Polynt Composites

Resins
Corrosion
EMEA

POLYNT COMPOSITES
The perfect partner for your corrosion challenge

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EMEA

Polynt Composites France S.A.

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After the merger on May 2017 the new Polynt-Reichhold Group is a global Company in the Intermediates, Coating and Composite Resins, Thermoset Compounds, Gel-coats and niche Specialties.

This combination enhances the Group's leading position as a global vertically integrated specialty chemicals player, with significant global presence in Europe, North America and Asia, a strategy initiated by Polynt with the successful integration of PCCR and CCP in the last years and now further reinforced by Reichhold's global scale, extensive product portfolio and R&D competencies.

Polynt-Reichhold Group is known for its superior quality and impressive range of products and with its excellent distribution network it can provide first-class service to customers whatever their market.

Customer Service and Technical Service teams are renowned for their customer focus, offering the best service even after products have left manufacturing.

The Group strives to keep customers satisfied, assisting them in producing premium quality products every time they use its products.

Product innovation is important for the Group's business and it's the reason for which it constantly works with customers to find solutions to problems.

Introducing new or improved products ensures that Polynt-Reichhold Group continue not only to deliver what the market wants and needs, but also when it is wanted and needed.

Composite in Anticorrosion Application

Fiber Reinforced Plastics (FRP) based on corrosion resistant resins have been proven to be a very cost-effective and durable solution for a vast variety of acidic, alkaline, oxidizing and solvent environments. In addition to excellent corrosion resistance and cost-effectiveness, FRP offers many other advantages over competing materials including lightweight, suitability over a wide temperature range both sub-zero and high temperature, low thermal conductivity and good electrical properties.
Composite material systems also exhibit high design freedom relating to shape, size, weight and manufacturing process to provide technical solutions for proven long-term performance.
Easy maintenance is another benefit of FRP in the corrosion sector.

Best Technology and Application Know How

Polynt can rely on a wide corrosion resistant competencies based on its own DISTITRON range recently enriched by CCP EPOVIA range and Reichhold DION brands. The combination of these technologies allows us to offer a broad product range collected now under the brand DION®. Hence, we can globally offer you a wide range of corrosion resistant resins together with the competence for tailor-made solutions.

DION® resins were originally developed for the extremely demanding chlorine-alkali industry environments and their success has led to diverse and highly regarded applications. The chemical resistance and performance of DION® resins have been demonstrated over the past 50+ years through the successful use of a variety of composite products in a large spectrum of different chemical environments. These include for instance chemical industry, mining or flue gas cleaning, where process conditions can cause extremely corrosive environments for traditional construction materials such as metals, steel or concrete.
Our competence in corrosion enables us to choose the best resin chemistry to support your demand and clarify its suitable conditions for use and possible limiting factors.

Corrosion Processes - Multiple Challenges

Industry indicates generally as corrosion what it is in reality a wide range of different possible processes and environments which may singularly or even together affect the composite performances.
It is essential for designers to make the correct material selection based on the required service life while developing structural parts exposed to industrial environments. In order to prevent that, as in metal, composites corrosion effects might occur, FRP can be and have been designed to cope with a vast variety of chemical environments where metals cannot be used or would be less cost-effective.
Selected examples of corrosion processes are given below.

Uniform corrosion

Some chemical environments can chemically attack the resin. Examples are chlorine, chlorine dioxide, highly concentrated nitric acid or sulfuric acid. The attack normally is limited to the surface and within the recommended temperature and concentration range reasonable/good service life can be obtained.

Diffusion and swelling

Small molecules may diffuse into FRP including water, solvents or certain acids such as hydrochloric acid. Solvent like chemicals may also cause polymer swelling.

Surface cracking

When exposed to temperature and chemical/moisture fluctuations surface cracks or crazing may occur. Examples are flue gas stacks or reactor type of equipment.

Stress-corrosion cracking

Stress corrosion cracking refers to a corrosion process of the glass fibre when simultaneously exposed to acid (e.g. by diffusion) and stress, and can result in dramatic failure if acid-sensitive glass has been used.

Blistering

Blisters may form in the laminate in aqueous and also acid environments through diffusion and osmotic processes.

Abrasion/erosion

Slurries or process streams containing particles may, in combination with uniform corrosion, cause abrasion or erosion leading to a reduction of the wall thickness of the laminate.

By choosing the appropriate resin chemistry and laminate build-up, the target mechanical performance can be achieved and the above outlined corrosion effects can be successfully prevented or forecasted and mitigated throughout the part service life. It is know that the best laminate performance requires that it is It is know that the best laminate performance requires that it is well manufactured and properly cured because both mechanical and chemical resistance properties are directly related to the degree of cure of the resin. Post-curing is in general recommended to enhance the performance of a composite product in corrosive environments. When post-curing at elevated temperature is required that the composite structure is gradually heated to avoid the sudden build-up of stresses. On the other hand, practical reasons may prevent large composite structures from post-curing before being brought into service. Since post-cure starts fast when the laminate is exposed to elevated temperature, a post-cure in service can be considered in some applications.

Corrosion Test Methods

EN 13121, or similar standards, describe the use of a corrosion barrier laminate of certain thickness, i.e. a laminate layer protecting the structural laminate from corrosion attack. In addition to the choice of resin, the type of glass, the type of surface veil, the curing system, the thickness of the corrosion barrier or e.g. fillers can be adapted for optimum performance. EN-13121 also describes how partial design factors, used to consider the effect of chemicals on the laminate in the design, can be obtained either from corrosion testing or on long-term experience.

Polynt Group performs corrosion tests according to ASTM C 581 or EN 13121. Fully cured laminates with specific laminate build-up are immersed in the corrosive medium and evaluated for mechanical and other properties as described in both standards. EN 13121 specifies acceptance criteria to let a resin or a laminate be considered either resistant or suitable for the specific intended use.

Influence of Manufacturing Processes on Laminate Performance

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How we can Help You

Polynt Group offers on a global base a wide range of corrosion resistant resins under the brand DION® and the competence for tailor-making these resins to satisfy specific needs.
Our resins are used in anticorrosion applications in many industrial segments including chemical industry, mining or flue gas cleaning, where process conditions can cause extremely corrosive environments for traditional construction materials such as metals, steel or concrete.
A deep knowledge of corrosion processes, polymer chemistries and application process is a must to choose the best solution for your corrosion challenge.
Our Research & Development and Technical Support Teams can help you to identify the best possible resin for your specific need and to advise the most appropriate laminate design for optimum service reliability and service life. You can contact us on corrosion@polynt.com.

Polynt Group Corrosion Technologies

Standard bisphenol A vinyl ester resin

Polynt Group's bisphenol epoxy based Vinyl Ester chemistry offers the most versatile resins in the product range. It provides excellent chemical resistance in a wide variety of acidic and alkaline environments together with high mechanical properties. Very good toughness and fast wetting properties enable these Vinyl Ester resins to be used to produce laminates with high impact and fatigue resistance.
DION® 9100 series is ideal for hand lay-up and filament winding processes and for applications requiring good resistance to corrosive environments and thermal cycling. Due to its very low water absorption and good water ageing properties, this resin series is also an optimum choice also to be used in a skin laminate in marine and swimming pool applications. **Dion 9100 Plus** is the most recent member of the family designed to combine corrosion resistance with good mechanical performance and application friendly viscosity and reactivity performance. The Dion 9102 series, having a lower viscosity, is recommended for infusion process.

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Special bisphenol A vinyl ester resins

Dion Impact 9133 is a higher crosslinked, Bisphenol A based epoxy Vinyl Ester resin with low VOC, low color and good reactivity. It offers higher temperature resistance and mechanical properties than the standard bisphenol A vinyl ester resin combined with good corrosion resistance properties. **DION® 9700** is a special Bisphenol epoxy based Vinyl Ester resin that features additional cross-linking sites on the polymer chain and in the monomer system. The high crosslink density yields a resin with a very high heat distortion temperature, excellent resistance to solvents and acidic environments, and very good retention of physical properties at elevated temperatures making it suitable for the construction of scrubbers and flue gas ducting.

Epoxy novolac vinyl ester resin

Dion 9400 series is a Novolac epoxy based Vinyl Ester resin that has been specially modified for improved fabrication properties. This high cross-linked density Vinyl Ester resin provides excellent retention of mechanical properties at elevated temperatures, and it is particularly useful in applications where resistance to solvents and chlorine is required. It also provides the combination of a high heat distortion temperature (HDT) and good tensile elongation. The **DION® 9400 series** is intended for hand lay-up and filament winding applications, and due to its high reactivity, this resin is widely used in pultrusion processes where the high temperature resistance and good electrical insulation properties are utilized.

Brominated vinyl ester resin

Dion 9300 series is a brominated fire retardant epoxy based Vinyl Ester resin reaching ASTM 84 Class II, BS 476; Part 7 Class 2 flame spread. Higher fire retardant characteristics can be achieved by adding 1.5-3% antimony trioxide (ASTM 84 Class I). Its chemical resistance is similar to that of the bisphenol A vinyl ester resin.

Elastomer modified vinyl ester resin

DION® 9500 series is a rubber-modified epoxy Vinyl Ester resin with high tensile elongation and good impact resistance. In addition, this resin offers many unique properties such as low shrinkage, low exothermal peak and especially good adhesion to glass, aramid and carbon fibers, PVC foam, steel and concrete.

These properties combined with excellent water resistance and good chemical resistance, make this Vinyl Ester resin well suited for structures exposed to dynamic loads and for use as a primer.

Urethane modified vinyl ester resin

DION® 9800 series are highly appreciated, special urethane modified vinyl esters with distinguishing user-friendly features. The vinyl ester does not foam when catalyzed with ordinary methyl ethyl ketone peroxide (MEKP) and displays excellent glass wet-out characteristics. It may also be made thixotropic with conventional (non-hydrophobic) grades of fumed silica. **DION® 9800 series** is well-suited for hand layup, filament-winding and pultrusion applications. The resin has superior acid, alkaline, bleach and other corrosion resistant properties.

VE Resins	VE resins references	Performance and Applications
Bisphenol A Epoxy Vinyl ester resin	Dion 9100, Dion 9100 Plus, Dion 9102	Heat, corrosion and chemical resistance
Higher HDT Bisphenol A Epoxy Vinyl ester resin	Dion Impact 9133, Dion 9700	Improved thermal resistance, corrosion and chemical resistance
Novolac Epoxy Vinyl ester resin	Dion 9400	High temperature performance, corrosion and chemical resistance
Urethane modified vinyl ester resin	Dion 9800	Heat, corrosion and chemical resistance
Brominated Vinyl ester resin	Dion 9300	FR resin, corrosion and chemical resistance, heat
Elastomer modified vinyl ester resin	Dion 9500	Flexibility, toughness, corrosion resistance

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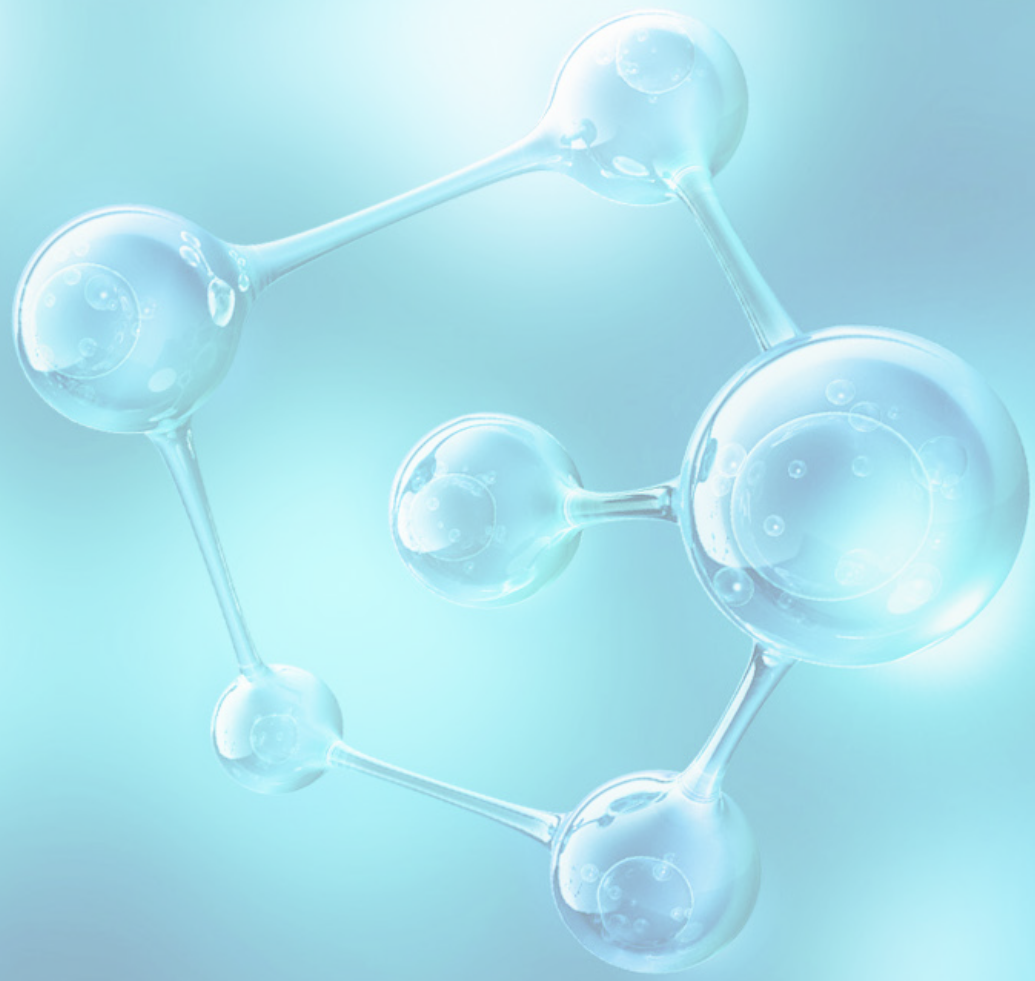

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