



HYDROGRAPH

FRACTAL GRAPHENE™ IN PROTECTIVE COATINGS

IGNITING MATERIAL CHANGE



Material OVERVIEW

Fractal Graphene creates an impermeable barrier at the nanoscale, fundamentally changing how protective coatings defend against corrosion, UV degradation, and environmental attack. By forming tortuous pathways that block diffusion of corrosive species - oxygen, water, and chemical agents - our pristine graphene delivers barrier properties that extend asset life and dramatically reduce maintenance cycles. At loading rates as low as 0.1 wt%, Fractal Graphene transforms conventional coating systems into high-performance barriers that maintain mechanical integrity under the harshest environmental conditions. With corrosion causing 3-4% of global GDP losses annually, Fractal Graphene enables coating formulators to deliver the breakthrough protection that industry demands.

Loading Efficiency

From only 0.1 wt% Fractal Graphene creates defect-free barrier networks that prevent permeation of corrosive media while preserving coating flexibility, adhesion, and application properties. Conventional fillers require up to 10x higher loadings that compromise mechanical performance. Fractal Graphene's structure provides maximum barrier efficiency with minimal impact on coating characteristics.

Fractal Graphene Enhancement

Salt-spray Corrosion Resistance Testing (Water-based Acrylic Coating; >1200 hours Exposure)



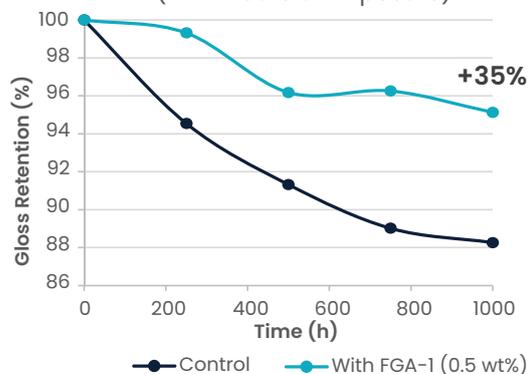
Conventional Coating



Still No Blistering

Coating Formulated with FGA-1

Gloss Retention of Polyurethane (PU) Coating (1000 hours UV Exposure)



Charts: Breakthrough barrier performance with FGA-1

Markets

- Pipelines & Storage Tanks
- Marine & Offshore Infrastructure
- Bridges & Civil Infrastructure
- Industrial Equipment & Machinery
- Chemical Processing & Power Generation

Manufacturing

- Spray Applications (airless, electrostatic, HVLP)
- Brush & Roller Application
- Dip Coating
- Powder Coating

Polymers

Applicable for Epoxy, Polyurethane, Acrylic, Alkyd, Polyester, and other coating resins used in demanding protective applications.

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HydroGraph Products

Fractal Graphene

Pristine turbostratic graphene of unsurpassed purity, identical batch-to-batch consistency and lowest environmental footprint.

- Pristine carbon structure (100% sp² hybridized)
- 99.8% carbon, 0.2% oxygen with no PAHs
- Thickness: 2-3 nm (average 6 graphene layers)
- Lateral dimensions: 20-50 nm
- Bulk mass density: 70-100 mg/cc
- BET specific surface area: 200 m²/g
- Composed of fractal aggregates of monomers (primary particles)
- Very dark, black, hydrophobic powder

Reactive Graphene

Functionalized turbostratic graphene featuring precise functional chemistry, identical batch-to-batch consistency and the lowest environmental footprint.

- Surface decorated with carboxylic acid (-COOH) functional groups
- 96.3% carbon, 2.1% oxygen, 1.6% hydrogen, no PAHs
- Thickness: 2-3 nm (average 6 graphene layers)
- Lateral dimensions: 10-50 nm
- BET specific surface area: 165 m²/g
- Composed of fractal aggregates of monomers (primary particles)
- Dark, black, hydrophilic powder

HydroGraph Advantage

Superior Quality

Highest purity graphene material in the market, exceptional particle size uniformity, identical batch-to-batch consistency, for unbeatable quality and reliability.

Ultra-low Addition Rates

Achieves exceptional performance at concentrations 10-100x lower than conventional graphene nanoplatelets, fundamentally transforming the economics for graphene technology.

Sustainable Advantage

Improves resource efficiency, reduces GHG emissions, inherently lowest energy footprint and carbon footprint graphene available.

The Fractal Future

The fractal structure—unique to HydroGraph's graphene—provides performance advantages that cannot be replicated by conventional graphenes. As industries increasingly seek sustainability by doing more with less, Fractal Graphene™ stands ready to transform the way products are formulated and manufactured.

Contact HydroGraph today to learn how Fractal Graphene™ can enhance your products and processes.



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