



DERAKANE NEWS

A Newsletter About DERAKANE Vinyl Ester Resins From Dow Chemical U.S.A. • Vol. 4, Issue 5 • November 1985

FRP Scrubber Replaces Multiple Scrubber System

The most cost-effective maintenance is preventative maintenance. For that reason, Brunswick Pulp & Paper Company, Brunswick, Georgia, decided in 1984 to replace a series of multiple stacks and scrubbers with a single scrubber unit made entirely from corrosion-resistant vinyl ester resin.

Brunswick officials opted for this new system even though the original system was still in operation. According to Joe Landrum, a Brunswick project engineer, "DERAKANE* 411-45 Vinyl Ester Resin was recommended to us by the consulting firm Kemanord, along with others in the industry." Before settling on DERAKANE, however Landrum conducted some research of his own—with the same result.

Brunswick produces bleached pulp in this plant. Residual chlorine and chlorine dioxide gas from Brunswick's bleaching process is piped into the bottom of this scrubber body, which measures 60' high and 14' in diameter. As the gas enters the scrubber, weak green liquor wash sprays down at a rate of 2,000 to 3,000 gallons per minute from beta spiral Teflon® nozzles located near the top of the scrubber.

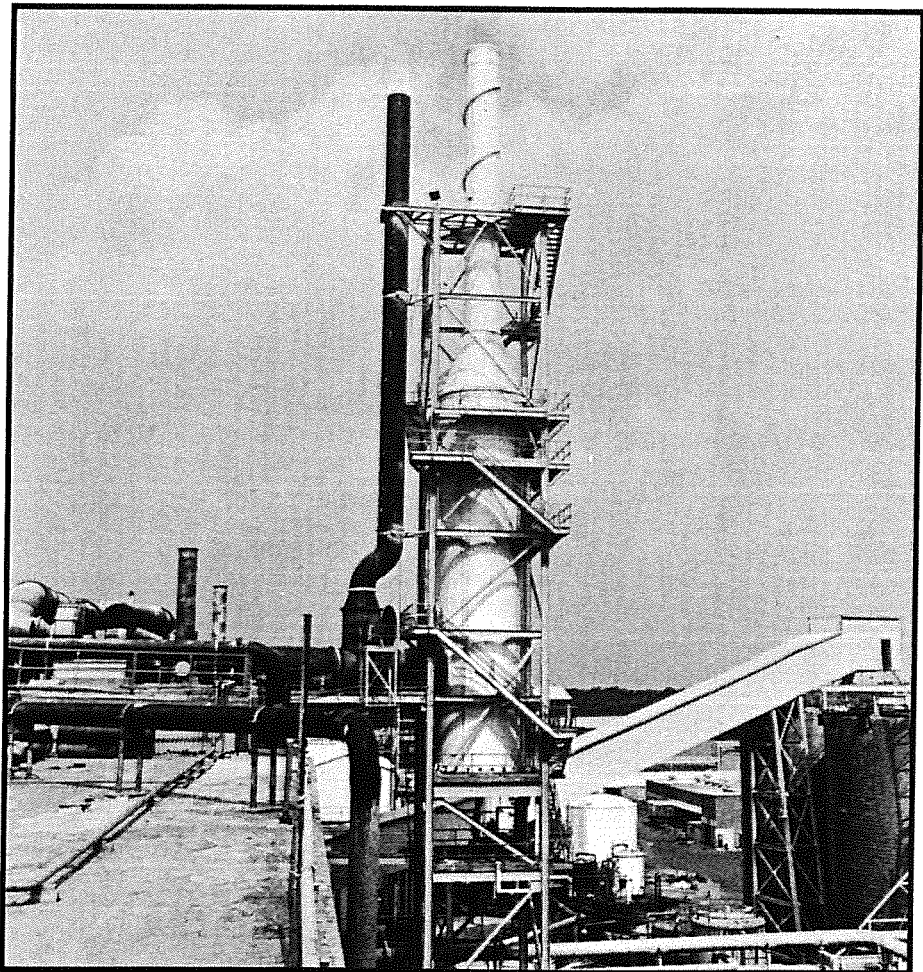
"This wash, at a temperature of about 120° F, is predominantly a sodium hydroxide/sodium sulfide/water solution," says Don

Hall, vice president and general manager of LaValley Plastics Construction Co., Biloxi, Mississippi, fabricator of the new scrubber, stack and cone configuration.

Cleansed fumes pass through

the scrubbing chamber at 140° F. After they rise to the vessel's top, they pass through a mist eliminator. "The mist eliminator extracts liquid particles so that only air is expelled from the

(over)



This FRP scrubber, which handles chlorine and chlorine dioxide, is one of the largest in the United States, according to its designer.

stack," notes Landrum. The scrubber body, including the scrubbing mechanism, mist eliminator and wash spray nozzles, can handle 97,000 actual cubic feet of vapors per minute.

The cone acts as a transition piece joining the scrubber body and the stack. It is approximately 11' high, with a diameter tapering from 14' where it joins the scrubber to 6' where it joins the stack. The 52'-high stack has a constant 6' diameter.

Simons Eastern Company, consulting engineers based in Atlanta, helped write purchasing specifications which called for DERAKANE 411-45 Vinyl Ester Resin. Brunswick then selected Caldwell-MacKay Co., Inc., Birmingham, Alabama, to design and furnish an FRP scrubber system to handle contaminated air streams from three separate bleaching facilities.

According to Rick MacKay, chemical engineer and vice president of engineering for Caldwell-MacKay, several designs were considered before a packed tower design featuring Glitsch 3" Kynar® ballast saddles was chosen. "This design offers easy maintenance, better flow of lime mud residue, and mass transfer coefficients which ensure up to 95% removal (by weight) of chlorine and chlorine dioxide," he explains.

"Because of the highly corrosive environment, DERAKANE 411-45 Resin was specified to laminate the inner corrosion barrier," MacKay continues. To overwrap the inner laminate, DERAKANE 530 Resin (formerly DOW Experimental Resin XP 71730.00) was specified because of its superior flexural strength and fire retardant properties¹. "Coupon testing and field data convinced us that laminates made with DERAKANE 530 Resin offer chemical resistance superior to

competing vinyl ester resins," MacKay says.

Caldwell-MacKay selected LaValley to fabricate the scrubber system because of the company's reputation as one of the most experienced FRP fabricators in the region.

LaValley fabricated the 60' long, 14' diameter scrubber by bonding together three 20' "cans", according to Hall. These cans had to be bonded together horizontally because LaValley's shop ceiling could not accommodate a vertical assembly, he adds. The stack and cone were fabricated in one piece from a mold.

All three pieces are at least 1/2" thick, with a maximum 1 1/2" thickness. The scrubber body thickness tapers from 1 1/2" at the base to 1" at the top. The cone wall thickness is a constant 1". The stack wall varies from 1" at the bottom to 1/2" at the top. LaValley also fabricated 2"-thick flanges for the installation.

DERAKANE 411-45 Resin cured with benzoyl peroxide-dimethylaniline was used by LaValley for the inner 1/4" of all surfaces. A 40-mil layer of Nexus veil added extra corrosion resistance. The next 1/4" was fabricated with DERAKANE 411-45 Resin cured with methyl ethyl ketone peroxide (MEKP) and cobalt. Notes Hall, "We use MEKP as a standard catalyst for about 90% of our fiberglass projects."

DERAKANE 530 Resin combined with NYACOL APE 1540 was used to fabricate the remainder of the varying walls. A 10-man crew from LaValley worked in their shop for three months fabricating the scrubber body, cone, stack and flanges.

The completed scrubber weighed more than 40,000 pounds. In order to transport it in one piece from LaValley's Biloxi shop to the plant site, LaValley hired an Alabama leasing company to build

a custom trailer. The other components were shipped on standard flatbed trailers.

R.E. Thomas Erectors Inc., a Brunswick-based construction company, was contracted to assemble the three pieces in the field. Thomas poured a 10"-thick concrete pad for a foundation, and erected a platform 85' high to help support the scrubber and stack.

Thomas then surrounded the assembly with a steel frame that serves as a support structure. The four-column, 25'-square building rises to a height of 170'. It took the 12-man Thomas crew 30 working days to assemble the scrubber apparatus and erect the steel frame building. It went into service in December 1984. Completely assembled, it stands more than 200' tall, according to Robert Thomas, president of R.E. Thomas Erectors.

Notes MacKay, "Not only is this system one of the largest in the United States, but its blend of engineering and fabricating expertise with quality materials makes it one of the most efficient bleach plant scrubbers ever built." ■

¹ While DERAKANE Vinyl Ester Resins offer fire retardant properties, all DERAKANE resins are organic materials. Products made with them will burn under the right conditions of heat and oxygen supply.