Doctor Design Considerations

Doctor Backs and Blade Holders

Essco's engineering department designs a doctor support beam (the doctor back) of the size, balance, strength, deflection, and vibration resistance sufficient to meet, or exceed, your application needs.

We select from structural angles, pipes, specially fabricated weldments, scoop backs, or apron backs to suit the space and requirements. Carbon steel, 304, 316, or special stainless steels in solid or clad construction are selected, fabricated, stress relieved and machined.

Machining of the blade holder-mounting surface is critical and we take great care to ensure that this important surface will conform to your roll, whether straight or crowned. We chart the machining results in thousandths of an inch, and maintain this chart as a permanent quality control record of your doctor.

With the integrity of the critical mounting surface now assured, the appropriate blade holder can be securely attached. Essco offers a wide variety of standard and custom holders designed to meet your needs.

Doctor design is dependent on many factors. Proper design and manufacturing procedures are crucial to successful installation, start-up, and ongoing performance.

Application

Doctors are used to perform a variety of functions. Depending on machine position, a doctor may be required to remove water, clean the roll, remove the sheet, direct the sheet, or some combination of these functions. Proper doctor design must take all of these factors into account, as well as many others.

Doctor Size

Doctors must be properly sized for the application. Considerations include roll width, machine speed, harmonics analysis, and space constraints on the paper machine. Doctor back sections increase in size as width and machine speed increase. However, there are often alternative designs that can achieve strength requirements in tight applications.

Roll Crown

Doctors are designed to match the roll crown where applicable. Proper crown information is critical to the performance of the doctor. Changes in roll crown may require modifications to the doctor, although Essco's ETUniform blade holder does provide some flexibility to changing crowns.

Loading Pressure

Proper loading is a critical element of doctor performance. Doctors with rigid holders such as the KF-35A must be designed with a proper natural balance in order to achieve proper loading pressure, particularly when equipped with pressure rig loading.

Pneumatic holders generate loading independent of the doctor balance. However, for safety considerations, doctors are designed with a slight positive natural loading whenever possible. This reduces the risk of the doctor rotating backwards during maintenance procedures.

Oscillation

Most doctors clean rolls more effectively when oscillated. Stroke length and frequency are not particularly crucial. It is simply necessary to minimize dwell time at the end of each stroke in order to keep the oscillation continuous. Oscillation improves the cleaning effectiveness of the doctor and reduces the risk of scratching or grooving a roll.

Essco offers both pneumatic and electromechanical models. The pneumatic model can also be run on water pressure, and includes the option of a closed loop recirculating system.

Corrosion Protection

Machine position normally dictates doctor back construction material. Essco can supply painted carbon steel doctors, stainless steel-clad doctors, and solid stainless steel doctors.

Determination of clad or solid stainless construction is usually driven by cost considerations. Solid doctors are normally less expensive up to a certain point, which can change as stainless steel prices fluctuate.

Clad doctors require special consideration. Essco's cladding system includes solid stainless steel journal pads, blade holder nosepiece, and cross-machine accessory pads when necessary. This insures that the structural integrity of the cladding remains intact.

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