

# BondingPastes EMEA



The Gravicol<sup>®</sup> and Norpol<sup>®</sup> Bonding Paste ranges are based on our Unsaturated Polyester Resin and Urethane Acrylate Resin systems to give the best possible end use characteristics.

## Contents

1. Production Sites	2
2. Polynt Reichhold Group	3
3. Bonding Pastes	3
4. Main advantages and applications	4
5. Applications of Bonding GRP Laminates	5
6. Company Addresses	7

## **Production Sites**



EMEA

Polynt Composites France S.A. Reichhold AS Polynt SpA

## Polynt Reichhold Group

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.

## **Bonding Pastes**

Gravicol and Norpol Bonding Pastes are specifically formulated for bonding Fiberglass components, imbedding of inserts, core materials or panels into laminates and bonding wood to Fiberglass structures. They are also designed for assembly, cavity filling and as an aid to lamination. A comprehensive range is available with a spectrum of properties to suit various applications.

A good bond is characterized by adequate adhesion and physical properties to accept stresses placed upon the final composite component. The best indicator that bonding paste has achieved a strong bond is when failure is seen within the laminate and not within the bonding paste. When designing the bonding pastes there are several key areas we look at to suit the numerous application areas of the pastes:

- Gel/Cure times A range of Gel and cure times, designed with low exotherm peak, assuring no deformation of the parts being bonded.
- Low Shrinkage levels The low shrink properties of the pastes assure that the will be "no pull through" on the parts to be bonded. Full Bond strength will be retained as the paste does not pull away from where it is intended to be, this allows the bond to form a water/air tight seal.
- Applications methods The physical characteristics of the pastes vary across the range to suit the different
  application techniques, which are typically, by hand comb or spatula or by application equipment which
  can dispense catalyzed material in a bead of adjustable diameter or in a spray pattern to cover larger
  areas more quickly.
- Mechanical properties The different mechanical properties in the range allow you to choose a paste specific to your bond requirements. Within the range of pastes there are grades with and without glass fibre to suit the different types of application within the construction of composite parts.

The use of glass fibre or lightweight fillers help to provide useful properties of additional strength, low density and improved flexibility and fatigue resistance.

Some specialty formula enable more specific applications like model surfacing, repair of concrete and use in vacuum bagging processes.

### Main advantages and applications

In many composite applications individual components are combined or attached with other parts, while surfaces may need treatment and finishing. Dedicated material systems that are easy to use at a competitive overall cost can help you to manufacture composite parts with improved performance.

The Bonding Paste range can be divided into the following main areas.

#### **Multi-Purpose Bonding Pastes**

A wide group of bonding pastes primarily developed to obtain optimum adhesion to GRP laminates.

The products have a variation of strength properties, tensile elongation, temperature tolerances and curing characteristics. These can often be a complex process involving several parts and different material types being involved. In these structures the bond must have the correct strengths and properties to adhere well with all of the materials used and to cope with the stresses of the end use of the composite part.

A good Bond not only depends on your choice of paste but also the preparation of and the geometry of the joint.

The thickness of the joint and the level of stress of a joint will have to endure govern the choice of bonding paste used:



This photo shows the application of Bonding Paste

- For thick joints over 5mm glass filled paste is best as the glass fibre will add strength;
- For thinner joints less than 5mm a paste with glass fibre is not needed, just a flexible or semi flexible paste is required, depending on the stress within the joint;
- For joints that experience stress then a more flexible grade of paste is needed and for static joints a semi flexible paste is required.

To maximize performance, our recommendation to ensure the best possible adhesion is to prepare the contact surfaces with some light abrasion and then to solvent wipe them to ensure they are free of grease, oil and contaminants.

#### **Sandwich Adhesive**

Sandwich adhesive is used for bonding core materials to core materials and to GRP laminates that add strength and insulation to parts whilst retaining lower overall weight. These products are characterized by low specific weight, high tensile elongation and a low exotherm during cure to provide low shrinkage and ensure a low surface distortion impact. Most pastes tend to be without glass fibre and typically applied with a comb or notched spatula. There are a number of different core materials used in sandwich composites, i.e. metals, wood, thermoplastics and parts made from SMC/BMC that impact bonding performance so care should be taken in product selection and application.

#### Gap filling / laminating aids

Some pastes can be used as gap fillers and sealants for certain applications. Hard to laminate and intricate areas can have the paste applied into them before being laminated over or having inserts or core materials placed over them. Again pastes used for these purposes must have low exotherm and shrinkage properties to avoid distortions in the surface of the laminates and eliminating air bubbles in the laminate.

#### Surface Filler / Model work

Surface fillers have a high content of fillers, rapid curing characteristics and are easy to sand.

Polynt Group supplies Norpol surface fillers that are recommended for filling larger irregularities and grooves, leaving a coarse surface. Additional surface fillers are recommended when a smooth and pore-free surface is required. Norpol surface fillers are used in model work for filling grooves and irregular surfaces.

In many cases key requirement is the absence of sagging when applied in thick joints. Also, as tolerances can be small achieving smooth and accurate surfaces is important.



Norpol surface fillers provide quick-curing characteristics, easy sanding and low shrink properties: in this surface filler range, Polynt Composites has products recommended for the basic or first application layer, and for the top layer where a smooth surface is required. These products offer a nice and even surface with very few pores.

#### **Thixotropic Paste**

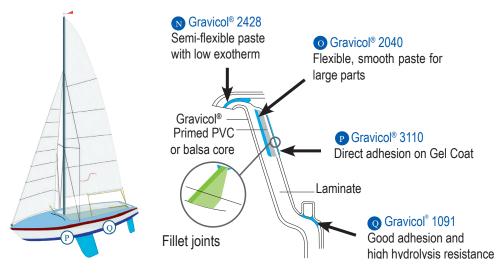
A highly viscous paste to be introduced to Polyester products to boost rheological behavior and assist in repair applications.

## **Applications of Bonding GRP Laminates**

#### Marine

In the construction of boats and vessels, decks and hulls have to be bonded together, as well as single components to the hull or deck. Polynt Composites offers a range of bonding pastes that allow for reliable bonding of GRP laminates in various Polymer chemistries and densities. Some of these have a white colour, and therefore are preferred for Marine applications. Vinyl ester based bonding pastes provide higher toughness and are currently being used for bonding stringers and the engine bed on to the hull. Using bonding pastes for the bonding of GRP laminates has proven to simplify manufacturing processes and hence save time. Meanwhile the workshop logistics are easier and gives operators better control.

In many applications the strength of the bond is at least as high as the strength of the laminate it is supposed to adhere to. Both and Gravicol and Norpol bonding paste series are formulated to obtain optimum bonding properties to GRP laminates.



If the laminates are "green" and do not contain wax, it is possible to directly bond the laminates together. Otherwise, it is recommended to abrade the surfaces in advance in order to obtain maximum adhesion. Bonding paste intended for bonding GRP laminates should have a tensile elongation of 1.5% minimum. The actual bonding property can be checked with a simple adhesion test. High tensile elongation is vital for a high quality bonding paste. This ensures a tough joint with high tolerance to dynamic loads. For manufacturers of lifeboats the slogan Safety First is the guiding principle in product development. Several free-fall lifeboat manufacturers use bonding pastes from the Norpol FI- Series mainly to bond the inner liner/ interior parts to the lifeboats. All vessels have to pass the strongest quality and strength tests before they are released to the market. Here, there is no room for compromise. Lifeboat free fall systems provide cutting-edge technology, particularly developed for the rough seas in the North Sea, including the world's largest lifeboat for vertical free-fall. Together with the lifeboats' other components, the Norpol FI- Series has passed numerous tests, and been proven over time to meet service requirements.

#### **Transportation**

The Gravicol and Norpol bonding paste series has proved very well-suited to the transportation sector. The products are used for bonding and filling styling parts on cars where the chassis or parts of the chassis have been made out of GRP laminates. Some of the bonding paste range have also been successfully used for attaching metal parts to GRP laminates.

Another application area is filling corners, voids and areas where there is a risk of air pockets forming when laminating. When it comes to surface treatment, Polynt Composites offers products ideal for smoothing the surface before a suitable primer and coating system is applied.

#### Industrial

There are numerous industrial process and application areas where the Norpol FI- Series and Norpol Colle- Series have proved most appropriate, such as in the production of



Adhesive joints with

Norpol® FI-186

containers, vessels and pipes. The products are very versatile and have proved suitable for filling grooves and corners.

For surface treatment of GRP laminates, such as leveling uneven surfaces, the Norpol surface filler recommended is one that builds well, is easy to apply, offers quick curing and is easy to abrade.

To obtain a smooth surface that needs less finishing treatment, selected Norpol surface fillers are recommended as a top layer.

For general applications such as joining pipes, securing sleeves, bonding laminates or bonding single GRP details, the Gravicol and Norpol bonding paste range offers a selection of products. Tests carried out with advanced testing equipment have proved that bonding pastes from the FI- Series have high strength. Tensile tests, in accordance with ASTM C287-80, reveal that it is the GRP laminates, and not the bond itself, that will start to crack. This proves the excellent strength and bond properties of these products.

#### **SPECIAL TYPES**

#### Wind Rotor blades

The rotor blades' light constructions are typically moulded in a vacuum infusion process as two individual shells and then bonded together. The blades, often more than 70 metres long, are subjected to extreme loads and tremendous dynamic stresses in service. Rotor blade bonding is an especially demanding area where bonding paste used for this application requires thorough testing.

Specific end product requirements as well as directions given by the classification authorities, has led to fo-

cused R&D resources and the use of advanced test-equipment which has made it possible to develop products that comply with the highest quality standards.

The Norpol FI-186 bonding paste recommended for use on rotor blades is approved by DNV GL.

Some of the tests performed for bonding paste testing include :

- Tensile testing from 50°C to + 60°C
- Fatigue testing
- Creep lap-shear
- Shear test from 40°C to + 50°C
- DCB testing of adhesion properties

#### **Packaging Sizes**

The Gravicol, Norpol FI- and Colle- Series is generally supplied in 20 kg or 225 kg packages. A limited range are also supplied in 9 kg package sizes. Some product types have minimum order sizes.

#### **Curing Systems**

For the major part of range standard MEKP can be utilized, however some specific BPO cured systems are available.

#### Application

The ideal application temperature range in the workshop is the same as the general recommendation for polyester, 18–23°C.

Lower temperatures give increased viscosity and longer gel time, and will require increased attention when the peroxide is mixed.

All the products are pre-accelerated and therefore easier to work with.

In general, most of the have high viscosity. This means thorough mixing of the peroxide is required in order to obtain even and correct curing characteristics. In most types a colour indicator has been added, this enables the user to see when the peroxide has been properly mixed.

The surfaces of the parts to be bonded should be free of dust and contaminants to ensure the best levels of adherence If necessary the surface of the parts should be abraded and solvent wiped.

### **COMPANY ADDRESSES**

### **EUROPE**

#### FRANCE

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