FLOODED DRYERS

A useful aid in helping to troubleshoot flooded dryers is the installation of pressure monitoring gauges on the rotary joint (see Diagram A). By installing a differential test assembly you can determine the pressure drop from pressure inlet to outlet. Paper machine syphons require a differential pressure (Delta P, ΔP) to evacuate the dryers. Kadant Johnson uses the following Delta P numbers (as a rule of thumb) in relation to speed (see Table A). Should your speed/Delta P be considerably different than those listed in Table A, we would expect some problems in your system. We recommend at least two joints in each steam section be equipped with a Delta P gauge system. During normal operation these pressure taps should be checked against the differential pressure recorder that monitors header to header pressure. Should a dryer flood, it will require considerably higher Delta P (than is normal) to recover.
Infra-red guns may be used to help determine flooded dryers. They are used as a relative guide to spotting flooded or inactive dryers. Caution is advised, however, low temperature readings don’t always indicate flooded dryers. Surface contact thermocouples with consistent pressure are more reliable.

When dryers with rotary syphons are suspected of being flooded, remember to always stop the dryers so that the manhole is at the top. When installing rotary syphons, the spring should be at the top (12 o’clock) and the pick-up fitting at the bottom (6 o’clock). When the dryers stop, the syphon will continue to evacuate condensate as long as steam pressure is available. In a flooded condition the differential pressure will need to be increased. You may find that twice the Delta P will be required to evacuate a flooded dryer. This process could take up to an hour or more. Periodic checks of your sight flow indicators will enable you to determine when the dryer is no longer flooded.

Sight flow indicators help determine if a dryer is flooded. During initial evacuation of a flooded dryer, the flow of condensate through the sight flow will appear to be a solid column of water. During normal operation, the flow will appear to be a mixture of wet steam and condensate (called a bi-phase flow). Fairly active blow-through steam and condensate flow through the sight flow indicator is required. Check the sight flow devices for proper drainage during operation. Should you see either surges of water/condensate or no flow at all, your system needs review.

During short shutdowns, 4-6 hours, when dryers are too hot to enter, the following can be checked to insure the integrity of the syphoning system.

**PACKING GLAND**

Remove the rotary joint head casting and packing gland. Check the packing and repack with Kadant Johnson packing should the existing packing not be soft and pliable. Re-install the packing gland and tighten to approximately 30 ft-lbs. The packing and packing gland provide a static seal and thereby the internal parts rotate together.

**HORIZONTAL OUTLET PIPE**

The outlet pipe should not protrude through the packing gland more than 3/8", otherwise the flow of the condensate may impinge on the outlet head casting wall surface and could erode the casting wall thickness. (Diagram B - Item 1).

**SYPHON EQUIPMENT**

With the head casting still off the rotary joint you can back-flush water through the syphon outlet pipe (Diagram B). A second person should remove the manhole cover and by floodlight view the syphon equipment internally. The water should bubble out around the syphon pickup fitting* (Diagram C). Water dripping out of any other point indicates a short circuit. A break in the outlet pipe, blown gaskets, bad packing, etc. will result in a loss of Delta P which will lead to a flooded dryer. The syphon pick-up fitting is manufactured to have a clearance of 1/16". Occasionally check this opening clearance and verify that the opening is not plugged with debris (especially after a shutdown).

**FLOODED DRYERS**

After 8 hours downtime, feel the lower side of the dryer shell. Dryers with excessive water will be warmer then those that are not flooded. Infra-red guns can be used for this check also.

**MISALIGNMENT**

The greatest cause of pre-mature carbon seal ring failure is misalignment of the rotary joint. This is evident when the joint wobbles during operation. When such a wobble takes place, the carbon seal ring (the internal sealing surface) is pinched against the I.D. of the joint housing and unusual wear or breakage may follow.

It is imperative that the joint be installed with flexible metal hoses (inlet and outlet). As seal ring wear takes place, a non-compensated joint will move away from the journal end. The hoses will allow for this movement. The hoses are to be of proper length to allow flexibility (contact the factory for proper lengths). All associated flanges/bolts must be tightened evenly on all sides so as not to force the joint out of alignment. Tighten bolts 180° from one another in a gradual manner. (Diagram D - Item 3).

Check the opening at the back side of the joint housing to verify that the clearance around the circumference of the nipple is even. (Diagram B - Item 2). If not, adjust support brackets and piping to and from the joint. All parts should either be parallel or perpendicular to the joint centerline for proper operation.
Diagram B

Diagram C

MANHOLE IN 12 O'CLOCK POSITION

KADANT JOHNSON ROTARY SYPHON

SYPHON PICK-UP FITTING (1/16" CLEARANCE)

SIGHT FLOW INDICATOR (TO VIEW FLOW)
JOINTS BLOWING STEAM

Verify that the gaskets have not blown out. On joints with a quick release nipple, be sure to check the metal gasket at the end of the nipple (inside the journal flange). Replace any questionable gaskets as required. (Diagram D - Item 4).

STEAM SLEEVES

Sometimes a leak near the nipple flange is actually coming from the weep hole in the journal flange. Upon removal of the Q nipple flange, look at the back of it where the weep hole impinged on its surface indicating a leak (Diagram D - Item 5).

Kadant Johnson’s warranty coverage requires that any and all parts assembled or replaced in any of our equipment be genuine Kadant Johnson parts. The use of non-Kadant Johnson parts will void the product warranty.

NOTE: Please follow your company’s safety procedures whenever working on Kadant Johnson rotary joints and read all of the instructions completely before proceeding.

Please refer to the assembly drawings supplied with your Kadant Johnson rotary joint for part identification. If you have any questions, please contact your Representative or Kadant Johnson.

The Kadant Johnson Warranty

Kadant Johnson products are built to a high standard of quality. Performance is what you desire; that is what we provide. Kadant Johnson products are warranted against defects in materials and workmanship for a period of one year after date of shipment. It is expressly understood and agreed that the limit of Kadant Johnson’s liability shall, at Kadant Johnson’s sole option, be the repair or resupply of a like quantity of non-defective product.

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