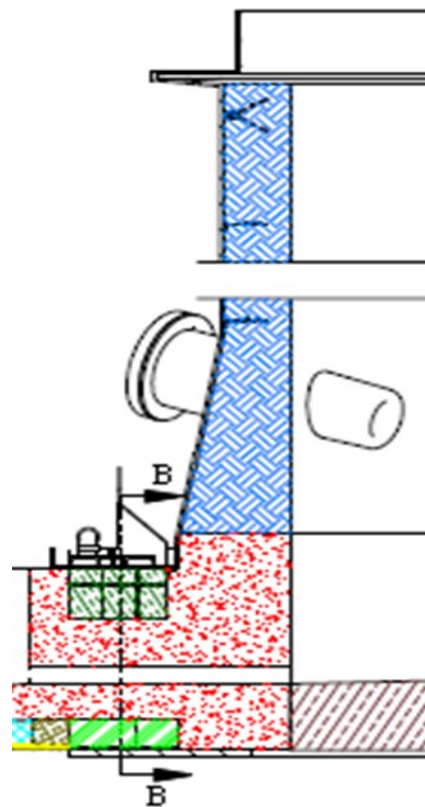
Taphole Monitoring

AMTS Engineering and Design Services

- Data collection analysis
- Monitoring and modeling
- Failure diagnostics of melt zone
- Problem analysis and integrated solutions
- Comprehensive engineering design capability
- Advanced refractory and cooling systems

AMTS Field Services

- Emergency responsiveness
- Placement of data collection equipment
- On-site supervision and assistance for:
 - Installation
 - Grouting
 - Maintenance
- Refractory properties and behavior
- Analysis of melt practices
- Training on best practices



Jacket Water Cooled Taphole

Refractory Solutions



Hotface Monolithic Products

Area	Products	Comments
Taphole	Omega Plastic	Resin Bonded High Alumina Graphitic Silicon Carbide Plastic
	STACKGUN 90	High alumina, low-clay gun refractory
	Karbshield	Carbon Bonded Gunning Mix with Oxidation Inhibitor
	VCast® 720	Ultra low-moisture, ultra low-cement, fused alumina-based
	DuraMeltz®	High Conductivity Brick



DuraMeltz® Taphole with External Water Cooled Jacket



DuraMeltz® Taphole with External Water Cooled Jacket

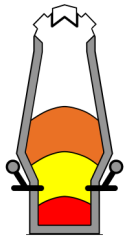


DuraMeltz® - Taphole High Conductivity Brick

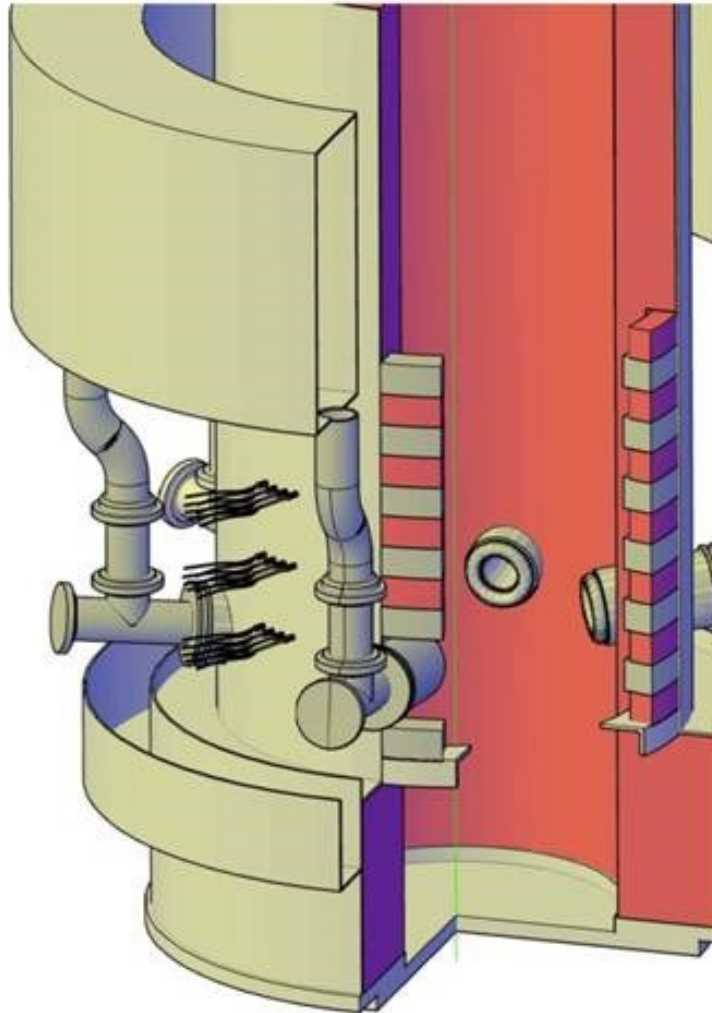
- Reduce Refractory Erosion
 - Reduced slag erosion height from 7" to 5" to 4".



DuraMeltz® - Taphole High Conductivity Brick



Allied Mineral Technical Services, LLC.



Cupola Lower and Upper Stack



Refractory Solutions



Hotface Monolithic Products

Area	Products	Comments
Lower Stack	DuraLast	High Abrasion Resistance Brick — Nitride Bonded SiC
	Metal Rok®	High Abrasion Resistance Pre Cast Shapete
	Guncast®65/70	Mullite based, abrasion resistant gun mix
	STACKCRETE 62	Alumina based, abrasion resistant shotcrete
	STACKCRETE 608	Mullite based, silicon-carbide shotcrete

Key Products

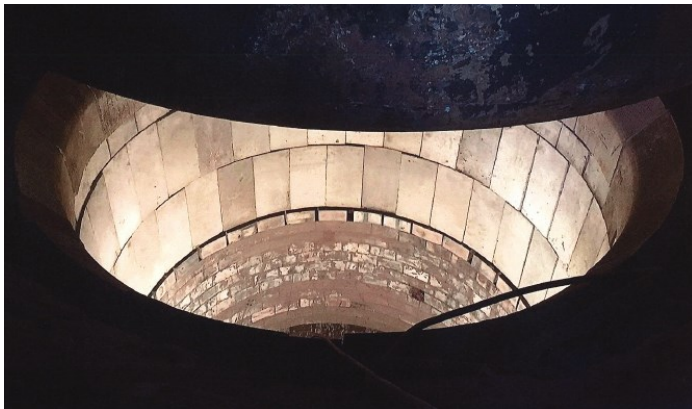
Area	Products	Comments
Upper Stack	DuraLast	Medium Conductivity Brick — Nitride Bonded (NB) SiC
	Guncast®65/70	Mullite based, abrasion resistant gun mix
	Duragun 47	Abrasion resistant gun mix



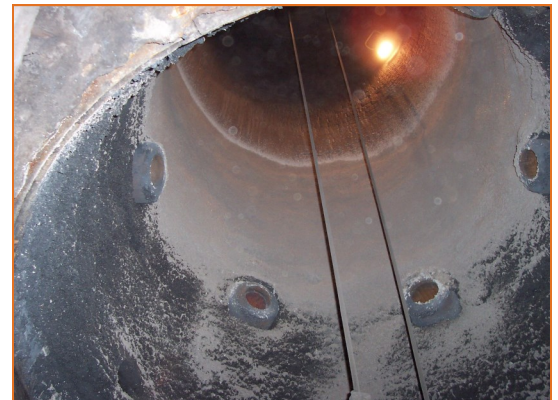
Arch Brick—DuraLast NB SiC - Lower Stack



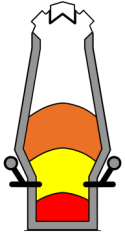
RKB—DuraLast NB SiC - Upper Stack



Metal Rok®—Precast Shapes—Lower Sack

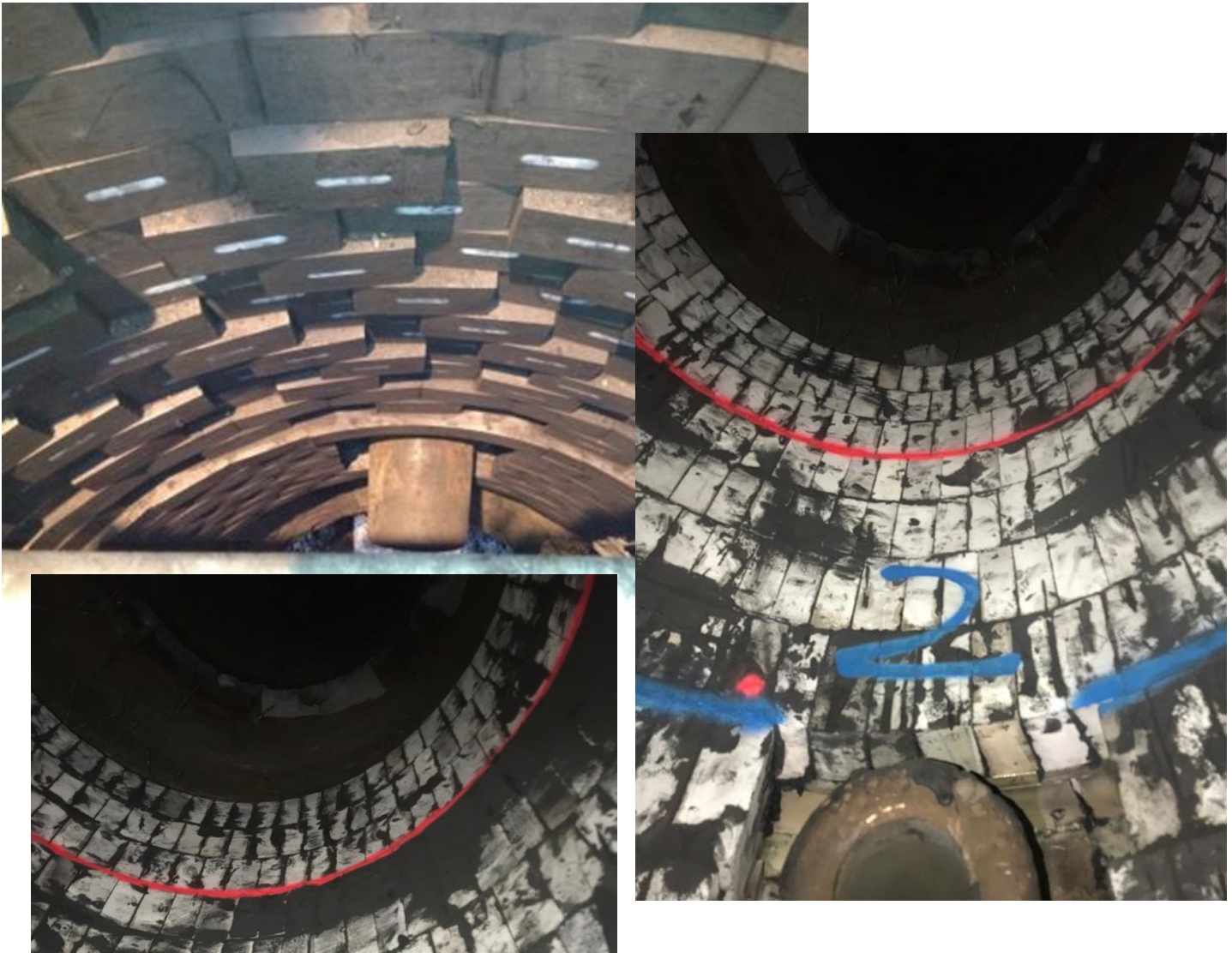


AMP LLC. Monolithic - Maintenance
Upper or Lower Stack



Allied Mineral Technical Services, LLC.

Fast → Flexible → Focused
Contact us today!



Allied Mineral Technical Services, LLC.

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