

**REICHHOLD**





# Reichhold

## Global Supplier to the Composites & Coatings Industries

Reichhold is one of the world's largest suppliers of unsaturated polyester resins for composites and a leading supplier of coating resins for a wide variety of markets and applications.

With its world headquarters in Durham, North Carolina, USA and 19 manufacturing sites (17 run by Reichhold) and 5 technology centres spread around the world, Reichhold has the widest global reach of any resin supplier today.

### The Early Start



Henry Reichhold

Reichhold's history of innovation began when founder Henry Reichhold emigrated to the United States from Germany in 1924 and found employment in the paint department of the Ford Motor Company.

Ford's assembly line production of the Model-T was hampered by the prolonged drying requirements of paint, lacquers and varnishes, taking anywhere from days to weeks resulting in many production delays. Following a personal request from Henry Ford, Henry Reichhold customized a solution in a friend's garage using resins imported from his family's business in Europe.

These synthetic resins radically decreased drying times (from weeks to hours) while imparting better colour and greater durability. These innovative resins enabled Ford to increase the speed of its assembly lines dramatically and contributed directly to the introduction and mass production of automobiles in the United States and around the world.

This marked the beginning of a long history of innovation and commitment from Henry Reichhold who, in 1927, started the business which would eventually be known globally as Reichhold.

90 years later, the same spirit of innovation is alive and well at Reichhold. For eight decades, Reichhold has worked with its customer to deliver customized solutions.

### About Reichhold

- Founded in 1927
- Publicly traded on NYSE 1955–1987
- Owned by Japan's Dainippon Ink & Chemicals, Inc. from 1987–2005
- MBO in September 2005
- Reorganized with new ownership in 2015 and continued leadership of Reichhold veterans with long-term interest in the company's success



Reichhold's headquarters in Durham, North Carolina



# Composites

## Composites Business

As a global leader in unsaturated polyesters, Reichhold manufactures polyester resins, gelcoats, vinyl ester resins and bonding pastes for customers who fabricate composite products ranging from bathtubs to wind turbine blades and for both reinforced and non-reinforced applications.

Innovation is the key to Reichhold's success. Reichhold offers resin systems that meet and exceed customer expectations for end product performance, application properties and environmental conformance.

## Markets Served

Key composites markets served by Reichhold are building and construction, transportation, marine, wind energy and industrial.

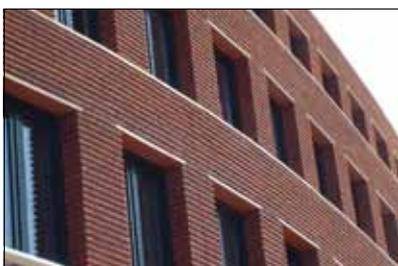
## Advanced Composites

Reichhold has introduced and commercialized ground breaking technology based on the proprietary ADVALITE™ VINYL HYBRID chemistry for advanced composite applications. The product range includes liquid styrene-free systems which can be used in applications such as RTM, infusion, filament winding, liquid molding, pultrusion processes and hot melt monomer-free prepreg resins which can be either directly coated or adhesive filmed for fiber impregnation.

## Building & Construction

Building and construction are amongst the largest and most varied of the composites markets that Reichhold serves through a wide variety of applications and end products, providing customized resins and gelcoats to the producers of:

- Pultrusion
- Chemical anchors
- Relining
- Casting applications
- Sanitary ware



While pultrusion is actually a "process", products manufactured through pultrusion processes span across many market segments. A few examples of pultrusion profiles where Reichhold resins are used include:

- Wind turbine components
- Ladders
- Train parts
- Window panels
- Bridge construction





# Composite

## Transportation

One of the fastest-growing markets for composites is the transportation industry and Reichhold supplies resins for an abundance of uses including:



- **Heavy Truck / Bus Parts / Utility Vehicles** - Reichhold provides resins for exterior body panels and is developing advanced composites using resins compatible with different fibres in RTM (resin transfer moulding) processes.



- **Automotive Parts** - Resin for “Class A” body panels (SMC) are an automotive composites focus for Reichhold as are low profile additives (LPAs) which help control shrinkage and surface quality. Reichhold has developed high-performance compounds for “under the hood” applications; for example: engine valve covers, forward lighting (headlamp reflectors) and front ends.

## Marine

Reichhold has long been a leader in the marine industry, supplying gelcoats, polyester and vinyl ester resins and bonding pastes for a variety of fabrication processes and applications to leading boat builders. Reichhold supplies:

- High performance gelcoat
- Bonding pastes
- Bulk laminating resins
- Resin infusion solutions
- Skin and barrier coats for improved aesthetics and water protection
- Composites tooling
- Complete low VOC system

While Reichhold maintains a full complement of POLYLITE® and HYDREX® laminating resins for open mould boat construction, the growing trend is for closed mould applications for boat building through the vacuum infusion process and RTM (resin transfer moulding) in both the Americas and Europe. Here, new and innovative products have been developed to serve the needs of customers and satisfy ever increasing end user expectations.





## Composite

### Wind Energy

Reichhold is a leading supplier of composite resin systems for wind turbine applications and is helping its customers meet the increasing global demand for wind energy solutions by offering specialised composite resin systems.

Reichhold's products provide high performance and reliable service, with a proven track record of over 30 years in the production of rotor blades and wind energy components.

Reichhold offers for the production of rotor blades and nacelles:

- Gelcoats
- Infusion and laminating resins
- Bonding pastes



### Industrial

The industrial market is a varied and dynamic part of the composites industry. Throughout its history, Reichhold has supplied resins for corrosion-resistant and flame-retardant applications.

**Corrosion Resistance** - Reichhold's DION® vinyl ester and bisphenol fumarate resins have proven themselves in some of the harshest environments imaginable. Case histories of service in environments such as pulp & paper production for 40+ years prove the dependability of these products. The use of DION® resins also extends to the fabrication of key components such as large diameter scrubbers, tanks and pipes as required in chemical and power plants where corrosion and heat resistance are critical.

**Flame Retardance** - For certain applications, flame-retardant composites are required and Reichhold has met the challenge with flame-retardant DION® resins that meet fabricator and regulatory demands and certifications.

**Cured-in-Place Pipe (CIPP)** - As municipalities have come to recognize the overall economy of employing cured-in-place pipe solutions rather than "digging & replacing" crumbling infrastructure, Reichhold's DION® resins have gained popularity as a cost-effective method for replacement of conventional materials.





# Composites

## Core Technologies

Reichhold's composites product lines are derived from the following core chemistries:

- Polyesters
- Vinyl esters
- Urethanes
- Vinyl hybrids

## Brands

ADVALITE™	The brand for speciality vinyl hybrid liquid and monomer free hot melt prepreg resin products for the Advanced Composites Market
DION®	The brand for all industrial resin products (especially vinyl ester resins), including those for corrosion-resistant, flame-retardant and pultrusion applications; also the brand for higher performance polyester resins across all markets
ENVIROLITE®	The brand for "GREEN" products containing renewable and/or recycled materials
HYDREX®	The brand for high-performance vinyl ester resins designed specifically for excellent hydrolytic stability in applications such as boat building and spa manufacturing
NORPOL®	The brand for all compounded products from Reichhold, chiefly gelcoats and bonding pastes (available mostly in Europe, Africa and India); also the brand for LP-additives for SMC/ BMC and pultrusion
POLYLITE®	The brand for all standard Reichhold resin products for composites, for both reinforced and non-reinforced applications

## Value Added Services

Reichhold's global reach provides its composites customers with services worldwide. To develop and improve products, it is essential that Reichhold understands all processes associated with end product fabrication.

Reichhold's five state-of-the-art Technology Centres around the world are dedicated to the research and development of resin systems, including gelcoats and bonding pastes for the composites industry.

Our specialised analytical and testing equipment allows simulation of most full-scale composites manufacturing processes. Development projects can be completed in close cooperation with key customers and suppliers, providing a short time to market for new products.

### Tests performed at our Technology Centres include:

- Nuclear Magnetic Resonance (NMR)
- Gas Chromatography (GC)
- Infrared Spectrography (FT-IR)
- Gel Permeation Chromatography (GPC)
- Differential Scanning Calorimetry (DSC)
- Thermogravimetric Analysis (TGA)
- Advanced Rheometry
- Spectrophotmetry
- Mechanical Properties
- Fire Testing
- Colour Matching
- Accelerated Weathering Tests





## Coatings

### Coating Business

For over 87 years, Reichhold has been a pioneer in creating innovating technologies to help coatings formulators meet their customers' most demanding applications. Whether developing the latest in high-performance industrial coatings, low-VOC architectural paints or super-durable powder coatings, formulators can look to Reichhold for the technologies and solutions they need.

Reichhold supplies a wide breadth of product lines for a variety of markets and applications in the coatings industry with technical and research facilities located around the world. Innovations combined with state-of-the-art manufacturing facilities and a sales and distribution network that is far reaching means that Reichhold can offer focused solutions for your needs.

### Markets Served

Reichhold offers waterborne, solvent borne, 100% solid, liquid and powder coating resins for the following primary market segments:

#### Architectural

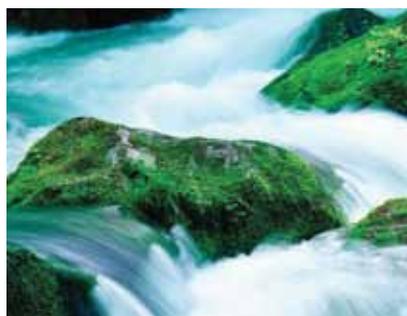
BECKOSOLAQ® Alkyd Latex are waterborne alkyds that offer traditional alkyd performance in a near zero VOC waterborne form. These innovative products enable coating suppliers to surpass all current and future VOC regulations while still providing classic performance demanded by consumers.

Reichhold also offers traditional solvent borne alkyds and acrylic modified alkyds for a range of architectural applications under its BECKOSOL® Alkyds and AMBERLAC® Modified Alkyd product lines.

In addition, Reichhold offers high performance UROTUF® Urethanes and EPOTUF® Epoxy products - waterborne and solvent borne - for demanding applications such as flooring and concrete coatings.

Along with quality products, Reichhold offers formulation recommendations and technical support for design of architectural coatings. Among these are:

- Interior/exterior wall paints and primers
- Trim enamels
- Wood floor finishes
- DIY stains and varnishes
- Deck coatings
- Concrete porch and garage paint
- Metal finishes





## Coatings

### Industrial Maintenance, Protective Coatings

Reichhold has long been a leader in high performance protective coatings for industrial maintenance, marine, aerospace, agricultural equipment and auto refinish. EPOTUF® epoxy resins and curatives provide outstanding performance as primers and concrete coatings. AROPLAZ® Polyesters and AROLON® Acrylic Polyols combine with conventional isocyanates in 2K urethane systems to provide excellent exterior durability.

Reichhold also offers high performance 2K Non-isocyanate systems under the EPOTUF® brand name. In addition, speciality BECKOLSOL® Alkyds are available for the industrial maintenance markets.

### Equipment manufacturer (OEM)

Since the beginning over 80 years ago, Reichhold has been a leading supplier of resins for industrial coatings. Solvent borne, waterborne and powder resin systems are used in a wide range of industries including:



- Wood coatings (cabinetry, furniture)
- General metals
- Heavy machinery and equipment
- Coil and can
- Factory-applied wood finishes
- Plastic substrate coatings
- Adhesives

### Graphic Arts

A sub-segment of our Coatings business is graphic arts. Globally, Reichhold offers resins which are used in both traditional printing and the digital printing market. Our strength in the graphic arts market is derived from core competence in alkyds, rosins, latex emulsions, phenolics, polyesters, and water and solvent borne urethanes, and epoxies.

These competencies extend to products for offset, energy cure, speciality inks, overprint varnishes, and thermosetting resins for black and coloured toners. Reichhold products offer superior dry rate, gloss, chemical resistance, pigment dispersion, substrate adhesion, colour projection and low fusing odor.

### Core Technologies

While each of these technologies are divided into various subsets, Reichhold's coatings product lines are derived from the following core chemistries:

- Alkyds
- Polyesters
- Polyurethanes
- Epoxies



# Coatings

## Brands

BECKOSOL®	Solvent-Borne Alkyds
BECKOSOL AQ®	Alkyd Latex and Modified Alkyd Latex
KELSOL®	Water-borne & Water-Reducible Alkyds
AMBERLAC®	Modified Alkyds & Copolymers
AROLON®	Styrenated Acrylics, Acrylic Polyols, and Solution Acrylics
SYNTHEMUL®	Non-styrenated Acrylics
AROPLAZ®	Polyesters
EPOTUF®	Epoxies & Epoxy Curing Agents
RESAFEN®	Phenolics
UROTUF®	Urethanes
FINE-CLAD®	Powder Coating Resins
FINE-TONE®	Resins for Digital Printing Inks

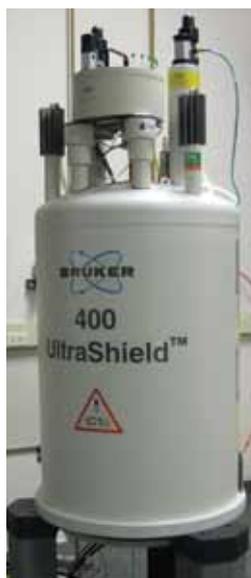
Coating products are not available in all regions. Please visit [www.Reichhold.com](http://www.Reichhold.com) for more information.

## Value Added Service

At Reichhold, products are constantly tested and technology refined so as to provide customers with high performing products, whether they be a flat interior house paint, a heavy-duty metal primer protecting the bottom of a ship or the ink in a high output commercial printer.

To support efforts on a global basis, Reichhold has state-of-the-art research and testing facilities located around the world. At these Technology Centres Reichhold has all necessary equipment for measuring physical and performance properties based on standardized test methods.

In addition, Reichhold takes every opportunity to test products in real-world applications.





# Locations

## Reichhold

For contact details see [www.Reichhold.com](http://www.Reichhold.com).



- World Headquarter
- Plants
- Licensees
- Technology Centres

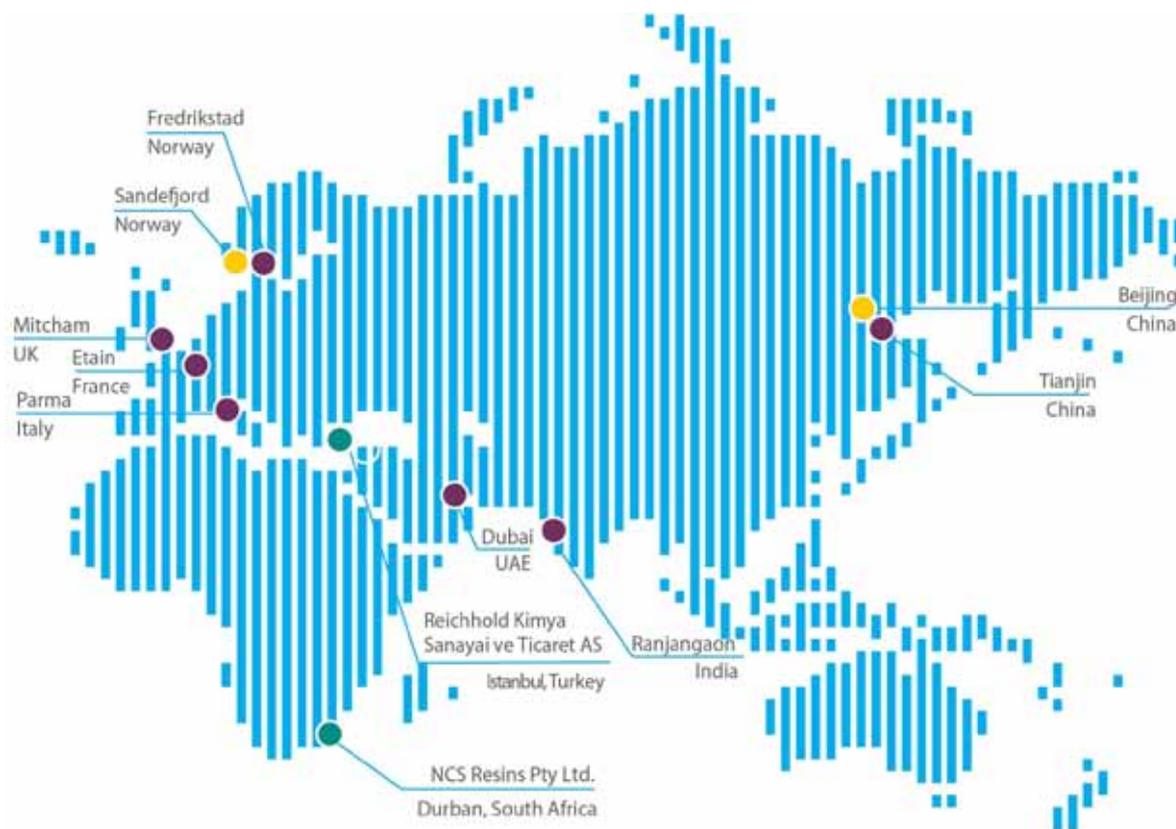
## Reichhold Technology Centres

### REICHHOLD WORLD HEADQUARTERS & TECHNOLOGY CENTRE

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[www.Reichhold.com](http://www.Reichhold.com)

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