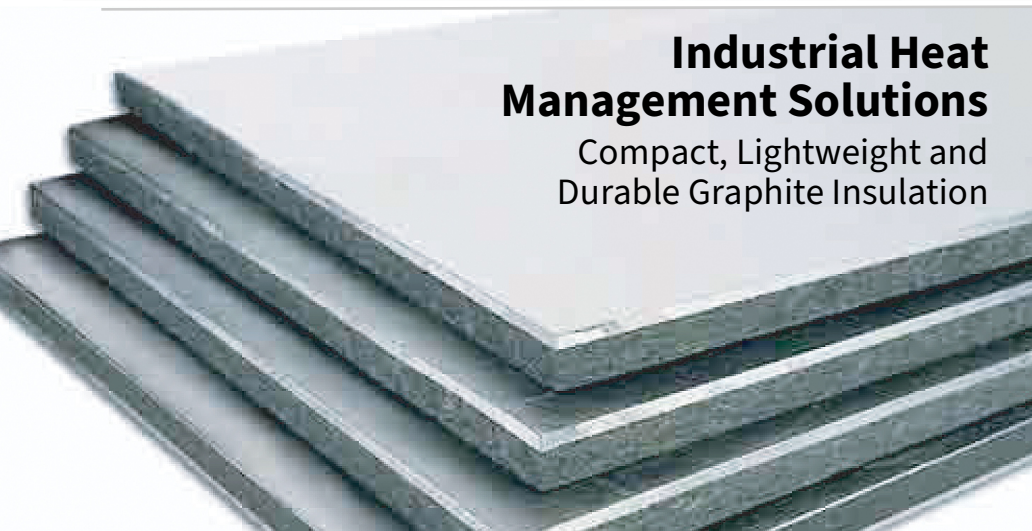
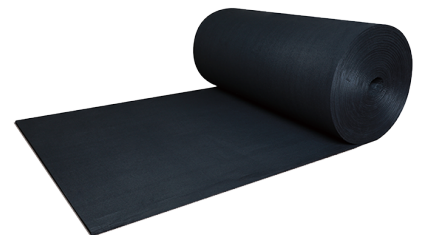
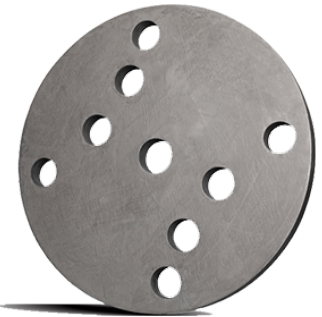
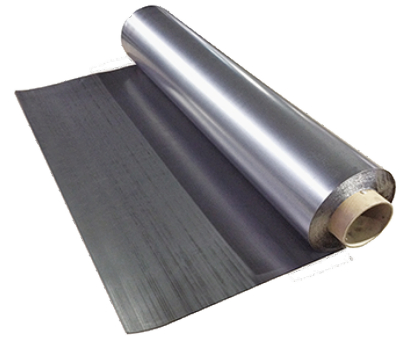




Heat Treating Insulation Solutions

Quality, Service, and Consistency



Industrial Heat Management Solutions

Compact, Lightweight and Durable Graphite Insulation





Heat Treating Insulation Solutions

Quality, Service, and Consistency

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

Grade	Features	Benefits	Typical Application
GRI Insulation	Low thermal conductivity Material uniformity Low ash content	Long life Energy efficiency Temperature uniformity	Brazing Sintering Annealing
GRI-C & GRI-CC Insulation	High in-plane conductivity Superior abrasion/impact resistance	Superior lifetime in harsh environments Energy efficiency Enhanced temperature uniformity	Brazing Sintering Annealing Hardening
GRI-G & GRI-GG Insulation	High in-plane conductivity Extremely low gas permeability	Enhanced lifetime Enhanced energy efficiency Superior temperature uniformity	Brazing Sintering Annealing

Grade type descriptions:

GRI Insulation

- A uniform, slurry-formed rigid insulation board made of rayon-based carbon fiber
- Available with an anti-dust coating for sensitive applications
- A superior insulation providing energy-efficient processing capabilities

GES Thermshield

- Proprietary insulation featuring superior strength and rigidity
- Applications requiring good thermal performance and stable structure

GES GRI/Thermshield Insulation

- GRI insulation faced with Thermshield material
- Provides benefits of a superior gas barrier, wear resistance and structural stability

GRI-C and GRI-CC Insulation

- GRI insulation faced with carbon fiber composite on one or both sides
- Provides added impact and wear resistance to insulation performance

GRI-G and GRI-GG Insulation

- GRI insulation faced with flexible graphite foil on one or both sides
- Minimizes the radiative heat losses while providing a superior gas barrier

GRI-Overview Rev.0

NOTE: The above data should be regarded as general information, not guaranteed specification limits.

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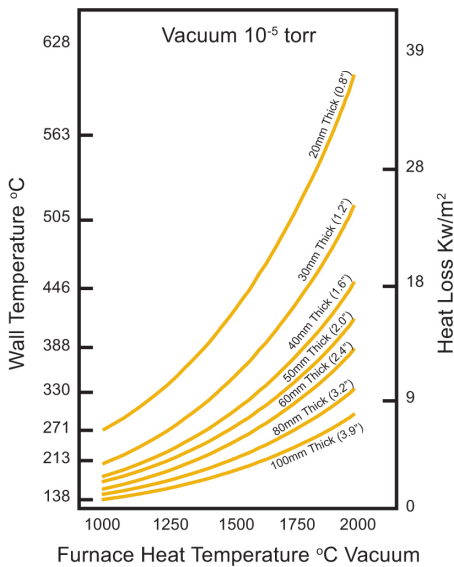
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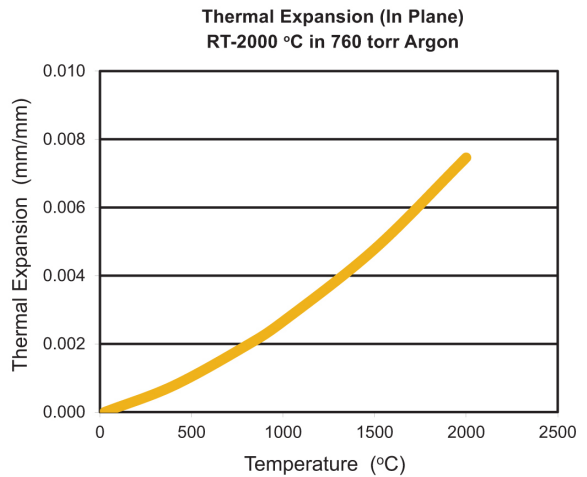
EXCELLENT INSULATION PROPERTIES = COST EFFECTIVENESS

Heat loss of various thicknesses of GRI insulation.



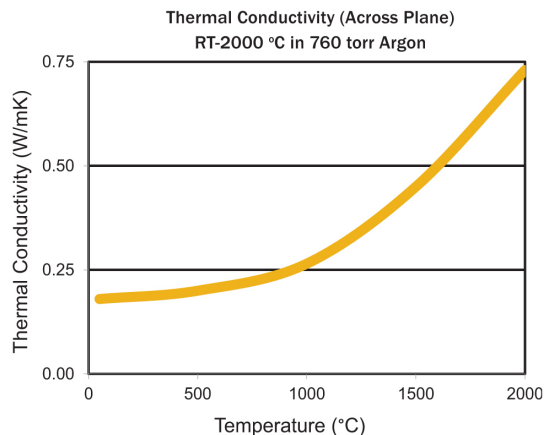
LOW CTE = INCREASED PRODUCT LIFE

A very low CTE ensures the GRI insulation will not suffer from fatigue as it cycles through the high and low temperature points of the process cycle. This increases insulation life and decreases downtime and replacement costs.



LOW THERMAL CONDUCTIVITY = ENERGY SAVINGS

GRI insulation's low thermal conductivity ensures low heat losses and better insulation.



LOW IMPURITIES = CLEAN PROCESSING

GES offers both standard purity materials (GRI Insulation) and ultra high purity materials (GRI-W Insulation).

Element	GRI-W (ppm)
Ash	~ 5.0
Aluminum	< 0.05
Calcium	< 0.05
Copper	< 0.05
Iron	0.4
Nickel	< 0.05
Silicon	0.06
Titanium	< 0.05





Heat Treating Insulation Solutions

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GRI Typical Properties

Properties	Unit	GRI	
Bulk Density	g/cc	0.18 +/- 0.03	
Thermal Conductivity	In Atmosphere	Vac	N ₂
Thermal Conductivity @500° C	W/mK	0.18	0.38
Thermal Conductivity @800° C	W/mK	0.30	0.51
Thermal Conductivity @1000° C	W/mK	0.40	0.59
Thermal Conductivity @1200° C	W/mK	0.38	0.70
Thermal Conductivity @1600° C	W/mK	0.59	1.02
Thermal Conductivity @2000° C	W/mK	1.00	1.51
Flexural Strength	MPa	1.03	
Compressive Strength	MPa	1.10	
Ash Content	ppm	<200	

Technical Support

Our 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.

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