

Vinyl ester range ready for the future!

Over recent years, the DSM Composite Resins focus has clearly been on the development of new vinyl ester resin types to strengthen its portfolio and to improve quality in the FRP industry.

Today, after completing this process by the development of the Atlac E-Nova vinyl ester resins, the product range for the anti corrosion industry is ready for the future. Although some additional chemical resistance testing is still going on, a full package of technical information

is now available, from the renowned bisphenol A resin Atlac 382 to the recently developed Atlac E-Nova FW 2045. New brochures including the latest information are available now.

As well as resins for the tank and pipe production, E-Nova technology has also proven to be ideal for industrial sewer relining.



Chemical Industry - a familiar home for Atlac!

Atlacs for the Anti Corrosion Industry

The history of DSM Composite Resins in anti corrosion resins goes back to the early 1960s.

It all began with Bisphenol A based unsaturated polyester resins. These resins offered much better chemical resistance and heat resistance properties than the standard unsaturated polyester resins available at that time. Today,

more than 40 years on, these resins, like Atlac 382, are still widely used and well respected in the market for their chemical resistance performance. For a good example of Atlac 382 in action, see the Case History on page 3.

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Committed to the Anti-Corrosion Industry?

You bet! In 2005 DSM continues to take its responsibility to support the Anti Corrosion Industry very seriously, by supplying high quality Atlac resins and providing reliable technical service. We have increased our staff at the Corrosion Resistance Center in Zwolle, the Netherlands, to provide even better support for your anti-corrosion challenges. We have updated and further completed our chemical resistant data and collected customers' experiences on the process ability of our two new resins Atlac E Nova FW 1045 and Atlac E Nova FW 2045. This year we have a complete new booth at the JEC in Paris and our staff will be more than happy to discuss and exchange ideas on your product or processing challenges.

Jan Lodewijk Lindemulder
Business Manager Tanks, Pipes & Relining

Atlac 430 for pulp & paper Storage of chlorine dioxide

The paper and pulp industry is one of the most important end markets for FRP equipment. This is because, during the pulp bleaching process to obtain white paper, relatively aggressive chemicals at high temperatures are used to support the process.

Chlorine used to be the main bleaching agent to whiten the pulp to produce whiter paper. But, for environmental reasons, more friendly relatively new bleaching processes that eliminate the use of elemental chlorine gas are used today (elemental chlorine-free (ECF) and totally chlorine-free (TCF)). ECF is the dominant pulp bleaching method, accounting for about 70 percent of world chemically bleached pulp production.

Typically, this bleaching of the pulp takes place in different steps in so-called bleaching towers - making use of chlorine dioxide and peroxides as bleaching chemicals (ECF-process). Storage and transport of these aggressive chemicals can only be handled with vinyl ester based composites or very exclusive and expensive metal alloys, so FRP is often the material of choice.

As well as bleaching towers and piping system, chemical storage tanks are another application found in a pulp bleaching plant. Atlac 430 was selected for the construction of a huge, 300 m³ tank used to store chlorine dioxide (10% concentration) in the pulp plant in Burgo Ardennes in Virton, Belgium. This storage tank was produced by Christen & Laudon Staffelstein - one of Europe's most respected tank producers. The company has a lot of experience in process equipment for the pulp and paper industry, using filament winding. The tank is equipped with a leak detection system (double wall) and the dimensions are 30 meters high and 3,5 meters diameter. To improve the performance of the corrosion resistant barrier layer, a synthetic veil is used as a first layer on the inside of the tank. The tank was produced and installed at the start of 2004.



Chlorine dioxide storage tank based on Atlac 430 ready for transport

Vinyl ester resins product line is now complete

(Continued from page 1) In 1997, as a result of the merged resin business with BASF, the portfolio was extended by the inclusion of a standard Bisphenol A based vinyl ester resin (Atlac 430 – formerly Palatal A 430).

BENCHMARK

This resin, together with Derakane 411, has become a benchmark the industry standard vinyl ester, with resistance to a wide range of chemicals including alkaline environments like sodium hydroxide and sodium hypochlorite.

Resin Type	Chemical nature	Typical Properties
Atlac 382	Bisphenol A based UP resin	Good chemical resistance
Atlac 430	Bisphenol A based Vinyl Ester resin	Industry standard Alkaline resistant
Atlac 590	Novolac Vinyl Ester resin	High temperature, acid and solvent resistance
Atlac E-Nova FW 1045	Flexibilized Epoxy bisphenol A Vinyl Ester Urethane	Resistance against a wide range of chemicals Easy processing
Atlac E-Nova FW 2045	Epoxy Bisphenol A Vinyl Ester Urethane	Exceptional chemical and temperature resistance Easy processing

ATLAC 590

Meantime, at the start of the 90s, DSM Composite Resins developed its own epoxy novolac based vinyl ester resin, Atlac 590, launched in 1994. Now, more than 10 years after market introduction, this resin is still recognized for its good temperature and chemical resistance properties - especially against strong acidic environments and organic solvents.

E-NOVA

The most recent development has been Atlac E-Nova vinyl ester resins, FW 1045 and FW 2045. These resins are based on proven urethane technology, (like Atlac 580), which was developed in the 80's, and delivers processability equal to standard polyester resins, but combined with excellent chemical resistance performance. Atlac E-Nova FW 2045 can easily compete with epoxy novolac based vinyl ester resins while Atlac E-Nova FW 1045 outperforms the standard bisphenol A based vinyl ester resins.

With this last development, DSM Composite Resins, now offers a complete product line for the Anti Corrosion Industry. Whether it's for storage tanks, pipe systems or gasscrubbers, the Atlac range combines the best from the past with the technology for the future.

Atlac's Anti corrosion resins

Atlac 382 for SO₂ scrubber

Atlac 382, DSM's bisphenol A based unsaturated polyester resin has been selected for parts of a DynaWave® AMMSOX® SO₂ Scrubbing System: designed and engineered by Monsanto Enviro-Chem: for SO₂ removal of the off gas from the ACN/MMA plant of Repsol YPF Chemicals, Tarragona, Spain.

The DynaWave Ammsox System meets the required SO₂ and dust outlet emission and will generate a product such as ammonium sulphate solution.

The gas emissions entering in the DynaWave have SO₂ maximum concentration of 1.25% w/w, dust 180 mg/Nm³ and temperature of 300 °C with a total maximum air flow of about 65000 Nm³/h.

The Repsol AMMSOX System is designed to cool the tail gas coming from the heat recovery section, from 300°C to 46°C, and reduce SO₂ emissions to less than 50 mg/Nm³ and particulate emission to less than 10 mg/Nm³. The DynaWave® scrubbing system consists of a pre-scrubber and an AMMSOX® system. A quenching Reverse Jet is installed in the inlet duct of a gas-cooling tower in the pre-scrubber. The AMMSOX® system has three Reverse Jets in series followed by 24 Brink Mist Eliminator elements (type HE-24244). Effluent from the second Reverse Jet is sent to an oxidation column where a 35-40 % solution of ammonium sulphate product is generated.

ATLAC 382 - LONG TERM EXPERIENCE

The main equipment, ducts and installation of these elements was carried out by MEFASA, (San Juan de Nieva, Avilés, Spain), a company dedicated to the manufacture of FRP and steel equipment for the chemical industry since 1965. Mefasa selected Atlac 382 because of the company's longterm experience with this resin and because of its outstanding chemical resistance performance.



Overview of the Dynawave plant in Tarragona - Spain.

Processing Atlac E-Nova FW 1045 It's a piece of cake!

Last month the company Polacel in the Netherlands finalized the production of a horizontal gas scrubber for a chemical plant in Germany. For this gas scrubber Atlac E-Nova FW 1045 was selected for the combination of chemical resistance performance and easy processing properties.

As well as the good alkaline and solvent resistance needed for this application, the spray-up process of Polacel, required a preaccelerated, thixotropic resin grade.

Thanks to the urethane technology, Atlac E-Nova resins, are easy to make thixotropic by using standard hydrophilic fumed silica types. Atlac E-

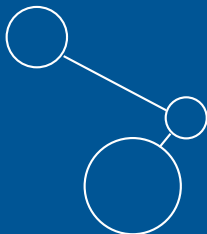
Nova FW 1045 was most suited to job. Although the degree of thixotropy was relatively high, due to the fact that vertical parts of 5 mm thickness had to be sprayed in one go, the wet-out and air release properties remained very good. Also the exothermic peak development was relatively low. This was the result of the well balanced pre-acceleration system in the resin, combined with a good through-cure in thin laminate parts. Compared with older vinyl ester urethane grades, the styrene content of this resin is significantly lower, which was appreciated by the workshop operatives for its reduced smell.

The gas scrubber consists of 3 compartments. For neutralisation reasons, in compartment 3, injection with sodium hydroxide and peroxide is



Atlac E-Nova gasscrubber in construction.

carried out.



Jeroen van Bussel
Business development
manager tanks & pipes.

On the 1st of December 2004, Jeroen van Bussel joined 'the ATLAC team' in Zwolle. Jeroen brings with him 14 years of experience in the Fiberglass piping world from his former employer, a GRP pipe manufacturer: "The market potential for composite pipes and tanks is huge but there are considerable hurdles to overcome." His major task will be to realise growth in the acceptance and application of GRP pipes and tanks - obviously made of Atlac vinyl esters!

Brochures

At the start of April, just before the JEC in Paris, two new brochures will be launched by the corrosion resistance expertise centre. Firstly a new update of the corrosion guide – guide to chemical resistance, will be available. Latest test results have been included in this version and, as well as the booklet, a pdf.file and selector guide will be accessible on our website.

Secondly a brand new brochure – Anti corrosion resins – Focussing on anti corrosion solutions – will be introduced. This brochure includes extensive product information about the most important vinyl ester resins. Information is also available on the application of these resins plus background information about standardisation, design and safety.

New email address for Atlac advice

To make it faster and easier for you to access chemical resistance advice or technical information on Atlac products, a new e-mail

address is now available that links you directly to the expertise centre tanks, pipes & relining. So please make a note: atlac.advice@dsm.com.

New alkaline study

Results of recent chemical resistance studies show that many factors are influential in determining the chemical resistance of a laminate. As well as the chemical composition of the resin, reinforcement type is a contributory factor – so too is the degree of cure of the resin, the application of different surfacing veils and the laminate construction itself. To get a better understanding of the influence of these factors, a new study has started up in close cooperation with the Swedish Corrosion Institute in Stockholm. Initially it will focus on alkaline resistance.

Hopefully, the results of this study will help in the future to determine the best corrosion solutions.

EVENTS CALENDAR

SAMPE 2005 SYMPOSIUM & EXHIBITION	1-5 May 2005, Long Beach, California, USA	www.sampe.org
REINFORCED PLASTICS 2005	24-26 May, 2005: Karlovy Vary (Czech Rep.)	http://home.tiscali.cz/~svkcr
INT.CONF.&EXHIB. FIBROUS MATERIALS	23-28 May, 2005: Saint-Petersburg, Russia	www.sutd.ru/interconf-fm-XXI.html
TRADE FAIR TEXTILES AND NONWOVENS	7-9 June 2005: Frankfurt am M, Germany	http://www.techtextil.com
CONF. ON STEEL AND COMPOSITE STRUC.	8 - 10 June, 2005: Maastricht, The Netherlands	contact@eurosteel2005.info
COMPOSITE CATAPULT COMPETITION.	6-8 July, 2005: 't Harde, The Netherlands	www.pultruders.com

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