FRC Global

Graphite Electrodes

Expert Teams.
Quality Products.
Global Networks.

Who We Are

FRC Global is a leader in the supply of refractories, electrodes, and high-temperature combustion systems.

Supplying the iron, steel, and non-ferrous metals industries for over three decades, our reputation has been built upon being problem solvers for our customers. We are constantly looking for new ways to maximize output, increase efficiency, and positively impact your bottom line.

Our commitment goes beyond providing premium raw materials; we are dedicated to offering unparalleled technical support from our team of seasoned engineers.

As a second-generation, family-owned and -operated American company, we are dedicated to shaping the future of our industry for generations to come.

Our Mission

We are dedicated to delivering innovative, efficient, and sustainable products and capabilities. We meet our customers everywhere by traveling across the globe to solve their complex and unique challenges. By showing up when others don't, we open new market spaces and bring the best of our expertise with a personal, small-company touch. We choose to have fun while deploying decades of expertise, bringing a fresh perspective to the metals industry.

About Us

Background Information

FRC Global is a second generation family owned company with 35+ years of history.

Our Global Offices

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

- 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.

Our sales force and services are available in the following regions:

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

Co-owners of FRC Global
Sisters Leanne Pate, Julie Lord, and Dianne Detwiler

From left, Leanne (Director of People Operations), Julie (President and CEO), and Dianne (Director of Electrode Sales)

Graphite Electrodes: EAF & LMF

Product Description: EAF

Our EAF graphite electrodes for electric arc furnaces are manufactured in state of the art, ISO 9000 production facilities to maintain complete process quality control. Our electrodes are made using 100% premium needle coke and LG graphitization (longitudinal graphitization) to provide the best possible physical and mechanical properties. Machining is done using computer controlled CNC equipment to insure very tight tolerances. We can supply all diameters up to 800mm/32 inches, and up to 140 inches in length. All styles of connecting pins and sockets are available per NEMA, IEC and JIS specifications.

Product Description: LMF

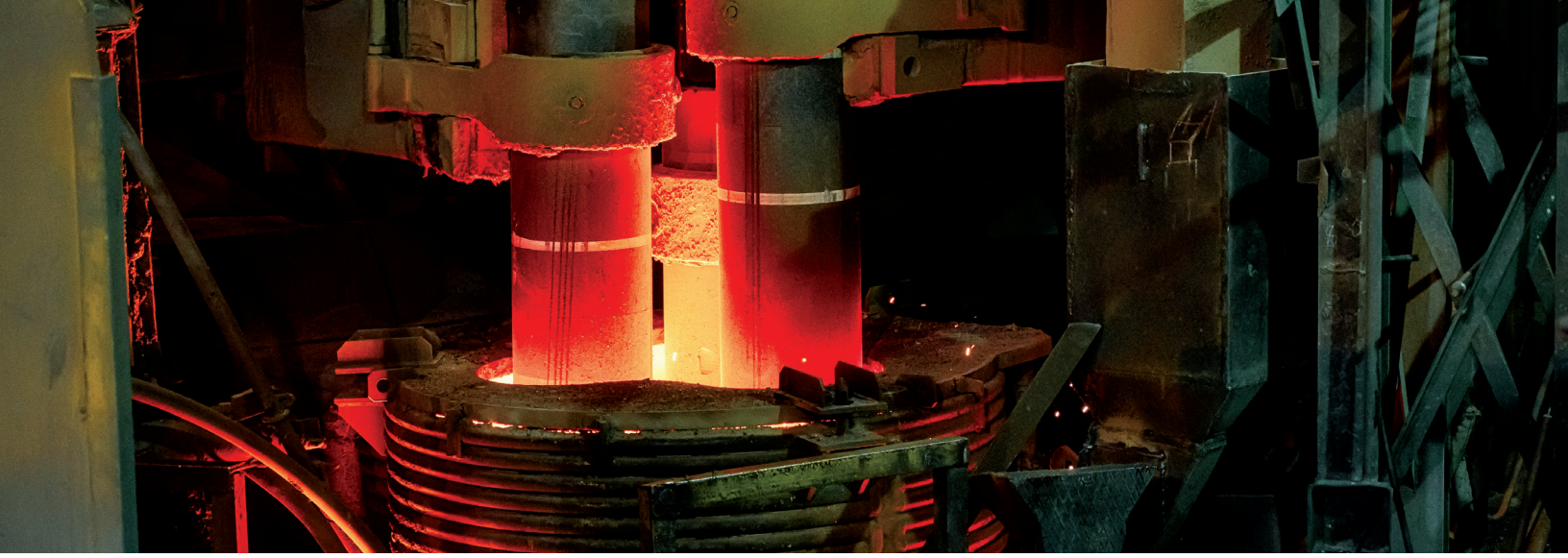
Our LMF electrodes used for lower powered melting furnaces and ladle met furnaces are manufactured in state of the art, ISO 9000 production facilities that utilize LG graphitization (longitudinal graphitization). Our focus is on creating a superior cost effective product to consistently meet your needs. Our LMF electrodes are machined using computer controlled CNC equipment to insure very tight tolerances. We offer diameters in all sizes up to 500mm/20 inches and a length up to 110 inches. All styles of connecting pins and sockets are available per NEMA, IEC and JIS specifications. To insure the best possible performance, all connecting pins are made from higher density UHP quality graphite, regardless of electrode quality; RP, HP, SHP or UHP.

FRC Global partners with Dantan Carbon as premier supplier for graphite electrodes

Our Expanded Partnership

FRC Global and Dantan have been working together for more than 15 years. This time working together has given us the unique opportunity to experience the superior quality and performance of Dantan's industry-leading electrodes first-hand. Dantan's production facility in China boasts a capacity of 120,000 tons per year, backed by ISO9001 quality system certification. The company produces a wide range of graphite electrodes, including regular power, high power, and ultra-high power options, and the largest-sized UHP electrode in China, which measures 800mm. Dantan does all of this while maintaining its signature high quality and stability, both of which are unmatched in the industry.

This expanded partnership furthers both companies' ongoing commitments to provide global customers with the best products and services in the industry.



Providing Solutions

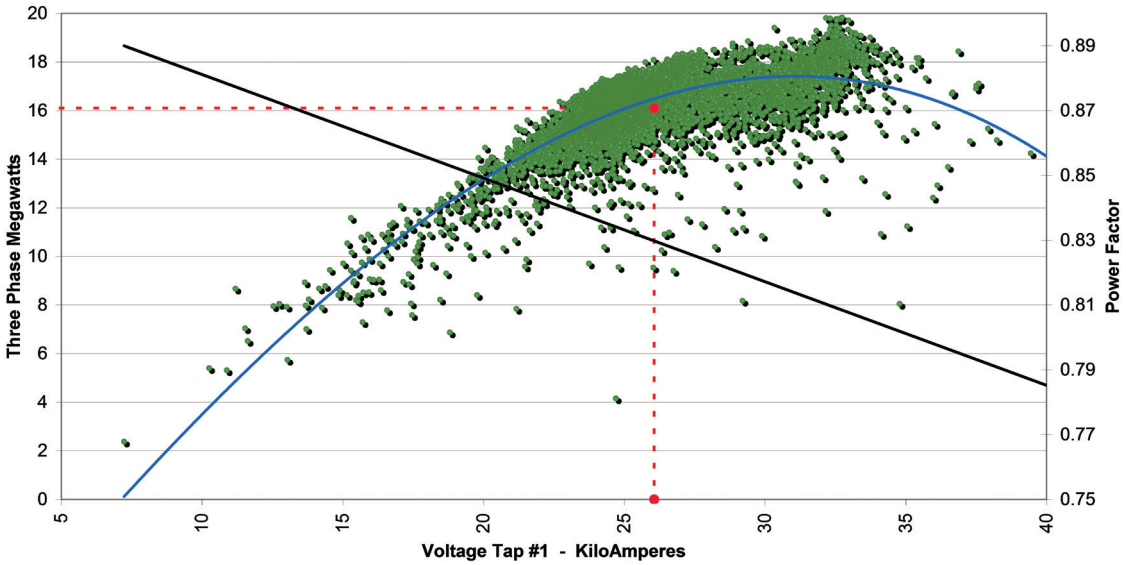
FRC Global is committed to providing innovative, quality products coupled with technical service specialists that continue to work with customers to monitor electrode performance. This results in better operational consistency, performance and cost effectiveness.

A full range of technical support services are designed to improve furnace performance and reduce your conversion costs.

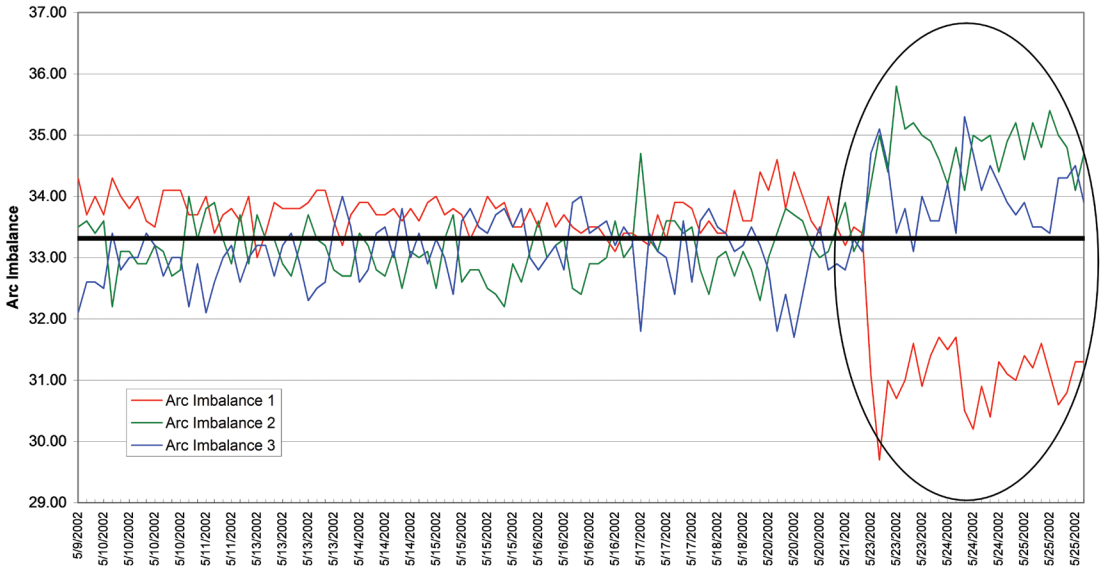
- Maximize energy input by determining effectiveness of power profile
- Maximize productivity by recharging at the optimal time
- Identify and solve regulation problems
- Determine electrical balance and solve arc flare problems
- Determine arc stability and effectiveness of foamy slag practice
- Trend furnace parameters—including those affecting electrode consumption

Technical Support

Power Curve



Help in Resolving Arc Imbalance



Technical Properties of Graphite Electrodes

Item	Unit	Product	Nominal Diameter (mm)							
			RP		HD		HP		SHP	UHP
			Regular Power		High Density		High Power		Super High Power	Ultra High Power
			250-350	400-600	250-350	400-600	300-350	400-600	350-600	350-700
Resistivity	μ Ω m	Electrode Nipple	7.8-9.0 5.2-6.5	7.8-9.0 5.2-6.5	7.1-7.8 4.2-5.0	7.1-7.8 4.2-5.0	6.2-7.5 4.2-5.0	6.2-7.5 4.2-5.0	4.8-6.0 4.2-5.0	4.6-5.5 4.2-5.0
Flexural Strength	(Mpa)	Electrode Nipple	8-11 10-15	8-11 10-15	10-15 10-15	10-15 10-15	10-15 10-15	10-15 10-15	10-15 10-15	10-15 10-15
Elastic Mondulus	(Gpa)	Electrode Nipple	7-11 7-14	7-14 7-14	7-14 7-14	7 - 14 7 - 14	7-14 7-14	7-14 7-14	7-14 7-14	7-14 7-14
Ash	%	Electrode Nipple	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
Bulk Density	(g/cm^3)	Electrode Nipple	1.53-1.65 1.75-1.80	1.53-1.65 1.75-1.80	1.60-1.69 1.75-1.80	1.60-1.69 1.75-1.80	1.65-1.73 1.75-1.80	1.65-1.73 1.75-1.80	1.68-1.75 1.75-1.80	1.70-1.77 1.75-1.80
C.T.E	(10^{-6} 1/°C)	Electrode Nipple	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5	1.0-1.5 1.0-1.5

Product	Item	Nominal Diameter (mm)								
		250	300	350	400	450	500	550	600	700
RP	**Rated Current**	4000-9000	6000-13000	8000-16000	10000-23000	13000-27000	16000-34000	19000-36000	23000-40000	---
HD	**Rated Current**	5000-10000	7000-15000	9000-18000	12000-24000	15000-31000	19000-34000	24000-40000	27000-50000	---
HP	**Rated Current**	6000-12000	8000-17000	11000-21000	15000-30000	18000-35000	22000-40000	27000-50000	32000-55000	---
SHP	**Rated Current**	7000-13000	10000-18000	14000-24000	18000-33000	23000-41000	28000-45000	34000-60000	42000-65000	---
UHP	**Rated Current**	8000-15000	12000-20000	16000-28000	21000-40000	27000-45000	34000-55000	41000-67000	49000-75000	66000-85000

Torque Specs

Diameter	Torque (ft-lbs)	Torque (NM)
4”	103	140
6”	115	156
8”	180	244
9”	300	407
10”	332	450
12”	480	651
14’’	650	881
16”	820	1112
18”	1180	1600
20”	1918	2600
22”	2655	3600
24”	3098	4200
26”	3688	5000
28”	4425	6000

Carbon Blocks for Blast Furnaces

Super Micro-pore Carbon Block

- Super Micro-pore Carbon Block is made from calcined anthracite under high temperature with other various additives by extruding, baking and processing.
- Typical properties: high thermal conductivity, high micro-pore porosity and good permeability which may reduce erosion to the body of the blast furnace, and avoid the iron liquid erosion and permeability.
- Super Micro-pore Carbon Block can meet the requirements for the larger scale blast furnaces.

Micro-pore Carbon Block

- Micro-pore Carbon Block is made from calcined anthracite under high temperature and other additives by extruding, baking and processing.
- Typical properties: better micro porosity, permeability and anti-erosion against iron liquid.
- Micro-pore Carbon Block can be used in blast furnace hearths.

High Thermal Conductivity Carbon Block

- High Thermal Conductivity Carbon Block is made from high thermal conductivity materials and partial graphite materials. Pitch acts as binder. Main processes are extruding, baking, and processing. The product has high thermal conductivity.
- High Thermal Conductivity Carbon Block is used for the bottom of blast furnaces.

Size (mm)	**Length** (mm)	
200 x 200 x L		
400 x 400 x L 400 x 500 x L		
400 x 600 x L 450 x 500 x L 500 x 500 x L 500 x 600 x L	**Available**: 0-3,500 **The best length:** 800-2000	**Tolerance** (industry standard or customer requirement)
515 x 450 x L		
500 x 660 x L 500 x 600 x L 550 x 600 x L 600 x 600 x L		

Carbon Blocks

Item		Unit	Partial Graphite	Graphite Block	Ultra Thermal Conductivity	High Thermal Conductivity	Micro-pore	Super Micro-pore
Fixed Carbon	≥	%	---	98	99.5	---	---	---
Ash	≤	%	10	0.5	0.2	7	20	23
Bulk Density	≥	g/cm^3	1.55	1.52	1.65	1.60	1.62	1.68
Open Porosity	≤	%	20	25	20	18	18	17
Real Density	≥	g/cm^3	1.90	1.92	2.10	---	1.90	1.90
Compressive Strength	≥	Mpa	30	20	30	30	36	38
Bending Strength	≥	Mpa	8.0	6	11	8	9	9
Iron Liquid Melting Index	≤	%	32	---	---	32	30	30
Average Pore Diam	≤	μm	1.25	---	---	---	0.5	0.1
Poor Capacity under 1 μm	≥	%	30	---	---	---	70	80
Oxidation	≤	%	20	---	---	20	28	8
Permeability	≤	mDa	50	---	---	70	9.0	1
Thermal Conductivity	Room temp.	W/m.k	6	80	100	20	7	---
	300 °C		9	60	80	---	10	16
	600 °C		12	---	---	25	14	20
Anti-alkaline			U or LC	U or LC	U	U or LC	U or LC	Anti-alkaline

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