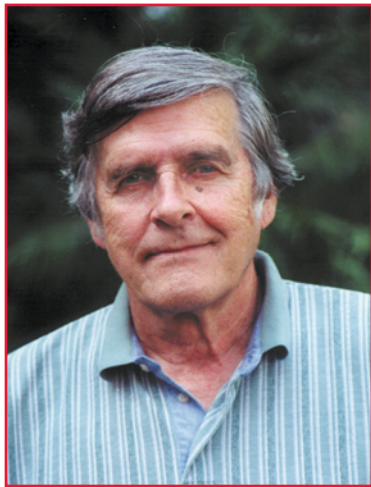




Jet Assist: heat boost on flute tips helps increase running speeds

*Bill Nikkel*

by Bill Kahn

Our colleague Bill Nikkel was the group leader of a small team which developed the Jet Assist in the late 1960s at the Westvaco Research Laboratory in Covington, VA. This process was patented in 1969.

The Jet Assist process uses live steam to supply heat to the still uncovered glue lines on the single face web before it enters the double facer. The live steam impinges onto the glue lines through small, closely spaced exit holes from a manifold, which was carefully developed and designed for optimal heat transfer efficiency.

At low speeds, the glue lines may be fully gelled before entering the double facer and making contact with the liner surface. However, the soft gel will still be moist from the steam having condensed on it, and this will effectively wet the liner surface and produce good bonding.

At higher speeds, the condensing steam raises the temperature of the glue lines significantly, thus reducing the amount of additional heat required from the hot plates to set the starch bond. This translates into increased running speeds.

Proper installation is the key to predictable performance

by Rex Woodville-Price

The Jet Assist is a great complement to a machine that runs heavier board, particularly double and triple wall. However, for it to provide all its potential benefits, it is important that it be installed correctly. Here are some tips that will help get the most out of your Jet Assist.

If you are installing a single unit, you will reap the most benefit by placing it under the top web. This is the most challenging bond when running double wall, so it makes sense to add heat to that web. Since the steam that exits the unit comes out at low pressure, it needs to be placed close to the web. Three quarters of an inch from the web is ideal.

We want to feed the manifold with live steam, not salvaged steam. A steam separator must be installed in the steam line just upstream of the Jet Assist to make sure it gets dry steam. This will avoid an excess of condensate getting into the Jet Assist and spewing onto the web. Though we feed the manifold with live steam, the pressure inside the 1" x 2" extending distribution tube is only somewhere between 5 to 10 psi. The steam pressure at the exit holes of the main manifold is only in the order of 1/4" to 1/2" water column. This is less than 1 psi and produces very low steam velocity, which will not disturb the glue lines. A small pressure gauge (0 to 30 psi) should be placed on the operator side of the unit so that application pressure can be monitored and adjusted.

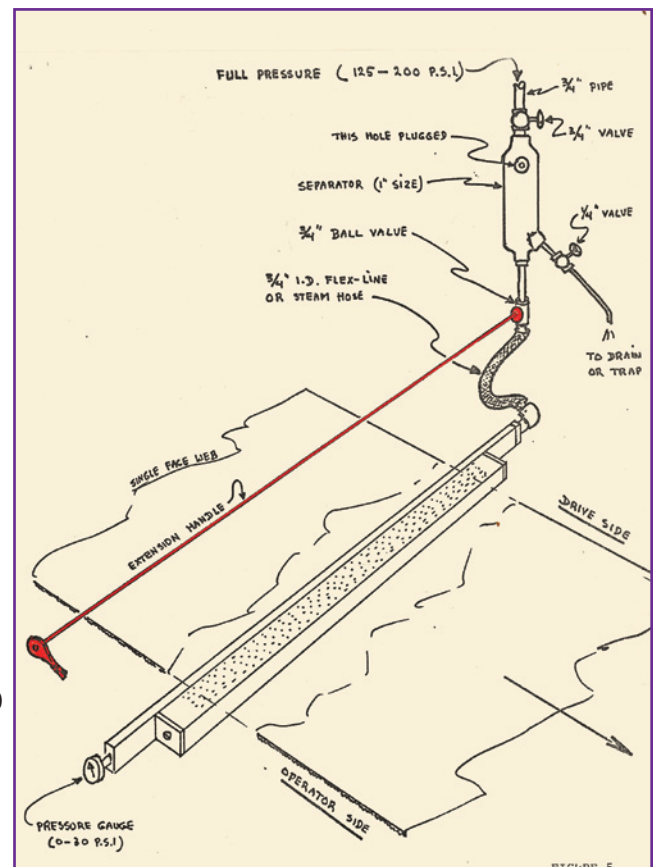


FIGURE 5

Make sure that the hoses or pipes that feed the Jet Assist are at least 1/2" ID throughout the entire run, and that those fittings or connections do not have internal passages that are smaller than 1/2". This is can sometimes be the case with 1/2" port valves, which can have restriction of less than 1/2", in spite of their nominal sizing.



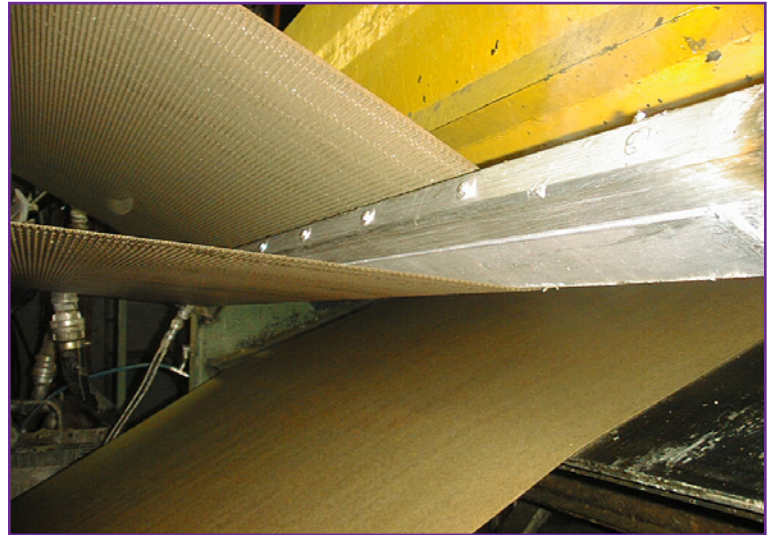
Heat and steam flow vary with machine speed

Since the heat requirements of the bonding process vary with speed, it is useful to be able to control the steam flow to the Jet Assist. A useful feature is a speed-controlled valve, which will regulate the steam flow to the Jet Assist as the machine changes run speeds. A typical setup for these is to have the steam flow shut off below 200 fpm. At those speeds the hot plates have ample heat to bond the board and no additional heat is usually needed. Between 200 fpm and an adjustable preset, say 450 fpm for example, the steam flow is directed through a valve which can be regulated to suit each machine. Above the second preset, 450 fpm in this case, the Jet Assist receives the full steam flow allowed by the regulator.

A small pressure gauge should be placed on the operator side of the unit so application pressure can be monitored and adjusted. Note position of condensate drain at lowest corner of the manifold.



Take care to install the unit in its correct orientation so that the condensate drain is in the lowest position. The unit should be mounted as level (side to side) as is practical, and of course it should be parallel to the web both in machine direction as well as side to side. This will also ensure even heat application and proper drainage of any condensate. The unit should be mounted so that it can be swung down 90 degrees and hang in that position when not in use. It should hinge from the upstream side so that when rotated, it will turn the perforated face of the unit, away from the moving web and keep debris or adhesive splatter from plugging up the exit holes. This will also prevent the web



from rubbing on it and coating it with starch. When the unit is running, detritus is less likely to obstruct the holes because there is steam coming out of them.

The Jet Assist resides under the web as it goes into the double backer. Since the web is angled upwards towards the glue pan, steam is trapped there by the web and can tend to migrate towards the pan. Steam accumulating on the underside of the glue tray may overheat the adhesive contained in it. Make sure the Jet Assist unit is mounted as close to the mouth of the double backer as possible. This is desirable not only because it applies the heat at the last possible moment before the bond occurs, but also because it places the unit as far away from the glue pan as practical. It is advisable to place a small fan, or better yet an air line, blowing air across the machine to move steam away from the glue pan, thus preventing it from gelling the starch contained in it. Results are best if the steam is moved from the operator side towards the drive side of the machine, so as to avoid blowing steam on the operators.

A Jet Assist can be a useful tool in improving run speeds on heavier board. It is a small investment and is inexpensive to operate (typically steam costs are less than \$10 per hour at full load). In order to obtain full benefit, the user needs to mount it properly, feed adequately controlled steam and ensure proper maintenance is performed on the unit.

Jet Assist care and feeding

Trouble-free operation depends on cleanliness and proper adjustment

by John Kohl

The Jet Assist manifold is not just a rectangular aluminum tube with some holes drilled into it. It is a complex mechanism that must be installed correctly and maintained properly. Like any other part of the corrugator that is in an area of high dust and adhesive spray, cleanliness is critical. It is designed to supply even pressure steam to the flute tips across the entire web. In order for it to deliver its full potential it should be included in the weekly cleaning and preventive maintenance program. All too often we see them dirty and caked with starch and paper dust.

Correct mounting (3/4" away from, and parallel to, the SF web) is critical to maintain equal heating across the web. Uneven heating of the flute tips, even by 10°F, will cause warp in the combined board. During installation the Jet Assist should be mounted with swivel brackets to allow the unit to swing down into a vertical position with the holes facing the throat of the double backer. This will prevent the buildup of starch and paper dust in the steam holes when not in use. Also, mounting with slotted brackets to allow easy removal is desirable for maintenance and cleaning.

A steam separator is required in the steam line close to the manifold to remove condensate from the steam before it is fed to the Jet Assist.

The drain at the bottom of the manifold should always be kept clear. This will prevent a large slug of water from spraying onto the web and causing wet board or a tear out.

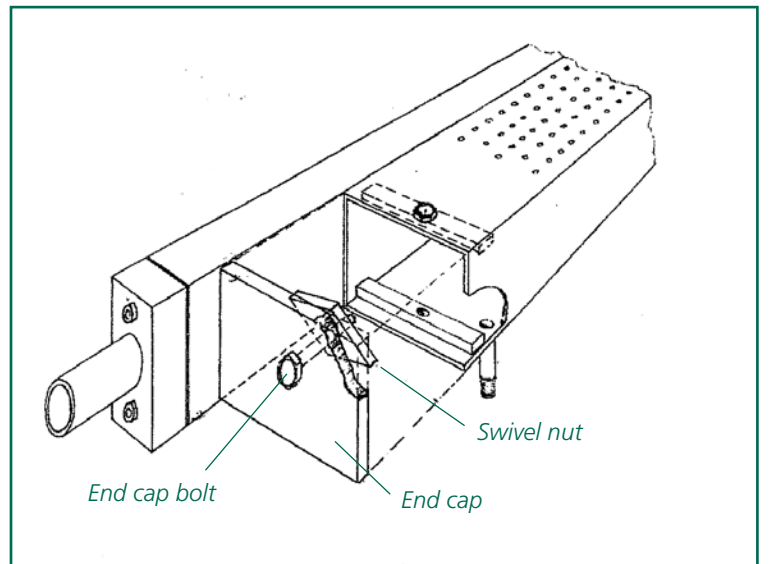
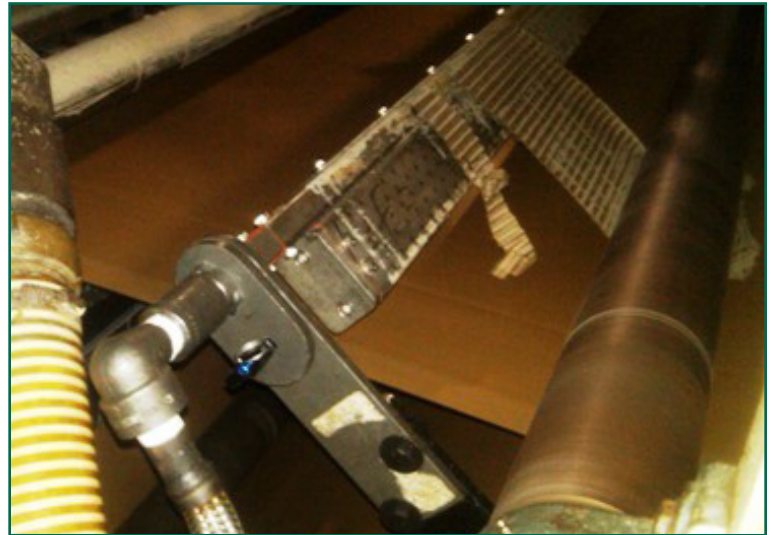
Weekly PM Items

- Check condensate drain to ensure it is clear of debris
- Scrape dried and gelled starch from manifold face
- Clean out 1/8" steam holes with a wire rod or nail
- Remove chamber end covers to clean out inside of tube
- Keep the drain connection at the bottom of the separator in the feeding steam line clear

During weekly PM it is advisable to remove both end caps and flush the tube with water or blow out with compressed air to clean out any debris. To remove the end cap, loosen the end cap bolt a few turns; then push it in and rotate the swivel nut one-fourth turn. The end plate and swivel nut will pull off as a unit.



The location of the Jet Assist manifold on the corrugator makes it vulnerable to dust, adhesive, and debris. Regular maintenance will prevent performance failure.



- How to maintain it
- How to install it
- What it does

In this issue: Jet Assist

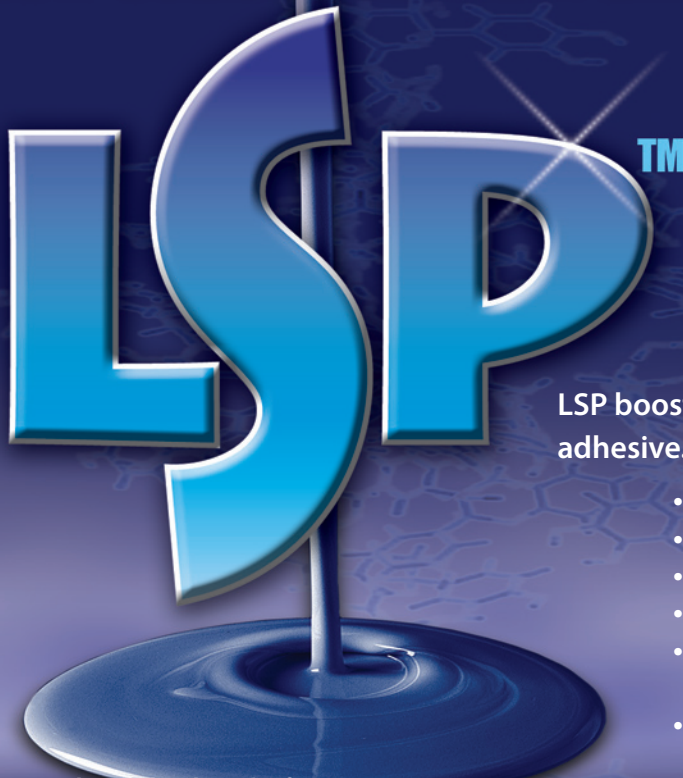
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