

PCEA Graphite

Technical Data Sheet 6018

Product Overview

Graphite-moderated gas-cooled nuclear power reactors are designed to operate at high temperatures to facilitate the combined generation of electricity and process heat. The result is a highly efficient and low emission source of electricity that is inherently safe, inexpensive and reliable. The high operating temperatures associated with these reactor designs present a new set of material performance challenges.

GrafTech International has been meeting and exceeding the expectations of the nuclear reactor design community ever since it supplied graphite for the Chicago Pile nuclear reactor in 1942. In response to this latest challenge, GrafTech scientists have formulated GRAFSTAR™ PCEA nuclear graphite for applications like permanent and replaceable Reflector Blocks and Fuel Elements.

GRAFSTAR™ PCEA, a purified graphite grade, provides the combination of strength, thermal conductivity, creep resistance and oxidation resistance needed in this application.



Graphite Prism

Typical Applications

- suitable for a wide range of nuclear applications

Typical Properties at Room Temperature*

Characteristic	Unit	WG	AG
Bulk Density	g/cm ³	1.84	
Specific Resistance	μΩm	7.3	7.8
Young's Modulus	GPa	11.3	9.9
Poisson's Ratio	-	0.23	0.16
CTE (30 - 100°C)	10 ⁻⁶ /K	3.5	3.7
Thermal Conductivity 25°C	W/mK	162	159
Flexural Strength (4-point)	MPa	32	23
Tensile Strength	MPa	22	17
Tensile Strain to Failure	%	0.4	0.3
Compressive Strength	MPa	61	68
Compressive Strain to Failure	%	2.6	3.8
Gas Permeability	Darcy	0.003	0.005
Apparent Porosity	%	8.1	
Rockwell Hardness	H Scale	57	
Shore Hardness	-	50	

Notes:

*Properties listed are typical and cannot be used as accept/reject specifications. Please contact GrafTech for high temperature and additional properties.

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