# Fire Retardant Resins

## PERFORMANCE THAT TAKES THE HEAT

AOC®

**Your Formula for Success**

RESINS | GEL COATS | COLORANTS

AOC's Firepel® resins combine the performance benefits of composite resins with fire retardant and smoke suppression technologies.

Firepel resins meet flame, smoke and other performance requirements for specific end-use applications and fabrication methods including hand lay-up, spray-up, filament winding and pultrusion. Some products can also be used in closed mold processes such as Resin Transfer Molding (RTM) and Infusion. With superior strength, durability and flexibility, AOC fire-retardant resins outperform the competition.

# PRODUCTS

Firepel®
FIRE RETARDANT RESINS

| FIRE RETARDANT RESINS | | Halogen-Free | | |
|---|---|---|---|---|
| **Resin Chemistry** | **Product Series** | **Description** | **Test Certifications** | **Primary Markets Served** |
| **Polyester** | Firepel K140 | • Designed for mass transportation and building applications<br>• Achieves ASTM E 84 Class A flame and smoke requirements<br>• Meets globally recognized transportation standards<br>• Exceeds US Docket 90 requirements<br>• Achieves HL2 rating by European Standard 45545<br>• Lighter weight than products using ATH<br>• Improved handling and storage stability | ASTM E 84<br>ASTM E 162<br>ASTM E 662<br>Bombardier SMP 800-C<br>ISO 5660<br>ISO 5658<br>ISO 5659 | Transportation<br>Construction<br>Architectural |
| **Halogen-Free Requires Alumina Trihydrate (ATH)** | | | | |
| **Polyester** | Firepel K320 | • High reactivity for improved cycle times in Light RTM applications<br>• Pre-promoted versions available and customized for ease of use<br>• Achieves ASTM E 84 Class B rating<br>• Renewable bio-derived versions available | ASTM E 84<br>ASTM E 162<br>ASTM E 662<br>Bombardier SMP 800-C<br>UL 94 | Transportation<br>Architectural<br>Construction |
| **Methacrylate Modified** | Firepel K133 | • Achieves ASTM E 84 Class A rating<br>• Exceptionally low smoke development<br>• Thixotropic versions available for improved ATH suspension<br>• Pre-promoted versions available and customized for ease of use<br>• Economical<br>• RoHS compliant versions | ASTM E 84<br>ASTM E 162<br>ASTM E 662<br>BSS 7239<br>UL 94<br>ASTM E 1354<br>ASTM D 635<br>BS 6853<br>BS 476 Part 6&7 | Transportation<br>Architectural<br>Construction |
| **Bisphenol-A Vinyl Ester** | Vipel K010 | • Designed for Light RTM applications<br>• Tough and versatile resin with excellent crack resistance<br>• Thixotropic versions available for improved ATH suspension<br>• Pre-promoted versions available and customized for ease of use | ASTM E 162<br>ASTM E 662<br>Bombardier SMP 800-C | Transportation<br>Architectural<br>Construction |

| ASTM E 84 Summary | |
|---|---|
| **Class I Flame Rating** | ≤ 25 Flame Spread |
| **Class II Flame Rating** | 26-75 Flame Spread |
| **Class I Smoke Rating** | ≤ 450 Smoke Development |
| **Class A** | Class I Flame and Class I Smoke |
| **Class B** | Class II Flame and Class I Smoke |

## FIRE RETARDANT TEST METHOD OVERVIEW

| Requirement | Test Method | Market Requirement | Test Characteristic | K140 | K320 | K133 | K010 |
|---|---|---|---|---|---|---|---|
| **International Building Code** | ASTM E 84 | Construction | Flame Spread and Smoke Development | ✓ | ✓ | ✓ | * |
| **British Standards** | BS 476 Part 6 and Part 7 | Construction | Fire Propagation and Flame Spread | * | * | ✓ | * |
| **British Standards** | BS 6853 Annex B and Annex D | Transportation | Smoke Development and Smoke Toxicity | * | * | ✓ | * |
| **Federal Transit Administration** | ASTM E 162 | Transportation | Flame Spread | ✓ | ✓ | ✓ | ✓ |
| **Federal Transit Administration** | ASTM E 662 | Transportation | Smoke Development | ✓ | ✓ | ✓ | ✓ |
| **Bombardier Specification** | SMP 800 | Transportation | Toxic Gas Production | ✓ | ✓ | | ✓ |
| **Boeing Specification** | BSS 7239 | Transportation | Toxic Gas Generation | * | * | ✓ | * |
| **European Consolidated Standard** | EN45545 (ISO 5658-2, ISO 5659-2, ISO 5660-1) | Transportation | Flame Spread, Smoke Development, Toxic Gas, Heat Release | ✓ | * | * | * |
| **Underwriters Laboratory** | UL 94 | Devices and Appliances | Flammability Rating | * | ✓ | ✓ | * |
| **Miscellaneous** | ASTM D 635 | Miscellaneous | Rate of Burning | * | * | ✓ | * |
| **Miscellaneous** | ASTM E 1354 ISO 5660-1 | Miscellaneous | Oxygen Consumption Calorimeter | ✓ | * | ✓ | * |

*Not tested. Many products are able to meet other requirements in addition to the formal testing listed above. AOC chemists can customize a formula to meet specific needs and test requirements not listed. Please contact your AOC sales or technical service representative for more information about your project's unique needs.

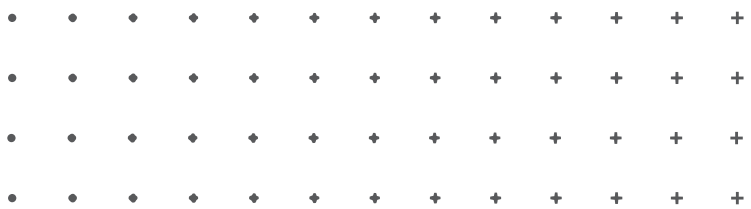
**Testing:** The degree of fire resistance of a cured resin is characterized by many different tests depending on the requirements for the end use application. These tests are performed under strictly controlled conditions by third party accredited testing facilities. How the results are reported vary depending on the test performed. Results from this testing can be assigned a rating based on a predefined scale and/or on a pass/fail criteria.

The fire retardant performance of a composite cured under controlled conditions can vary significantly in an actual fire situation due to the large number of unpredictable variables associated with actual fire situations. The fire performance of a particular resin as determined by the conditions of a fire test is indicative of a fully-cured composite and is dependent on part thickness and glass content. AOC has additional information regarding post-cure and laminate construction that can be useful for assisting our customers in fabricating a composite part to meet the intended fire test requirements.

## FIRE RETARDANT / CORROSION RESINS

### Contains Halogens

| Resin Chemistry | Product Series | Description | Primary Markets Served |
|---|---|---|---|
| **Brominated Bisphenol-A Vinyl Ester** | Vipel K022 | • Can meet ASTM E 84 Class 1 flame spread requirements<br>• Versions containing Antimony Trioxide (ATO) are available for improved flame spread results<br>• Excellent corrosion resistance<br>• Thixotropic versions available for improved sag resistance<br>• Pre-promoted versions available and customized for ease of use<br>• RoHS compliant versions | Construction Chemical |
| **Specialty Brominated Bisphenol-A Vinyl Ester** | Vipel K026 | • Can meet ASTM E 84 Class 1 flame spread requirements<br>• Thixotropic versions available for improved sag resistance<br>• Excellent corrosion resistance<br>• Higher heat distortion temperature than standard Brominated Bisphenol-A Vinyl Esters | Construction Chemical |
| **Brominated Novolac Vinyl Ester** | Vipel K095 | • Can achieve ASTM E 84 Class 1 flame and smoke requirements<br>• Excellent corrosion resistance<br>• Designed for elevated temperature service | Construction Chemical |
| **Brominated Isophthalic** | Vipel K733 | • Can meet ASTM E 84 Class 1 flame spread with and without ATO<br>• Thixotropic versions available for improved sag resistance<br>• Pre-promoted versions available and customized for ease of use<br>• Suitable for some mild chemical resistant applications | Construction Chemical |
| **Brominated Polyester** | Firepel K130 | • Most versatile fire retardant resin<br>• Can meet ASTM E 84 Class 1 flame requirements<br>• ATH filled versions available to achieve ASTM E 84 Class A rating<br>• Pre-promoted versions available and customized for ease of use<br>• RoHS compliant versions | Construction |
| **Chlorendic Polyester** | Vipel K190 | • Preferred resin for hot-wet chlorine and oxidizing chemicals<br>• Can meet ASTM Class B requirements<br>• Excellent corrosion resistance | Chemical |



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