

# FRC Global Foundry Refractories

Innovation

High Temp

**FRC**  
Global

# Expert Teams.

# Global Networks.

# Quality Products.

## Who We Are

**FRC Global is a leading supplier of refractories, electrodes, and high temperature combustion systems.**

FRC Global provides outstanding results for our clients within the iron, steel, and non-ferrous industries. Our company's reputation is built by delivering high quality products made with premium raw materials. We are more global now than ever before.

We give you a competitive advantage by offering you superior proven products that positively impact your bottom line and perform better. Our knowledgeable engineers ensure the proper application of our products to give you the maximum level of output and safety.

With over 25 warehouse facilities in the United States, Canada, Mexico, and South America we assure your products are readily available when you need them in these regions.

**Through the use of vast global resources, all of us at FRC Global are committed to being the value creators and problem solvers for our industry.**

# Mission Statement

Embrace modern technology to increase innovation, efficiency, and transparency. Inspire the next generation by driving change, promoting curiosity, and shaping sustainable solutions in the high temp world.



# About Us



## Background information

FRC Global is a second generation family owned company with a 30-year history.

FRC Global has offices, agents, or partners in 20 countries around the world.

Global Offices:

- ◆ North America: United States and Canada
- ◆ South America: Colombia
- ◆ Asia: China

We provide quality engineered products and services for all your high temperature applications.

## FRC Global facts

Our quality control employees thoroughly inspect shipments to ensure products are within specification and are properly packaged.

Sales force and service needs are available in the following:

- ◆ North America
- ◆ Central America
- ◆ South America
- ◆ Europe
- ◆ Middle East

# Why FRC Global?

## Why Us

Our experts and service staff are there for you when you need it.

Our goal is to study your operation, propose solutions, and ultimately lower your cost per ton of metal produced.

Global operations enable us to competitively provide all products for any area of the furnace. Additionally, FRC Global can supply equipment such as frit machines, mixers and gunning apparatus as required. We offer world-class refractories for foundry operations of all types. From induction furnaces to AOD's, we have you covered.

Our strong relationships with global enterprises, primarily in strategic raw materials ensure availability, price stability and consistent high quality.

We have on-staff engineers, product managers and quality control teams who travel around the world to produce high-end products from only the best raw material to generate superior results for our customers.



# Foundry Refractories & Brick



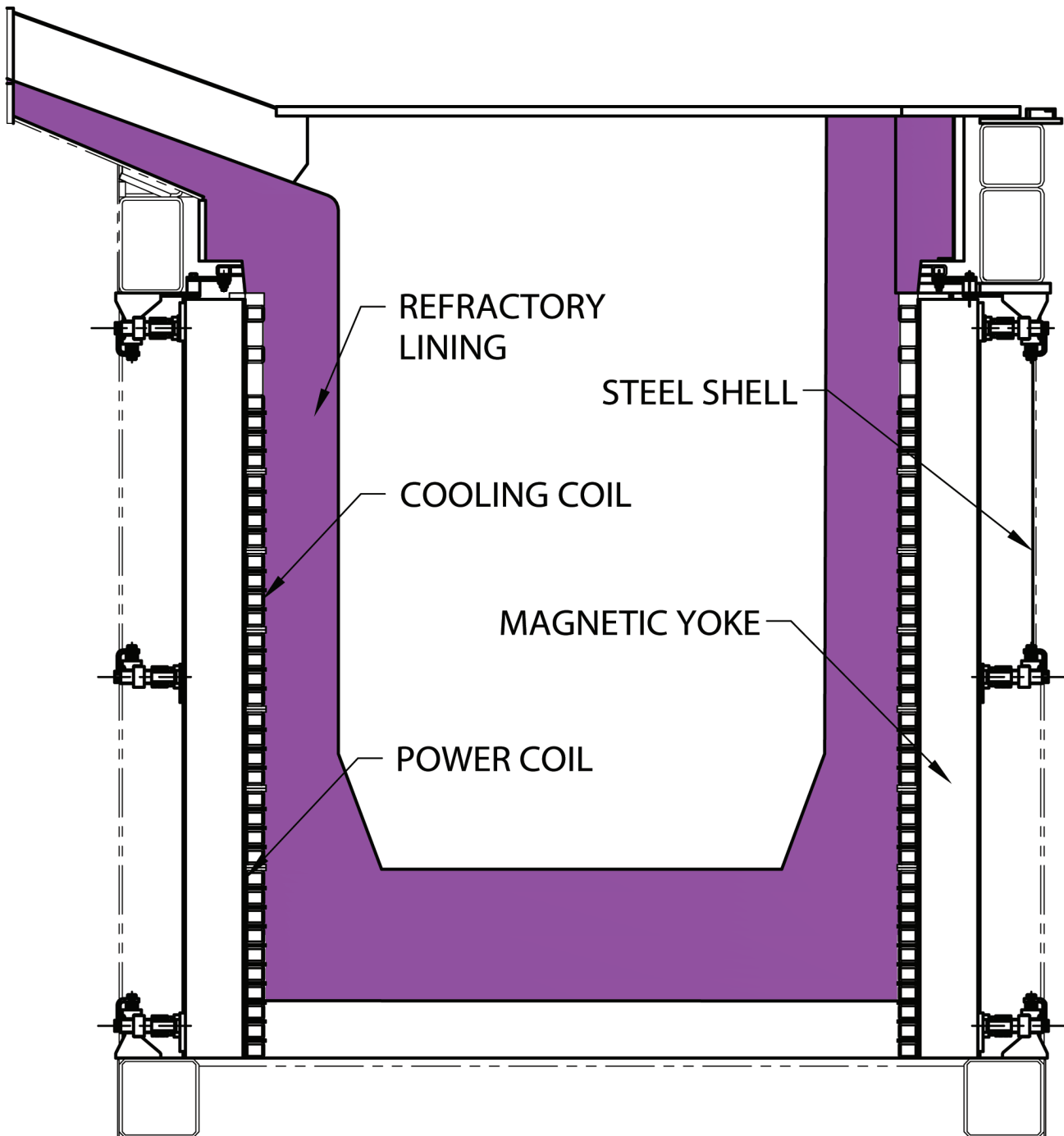
## Product Description

FRC Global has proven products for every furnace, slag or practice. Induction furnace linings are available in spinel (brick or dry vibrate), alumina (brick, dry vibrate and pre-cast), and magnesite-based (brick, ram and pre-cast) qualities. Electric arc furnace bricks are available in silica, alumina, mag-chrome, mag-carbon, burned magnesite and burned dolomite. Ladle linings are available in ram, castable and brick in every quality (silica, alumina, spinel, alumina-chrome, alumina-carbon, alumina-magnesia-carbon, mag-chrome, dolomite, and mag-carbon).

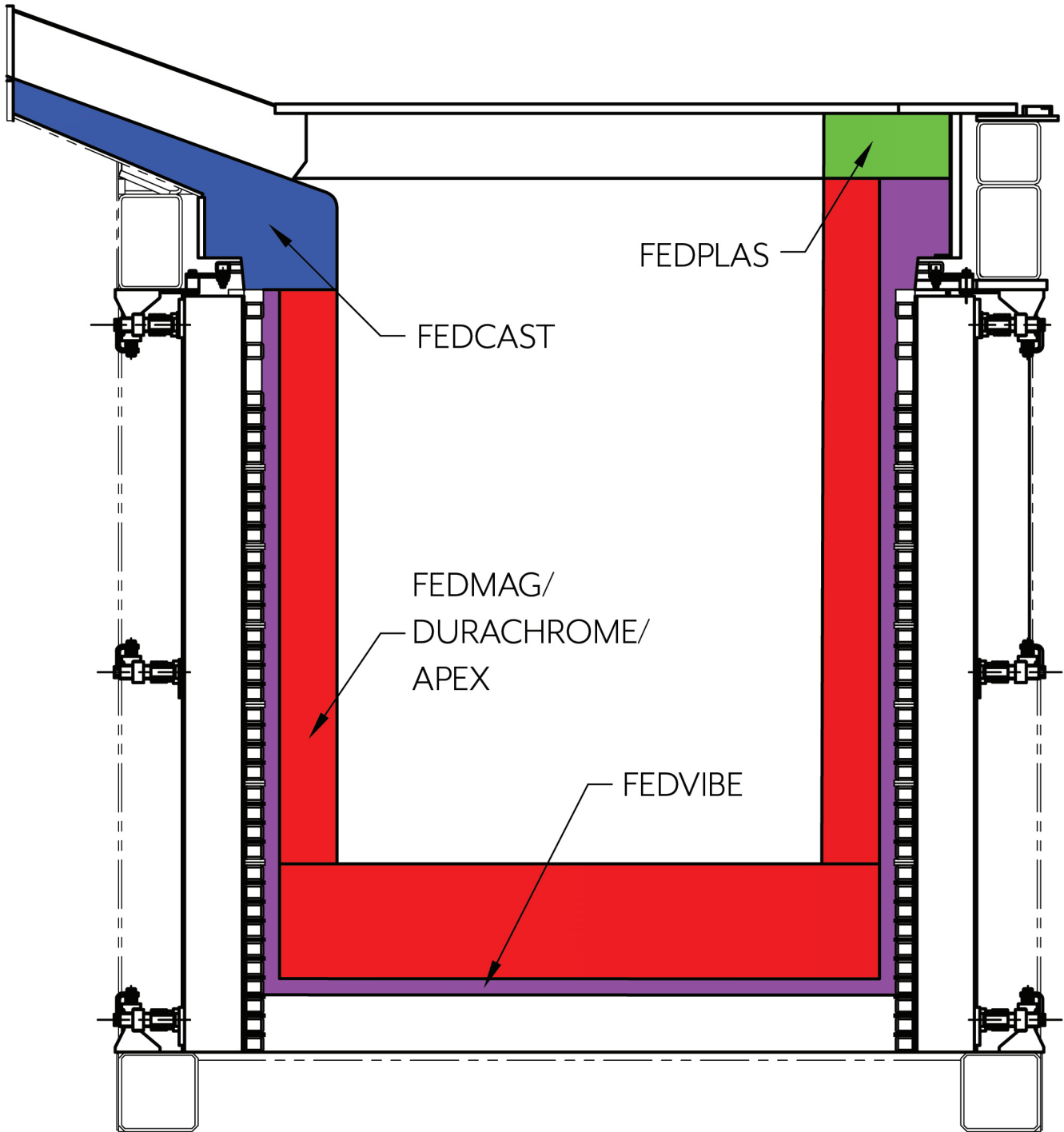
## Performance Highlights

The highest grade raw materials are processed in modern state-of-the-art facilities to provide you with the high performance refractories you need. We have full-time CAD engineers on staff as well as a dedicated force of product managers to meet with you and determine how best we can serve you. We stock products locally for drop shipment, and will consign material as necessary to satisfy your just-in-time demands.

# Induction Furnace

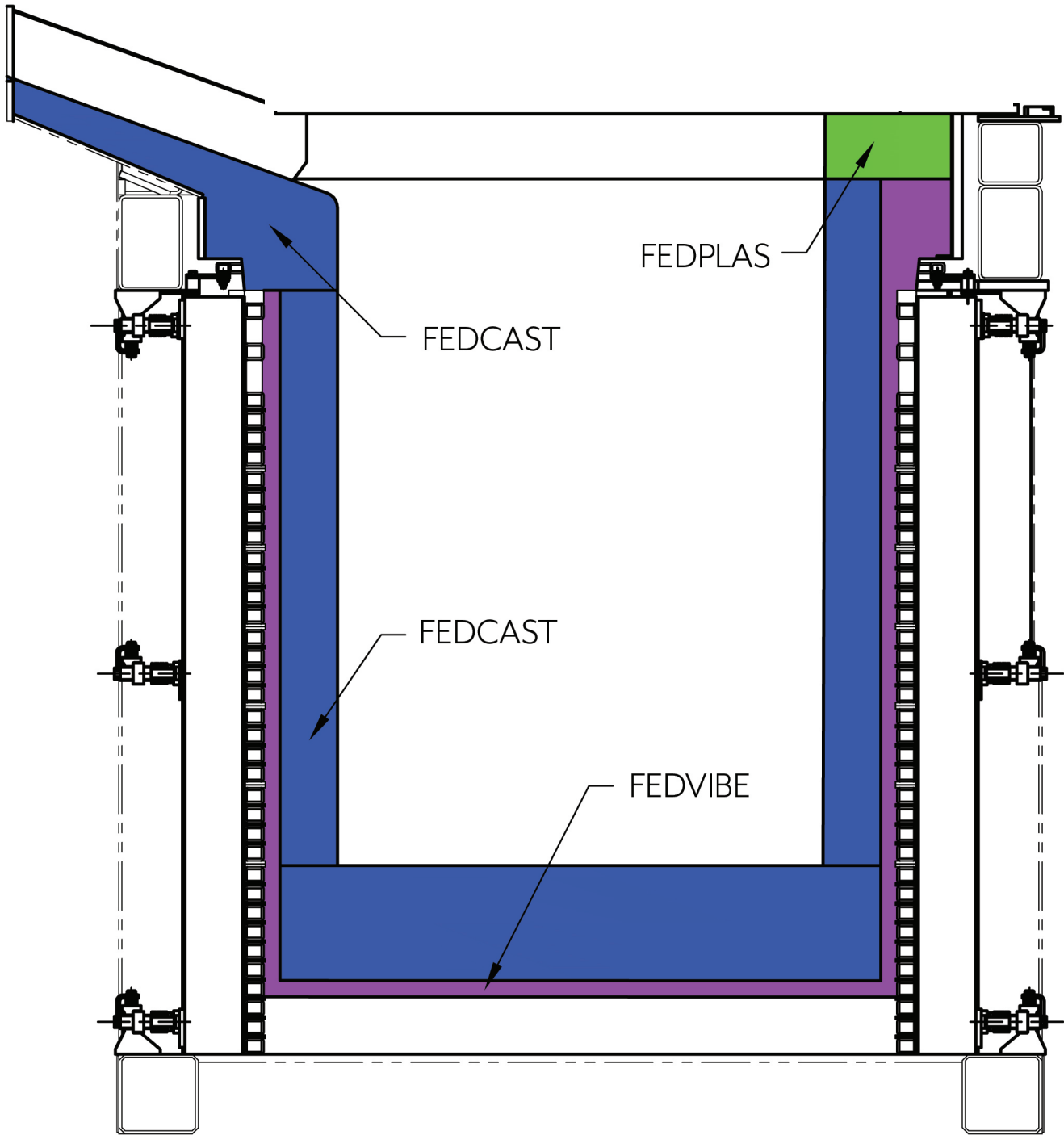


# Induction Furnace Brick Lining

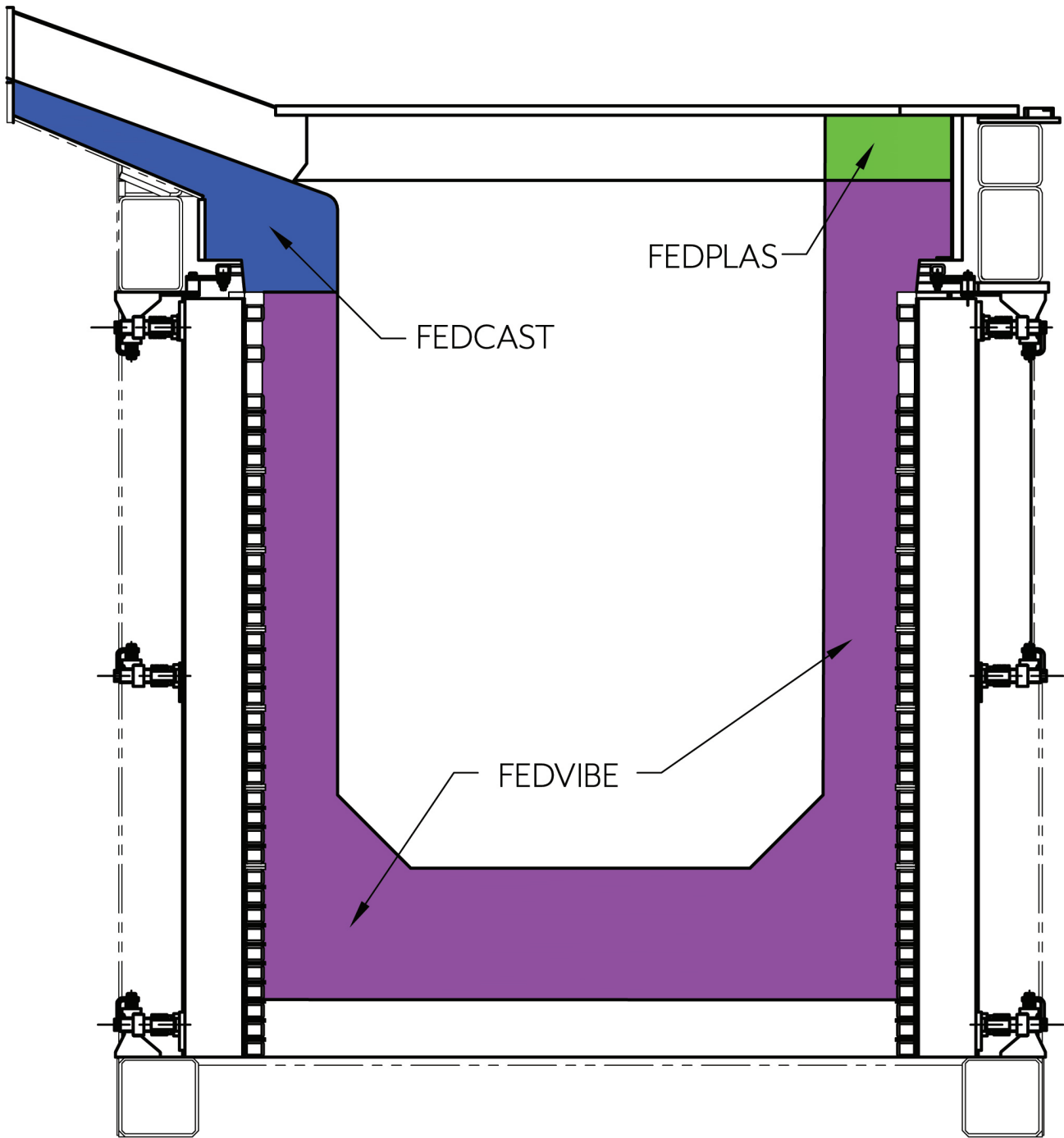




# Induction Furnace Pre-Cast Crucible



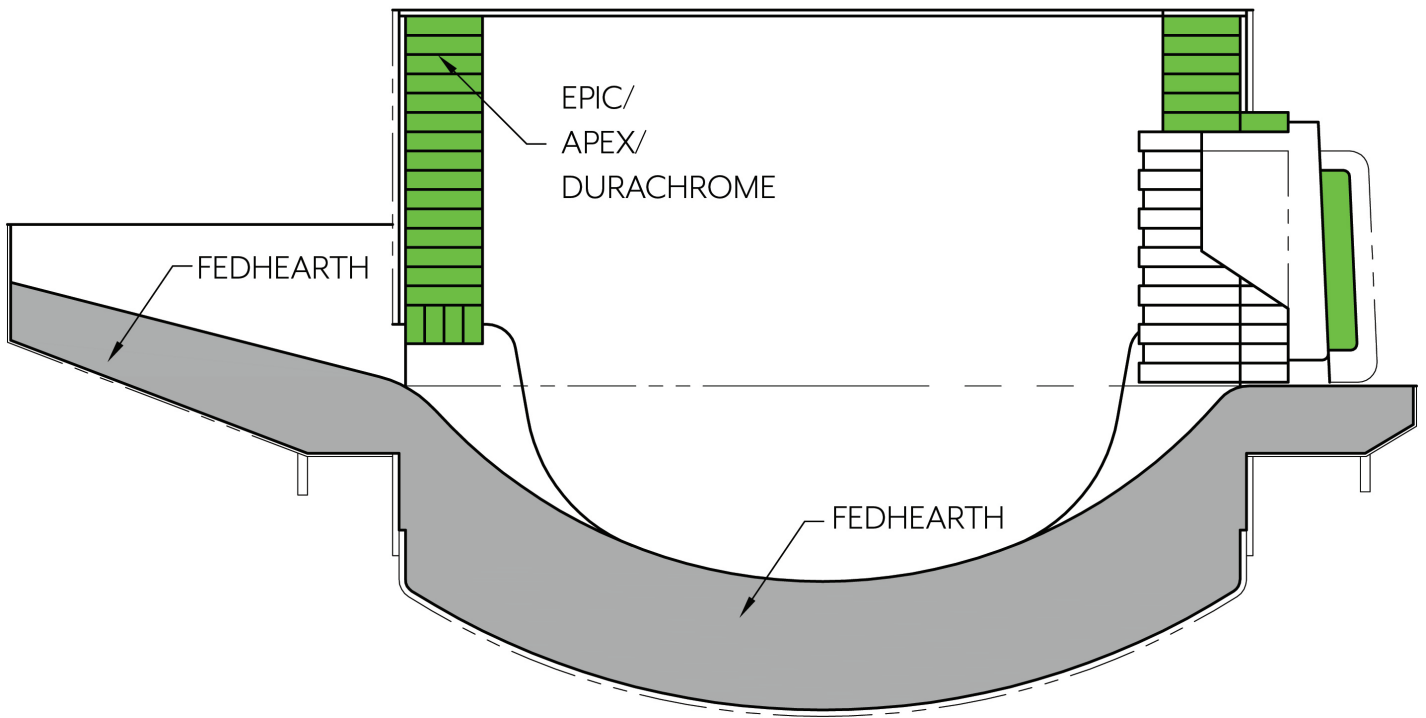
# Induction Furnace Monolithic



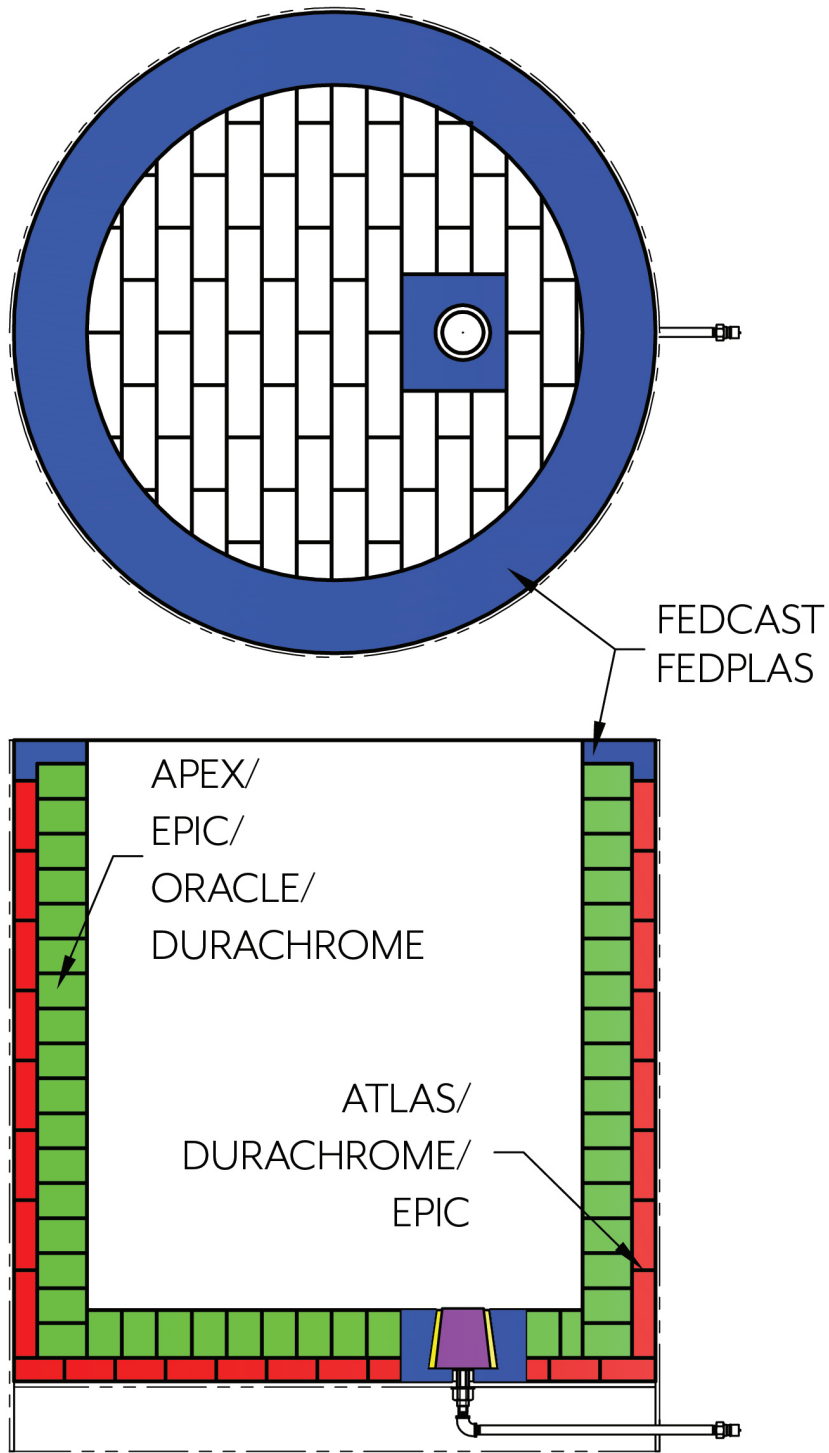
# Monolithics

Product	Chemical analysis: Approximate weight %									B. Density (g/cc)		CCS (Mpa)		Max
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	MgO	CaO	ZrO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>	TiO <sub>2</sub>	Cr <sub>2</sub> O <sub>3</sub>	Green	Fired	Green	Fired	Temp (°C)
<b>PLASTICS</b>														
FEDPLAS 50	47.9	43.3	1	3.4	0	1.3	3.5	1.6	0	2.45	2.21	15	60	1400
FEDPLAS 60	62	32	0.9	0.3	0	1	3.5	1.5	0	2.45	2.38	12	46	1550
FEDPLAS 70	70	24	0.1	0.1	0	0.8	3.5	1.3	0	2.7	2.49	14	38	1700
FEDPLAS 85	85.2	8.1	0.2	0.3	0	1.1	3.5	1.2	0	2.88	2.7	12	41	1780
FEDPLAS 92	92	3	-	-	-	0.1	4.3	0.4	0	2.95	2.75	20	40	1800
<b>DRY-VIBES</b>														
FEDVIBE 60	61	36	0.8	2	0	0.9	0	1	0	2.55	2.4	n/a	n/a	1650
FEDVIBE 85S	86	0.2	13	0.3	0	0.2	0	0.8	0	2.8	2.5	n/a	n/a	1700
FEDVIBE 86S	85	0.2	13	0.3	0	0.2	0	0.9	0	2.8	2.5	n/a	n/a	1700
FEDVIBE 90S	90	0.1	7	0.1	0	1.2	0	0.7	1.6	2.85	2.5	n/a	n/a	1750
	Chemical analysis: Approximate weight %									B. Density (g/cc)		CCS (Mpa)		Max
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	MgO	CaO	ZrO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Alkalies	TiO <sub>2</sub>	Cr <sub>2</sub> O <sub>3</sub>	Green	Fired	Green	Fired	Temp (°C)
<b>CASTABLES</b>														
FEDCAST 50	50	41.2	0.2	3	0	1.7	2.1	1.6	0	2.23	2.2	45	78	1400
FEDCAST 60	60	35.8	0.9	1.3	0	0.1	0.1	1.6	0	2.55	2.5	58	100	1550
FEDCAST 70	70	24	0.2	1.7	0	1.5	0.2	2.4	0	2.74	2.71	55	105	1700
FEDCAST 85	83.5	11.5	0.1	0.6	0	1.1	0.3	2.8	0	2.85	2.78	40	45	1780
FEDCAST 94SP	93.8	0.1	4.2	1.6	0	0.1	0.2	0	0	3.04	3.02	95	105	1850
FEDCAST 94C	93.5	0.3	0	1.4	0	0.1	0	1.8	3	3.04	3.01	45	40	1850

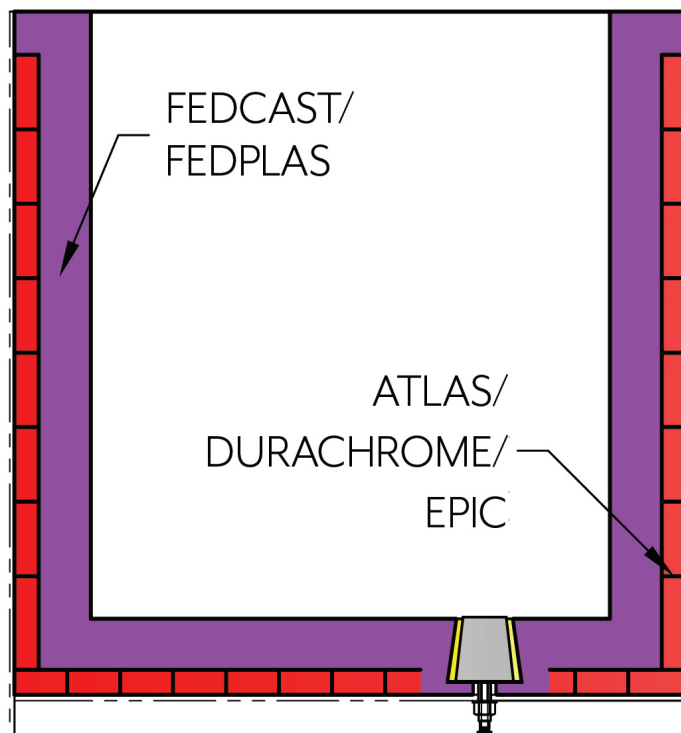
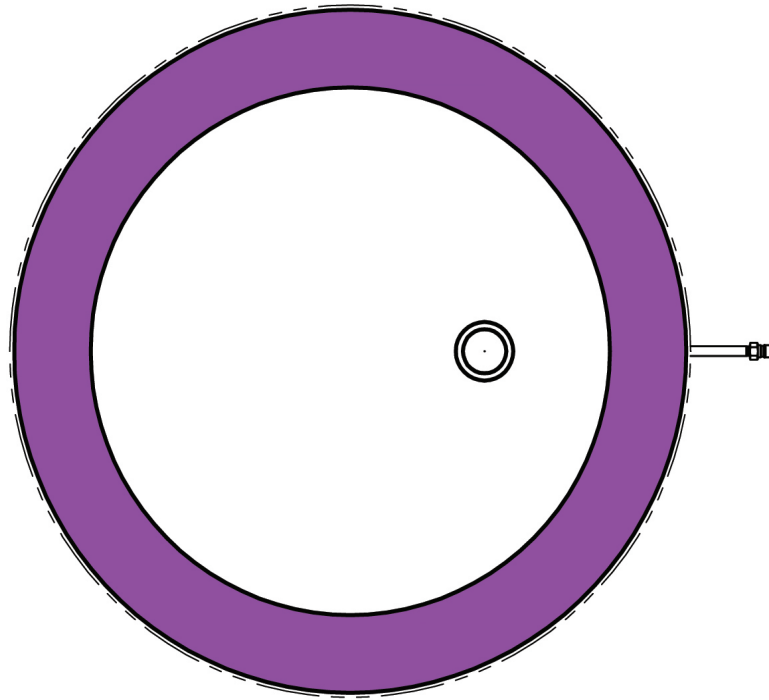
# Electric Furnace



# Ladle Lining Brick



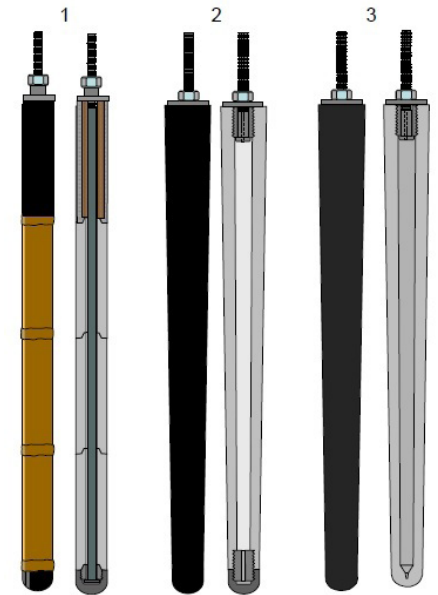
# Ladle Lining Monolithic



# Brick

Brick	Chemical analysis: Approximate weight %							B. Density (g/cc)	CCS (Mpa)	AP %	Carbon Weight, %
	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	MgO	CaO	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Cr <sub>2</sub> O <sub>3</sub>				
<b>MAG-CARBON</b>											
APEX 8	0.1	0.4	98	1.4	0.2			3	41	2.5	5-20 as needed
APEX 7	0.2	0.7	97	1.8	0.3			3	41	2.5	5-20 as needed
APEX 6	0.7	1	96	1	0.5			3	41	2.5	5-20 as needed
APEX 5	2	1	95	1	1.9			3	41	2.5	5-20 as needed
<b>MAG-CHROME</b>											
DURACHROME 60DB	6	1.5	62	1.5	12		17	3.06	40	19	0
DURACHROME FG20	6.8	0.5	61	0.9	12		19	3.18	50	15	0
DURACHROME FG50	9	1	57	1.6	11		19	2.26	65	16	0
DURACHROME FG100	12	1.5	55	2.2	10		20	3.3	80	16	0
<b>MAG-ALUMINA-CARBON</b>											
ICON	10	0.1	87	1	1			3	50	5	7
ICON IP	10	0.1	78	1	1			3.05	50	5	7
<b>ALUMINA-MAG-CARBON</b>											
ORACLE	80	4	11	1	1	1		2.94	80	5	5
ORACLE IP	87	2	11	1	1	1		3.22	120	4	5
<b>MAG-SPINEL</b>											
FEDMAG 87	10	1	87	1.2	0.5			2.9	40	18	0
FEDMAG 92	7	0.3	92	1	0.5			2.9	40	18	0
<b>EPIC</b>											
EPIC 60	60	20	0.2	0.8	2	4.7	0	2.35	58	22	0
EPIC 70	70	24	0.1	0.6	2.4	3.5	0	2.8	60	17	0
EPIC 80	80	16.6	0.1	0.1	1.8	2	0	2.8	70	19	0
EPIC 90	90	10	0.1	0.1	1	1	0	3	88	16	0

# Foundry Stoppers & Nozzles



## Product Description

ISO-statically pressed carbon bonded alumina-graphite stopper-rods and nozzles, clay composition extruded sleeves, hydraulically pressed clay nozzles and clay-graphite stopper-heads. One piece stoppers are typically a single composition, but can feature some of the same design and multi-composition as those used for continuous casting. Steel rods/rigging and mortars are also available.

## Diagram

1. Conventional stopper-head, clay sleeves with optional slag resistant AG/clay sleeve.
2. One piece ISO-statically pressed Al-C sleeve with clay-graphite stopper-head.
3. One piece ISO-statically pressed Al-C stopper-rod.



# Fused Silica Flow Control



## Product Description

Fused Silica is used in many applications. From continuous casting of steel to foundry and non-ferrous operations. The shapes are slip cast to form shrouds, stoppers nozzles and sub-entry nozzles. For non-ferrous pressure and vacuum casting, coatings are applied to prevent air ingress.

## Performance Highlights

Steel reinforcement with argon channels is also possible with this versatile product. Free from thermal shock, it can be used directly from the crate. Fused Silica has natural insulation properties which prevents heat loss during casting and often provides a cost savings for shops with shorter casting sequences.

# MICA & Ceramic Fiber



## MICA Product Description

ISO-flex products prevent early leakage and costly damage to the coil.

- ◆ ISO-combi: Laminated material made from mica and biosoluble fiber paper
- ◆ ISO-foil 'R': Phlogopite mica paper reinforced with a glasscloth in the middle
- ◆ ISO-foil 'R-MV' & ISO-foil 'R-M2V': Phlogopite mica paper reinforced with 1 or 2 glasscloth outside
- ◆ ISO-ceram: Biosoluble AES fiber paper
- ◆ ISO-foil 'S': Phlogopite mica sheets impregnated with a specific high temperature binder.

## Ceramic Fiber Product Description

FRC Global's ceramic fiber blanket presents unparalleled refractories and thermal insulation due to its long spun fiber needling technique. They offer superior insulating performance, flexibility and resilience. These products are unaffected by most chemicals (except hydrofluoric & phosphoric acids and concentrated alkali). Thermal and physical properties are retained after drying following wetting by oil, steam or water. The blankets are completely inorganic, so there are no fumes when heating for the first time. Ceramic fiber board and textile are also available.

# Additional Foundry Products & Specialties



## Additional Foundry Products

SAE Grade Steel Shot:

- ◆ Low Carbon
- ◆ High Carbon
- ◆ Grit
- ◆ Cut-Wire Shot

Silicon Carbide Crucibles:

- ◆ Available to be made in custom shapes and sizes for multiple furnace requirements

## Specialties

FRC Global has proven specialty products from rams to castables. Alumina castables from 50 to 94%. Alumina chrome castables and basic castables. Mortars in every flavor and consistency.

- ◆ Induction linings of spinel (brick or dry vibe), alumina (brick, dry vibe and pre cast), magnesite based (brick, ram and pre cast).
- ◆ Electric arc lining are available in silica, alumina, mag-chrome, mag-carbon, burned magnesite and burned dolomite.

Innovation

High Temp

**FRC**  
Global

# FRC Global

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