

# NeoGraf Solutions Graphite: The Fire Safety and Energy Efficiency Material of Choice for Roofing and Insulation Systems

## Overview

Roofing and insulation systems are turning to graphite for improved fire safety, energy efficiency, and sustainability. Replacing halogenated flame retardants and heavy mineral boards, graphite and expandable graphite enhance thermal performance and provide fire resistance by forming a protective barrier from heat and flame. It helps materials meet modern fire codes while supporting lightweight, non-toxic construction solutions.

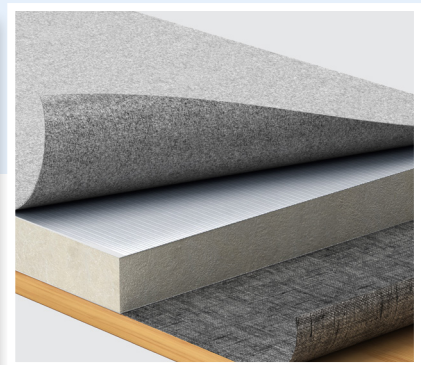
The following innovative applications for NeoGraf graphite products showcase how expandable graphite and graphite-infused materials improve fire resistance, thermal performance, and durability across a variety of modern construction products - from insulation foams and roofing membranes to multi-layer barrier systems.



*Fire resistant coatings for wood and other substrates*



*Roofing underlayment provides lightweight fire protection*



*Expandable graphite in layers of roofing structure for maximum fire protection*

## Markets

### Composite Insulation Panels (SIPs or Roofing Sandwich Panels)

#### • Applications

- Rigid foam boards used in walls, roofs, and under-slab insulation
- Structural insulated panels (SIPs), modular buildings, and prefabricated roofs

#### • Product Example: Grey EPS (expanded polystyrene) with graphite, often marketed as grey board or graphite-enhanced EPS. The graphite particles are embedded in the foam and act like tiny mirrors, reflecting radiant heat.

#### • Material Benefits

- Up to 20% better thermal performance than white EPS
- Higher energy efficiency without thickening the panel
- Lightweight and moisture-resistant

#### • NeoGraf Products

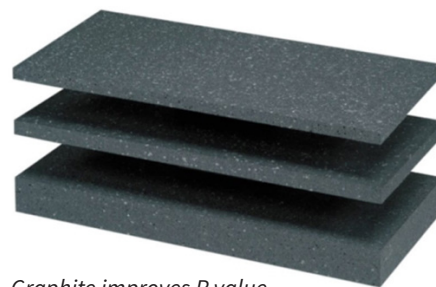
- Graf+® graphite powders
- Graf-M™ graphite masterbatches
- Graf-X™ graphene additives

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## Markets (continued)

### Roofing Membranes and Coatings

- **Applications**
  - Flat roof waterproofing systems
  - Bitumen and rubber-based roofing membranes
  - Coated glass slip sheets
  - Elastomeric coatings
- **How It Works:** Graphite powder is added to membranes to:
  - Enhance UV resistance
  - Improve thermal conductivity or heat dispersion
  - Expandable graphite flakes are added to intumescent roof coatings which expand and protect the surface in a fire
- **Material Benefits**
  - Prevents blistering and degradation under solar load
  - Meets ASTM D6164 & UL Class A fire resistant requirements
  - Enables a high slope rating on shingled roofs by preventing the migration of a flame
  - Can extend service life of roofing materials
- **NeoGraf Products**
  - GrafGuard® expandable graphite flakes
  - Graf-M™ graphite masterbatches



*Graphite improves R value, fire retardancy, and UV protection of foams*

### Fire Barriers in Multi-Layer Roof Assemblies

- **Applications**
  - Layered roof systems in commercial or industrial buildings, especially over steel decking
- **How It Works:** A thin expandable graphite barrier layer such as an intumescent underlayment is added between insulation and structural layers
  - Upon high heat exposure, it expands up to 300x, forming a thermal and gas barrier
  - Common in UL fire-rated assemblies
- **Material Benefits**
  - Provides thermal runaway containment
  - Stops flame and smoke penetration
  - Lightweight alternative to mineral-based fireboards
- **NeoGraf Products**
  - GrafGuard® expandable graphite flakes
  - Graf-M™ graphite masterbatches

## Summary

NeoGraf has created a portfolio of graphite additives, some with fire retardant properties and some with electrical/thermal characteristics for use in roofing materials and coatings.

- **Thermal Performance:** Reflects and/or spreads heat and improves insulation efficiency
- **Fire Safety:** Provides active protection in fire situations via intumescence (expandable graphite)
- **Environmental & Compliance:** Non-halogenated alternative for meeting strict fire codes (UL, ASTM E84, EN 13501-1)
- **Lightweight and Scalable:** Can be engineered into foams, layers, or coatings without heavy materials

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