

Heat Treating Solutions

Advanced graphite materials specifically engineered for heat treating applications

GrafTech offers a variety of graphite and insulation solutions specifically engineered for the heat treating industry.

The **GRAFSTAR™** graphite portfolio provides customers with an extensive range of key properties to meet a wide variety of application requirements.

The **GRAFSHIELD™** insulation portfolio provides customers with optimal solutions to achieve superior energy efficiency, long product life, cost effectiveness, and temperature uniformity.



GRAFSTAR™ Graphite

Grade	Features	Benefits	Typical Application
CS	Very high strength Excellent oxidation resistance Low ash content	Long life Precise machining tolerances Enables complex geometries	Heating elements
XTJ10	Superior strength Excellent oxidation resistance Very low ash content Super fine grain	Long life Highly precise machining tolerances Enables complex geometries	Nozzles
PGW PGX	High strength Excellent oxidation resistance Low ash content	Long life Precise machining tolerances Enables complex geometries	Hearth fixtures

GRAFSHIELD™ Insulation

Grade	Features	Benefits	Typical Application
GRI™ Insulation GFT-1400 Carbon Felt GFT-2200 Graphite Felt	Low thermal conductivity Material uniformity Low ash content	Long life Energy efficiency Temperature uniformity	Brazing Sintering Annealing
GRI™G & GRI™GG Insulation	GRI™ Features + High in-plane conductivity + Extremely low gas permeability	Enhanced lifetime Enhanced energy efficiency Superior temperature uniformity	Brazing Sintering Annealing
GRAFBOARD® Insulation	GRI™ Features + Very high in-plane conductivity + Low gas permeability + Excellent abrasion/impact resistance	Enhanced lifetime in harsh environments Enhanced energy efficiency Superior temperature uniformity	Brazing Sintering Annealing Hardening
GRI™C & GRI™CC Insulation	GRI™ Features + High in-plane conductivity + Superior abrasion/impact resistance	Superior lifetime in harsh environments Energy efficiency Enhanced temperature uniformity	Brazing Sintering Annealing Hardening

GRAFSTAR™ Graphite: Typical Properties* and Grade Comparison

Property	Unit	PGW	PGX	CS	XTJ10
Bulk Density	g/cc	1.63	1.73	1.74	1.76
Flexural Strength	MPa	14	11	21	55
Specific Resistance	$\mu\Omega\text{m}$	8.6	10	7.1	11.5
C.T.E. (to 100°C)	$10^{-6}/^{\circ}\text{C}$	3.0	2.2	2.5	3.2
Thermal Conductivity	W/mK	-	125	160	105
Gas Permeability	Darcy	-	0.04	0.05	0.005
Ash Content	%	0.12	0.07	0.09	0.01

* Properties listed are typical and cannot be used as accept/reject specifications

GRAFSHIELD™ Insulation: Typical Properties* and Grade Comparison

Property	Unit	GRI™	GRI™G	GRAFBOARD®	GRI™C
Bulk Density	g/cc	0.18	0.18	0.18	0.18
Thermal Conductivity (Through-plane)	W/mK	0.18	0.18	0.18	0.18
Thermal Conductivity (In-plane) (Surface)	W/mK	0.39	140	140	30
Flexural Strength (Surface)	MPa	1.1	1.1	9.8	110
Gas Permeability	10^{-6} Darcy	-	5	5	-
Ash Content	%	0.15	0.15	0.15	0.15

* Properties listed are typical and cannot be used as accept/reject specifications

Global Technical Support

Our global team of Applications Engineers is knowledgeable about graphite and applications spanning multiple industries. These include metallurgical casting, electronics, chemical, nuclear, defense/aerospace, solar, LED, semiconductor, and other high temperature processes.

Regardless of your product design phase (concept, prototyping, or mass production), we offer technical answers to some of your most challenging problems with a fast response time.



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Redefining limits

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