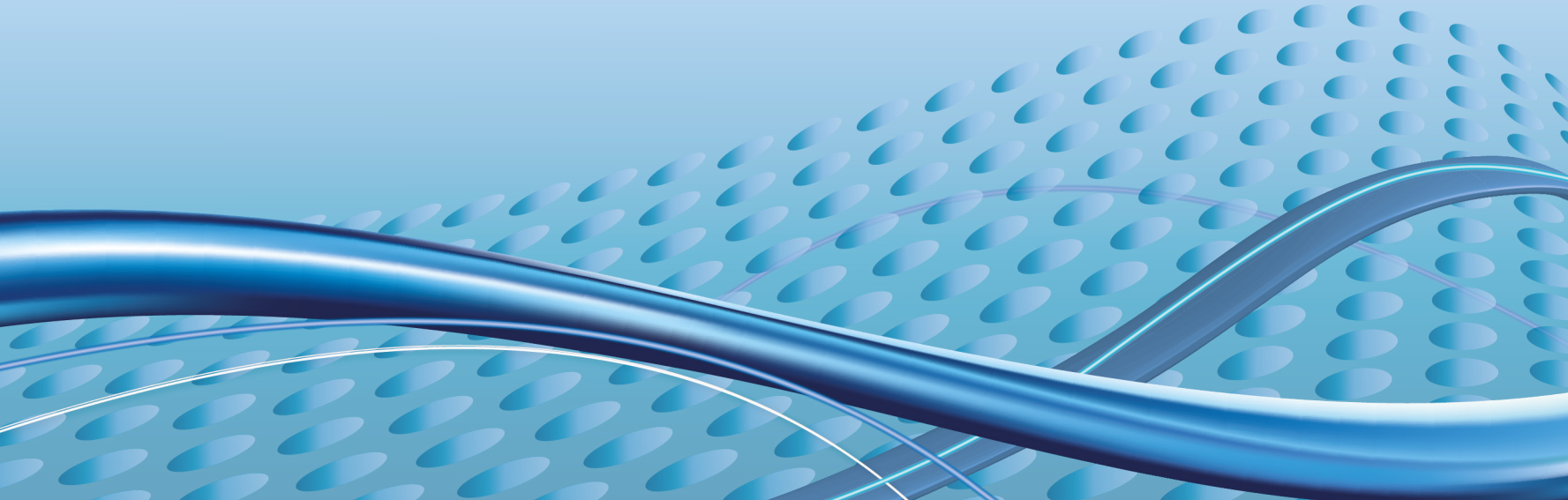


Resins  
UPR & VE  
EMEA



# POLYNT COMPOSITES

Global leader  
for thermoset composites



## Index

Production Sites.....	3
Polynt Composites.....	4
Resins.....	5
Unsaturated Polyester Resins.....	6
EMEA Specialty Products Portfolio.....	8
Vinyl Ester Resins.....	16
Company Addresses.....	18



## EMEA

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**Polynt SpA - San Giovanni Valdarno (Italy)**

**Polynt Composites Poland Sp. z o.o.**

## 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 for our business and it is the reason for which 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 European 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 agglomerrates, flat and corrugated sheets, pipes, putties, mastics, CIPP (Cured-in-Place Pipe), electrical equipments, etc.)
- [Industry](#) (tanks, abrasives, profiles and gratings, etc.)
- [Sanitary](#) (bathtubs, shower trays, solid surface, etc.)
- [Swimming pools](#)

The portfolio also includes a series of UP resins for 'food contact applications' that fulfil the relevant [EC Regulations](#), including N° 10/2011 on plastic materials and articles intended to come in contact with food (*Plastics Implementing Measure – PIM*).

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 (UP) 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 EMEA UP resins' evolution of coding system**

Each new UP resin reference developed in Europe will now only be named according to a new code format.

For example, a special thixo preaccelerated ORTHO UP resin could now be identified as POLYNT 2500 TA.

For existing products, there is no change: the UP resins remain the same and available under their historical names, based on commonly used UP resins product names described below (DISTITRON®, NORSODYNE®, ENYDYNE®, ENCORE® PRIME, etc.).

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



## Unsaturated Polyester (UP) Resins Product Family

<i>UP Resins Family</i>	<i>Resins Types</i>	<i>Applications</i>
<b>DISTITRON®</b>	Orthophthalic, Isophthalic, Maleic, DCPD (Dicyclopentadiene), VE	Industry, construction, marine, transportation
<b>ENVIROLAM™</b>	Low-Styrene Content (LSC)	Sanitary, industry, transportation
<b>OPTIMOLD®</b>	Tooling system	Industry
<b>ENVIROGUARD®</b>	Bio-based resins	Construction, transportation, marine
<b>FIREBLOCK™</b>	Intumescent (Highly Resistant to Fire)	Transportation, construction
<b>ENCORE® PRIME</b>	Styrene-free	Transportation, CIPP
<b>NORSOLOOK®</b>	Low Profile Additives (LPA)	Transportation, SMC
<b>NORSODYNE®</b>	Orthophthalic, Isophthalic, Maleic	Industry, construction, marine, swimming pools
<b>ENYDYNE®</b>	DCPD (low-styrene content)	Industry, marine, construction

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, preaccelerated, thixotropic, low-styrene content LSC, low-styrene emission LSE, etc.) to meet all composites industry's needs in case of reinforced or unreinforced applications.

## EMEA Specialty Products Portfolio

As leader in resins production, Polynt Composites can offer the best technologies for specific high-performance markets.

### LOW-STYRENE CONTENT

**ENVIROLAM™** is a cost effective solution for lower emissions. The very low-styrene content (from 15%) of this range provides:

- low-styrene emission (up to 50% reduction) during application and cure
- improved cosmetics
- low-exotherm allowing thicker laminates

The ENVIROLAM™ product line gives solutions to help manufacturers comply with lower styrene emission limits required in several EMEA countries.



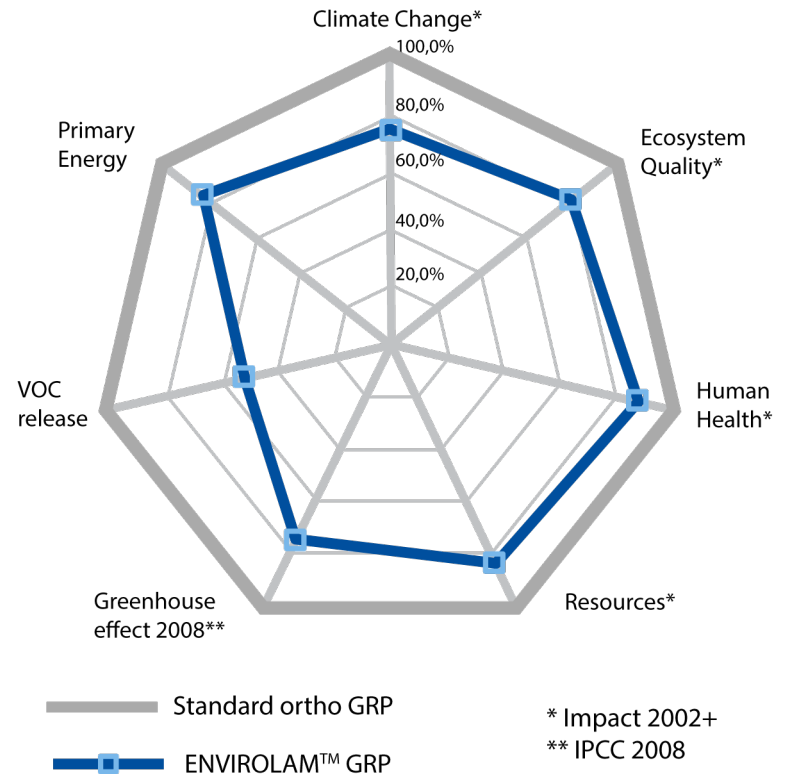
ENVIROLAM™ application:  
sanitary



## Cradle to grave LCA comparison - Standard ortho GRP vs ENVIROLAM™ GRP

A Cradle to Grave Life Cycle Assessment (LCA) concluded that ENVIROLAM™ GRP (Glass-reinforced plastic) reduces by 25% the Greenhouse Gases emissions and by 50% VOC (Volatile Organic Compounds) compared to a standard resin GRP.

ENVIROLAM™ market: transportation



## 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, VOC (Volatile Organic Compounds) and thickening for SMC products.



An example of ENCORE® PRIME market:  
transportation

## 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 CO<sub>2</sub> 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.

Example of FIREBLOCK™ market: railway industry



## BIOBASED RESINS

**ENVIROGUARD®** is the Polynt Composites' range that contains up to 50% of bio-sourced content. This product line provides:

- Similar properties to the conventional UP resin
- Suitable application for Hand Lay-up, RTM, pultrusion and SMC/BMC
- Can be drop-in for existing composite processes

The use of ENVIROGUARD® resin, depending on the renewable material content, provides a carbon footprint of 10 to 30% less than a traditional resin.



Two examples of ENVIROGUARD® markets: construction and marine



## 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

*SWIFT* motor caravan: the front and rear bumpers and roof of caravans and campervans are made of Optimold Tooling (and tooling gel coat)



## LOW PROFILE ADDITIVES

**NORSOLOOK®** low shrink and low profile additives are designed for use in a variety of fiber-reinforced plastic fabrication processes: SMC/BMC, RTM, pultrusion, etc.

Depending on the grade, the main features and benefits of NORSOLOOK® additives are:

- Low profile or Class A automotive appearance with outstanding aesthetic properties
- Good to high gloss
- Good mechanical properties and pigmentation
- Good to excellent toughness
- Excellent shrinkage control
- Improved paintability of Class A SMC
- Can be thickened

An example of UP Resin's application:  
composites' panel for transportation





This photo shows the 'Soffio 31' RIB (Rigid Inflatable Boat) photo by kind permission of Soffio 31 project.

This powerboat is composed of 3 basic components: deck, hull and engine covers. In order to save weight and increase performance, Polynt Composites specially modified epoxy Vinyl Ester resin PCCR 138-40-40 was used for the hull of the boat. This particular resin gives excellent mechanical properties, adhesion to different fibres and the toughness and fatigue resistance required for race conditions, reducing problems of stress failure of any composite parts.

The Deck was constructed with temperature controlled infusion technology using unidirectional glass fibre and carbon fibre reinforcement, the resin used was Polynt Composites Vinyl Ester, Distitron VE ef220V4.

The Engine covers were, again constructed with temperature controlled infusion technology using different layers of carbon fiber fabric for the structure and Polynt Composites special urethane modified Vinyl Ester resin, Distitron VE104.

This process (with controlled optimised resin infusion) allows the use of medium high viscosity resin, a resin with less reactive solvent and excellent adhesion to reinforced fibres, less shrinkage during polymerization and enhanced toughness.



## Vinyl Ester (VE) resins

Vinyl Ester resins are produced by reaction of an epoxy resin with an unsaturated monocarboxylic acid. The polymer obtained is dissolved in a reactive monomer, such as styrene and/or an alternative monomer, generating a solution that can be applied and cured as conventional polyester resins.

Due to the chemical nature of the family, Vinyl ester resins are able to provide superior performance such as:

- 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 **DISTITRON®** 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, ducts and exhaust stacks and. Polynt Composites' VE resins are also widely used by marine, swimming pools and automotive sectors.



<b><i>VE Resins</i></b>	<b><i>VE resins references</i></b>	<b><i>Performance &amp; Applications</i></b>
<b>Bisphenol A Epoxy Vinyl ester resin</b>	DISTITRON® VE 100, EPOVIA® OPTIMUM KRF 1001	Heat, corrosion & chemical resistance
<b>Bisphenol A Epoxy Vinyl ester resin</b>	EPOVIA® OPTIMUM EP KRF 1101 TA	Styrene-free, chemical resistance, CIPP
<b>Bisphenol A Vinyl ester resin</b>	DISTITRON® VE 102	High thermal resistance
<b>Novolac Epoxy Vinyl ester resin</b>	EPOVIA® OPTIMUM KRF 1051	Heat, corrosion & chemical resistance
<b>Bisphenol A Vinyl ester resin urethane modified</b>	DISTITRON® VE 104	High mechanical properties (SMC/BMC)
<b>Bisphenol A Vinyl ester resin urethane hybrid</b>	EPOVIA® OPTIMUM RF 5000	High performance, Transportation (SMC/BMC)
<b>Bisphenol A Vinyl ester resin low-styrene content</b>	DISTITRON® VEef 220	High mechanical properties
<b>Infusion grade Bisphenol A Vinyl ester resin</b>	DISTITRON® VE 370	Hydrolysis resistance, Marine
<b>Brominated Vinyl ester resin</b>	EPOVIA® OPTIMUM KRF 2000	Heat, corrosion & chemical resistance
<b>Bisphenol A Vinyl ester/ DCPD blend</b>	EPOVIA® OPTIMUM KRF 4031	Hydrolysis resistance, Marine

For further information please contact us

On the left example of DISTITRON® VE 100 application

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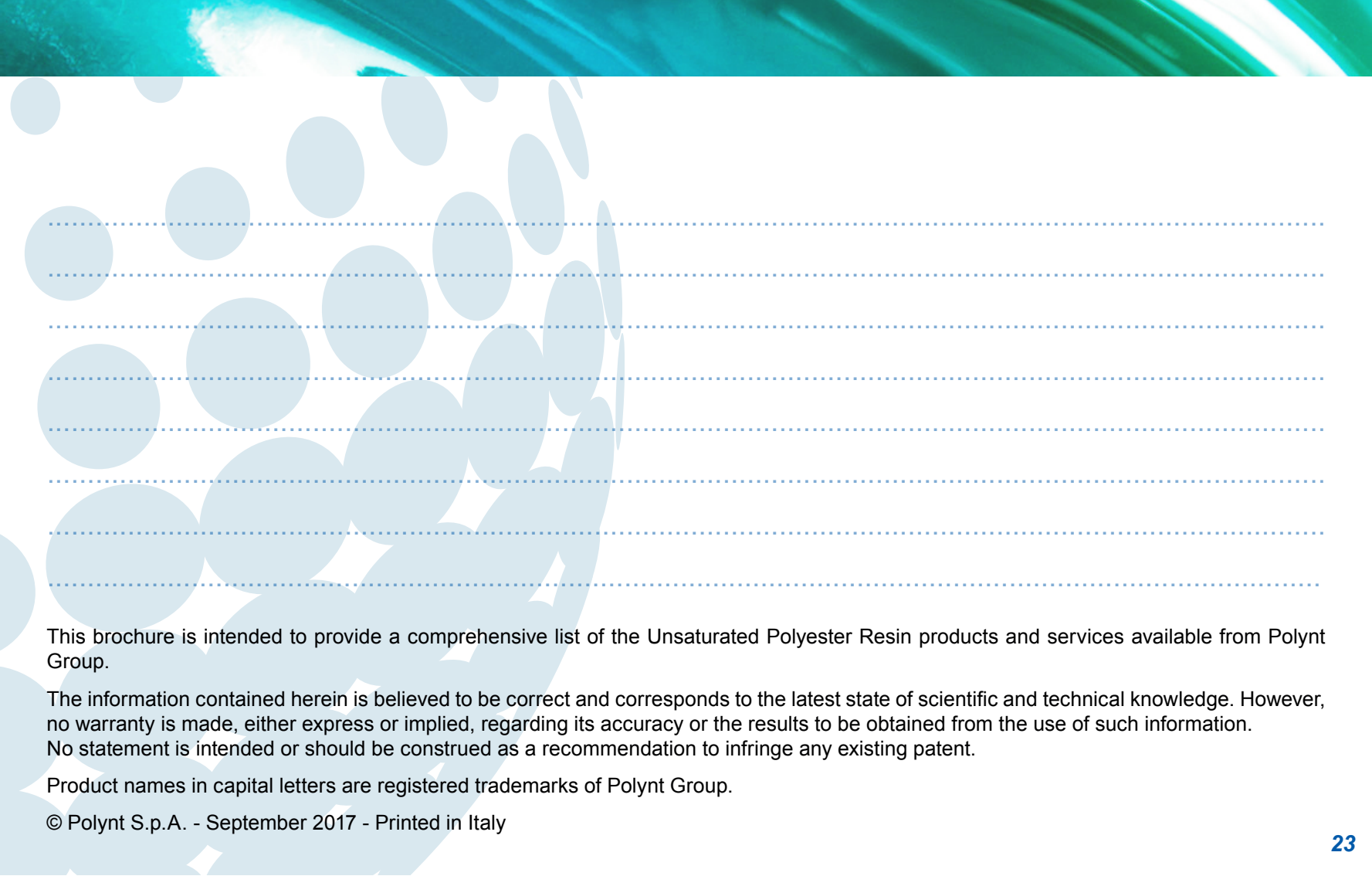


## Notes





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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.

The information contained herein is believed to be correct and corresponds to the latest state of scientific and technical knowledge. However, no warranty is made, either express or implied, regarding its accuracy or the results to be obtained from the use of such information. No statement is intended or should be construed as a recommendation to infringe any existing patent.

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