



**TECHNICAL
ARTICLE
SERIES**

Pump Moves Glue Easily

ARTICLE # TL-104

INDUSTRY: Pulp and Paper

ENTITY: Sierra Lumber Company

SOLUTION(S) PUMPED: Polyvinyl acetate glue

PUMP TYPE(S): FLEX-I-LINER Sealless Self-Priming Peristaltic Pumps

Vanton Pump & Equipment Corp.
201 Sweetland Avenue
Hillside, NJ 07205 USA
Telephone: 908-688-4216
Fax: 908-686-9314
E-Mail: mkt@vanton.com
www.vanton.com

Vanton Pumps (Europe) Ltd
Unit 4, Royle Park
Royle Street
Congleton, Cheshire, UK CW12 1JJ
Telephone: 01260 277040
Fax: 01260 280605
www.vantonpump.com

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Reprinted from PLANT SERVICES

Paul Wnuk, General Manager

Jim O'Bannon, Finger Jointer Supervisor, Sierra Lumber Co., Stockton, CA

Morgan C. Larkin, Editor-West



Shown is the close-coupled pump used at Sierra Lumber Co. The Flex-i-liner® progressive cavity operation requires no packing or gaskets.

Sierra Lumber Company in Stockton, CA, manufactures components for wood doors for home building. The door framing is assembled using glued, interlocking finger joints, which are accurately cut and fit.

A chronic problem at the jointer machine had been the pumping of a viscous, catalyzed, polyvinyl acetate glue to the point of application. Plugging and expensive parts replacements caused frequent difficulties. Personnel at Sierra felt that a pump more compatible with their procedure and materials would alleviate the problems.

Solution

The parameters for the glue pump included continuous delivery of up to 4 gpm against a 10 psig head. Flow characteristics would be governed by the 150-cp viscosity of the glue. Although the catalyst was already in the glue, curing was slow enough so that set-up was minimized in transport and was timed to be effective on the wood when joined.

Research revealed a rotary, squeegee-type cavity pump in which the fluid is isolated from moving parts.

With this background, research revealed a rotary, squeegee-type cavity pump in which the fluid is isolated from any moving mechanical parts. The pump dimensions are about 15 inches long, 7 inches wide and 8 inches high, allowing a compact installation. Hose connections are 1 inch.

In operation, a close-coupled ¼-hp, 1750-rpm motor turns a cylindrical rotor on an off-center shaft, thereby providing a cam-like action. The rotor oscillates inside a flexible, neoprene liner, deforming this to create a non-backflow seal and cavity within a circular opening in a heavy-duty Teflon® pump block. The sealing zone of the liner, moved by the off-set rotor, induces inlet flow through the intake and simultaneously forces the glue through the outlet. The inlet and outlet cavities between liner and block are separated from one another by a raised segment of the liner, which extends into the block.

Glue delivery thus is carried out with many of the advantages of positive displacement. The pump is self-priming, withstands dry-running without damage and is immune to air bubbles or vapor lock. Agitation of the fluid is minimized.

The components of the pump are comprised of a cast iron motor bearing plate through which the shaft connects with the phenolic resin rotor. Bearings are permanently lubricated and there is no need for a stuffing box. Not only are mechanical parts isolated from the glue, but conversely, there is no danger of contamination of the fluid by any lubricants.

The liner is cylindrical and has a thick wall. The deformation and pumping movement is well within the flexing limits of neoprene. Change of liner for preventive maintenance is required about once a year. The pump is assembled between a cast-iron front plate bolted to the motor plate by four lag bolts. Flanges on the flexible liner are received in machined grooves in the plates to assure total closure without seals. Disassembly and reassembly of the pump require about fifteen minutes.

The only sliding contact is between the rotor and the inside surface of the liner. This friction is alleviated by the addition of seven drops per week of a silicone lubricant applied through a head-mounted oil cup. When idle, the pump is its own check valve and the liner-block contact prevents back flow.

One pump has been in service for 1-½ years and a second was put into operation about 6 months ago.

Results

There has been no interruption of the jointer due to failure of glue supply since the pumps were installed. Sierra Lumber engineers feel that the sealless, squeegee pumps have solved their problem.

Viscosities of familiar fluids

Fluid	SSU
#2 FUEL OIL	40
SULFURIC ACID	75
SAE 10 ENGINE OIL	200
SAE 20 ENGINE OIL	300
SAE 30 ENGINE OIL	500
SAE 40 ENGINE OIL	750
SAE 50 ENGINE OIL	1220
SAE 60 ENGINE OIL	2000
SAE 70 ENGINE OIL	2800
LIGHT CORN SYRUP (KARO)	5200

Flex-i-liner® Rotary Diaphragm Pumps

PERFORMANCE CURVES

(EFFECT ON OUTPUT AT DIFFERENT VISCOSITIES)

