NEOGRAF™ SOLUTIONS

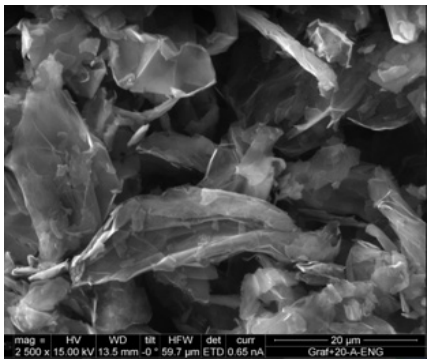
Graf+®

Graf+® Graphite Powders

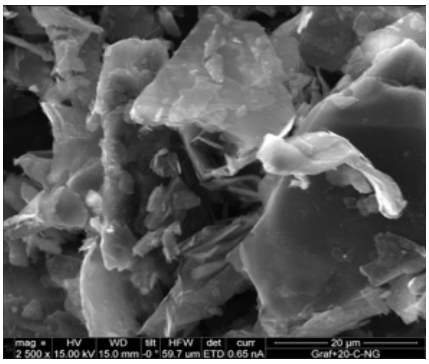
TECHNICAL DATA SHEET 456

Product Overview

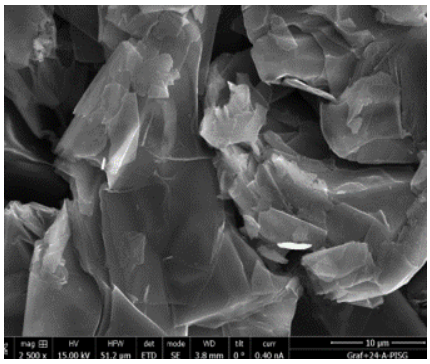
NeoGraf Solutions, LLC manufactures a variety of natural and synthetic graphite powders and nanoplatelets under our Graf+® trade name. Graphite can be added to a range of polymers to enhance thermal and electrical conductivity, reduce degradation to UV radiation, and increase insulation value in foams and boards. Graphite is also an excellent lubricant. Our Graf+ powders are available in a range of particle sizes and purities depending on the end use application. High purity (>99.9% carbon) grades are used in battery applications. Our graphite powders are available as dry powders, compounded with polymers (masterbatches), as pastes with mineral oil and petrolatum or as water-based dispersions/ solid lubricant.



Expanded Natural Graphite



Flake Natural Graphite



Polyimide Derived Synthetic Graphite

Grade Designations

Graf+ Particle Size D50 - Purity - Graphite Type

- Particle Size D50 varies from ~ 5µm to mm
- Purity available at 99.9+% Carbon (A), 98+% (B), 95+% (C), and < 95% (D)
- Graphite Type – Expanded Natural Graphite (ENG), Flake Natural Graphite (NG) or Coke-based Synthetic Graphite (CSG), Coke/Pitch-based Synthetic Graphite (CPSG), or Polyimide-based Synthetic Graphite (PISG)

Example:

Graf+ 20-C-ENG denotes D50 20 µm, Purity > 95+% Carbon, Expanded Natural Graphite Material

Expanded Natural Graphite Grades (ENG)

Expanded natural graphite (ENG) powders are made by intercalating natural graphite flake with acids and then heating to drive off the intercalants to create an expanded or exfoliated graphite. The exfoliated graphite is subsequently milled. The main features of expanded graphite materials are their high surface area and low Scott density resulting in a low percolation threshold and high compressibility. Purity levels vary depending on the starting flake purity from ~ 95% carbon to 99.9+% carbon, with lower purity adequate for industrial applications and higher purity required for battery applications. End use applications include extruded polystyrene (XPS) insulation boards, alkaline, lead acid and Li-ion batteries, fuel cells, specialty adhesives, conductive polymers and ceramics. Expanded graphite powders are also available in masterbatches containing between ~ 20-40 wt.% graphite solids and water dispersions containing between 13-18 wt.% graphite solids. Expanded graphite powders are also available un-milled.

Typical Properties*

PROPERTY	UNIT	EXPANDED NATURAL GRAPHITE FLAKES (ENG)					
		Graf+ 10-A-ENG	Graf+ 20-A-ENG	Graf+ 40-A-ENG	Graf+ 10-C-ENG	Graf+ 20-C-ENG	Graf+ 40-C-ENG
Ash	%	<0.1	<0.1	<0.1	<5%	<5%	<5%
Typical Particle Size							
D10	microns	5	7	15	5	7	15
D50	microns	10	20	40	10	20	40
D90	microns	27	47	100	27	47	100
Scott Density	g/ml	0.06	0.06	0.07	0.06	0.06	0.07
BET Surface Area	m^2/g	20	18	16	20	18	16
Moisture	%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Flake Natural Graphite Grades (NG)

Flake natural graphite powders are derived from naturally occurring flake deposits. The flake is milled between ~ 4-30 µm. The main features of flake natural graphite materials are lower surface area and higher Scott density. Purity levels vary depending on the starting flake purity from ~ 95% carbon to 99.9+% carbon, with lower purity adequate for industrial applications and higher purity required for battery applications. End use applications include expanded polystyrene (EPS) insulation boards, lubricants and greases, friction products, alkaline, lead acid and Li-ion batteries, fuel cells, specialty adhesives, conductive polymers and ceramics. Flake natural graphite powders are also available un-milled.

Typical Properties*

PROPERTY	UNIT	FLAKE NATURAL GRAPHITE GRADES (NG)						
		Graf+ 4-A-NG	Graf+ 8-C-NG	Graf+ 10-A-NG	Graf+ 25-A-NG	Graf+ 25-C-NG	Graf+ 100-C-NG	Graf+ 200-C-NG
Ash	%	<0.5	<5	<0.5	<0.5	<5	<5	<5
Typical Particle Size								
D10	microns	1.2	2	5	11	11	20	80
D50	microns	4	8	10	25	25	100	200
D90	microns	9	25	20	47	47	180	400
Scott Density	g/ml	0.09	0.15	0.08	0.11	0.11	0.11	0.35
BET Surface Area	m^2/g	16	13	7	4	4	3	1
Moisture	%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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

Polyimide-Based Synthetic Graphite Grades (PISG)

Polyimide-based synthetic graphite powders are derived from polyimide materials that are carbonized and graphitized. The graphitized polyimide is milled between ~ 5-40 µm. The main features of polyimide-based synthetic graphite powders are high oxidation resistance, high electrical and thermal conductivity and high purity (99.9% carbon). End use applications include ad-mixtures for battery applications and specialty applications.

Typical Properties*

PROPERTY	UNIT	POLYIMIDE-BASED SYNTHETIC GRAPHITE GRADES (PISG)
		Graf+ 20-A-PISG
Ash	%	>0.5
Typical Particle Size		
D10	microns	10
D50	microns	20
D90	microns	40
Scott Density	g/ml	0.09
BET Surface Area	m^2/g	6
Moisture	%	<0.2

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

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