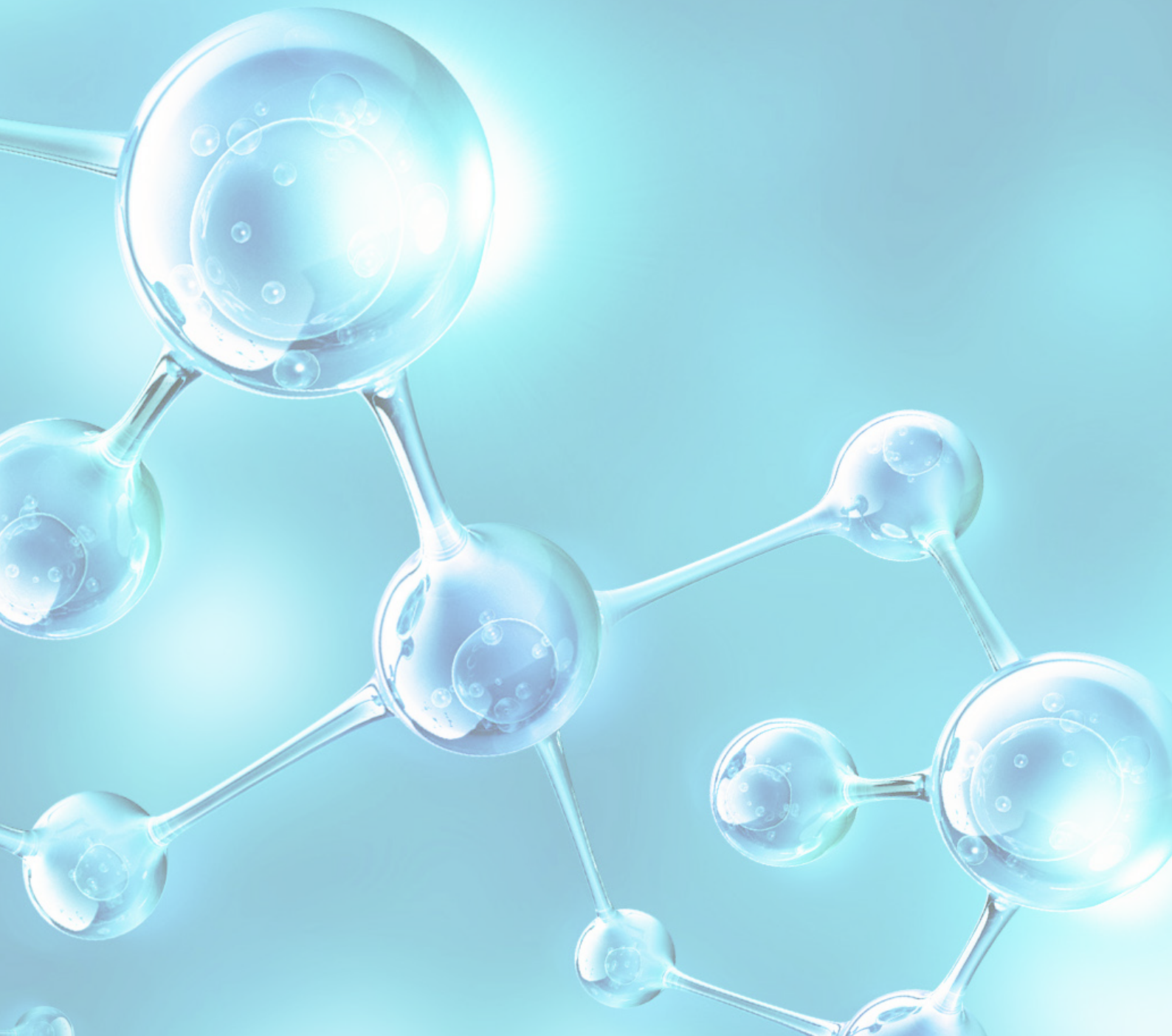
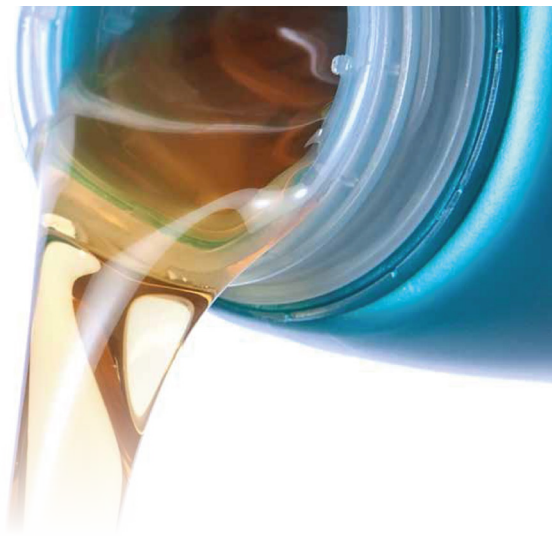
Polynt Group

Resins
Tooling System



POLYNT COMPOSITES

Turn your ideas into shape
Fast Creation of FRP Moulds
with Polynt Low Profile Tooling Systems



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Production Sites

Polynt Composites France S.A.

Polynt Composites Germany GmbH

Polynt S.p.A. (Italy)

Polynt Composites Norway AS

Polynt Composites Poland Sp. z o.o.

Polynt Composites Spain, S.L.U.

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Polynt Group

After the merger with Reichhold on May 2017 the new Polynt 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 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 Group continue not only to deliver what the market wants and needs, but also when it is wanted and needed.

Turn your ideas into shape

In FRP manufacturing processes it is vital to use quality moulds in order to make quality parts. You have created a unique shape and surface appearance (gloss, texture), so you want it to be perfectly reproduced during scale up and commercial manufacturing. Meanwhile your moulds must be robust in practical use, and should be low in maintenance.

Different tooling systems are available to stand up to the many stressors in the production moulding process. Consideration needs to be given to mould dimensions and anticipated exposure to wear, such as mechanical stress, chemical attack and elevated temperatures. Depending ultimately upon the desired shape and/or surface quality, these include steel, aluminum, as well as FRP solutions based on polyester, vinyl ester and epoxy resin systems.

Polyester FRP moulds have gained a wide acceptance in the composite industry, because of the versatility of the polyester material and the attractive overall economics.

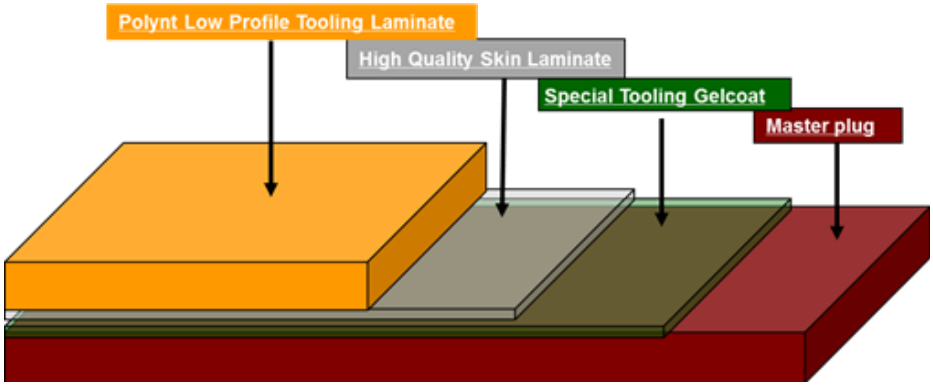



Benefits of Low Profile Tooling Systems:

Benefits	Features
Tools ready in days not weeks (tool production in only 20 % of the time vs. conventional FRP solutions). Significant reduction in labour costs.	Good Curing System. Better overall cure in early stage (allows to make more laminates in one go).
Suitable for Hand lay-up and Spray up. Special Infusion grades. Low viscosity. Improved mechanical properties.	Easy application. Large Moulds can be made in a closed process. Good reproducibility; low styrene emission. Excellent fiber wet out. Excellent heat resistance.
Elimination of surface defects and dimensional inaccuracies.	Close-to-zero shrinkage through fine-tuned low profile package. Exceptional surface quality.
Easy material handling during tool production.	Available as one-pack solution. Quick curing with standard MEKP peroxides. Visual Colour Change Built-in quality indication.

For further information please contact us

Polynt Low Profile Tooling Build-up



Special Tooling Gelcoat

Specially developed high gloss gelcoats with durable surface; excellent release properties; high resistance to heat and chemicals allows it to withstand repeated moulding cycles with good strength and abrasion resistance.
Available in different colours.
Possible application: Brush or Spray.

High Quality Skin Laminate

Selected laminating resins with an optimum cure in thin laminates and high mechanical properties to avoid any air entrapment between gelcoat and construction laminate.
Preferred application: Hand lay-up.

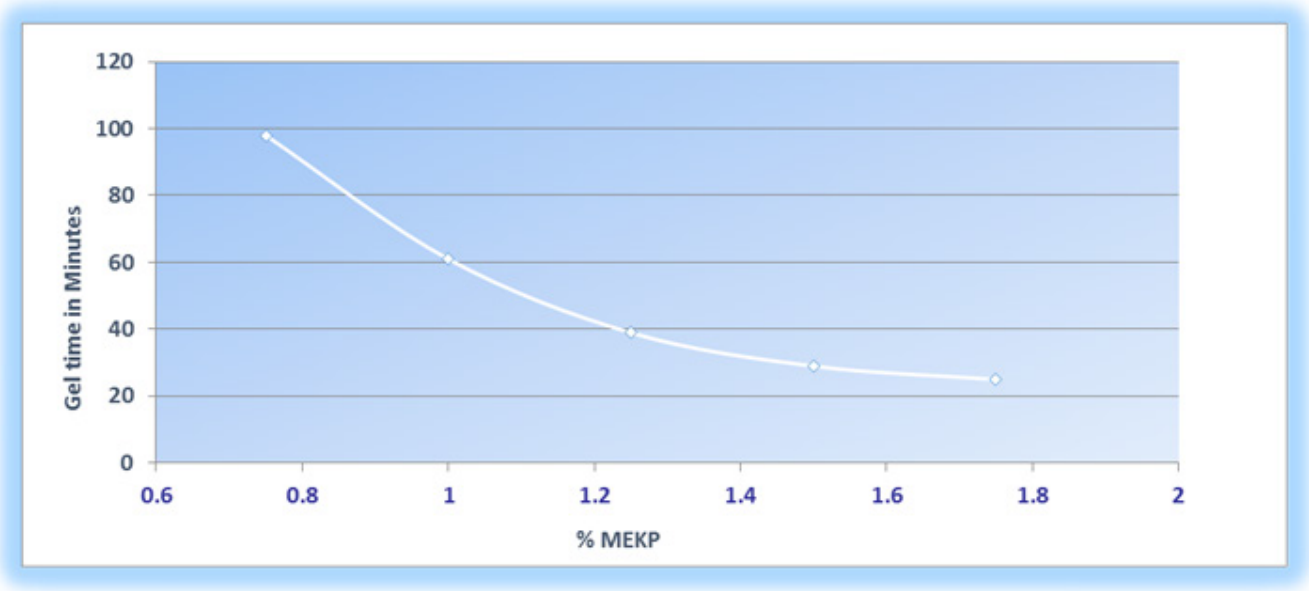
Polynt Low Profile Construction Laminate

Low profile resins systems with good wetting properties; high heat distortion temperatures and excellent dimensional accuracies.
Possible application: Hand lay-up/ Spay-up (Filled systems); Vacuum Foil Infusion (Non Filled).

Points of attention

- Master Plug. ensure that the plug is styrene and heat resistant. An optimum surface gives less repair/ surface finish on the Mould. Design shape which can be released. Use an approved mould release system.
- Tooling gelcoat. apply a minimum film thickness minimum 600 microns (cured). By brush: Apply in two layers to avoid air entrapment. By spray: Apply in 4 layers wet on wet, 150-200 microns each, with 4-8 min. interval between passes. Ambient room temperature and gelcoat temperature both between 18-25 °C. Air humidity should be 50-70%. Catalyst amount between 1.0-2.0%.
- Skin Laminate. apply 1 x 225 g/m² with 1 x 450 g/m² powder bonded glass mat or 2 x 300 g/m² to achieve the right curing. Skin laminate resins are specially designed for good wet out and fast cure in combination with high mechanical properties. Ensure that all the air is removed from the first layer and that the reinforcement conforms to all the sharp angles in the mould. Cure overnight.
- Construction laminate. Resins systems suitable for HLU/Spray-up are filled. Stir the resin well before use, as some filler settling and separation may occur during transport and storage. For application through spray-up processes, ensure equipment is used capable to handle high filler contents.

For optimum cure the thickness of the laminate should be at least 4 mm wet-on-wet (3 x 450 g/m2). When laminate thickness is below 4 mm the reactivity will be too low, and laminate can risk poor cure.



Geltime vs. Peroxide level

The gel time can be adjusted with standard MEKP peroxide. Lower peroxide levels (e.g. down to 0.75 %) will give an increase in gel time. Fluctuation of temperature will also influence the gel time.

- Demoulding. Time for de-moulding from the plug is typically 24 hours at room temperature. For improved tool curing and plug de-moulding, curing times of 2-3 days are recommended at 35-40°C (while the mould is still in the plug). Check Barcol Hardness before use, in order to confirm final cure.

Tooling Gelcoat Application Advices

NORPOL® GM, POLYCOR 9650/9750 VE and UNIGEL VE are vinyl ester modified tooling gelcoats formulated to give optimum solvent resistance to the surface of a GRP mould.

To obtain the best possible final result it is important that certain parameters are in place before or during gelcoat application.

Preparation

When the plug (pattern, model) is finished and wax has been applied it is time for tooling gelcoat application.

Before applying the tooling gelcoat, allow the release agent layer to cure sufficiently. For wax systems it's normally recommended to wait overnight.
For other types of release agent, or if in doubt, consult your release agent supplier.

Use of PVA release-agents on the plug is not recommended as this may produce an uneven or striped surface in the mould.

- The ambient temperature must be 20-23°C. Remember the floor temperature may be lower than in the middle of the room.
- The plug should be conditioned for some time at this temperature prior to gelcoat application.
- Ensure the plug is free from dust, and that the room as far as possible is dust-free.
    - Never use compressed air to remove dust from the plug ("What goes up, must come down") and can also be a source of moisture.
    - Tack-rags can be used, but ensure they do not leave a residue on the plug surface.
- Ensure that the Tooling Gelcoat is conditioned to 20-23°C.
    - Beware that recently collected material from a cold storage can take days until the gelcoat reaches the correct temperature.
    - Using a cold gelcoat will increase danger of poor curing and pinholes in the mould surface.
- When opening a pail of VE modified tooling gel coat, it will have a gel-like appearance and consistency. This is a result of the special thixotropic system used, and quite normal.
    - Stirring the gelcoat will bring it back to normal viscosities.
    - Power-stirrers can be used, but with care and at low speed so not to destroy thixotropy and introduce air.
- Air humidity should be 50-70%.
    - Always check the gel time first, particularly for older material, by e.g. mixing 100 g gelcoat with the specific type of 1.5% MEKP-50 appropriate for Vinyl esters modified gelcoats.
    - The gel time for this sample should be less than 25 min. If it exceeds this time, please contact your local TS representative.
- Make sure that containers which have been opened are properly closed.
- Ventilation: No air current should be directed towards the pattern during gelcoat application and early curing stage. Once the curing is well under way, necessary ventilation may be freely used.
- Add the correct amount, 1.3 - 1.8%, of the appropriate peroxide, and ensure thorough mixing.
- Do not use Peroxides, with high water content and high Hydrogen peroxide levels as they will contribute to porosity in the film.

Cumyl hydroperoxide for VE cannot be used as these are not compatible with the accelerator system in the VE modified tooling gelcoats.

If in doubt, always run a gel time / cure test prior to tooling gelcoat application.

Brush application

1. Use a soft, broad brush. The bristle length should be 5-7 cm.
2. The first coat should be applied to wet film thickness of 500-700 microns (0,5-0,7 mm), measured with a wet film gauge.
3. The second coat should be applied to wet film thickness 300-400 microns (0,3-0,4 mm), measured with a wet film gauge after first layer has fully cured.
   When using a brush, two coats of tooling gelcoat are normally required. Do not apply more than the above mentioned layers and thickness, in order to avoid problems like brittleness and cracks.
4. Application-technique
   Apply the gelcoat as evenly as possible. Best results are obtained with teams of two operators, where one applies the gelcoat while the other ensures an even spread and correct thickness (measured by film gauge).
   Be particularly aware of thin tooling gelcoat (i.e. start and stop marks from brush, and applications in corners and difficult application areas) in the first layer.
   Thin areas can give an under cure of the tooling gelcoat, resulting in poor chemical resistance in these areas and potential for wrinkling / alligatoring.
   Do not use the brushes for too long as material will start to gel during application. Change them for clean ones every 15 minutes.

Spray application

Due to the number of different available spray application equipments, it's not possible to give a direct recommendation for each equipment set-up.

VE modified tooling gelcoats are more sensitive to porosity compared to standard gelcoat types, and consequently spray application will require more attention to have a perfect end result.

Important parameters for the spray equipment identified from testing;

- Ideally Air atomised Pot guns are used to give best results rather than airless guns, as they can atomise gelcoat more efficiently and are easier to control during spraying.
- Some spray guns, normally designed for cup/pressure-cup spray, have a screw/valve allowing adjustment of material flow. This can be a big benefit for controlled tooling gelcoat application.
- Lower, gentler material flow is required, preferably 500-700 grams/minute.
- The spray pattern should be set up whilst making a test spray panel.
- Carefully adjust pump pressure and/or size spray nozzle.
- Air atomization on spray gun recommended, that can fine tune the fan pattern into a lighter film application pattern.
- Spray guns without air atomization option are much more sensitive to create porosity.

Spray equipment with external peroxide mix are not recommended as some catalyst is not incorporated into the fan and can coat mould surface, drip and cause reaction and porosity issues.
If equipment with external peroxide mix is used, it's even more important to do a test application prior to applying tooling gelcoat on the plug.

The tooling gel coat is sprayed and built up gradually in 4 layers wet on wet, each 150-200 microns, with 4-8 minutes intervals between passes to allow for effective air-release in each layer.

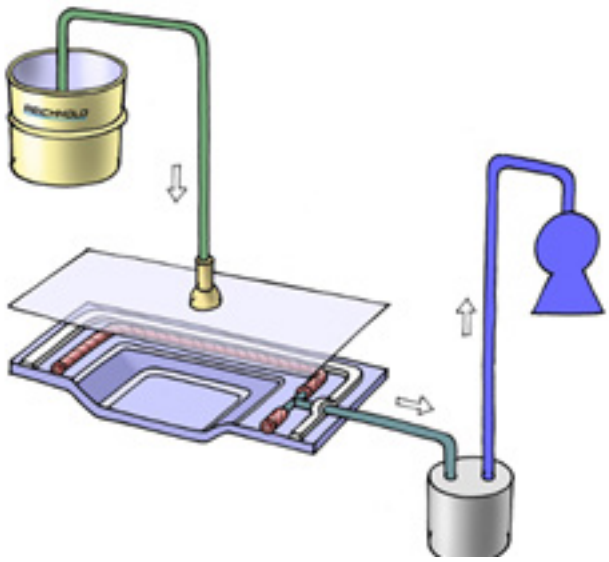
If there are any doubts regarding spray equipment set-up and/or application procedure, do a spray test prior to applying the tooling gelcoat on the plug.

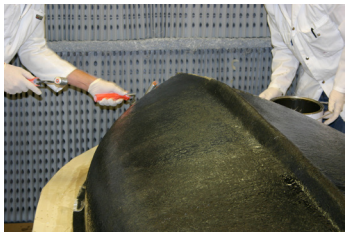
Low Profile Tooling by Vacuum Foil Infusion

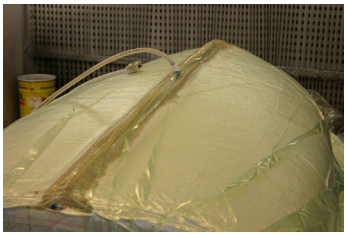
A continuous search for cleaner working conditions and higher demands on the end quality of the moulds is reached through a new way of producing moulds based on Vacuum Foil Infusion.

Benefits of Low Profile Infusion Tooling:

- Better controlled material usage
- Higher mechanical properties
- Weight reduction
- Less dependent on laminating skills
- Cleaner working conditions
- Low styrene emission







Advantages Vacuum Foil Infusion	Details
Low investments.	Only small modifications are required to existing open mould methods.
Improved laminate mechanical properties.	Higher density laminates with increased glass content versus hand lay-up / spray-up.
Good reproducibility: reduced dependence on workmanship.	As long as process parameters are reinforcement package design are kept constant.
Large products can be made in a closed process.	Highly effective for components with large surface area and complexity.
Very low styrene exposures and emissions.	Reduced ventilation cost possible.
Cleaner production.	More pleasant work environment.

For further information please contact us

COMPANY ADDRESSES

EUROPE

FRANCE

Polynt Composites France S.A.
Route D'Arras CS 50019
62320 Drocourt - France
Phone: +33 3 21 74 84 00
Fax: +33 3 21 49 55 84
email: contact.FRcomposites@polynt.com

GERMANY

Polynt Composites Germany GmbH
Kieselstraße 2
56357 Miehlen - Germany
Phone: +49 6772 93210
email: contact.DEcomposites@polynt.com

ITALY

Polynt S.p.A.
Via Caduti e Dispersi dell' Aeronautica, 18
24030 Brembate Sopra (BG) - Italy
Phone: +39 035 62 31 00
Fax: +39 035 33 35 00
email: contact@polynt.com

Polynt S.p.A.
Via Abate Bertone, 10
13881 Cavaglià (BI) - Italy
Phone: +39 0161 9966 11
Fax: +39 0161 9966 23
email: contact@polynt.com

Polynt S.p.A.
Via Baiona, 192
48123 Ravenna - Italy
Phone: +39 0544 457 011
Fax: +39 0544 451 812
email: contact@polynt.com

Polynt S.p.A.
Via del Pruneto, 40
52027 San Giovanni Valdarno (AR) - Italy
Phone: +39 055 91 281
Fax: +39 055 94 3936
email: contact@polynt.com

Polynt S.p.A.
Via Romagnoli, 23
43056 San Polo di Torrile (PR) - Italy
Phone: +39 0521 812811
Fax: +39 0521 813445
email: contact@polynt.com

Polynt S.p.A.
Via Enrico Fermi, 51
24020 Scanzorosciate (BG) - Italy
Phone: +39 035 652 111
Fax: +39 035 652 421
email: contact@polynt.com

NORWAY

Polynt Composites Norway AS
Lilleborggata 4,
1630 Gamle Fredrikstad - Norway
Phone: +47 69357000
Fax: +47 69357001
email: contact.NO@polynt.com

POLAND

Polynt Composites Poland Sp. z o.o.
ul. Grabska 11d
32-005 Niepołomice - Poland
Phone: +48 12 281 42 00
Fax: +48 12 281 42 01
email: contact.PLcomposites@polynt.com

SPAIN

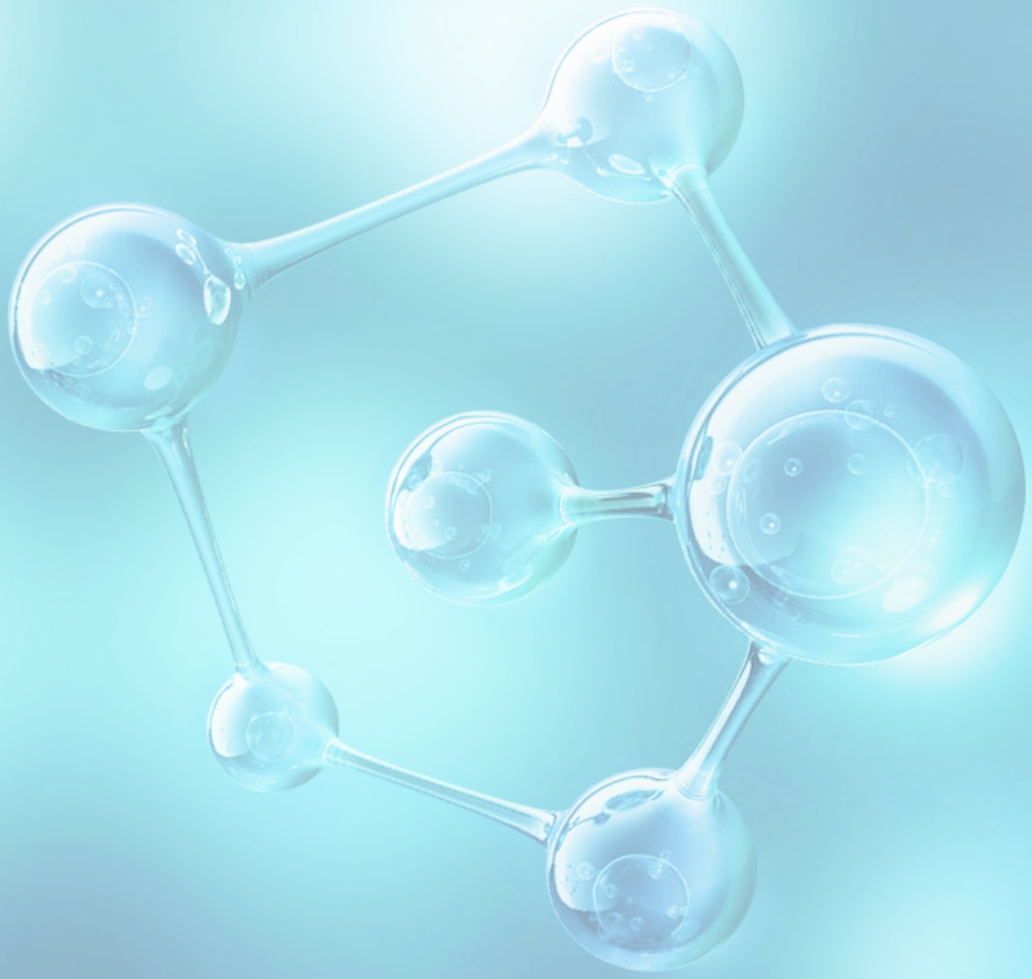
Polynt Composites Spain, S.L.U.
Avenida República Argentina, S/N
09200, Miranda de Ebro - Burgos -
Spain
Phone: +34 947 333 348
email: contact.EScomposites@polynt.com

UK

Polynt UK Ltd.
Station Road
Cheddleton
Staffordshire ST13 7EF -
United Kingdom
Phone: +44 (0) 1538 369 000
Fax: +44 (0) 1538 361 330
email:
contact.UKIntermediates@polynt.com

Polynt Composites UK Ltd.
Laporte Road
Stallingborough - Near Grimsby
North East Lincolnshire DN41 8DR
United Kingdom
Phone: +44 1469 552570
Fax: +44 1469 552597
email: contact.UKComposites@polynt.com

Polynt Composites UK Ltd.
54 Willow Lane - CR4 4NA
Mitcham
United Kingdom
Tel: +44 20 8648 4684
Fax: +44 20 8640 6432
email: contact.UKComposites@polynt.com



Polynt Composites USA Inc.
99 East Cottage Avenue
Carpentersville, IL 60110
United States
Phone: +1 800 322 8103
email: contact.US@polynt.com
www.polynt.com

Polynt S.p.A.
Via Enrico Fermi, 51
24020 Scanzorosciate (BG)
Italy
Phone: +39 035 652 111
email: contact.IT@polynt.com
www.polynt.com