

GRP filter box

Sabic (former DSM Polyethylenes), Geleen

For Sabic (formerly DSM Polyethylenes Geleen, The Netherlands), a combination of resins provided a solution to the severe corrosion problems encountered in a steel based filter box. In this unit, powder is removed from a waste gas contaminated with traces of water, aggressive inorganic acids and organic solvents.



SHUT DOWN

In just two years, the environment inside the existing filter had heavily corroded the uncoated steel box. An epoxy coating applied to prevent further corrosion itself lasted only two years. To avoid a shutdown every two years, DSM Polyethylenes decided, in 1997, to switch to GRP to solve severe corrosion problems in the filter box. They were also satisfied with both the operational performance and low running cost of the installation.

There's another side to the economic advantages of FRP, and that's 'fit-for-purpose'. FRPs can be engineered to solve a particular corrosion problem. The depth of the DSM Composite Resins range of Atlac chemical resistant resins makes it possible to select one that meets specific requirements in the most cost-effective way. Why pay for performance you don't need. There is also the relationship between capital expenditure (CAPEX) and operational expenditure (OPEX).

TEAMWORK IN THE FIGHT AGAINST CORROSION

A team was put together with representatives from DSM Polyethylenes, DSM Services, Jongerius (filter technology), Plasticon (plastic manufacture) and DSM Composite Resins. It was not simply a case of replacing steel with FRP as there were several issues to be addressed; for example an FRP filter box is larger than a steel counterpart because extra reinforcement is necessary for use under vacuum conditions. And since the new filter section had to fit inside the same space as the old one, some modification was required to existing attachments and support systems. Adequate earthing is another important consideration to prevent problems with static electricity. But perhaps the most important aspect of the filter box is its chemical resistance performance. Atlac 590, a novolac vinyl ester resin, was an ideal candidate for the job.

SANDWICH CONSTRUCTION

Atlac 590 resin was used to produce a chemically resistant layer 4 mm thick. The Atlac 590-based laminate is ideal because it easily

SUMMARY

> Filter box

OPERATING CONDITIONS

- > 71% Nitrogen, 21% Water, 7% Oxygen, 1% Carbon dioxide, 1% Hydrochloric acid.
- Working temperature of 60°C
- Design temperature of 90°C
- Internal pressure 0.98 Bars

ATLAC SOLUTION

> Atlac 590

IN SERVICE

> 01-01-1998

BENEFITS

- > Corrosion free
- chemical resistant

REMARKS

- > Additional to the ribs, 3D fabrics were used to withstand the vacuum conditions.

resists water vapour contaminated with traces of inorganic and organic materials. It also shows virtually no reduction in flexural modulus at 80°C, the maximum service temperature in the filter.

MAINTENANCE-FREE

An additional benefit of using FRP in this example was that no on-site welding was necessary.

Consequently, the plant did not have to stop production, a move that would have resulted in costly shutdown time. And since the FRP box is able to withstand extreme process conditions, it's virtually maintenance free and can achieve an exceptionally long lifetime.

THE ATLAC BENEFITS

Replacing epoxy-coated steel with FRP is beneficial on three fronts. Firstly, it meets the chemical industry's demands for corrosion resistance and design flexibility. Secondly, it's an environmentally responsible approach. And thirdly, its extended operational life and low maintenance requirements make economic sense. As production engineers become more familiar with FRP as a high-performance construction material, they are meeting the challenges of using FRP in existing process installations. This requires some creative

adjustments to cope with dimension limitations, so the Business Support Team is ready to assist equipment designers, compound suppliers and endusers alike.

Atlac 590 is a vinyl ester resin based on the addition of epoxy novolac and methacrylic acid, dissolved in styrene.

THE DIFFERENCE!

The benefits of using Fibre Reinforced Plastics (FRP) for constructions in the chemical industry are gaining recognition. But if the higher initial investment compared to traditional steel and concrete alternatives is still putting you off, it's time to look at FRP again. Because savings in lower maintenance and replacement costs soon make up the difference!

About DSM

DSM Composite Resins is the largest producer of unsaturated polyester resins in Europe. With production facilities in many different European countries, DSM Composite Resins offers a wide range of resins, matching every conceivable processing and end-use requirement, in the most diverse applications. Local Sales offices and Technical Service laboratories enable close cooperation and partnerships between customers and DSM Composite Resins. Central Research & Development is fully equipped to develop and test new resins and to tune systems for optimal results in specific processing techniques. The development, service and manufacture of composite resins are certified according to ISO 9001.

About Atlac

For several decades Atlac resins have proven themselves highly suitable in applications where chemical and thermal resistance in combination with high mechanical properties are required. Atlac resins have outstanding corrosion resistance to a wide range of organic and inorganic acids, alkalines, solvents and bleaches. They are widely used for fibre-reinforced applications such as storage tanks, vessels, pipes and ducts. The Atlac resins can be processed by means of a wide range of fabrication techniques, including filament winding, hand layup, spray-up, and polymer concrete.

Contact

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Technical details	
Application	Filterbox
Medium	Nitrogen, water, oxygen, carbon dioxide, hydrochloric acid.
Construction details	Innerlayer: Atlac 590-ISO/NPG, Outerlayer: ISO/NPG 3D fabrics were used to withstand vacuum conditions.
Conditions	Operating temp 60°C, design temp 80°C
Resin	Atlac 590
Commissioning	01-01-1998
Inspected	01-01-1999
Manufacturer	Plasticon - Oldenzaal
End user	End-user details
Location	Sabic, formerly DSM Polyethylenes, Geleen, The Netherlands
Remarks	Atlac 590 is suitable for a wide variety of chemical processing equipment including storage tanks, process vessels, piping, ducts, chimneys and linings. It can also be used to formulate flaked glass coatings and mortars.