

Chlorine dioxide bleaching tower

Kimberly-Clark

It pays to innovate with GRP equipment. The Kimberly Clark Corporation reported, as far back as 1966, success stories on the use of GRP for bleach towers, process piping and other chemical plant, in highly corrosive service conditions at their pulp and paper mill in Anderson, California.



THOROUGH ANALYSIS OF CORROSION PROBLEMS

Kimberly-Clark engineers needed to establish the proper specification for a reinforced plastic that would suit their structural needs and stand up to the corrosive chemicals used in their bleaching processes.

After extensive lab tests with various resin systems, they decided on Atlac 382 bisphenol A polyester resin. The application would be two huge chlorine dioxide bleaching towers and their related process piping; chlorine, chlorine dioxide, hypochlorite washing hoods, fans, ducts, tanks, absorption tower for chlorine dioxide, reactors, scrubbers and other equipment.

HUGE SAVINGS FROM THE OUTSET

One dramatic example of saving is the case of the two identical towers. Constructed entirely of reinforced Atlac, the main tower downflow section is 3.30 m internal diameter, and about 13.5 m high. The pre-retention section is 2.10 m diameter and length is 7.5 m. Laminate thickness is around 12.5 mm for the pre-retention section, reducing towards the elbow section. The main

tower tapers from 25 to 10 mm at the top. The design was based on wind loading exceeding 160 km/h and Zone 2 seismic stresses.

The first concern was the tight plant construction schedule. But by using GRP, Ceilcote could build each tower in three sections - onto bases laid in advance. The towers were constructed on the job site in nine days. Resultant savings on fabrication and field construction are conservatively placed at 30% compared to tile-lined steel towers - which would require several months for erection and lining.

TENFOLD SERVICE LIFE INCREASE

Kimberly Clark (K-C) reaped a double advantage by using reinforced Atlac process piping. For the pulp bleaching stages (both pulp and white liquor systems), they expected longer life than the three years or so obtained with type 317 stainless steel. This certainly proved the case, with the GRP tanks lasting more than ten times longer than steel. K-C also doubted that installation costs with 'plastic' pipe would be lower, mainly because the installation techniques

SUMMARY

- > Chlorine dioxide bleaching towers
- > Chlorine dioxide adsorption towers

OPERATING CONDITIONS

- > Chlorine gas, chlorine dioxide

ATLAC SOLUTION

- > Atlac 382 bisphenol A polyester

IN SERVICE

- > In service since November 1964

BENEFITS

- > corrosion resistant
- > light weight
- > durable

REMARKS

- > Installed outdoors, the tanks resisted atmospheric corrosion and never needed painting.
- > They also withstood four decades of corrosive attack

were considered new at that time.

So for comparison purposes, K-C kept track of the total costs for installing two almost identical pipe lines - one of 200 mm type 317 steel and one 200 mm GRP. The material costs showed a considerable saving of 33% in favour of GRP. The company was pleasantly surprised to find that, even with inexperienced workman, the labour costs per meter of installed pipeline, were another 25% lower than for the stainless steel line.

FRP STRENGTH ADVANTAGES

The high strength-to-weight ratio of Atlac GRP was a distinct advantage in the construction of the chlorine dioxide adsorption tower. This unit is 600 mm in diameter, with an over-all height of 12.5 m. With its base supported 3 m from the ground, such a tall slender vessel is difficult both to erect and support. However, as a GRP construction, it weighed just 450 kg compared to over one ton for a similar tower made with sections of vitrified tile.

KIMBERLEY-CLARK CONCLUSION

The report of Kimberly-Clark concluded with the statement: "We feel that we have taken only the

first few steps in the use of reinforced plastics in the manufacture and bleaching of wood pulps and are looking forward to applying the new developments in our future mills...".

Current status:

The two towers withstood 35 years of continuous service before the facility was purchased by Shasta Paper in 1999 and de-commissioned in September 2001. Operation of the plant site as a paper mill is no longer viable due to the division of the Shasta Paper Company property and the relinquishment of permits.

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.

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Technical details	
Application	Chlorine dioxide bleaching/adsorption towers
Medium	chlorine dioxide
Conditions	
Construction details	Chemical resistant barrier layer, reinforced with C-glass
Resin	Atlac 382 Bisphenol A polyester
Commissioning	Tow towers were put into service in November 1964
Inspected	Regular inspections have indicated no signs of chem attack
Manufacturer	The Ceilcote Company
End user	Kimberly-Clark, Shasta, USA
Location	Anderson, California along the I-5 corridor
Remarks	K-C's first step in the use of Atlac reinforced plastics were succesfull and copied in many other mills