

February 22, 1993

Company Name and Address

Attention: Mr.

Subject: Eaton/Airflex Clutches on Paper Mills

Dear Mr.:

We are pleased to advise preventive maintenance information on the subject clutches. These instructions are a guide to extending the life of the Airflex clutches on your paper machines.

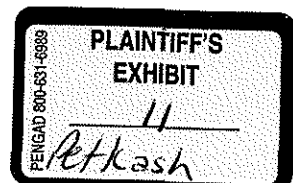
To insure a good service life, the clutch must be the appropriate size for the application. The clutch must satisfy the TAPPI torque, acceleration torque and energy requirements for a given section.

Normally, a couch, press, calender or reel section is sized based on TAPPI torque requirements. The TAPPI torque is calculated by utilizing the normal running load constant developed by TAPPI, width of the machine, paper speed and speed at the clutch. The clutch is then sized to develop the TAPPI torque with an appropriate safety factor. The energy requirements are analyzed to insure the size.

Due to large inertias, dryer clutches are sized based on their energy capacity. To insure a good service life from the friction material, the energy loading does not exceed 3000 ft-lb/in². The selection is then checked to see if it yields the applicable TAPPI and acceleration torques with the available air pressure.

The clutch must start-up the section at an appropriate acceleration rate. Normally, a rate of 22 FPM/second for dryer sections, 40 FPM/second for all other sections will properly protect the drive components of each section.

On the air line, a pressure gauge should be located before the clutch. The gauge should be marked at the minimum air pressure to properly operate the section.



We suggest strobing the clutch element/drum while the section is running, to see if it is slipping. If the element is slipping, increase the air pressure until the slipping stops. This exercise can be performed once a week, before a shutdown or for a change in paper weight.

Slipping will occur if there is an increase in load to the cans of a section. For example, if a condensate pump fails, the dryer cans fill up with water increasing the total load of the section. The load at the clutch could be two times the normal running load. Slipping occurs wearing out the friction material. The air pressure should be increased. After the pump is fixed, the air pressure can be decreased to the minimum operating pressure.

We suggest starting a section with the doctor blades up. If the blades are down, the clutch will experience a large load that could cause slipping.

If the air pressure is increased to the maximum plant pressure and the clutch continues to slip, the clutch and drum must be removed for inspection. We suggest following these inspection instructions.

- If the friction linings are glazed, they may be lightly sanded to remove the glazing provided they do not contain asbestos. Clean the edge of the lining. If a blue stripe and a white stripe along with brass flakes in the friction material are present, then the lining contains asbestos. Using the appropriate precautions for working with asbestos, remove the lining and dispose of properly. Do not attempt to sand friction material containing asbestos.
- A wear groove indicator is provided on each end of genuine Airflex friction blocks. When the groove is not present, then the blocks must be replaced. The groove represents the minimum allowable thickness. If the blocks wear past the groove, the drum could be damaged by the rivets.
- Tapered wear across the friction surface typically indicates a worn drum and/or misalignment. If two or more adjacent shoes are worn on one end only, the air actuating tube has most likely developed a ply separation at that location.

- Check the outside diameter of the drum and compare to the minimum drum diameters. Operation of a clutch on a drum that has worn or has been machined to less than minimum drum diameter will result in damage to element components. The minimum drum diameters for the clutches Company Name utilizes are:

Clutch Size	Minimum Drum Diameter
11.5VC500	11.41 in
16VC600	15.91 in
20VC600	19.88 in
24VC650	23.88 in

- Check the drum for heat-checking, which may be removed by machining the drum outside diameter. If the drum has been subjected to excessive heat, the open end may flare out, giving the impression that drum has not worn. It is therefore important to check the diameter at several locations across the face.

The following inspections should be made when the clutch element is disassembled:

- Wear on the ends of the backing plates from bearing against the side plates is indicative of misalignment or thrusting. If wear is on one end only, and uniform for all backing plates, a worn drum may be causing the shoes to thrust as the element engages. If wear exists on both ends of all of the backing plates, excessive misalignment is probably the cause. Slight notching in the torque bar cavity is normal; however, if the notching occurs in a short amount of time, check shaft alignment. If both walls in the torque bar cavity are notched, there may be a significant vibration problem.
- Excessive wear at the ends of the torque bars where the release spring rides indicates excessive parallel misalignment.
- Any wear on the backing plates will also be reflected as elongation of the torque bar holes in the side plates.

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- Check the air actuating tube. If any portion of the tube is hard, charred or blistered, the tube must be replaced.

Periodic inspections can be made when a section is not running. The following inspections can be performed:

- Check the wear groove indicator.
- Oil or grease contamination will reduce the developed torque of the clutch, which would be a cause to increase air pressure due to slippage. Disassembly will be required to clean any oil or grease build-up. Do not attempt to use a solvent to remove oil or grease without first removing the element. While squirting a solvent into an installed clutch may improve performance temporarily, a fire hazard exists from the heat generated during slippage.
- In extremely dusty environments, dust may accumulate in the backing plate cavities to the point where the friction shoes will not properly retract. Dust accumulations may be vacuumed out of the cavities. Do not use compressed air to blow dust accumulations out of the backing plates. Although the friction material does not contain asbestos, the dust created as the friction material wears, along with the dust from the operating environment, may irritate respiratory systems.
- Repair any air leaks in the system.

If you are experiencing misalignment or vibration problems, please contact me.

We have enclosed a component parts schematic for your reference.

We hope that this information aids in your efforts to put together a preventative maintenance program for your Airflex clutches.

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Thank you for the opportunity to forward this material, and
if we can be of further assistance, please do not hesitate
in contacting me at (414) 786-4477.

Sincerely,

Sales Engineer
Title

Enclosure

CC: Marketing Services/Eaton Corporation

Barry Inman v. A.W. Chesteron, Inc. et al. 70/6/2010
St. Louis City Circuit Court No. 0922-CC090067