Commercial Fireproofing

Superior Fire Protection for Commercial Applications
Solving our customers’ problems is how we got started and after 70 years, it’s still our focus at Carboline.

Since 1947, we have been dedicated to delivering innovative coatings, linings and fireproofing products. We are driven to provide the best solutions, service and quality to our customers.

Our customers can be confident that behind every sale is a team of some of the most well-respected members of the industry, dedicated and determined to make your project a success.

Our global network of industrial service centers and distribution points are strategically located around the world to provide the highest level of service and support for your project.

Carboline is a global leader in providing high performance protective coatings and fireproofing products. Our comprehensive passive fire protection line of Sprayed Fire Resistive Materials (SFRMs) and Intumescent Fire Resistive Materials (IFRMs) offer dependable and proven aesthetically pleasing solutions for commercial applications. Our global reach allows us to consistently provide the highest quality products and services to our customers anywhere in the world.

Certifications/Listing
Our highly regarded passive fire protection products have been fully tested and qualified to meet the most current fire protection and performance standards by world-class organizations such as:

Affiliations

www.carboline.com
**Extensive Testing & Certification**

Our Southwest Fireproofing™, Pyrocrete®, Firefilm®, Thermo-Sorb®, and Thermo-Lag® brands have been rigorously tested and certified to trusted industry standards. These products have been subjected to a myriad of destructive exposures to simulate real world performance. Extensive 3rd party certification ensures that our products meet the fire performance and environmental requirements of commercial and light industrial assets. Our products stand the test of time and deliver cellulosic fire protection when needed.

**Fire Testing & Certification**

Carboline’s Commercial fireproofing products have been certified to the following industry accepted fire test standards:
- ANSI/UL 263 Cellulosic Fire
- NFPA 251 Cellulosic Fire
- CAN/ULC S101 Cellulosic Fire

**Environmental Testing & Certification**

In addition to the fire test protocols, all Carboline commercial fireproofing products have been tested and certified to the UL Environmental Program to simulate real world exposures:
- Emissions / Greenhouse gasses (CO₂, SO₂, etc.)
- 100% humidity
- Wet, freeze, thaw cycling
- UV exposure
- Continuous salt spray environment

Products are fire tested after cyclic exposures to ensure they retain fire performance. Products are then classified for interior or exterior use.

**Leadership in Energy Efficient Design (LEED)**

As a global leader in fire protection technology, Carboline is committed to developing and supplying products that contribute toward the design and construction of environmentally sustainable infrastructure. Our commercial fireproofing products have been formulated to meet the new LEED v4 requirements as well as local, regional and national environmental regulations. Our products can contribute towards points under the LEED Green Building Rating System in the following categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>LEED Credits</th>
<th>Points</th>
<th>Carboline Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy &amp; Atmosphere</td>
<td>EA Credit: Optimize Energy Performance</td>
<td>1-18 Points</td>
<td>Pymolite® Series, Southwest Type 5™ Series, Southwest Type 7™ Series, Southwest Type DK 3™, Pyrocrete Series</td>
</tr>
<tr>
<td></td>
<td>MR Credit: Construction &amp; Demolition Waste Management</td>
<td>1-2 Points</td>
<td>Pymolite Series, Southwest Type 5 Series, Southwest Type 7 Series, Southwest Type DK 3, Pyrocrete Series, Pyrophyme 775, A/D Type TC-55, Firefilm Series, Thermo-Sorb Series, Thermo-Lag Series</td>
</tr>
<tr>
<td>Materials &amp; Resources</td>
<td>MR Credit: Building Product Disclosure &amp; Optimization - Sourcing of Raw Materials</td>
<td>1-2 Points</td>
<td>Pymolite Series, Southwest Type 5 Series, Southwest Type 7 Series, Southwest Type DK 3, Pyrocrete Series, Pyrophyme 775, A/D Type TC-55, Firefilm Series, Thermo-Sorb Series, Thermo-Lag Series</td>
</tr>
<tr>
<td></td>
<td>MR Credit: Building Product Disclosure &amp; Optimization - Material Ingredients</td>
<td>1-2 Points</td>
<td>Pymolite Series, Southwest Type 5 Series, Southwest Type 7 Series, Southwest Type DK 3, Pyrocrete Series, Pyrophyme 775, A/D Type TC-55, Firefilm Series, Thermo-Sorb Series, Thermo-Lag Series</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>EQ Credit: Low Emitting Materials</td>
<td>1-3 Points</td>
<td>Pyrophyme 775, A/D Type TC-55, Firefilm Series, Thermo-Sorb VOC, Thermo-Lag Series</td>
</tr>
</tbody>
</table>
Fire Protection Solutions For Any Specification

The Carboline Company is a world leader in fire protection and high performance coatings. We offer the most comprehensive fireproofing package of Sprayed Fire Resistive Materials (SFRMs) and Intumescent Fire Resistive Materials (IFRMs) available from any single source. Our versatile range of products allow us to provide trusted solutions to meet and exceed any project specification and performance criteria.

- **Elevator Shafts / Stairwells**
  - Thermo-Sorb Series
  - Firefilm Series
  - Thermo-Lag E100

- **Atriums / Glass Curtain Walls**
  - Thermo-Sorb Series
  - Firefilm Series
  - Thermo-Lag E100

- **Interior Concealed Structural Steel**
  - Thermo-Sorb Series
  - Firefilm Series
  - Thermo-Lag E100

- **Parking Garages**
  - Southwest Fireproofing
  - Thermo-Lag E100

- **Roof Deck / Roof Assembly**
  - Southwest Fireproofing

- **Floor / Deck Assembly**
  - Southwest Fireproofing
  - Thermo-Sorb Series
  - Firefilm Series
  - Thermo-Lag E100

- **Perimeter Structural Steel**
  - Southwest Fireproofing

- **Interior Exposed Structural Steel**
  - Southwest Fireproofing

- **Plenum Areas / Mechanical Rooms**
  - Southwest Fireproofing
  - Thermo-Sorb Series
  - Firefilm Series
  - Thermo-Lag E100

The WWII D-Day Museum was named by USA Today as the #1 Best Place to Learn U.S. Military History and designated by Congress as America’s official museum about World War II. This National WWII Museum features a rich collection of artifacts that brings history to life.

This project utilized two of our fireproofing products: Thermo-Sorb VOC and Southwest Type 5GP fireproofing. These were chosen because Thermo-Sorb VOC could be applied prior to the window installation, and Southwest Type 5GP was used because of Carboline’s stocking capabilities in the New Orleans area.

The Transbay Transit Center Project is a visionary transportation and housing project that transforms downtown San Francisco and the San Francisco Bay Area’s regional transportation system by creating a “Grand Central Station of the West” in the heart of a new transit-friendly neighborhood.

Thermo-Lag E100 was selected due the product’s exterior ratings, high end aesthetics and the ability to be applied offsite. Thermo-Lag E100 was applied to columns, beams, and beam assemblies supporting glass floors. Since there were no UL rated 3 hour assemblies with a glass floor in existence, we assisted the client to execute a successful fire test program at UL and achieved the necessary certification required for the project. This glass floor assembly utilizing Thermo-Lag E100 is now listed in the UL directory.
Low, Medium & High Density Cementitious Fireproofing

Carboline’s cementitious Sprayed Fire Resistive Materials (SFRMs) offer high performance, cost effective fire protection solutions for both concealed and exposed steel structures and assemblies. These durable, wet mix, gypsum and Portland cement based products have been formulated to meet any density specification, performance criteria and IBC building code requirements, providing specifiers the ultimate flexibility in design and construction.

Southwest Type 5GP™
15 pcf (240 kg/m³) commercial density fireproofing with excellent application characteristics. Provides fire protection for interior columns, beams, joists and floor/roof assemblies.

Southwest Type 5MD™
15-22 pcf (240-352 kg/m³) medium density fireproofing with high physical performance and durability. Formulated to meet current IBC high rise bond strength requirements.

Southwest Type 5AR™
15 pcf (240 kg/m³) extended set fireproofing. Developed as a holding material that can be left in equipment and lines up to 4 days without setting, reducing clean up labor and waste.

Southwest Type 7GP™
22 pcf (352 kg/m³) medium density fireproofing with high physical performance for exposed areas where more durable fireproofing is required, such as elevator shafts, mechanical rooms and parking garages.

Southwest Type 7HD™
40 pcf (640 kg/m³) high density fireproofing formulated for high damage resistance in areas with prolonged exposure to physical abuse, moisture and high humidity.

Pyrocrete® 40
40 pcf (640 kg/m³) high density fireproofing for exterior or interior environments where superior physical performance is required.

Pyrocrete 239
28 pcf (448 kg/m³) medium density fireproofing used for a variety of applications where high durability is required. Can be used as a 15 minute thermal barrier over urethane and polystyrene foam insulation and for noise reduction (NRC: 0.75).

Pyrocrete 241
55 pcf (881 kg/m³) high density fireproofing for exterior or interior environments where the highest level of physical performance and durability are paramount.

Product Comparison

<table>
<thead>
<tr>
<th>Product</th>
<th>Southwest Type 5GP</th>
<th>Southwest Type 5MD</th>
<th>Southwest Type 7GP</th>
<th>Southwest Type 7HD</th>
<th>Pyrocrete 239</th>
<th>Pyrocrete 40</th>
<th>Pyrocrete 241</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (ASTM E605)</td>
<td>15 pcf (240 kg/m³)</td>
<td>15-22 pcf (240-352 kg/m³)</td>
<td>22 pcf (352 kg/m³)</td>
<td>40 pcf (640 kg/m³)</td>
<td>28 pcf (448 kg/m³)</td>
<td>60 pcf (1,440 kg/m³)</td>
<td>55 pcf (881 kg/m³)</td>
</tr>
<tr>
<td>Type</td>
<td>Gypsum</td>
<td>Gypsum</td>
<td>Cement</td>
<td>Cement</td>
<td>Cement</td>
<td>Cement</td>
<td>Cement</td>
</tr>
<tr>
<td>Environment</td>
<td>Interior</td>
<td>Interior</td>
<td>Interior</td>
<td>Interior</td>
<td>Exterior / Interior</td>
<td>Exterior / Interior</td>
<td>Exterior / Interior</td>
</tr>
<tr>
<td>Compressive Strength (ASTM E761)</td>
<td>3,700 psf (177 kPa)</td>
<td>10,354 psf (496 kPa)</td>
<td>38,448 psf (1,840 kPa)</td>
<td>660 psi (4.4 MPa)</td>
<td>105 psi (723 kPa)</td>
<td>502 psi (3.4 MPa)</td>
<td>1,111 psi (7.6 MPa)</td>
</tr>
<tr>
<td>Meets High Rise Bond Strength Requirement of 150 psi</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Meets High Rise Bond Strength Requirement of 430 psi</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Meets High Rise Bond Strength Requirement of 1,000 psi</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Note: Southwest Type 5MD has a bond strength of >430 psf @ 15 pcf, >1,000 psf @ 18 pcf and >3,000 psf @ 22 pcf.

The FMC Tower is a 47-story Cira Centre skyscraper in Philadelphia, PA. It stands 730 feet tall and will include a combination of office space, retail and residential units vertically stacked all in one building. It is also home to the FMC Corporation, a specialty chemical company. The top floors will provide 268 luxury apartments and extended-stay suites with panoramic views of the Philadelphia skyline.

Carboline’s Southwest Type 5MD gypsum based, Spray-applied Fire Resistive Material (SFRM) was selected for it’s excellent application characteristics, high coverage, and high bond strength, which meets the IBC bond strength requirement of 1,000 psf throughout the building for structures over 420 feet in height.
Decorative, Intumescent Fire Resistive Coatings

Carboline’s Intumescent Fire Resistive Materials (IFRMs) offer superior fire protection for commercial and light industrial projects. Our Firefilm, Thermo-Sorb, and Thermo-Lag systems allow architects to create unique exposed steel designs with unsurpassed aesthetics, durability and performance where fire resistance ratings are required. Our versatile range of intumescent coatings provide high end architectural finishes and give project planners options to develop specifications to meet all building types, project requirements and conditions.

A/D Firefilm® III
Interior, water based thin film intumescent designed to provide the smoothest aesthetic finish in the industry.

Firefilm IV
Interior, water based thin film intumescent designed for high end aesthetics, fast recoat and reduced thickness.

Thermo-Sorb® VOC
Interior, low VOC, solvent based thin film intumescent developed to meet the VOC and LEED requirements. Provides smooth aesthetic finish. Can be applied in semi-exposed, high humidity environments and is less sensitive to inclement weather and lower temperatures.

Thermo-Lag® E100
Exterior/interior, epoxy based intumescent designed for high durability, fast application and permanent exposure to exterior environments and where the highest level of physical performance is required. Material can be applied both onsite and offsite for improved project scheduling.

Product Comparison

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>Environment</th>
<th>Finish</th>
<th>Shore D Hardness (ASTM D2240)</th>
<th>VOC (g/l)</th>
<th>Compressive Strength (ASTM E761)</th>
<th>Surface Burning (ASTM E84)</th>
<th>Suitable For Offsite Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/D Firefilm III</td>
<td>Water based</td>
<td>Interior</td>
<td>Ultra Smooth</td>
<td>70</td>
<td>20 (g/l)</td>
<td>757 psi (5.2 MPa)</td>
<td>Class A</td>
<td>Yes</td>
</tr>
<tr>
<td>Firefilm IV</td>
<td>Water based</td>
<td>Interior</td>
<td>Smooth to Slight Texture</td>
<td>60</td>
<td>4 (g/l)</td>
<td>367 psi (2.53 MPa)</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Thermo-Sorb VOC</td>
<td>Solvent Based</td>
<td>Interior</td>
<td>Smooth to Slight Texture</td>
<td>70</td>
<td>142 (g/l)</td>
<td>1,187 psi (8.1 MPa) pending</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Thermo-Sorb 263</td>
<td>Solvent Based</td>
<td>Interior</td>
<td>Smooth to Slight Texture</td>
<td>63</td>
<td>149 (g/l)</td>
<td>2,330 psi (16.0 MPa)</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Thermo-Lag E100</td>
<td>Epoxy Based</td>
<td>Exterior / Interior</td>
<td>Smooth to Slight Texture</td>
<td>60</td>
<td>13 (g/l)</td>
<td>pending</td>
<td>Class A</td>
<td></td>
</tr>
</tbody>
</table>

World Financial Center is a commercial building in downtown NYC (Manhattan) adjacent to the World Trade Center. This was a very unique application to a tree-like support structure comprised of circular pipe columns. Firefilm was selected for the project due to its excellent application properties, smooth aesthetic finish, and low thickness requirement. Firefilm is a decorative, fiber-free, thin film intumescent coating designed for the fire protection of steelwork for up to a three-hour fire rating, depending on the design.