ProJet - Best cleaning practice on forming fabrics and press felts

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INTRODUCTION:

The Forming Section and Forming Fabrics on Paper Machines

The forming of the paper sheet is the most critical phase in the paper production process. The cleanliness throughout the operating life of the forming fabrics is critical to maintain paper quality on a high quality. A clean Forming Fabric, with consistently high permeability and dewatering capabilities, delivers important productivity and performance advantages. Better dewatering in the Forming Section leads substantial improvement in dryness level when the sheet leaves the Wire Section, into the Press Section. Forming Fabrics loose dewatering ability when contamination builds up over time. More and more contamination can be found on Forming Fabrics caused by an increasing use of secondary fibers, recycling of coated broke, increasing use of sheet fillers, an increased use of recycled mill water supplies, and the increased use of process chemicals. Typical contaminants are wet strength resins, retention aids, stickies, scale, de-foamers, calcium carbonate, clay, starch, and alkaline size.

Controlling contamination on machine clothing on Tissue machines

Controlling contamination on a tissue machine is critically important. A customized cleaning program for machine clothing will keep the tissue machine running efficiently and producing high quality tissue. A Tissue crescent former forming fabric and press felt are relatively short and run at high-speed making effective cleaning more challenging. In combination with the industry trend to use more recycled fiber, result in unique cleaning requirements for tissue machines.

Typical contaminants found in tissue clothing are similar as in paper machines, mentioned afore, plus paper fines, Yankee coatings, and rust, The biggest cleaning challenge for forming fabrics are stickies and other contaminants that are not water-soluble. These contaminants start to collect in machine's clothing yarn crossover points. Once small particles (stickies) attach, they attract other stickies and they start to conglomerate.

While these conglomerates are growing, they more and more will affect the drainage path of the fabric, eventually leading holes in the sheet. Most high-speed tissue machines are using triple layer forming fabrics which provide the best sheet formation on the sheet side and longer life for the inner layer of the fabric. Sheet dewatering occurs when the press felt transfers water from the sheet to the press through microscopic voids in the felt. Water transfer cannot occur properly anymore when the channels are blocked with contaminants or gels. Properly cleaned press fabrics maintain their voids and provide consistent, dewatering performance throughout the life and have a positive effect on dewatering efficiency, energy use, sheet profile, sheet bulkiness and press felt life.

Conventional cleaning methods for Forming Fabrics and Press Felts

Cleaning methods can be classified in chemical and mechanical; while chemical is becoming less common, it still required for certain conditions. Mechanical (high pressure) is the most widely used method.

The conventional cleaning method comprises of an oscillating HP shower on the sheet side and a flooded nip shower on the inside.

Figure 1: Typical "stickies" on a Forming Fabric.

Typical pressure varies between 15-40 bar (230-600 psi) and typical nozzle size is 0.8-1.0mm (.032"-.040"). This leads, depending on number of nozzles and sheet width, to a water consumption between 100.0 – 250.0 ltr/min (25.0 – 100.0 GPM). Typical power consumption of the HP pump for these showers is 40.0 – 80.0kW (50.0 – 100.0hp).

Figure 2: ProJet's ProCleaner in operation on a Top Former.

ProJet ProCleanerTM, traversing head shower

ProJet (www.pro-jet.nl), a company from the Netherlands, has developed a revolutionary new cleaning technology, called ProCleanerTM, using a multi nozzle traversing head, that has some unique advantages over traditional HP showers. The ProCleanerTM is located on the sheet side at an inside return roll.

The ProJet cleaning heads are equipped with ProMax chemical spraying capability to enhance cleaning efficiency even further. ProMax can be added continuously or intermittently for the Forming Fabrics of the middle layers of the board, which tend to contaminate more. The ProJet Cleaners are furthermore equipped with PLUS-mode, which guarantees highest possible cleaning capacity if and when required.

Applying a ProJet ProCleanerTM guarantees consistently clean Forming Fabrics and Press Felts from beginning to end of the usable life, which deliver the following significant advantages over conventional showers:

- In most cases, conventional HP showers can be switched off leading to water consumption savings of up to 90%.
- Lower power consumption of HP pump, up to 80%.
- PMC life will be substantially improved.
- Less shutdowns will be required for manual and chemical cleaning, as well as less shutdowns for PMC changes. This will provide increased manufacturing productivity and profitability.

- Maintaining consistently high Forming Fabric and Press Felt permeability and dewatering capabilities increases dryness of the sheet when leaving the Wet Section and entering the Dryer Section.
- Capability for programing Zone Cleaning, i.e. targeted cleaning of contaminated zones in cross machine direction.
- Reduced number of sheet breaks, caused by contaminated PMC.
- ater mist elimination is achieved by the application of air knives that contain water mist and contamination, which is discharged through Venturi tubes and finally into a save all pan.
- The system has a Park Position outside the machine, which enables maintenance such as nozzle and filter changes during production.

Flexibility in cleaning parameters :

The ProJet ProCleanerTM is designed with maximum flexibility to adapt the system to every machine situation, paper grade, furnish and required cleaning conditions. ProJet has designed the pump station and control system to be able to choose from the optimum set of parameters:

- Traversing speed: can be synchronized with the machine speed, so maximum coverage is achieved and overlapping of nozzles is minimized
- Cleaning width: the cleaning head is equipped with an encoder, so the head can be sent to certain areas of the felt that can then be cleaned more intensively for a certain period of time, before returning to full width cleaning. Customers have identified this as a problem-solving tool when other disturbances in the production process lead to dirty streaks on the felt.
- Pressure: The pump is designed to have a maximum pressure of 240 bar (3,500psi). This allows the system to run e.g. with higher pressure and smaller nozzles.
- Nozzle size: The nozzle size is typically between 0.2-0.3mm, but can be varied to optimize the cleaning efficiency.

ROI calculator:

ProJet understands that each client application is unique. For that reason, ProJet developed an automated ROI-calculator that will be applied to each application and produced paper grade. By contacting info@pro-jet.nl ProJet will perform a no-charge ROI calculation of any Forming Fabric, Press Felt or Dryer Fabric application. After inputting the process parameters provided by customers, they will be provided with a ROI-Analysis of each specific application and investment justification. **www.pro-jet.nl**

Figure 3: Multiple ProJet pump stations for Forming Fabric, Press Felt and Dryer Fabric Cleaners.