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ASIA PACIFIC

Polynt Composites Australia Pty Ltd.

Polynt Composites Korea Co., Ltd.

Polynt Composites Malaysia Sdn. Bhd. (936604-P)
Polynt Composites

Polynt Composites is known for its superior quality and impressive range of products, including Polyester and Vinyl Ester Resins, Compounds, Gel Coats, Low Profile/Low Shrink Additives, Tooling Systems, Bonding Pastes, Catalysts, and Cleaning Agents.

Polynt Composites products are produced on all continents, and with our excellent distribution network we can provide first-class service to our customers whatever their market. Polynt Composites Customer Service and Technical Service teams are renowned for their customer focus, offering the best service even after our products have left manufacturing. We strive to keep our customers satisfied, assisting them in producing premium quality products every time they use our products.

Product innovation is important to our business and the reason we constantly work with customers to find solutions to problems. Introducing new or improved products ensures that we continue not only to deliver what the market wants and needs, but also when it is wanted and needed.
What are Resins?

Polynt Composites is one of the leading Asia-Pacific companies in the production and sale of Unsaturated Polyester (UP) and Vinyl ester (VE) resins. Due to the continuous innovation of composite materials, filled and reinforced, more specific and better performing products are required. UP and VE thermosetting resins are available in a wide range of grades (neutral, pre-accelerated, thixotropic, low-styrene content LSC, low-styrene emission LSE, etc.) suitable to meet all the needs of the composite industry and its high diversification.

Polynt Composites products find application in major industrial sectors such as:

- **Transportation** (automotive, marine, railway, sandwich panels for refrigerated lorries, etc.)
- **Construction** (marbles agglomerates, flat and corrugated sheets, pipes, putties, mastics, CIPP (Cured-in-Place Pipe), electrical equipment, etc.)
- **Industry** (tanks, abrasives, profiles and gratings, etc.)
- **Sanitary** (bathtubs, shower trays, solid surface, etc.)
- **Swimming pools**

UP and VE resins have been optimized to be processed using various application technologies such as hand lay-up, spray-up, casting, pultrusion, filament winding, SMC/BMC, infusion, injection, RTM, etc.

The broad polymer chemistry knowledge of our R&D and Technical Service departments enables us to develop tailor-made products to meet the specific needs of each individual user.

Whatever your composite needs, we have the resin system and expertise to meet your application requirements.
Unsaturated Polyester Resins

Unsaturated polyester resins are thermosetting produced by the reaction of polyesterification between dicarboxylic acids (saturated and unsaturated) and glycols.

The final mixture is obtained by dissolving the resulting resin (a solid polymer at room temperature) in an unsaturated and reactive solvent, styrene and/or in an alternative monomer for Low-styrene/Styrene-free resins.

The crosslinking reaction is obtained by the addition of organic peroxide which acts as an initiator, leading to the formation of a complex three-dimensional network generating a solid irreversible state.

Polynt produces several anhydrides (phthalic and maleic anhydride) and dicarboxylic acids (fumaric acid) used for the synthesis of polyester resins: these raw materials along with the strong formulation know-how gained over the years allowed Polynt Composites to develop products with the following chemistry and products lines.

Polynt Composites’ portfolio includes a wide range of Unsaturated Polyester resins developed for general and more specific application sectors (see the chart).

Example of UP Resin's application
### UP Resins Family

<table>
<thead>
<tr>
<th>Resins Types</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STYPOL®</strong> Isophthalic</td>
<td>Bathwell</td>
</tr>
<tr>
<td><strong>OPTIMOLD®</strong> Tooling system</td>
<td>Industry</td>
</tr>
<tr>
<td><strong>FIREBLOCK™</strong> Intumescent (Highly Resistant to Fire)</td>
<td>Transportation, construction</td>
</tr>
<tr>
<td><strong>ENCORE® PRIME</strong> Styrene-free</td>
<td>Transportation, CIPP</td>
</tr>
<tr>
<td><strong>NORSODYNE®</strong> Orthophthalic, Isophthalic, Maleic</td>
<td>Industry, construction, marine, swimming pools</td>
</tr>
<tr>
<td><strong>ENYDYNE®</strong> DCPD (low-styrene content)</td>
<td>Industry, marine, construction</td>
</tr>
</tbody>
</table>

For further information please contact us

Product line also includes resins synthesized using special anhydrides: these anhydrides are able to provide technical and application characteristics unique in the world of UP resins, such as the excellent surface curing and high resistance to UV rays.

Resins are available in a wide range of versions (neutral, pre-accelerated, thixotropic, low-styrene content LSC, low-styrene emission LSE, etc.) to meet all composites industry’s needs in case of reinforced or unreinforced applications.
ASIA-PACIFIC Specialty Products Portfolio

**STYRENE-FREE**

ENCORE® PRIME is the styrene-free products range. These resins offer the following benefits:
- low-odor
- limitation of styrene exposure during part processing
- unchanged mechanical properties compared to standard UP and VE resins.

ENCORE® PRIME is an optimized product line in terms of odor and VOC (Volatile Organic Compounds).

**FLAME RETARDANT**

Fire protection is a challenging application where composite materials play an important role.

Polynt Composites can provide a full range of products halogenated, filled with ATH (Alumina trihydrate) and the intumescent system FIREBLOCK™.

Intumescent materials work by forming a char layer at the interface of the fire source and the composite laminate, thus cutting off the oxygen accelerant from the organic fuel source.

FIREBLOCK™ can offer the following benefits:
- Halogen-Free
- Lowering the toxicity and the opacity of the fumes
- Lower density compared to standard fire retardant products
• Eco-efficient: up to 13% reduction in CO2 emissions compared to conventional system in railway application
• Easy to use in all composites processes (mainly Hand Lay-up, RTM and pultrusion)
• Compliant with EN 45545-2 at highest level (HL3) for Railway Rolling Stock and reaches HL2 level on each side of the laminate.

TOOLING SYSTEM
The OPTIMOLD® solution offers the best solution for mould construction providing to user the following benefits:
• Easy to use - low viscosity for hand lay-up or spray-up applications
• One component - requires only the addition of standard MEKP (Methyl ethyl ketone peroxide) catalyst
• 24-hour turnaround - fast build-up of the mould thickness is an advantage
• Superior dimensional stability - high heat distortion temperature (HDT) allows better rigidity and tool life
• Improved stability - more stable filler suspension and gel time
• Reduced fiber print - low shrink system replicates the master mould surface more accurately
• Use with Polycor tooling gelcoat - high HDT and chemical resistance makes the gelcoat an ideal choice.
Vinyl Ester Resins

Vinyl ester resins are produced by the reaction of an epoxy resin with an unsaturated monocarboxylic acid. The polymer obtained is dissolved in a reactive monomer, such as styrene, generating a solution that can be applied and cured as conventional polyester resins. Due to the chemical nature of the family of Vinyl ester resin EPOVIA® VE, they are able to provide superior performance thanks to their:

• High mechanical properties and high toughness
• High chemical and hydrolysis resistance
• High heat resistance at elevated operating temperatures
• Excellent adhesion to reinforcing fibers.

The range of Vinyl ester resins is designed to meet the high requirements of various application areas and is based on EPOVIA® and EPOVIA® OPTIMUM products line, as described in the chart.

This VE resins product line finds its main use in a variety of industrial applications such as absorption towers, process vessels, storage tanks, pipes, hoods, scrubbers and ducts.

Polynt Composites’ VE resins are also widely used by marine, swimming pools and automotive sectors.
<table>
<thead>
<tr>
<th><strong>UP Resins Family</strong></th>
<th><strong>Resins Types</strong></th>
<th><strong>Applications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bisphenol A Epoxy Vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 1001MV, EPOVIA® RF 1001MV</td>
<td>Heat, corrosion &amp; chemical resistance</td>
</tr>
<tr>
<td>Tooling gel coat base Bisphenol A Epoxy Vinyl ester resin</td>
<td>EPOVIA® RF 6000</td>
<td>High thermal and styrene resistance</td>
</tr>
<tr>
<td>Elastomer modified vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 3200</td>
<td>High elongation</td>
</tr>
<tr>
<td>Novolac Epoxy Vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 1051, EPOVIA® RF 1051</td>
<td>Heat, corrosion &amp; chemical resistance</td>
</tr>
<tr>
<td>Bisphenol A Vinyl ester resin urethane hybrid</td>
<td>EPOVIA® OPTIMUM RF 5000</td>
<td>High performance, Transportation (SMC/BMC)</td>
</tr>
<tr>
<td>Pultrusion grade Bisphenol A Vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 3100</td>
<td>High mechanical properties, optical fiber core</td>
</tr>
<tr>
<td>Infusion grade Bisphenol A Vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 1031, ARMORSTAR VXSH200</td>
<td>Hydrolysis resistance, Marine</td>
</tr>
<tr>
<td>Brominated Vinyl ester resin</td>
<td>EPOVIA® OPTIMUM KRF 2000SE, EPOVIA® RF 2000 SEM</td>
<td>Heat, corrosion &amp; chemical resistance</td>
</tr>
<tr>
<td>Bisphenol A Vinyl ester/ DCPD blend</td>
<td>ARMORSTAR VXSH2200</td>
<td>Hydrolysis resistance, Marine</td>
</tr>
</tbody>
</table>

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This brochure is intended to provide a comprehensive list of the Unsaturated Polyester Resin products and services available from Polynt Group.

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