

Flooded Wheel Tutorial

The term “Flooded Wheel” is used to describe a particular condition when the supply of media to the wheel is greater than the wheel can dispense. The media will then accumulate in the feed spout and in many cases further up the feed line. The flow rate is actually reduced during this condition because the media cannot enter the wheel at a good velocity and flow rate.

#1 Test for Flooded Wheel:

Observe the wheel motor amperage reading during this (suspected) condition. Cut the flow of media to the wheel. If you have the flooded wheel condition the ammeter should continue indicate a stable reading until this accumulated media is passed and just as the last amount of media is allowed into the wheel the amperage will increase somewhat and drop to the idle amps condition.

#2 Test for Flooded Wheel:

With the wheel motor spinning and no media flow observe the idle amps amount. Slowly increase the media flow rate and continue to observe the ammeter. The motor amps should slowly increase as you increase the flow rate. Eventually the media flow rate will exceed the capability of the wheel to accept the media and the media will begin to accumulate in the feed spout. When this happens the motor amps will drop. As you continue to increase the media flow rate the ammeter will not show any increase because it is now choked, unable to pass more media.

Changes in Wheel Speed RPM:

#1 Condition: Fixed flow rate

As you increase the wheel speed the motor amperage must increase reflecting the higher acceleration of the media to higher velocity. Eventually the maximum motor amperage may be encountered and you cannot increase the wheel RPM above this point. Conversely, as you decrease the wheel speed the motor amperage will decrease proportionally.

#2 Condition: Fixed motor Amps (MagnaValve Control System)

As you increase the wheel speed the motor amperage will stay fixed. The only way to provide this reaction is to have the MagnaValve automatically reduce the flow rate and therefore keep the amperage constant. You should be able to increase the wheel RPM up to its maximum capacity and since the motor amps are not increasing you will not exceed the motor power rating.

As you decrease the wheel speed the MagnaValve will have to dispense more media in order to maintain the constant amperage requirement. A lower limit will be reached when the flooded wheel condition is achieved. The MagnaValve will go to full-flow condition, maximum output, as it attempts to satisfy the motor amps request. Once the media accumulates in the feed spout the flow will actually reduce since media velocity into the wheel is now drastically reduced. The MagnaValve Controller may trigger a low flow alarm (if it is set to a proper value) and the indicated Amps will be less than desired.

Questions? Call Electronics Incorporated 1-574-256-5001 Engineering Assistance