



## Procedure for Testing a Pressure Actuated Bypass System

### Perform this test at least once annually

1. Prior to beginning the test be sure that accessible, clean safety water is available and that facility personnel are wearing ammonia rated gloves and goggles. Several facility personnel may be needed to assist in the test (i.e. at nurse tank riser and at pump to record pressures, etc.).
2. Attach and open all liquid and vapor riser and nurse tank valves OR open manual bypass valve if there is a manual bypass in the pumping system. Let pressure to equalize between storage system and nurse tank OR within storage system piping if using the manual bypass.
3. Once the pressure is equalized record the pressure on the 0-400 psi gauge located in the discharge side of the pump. This is the **STATIC PRESSURE**.
4. Start the pump and route anhydrous ammonia (NH<sub>3</sub>) into the nurse tank OR back into the storage tank through the manual bypass valve.
5. Slowly close off the liquid riser valve OR the manual bypass valve.
  - A. What if the pump pulls down and/or an excessive pressure is encountered as indicated on the pressure gauge?  
Shut off pump. The pressure actuated (PA) bypass spring is either:
    1. Out of adjustment. The adjusting bolt or screw on the top of the PA bypass may have to be adjusted to the optimum pressure differential (PSID) for the pumping system – allowing full flow of pump back into storage tank without pump pull down and excessive pressure.
    2. Too large, that is, the spring has too high a PSID rating to allow the PA bypass

to open/bypass NH<sub>3</sub>. A correctly rated spring will need to be installed. The PA bypass may also need to be thoroughly cleaned and lubricated. Gaskets and o-rings may need to be replaced. An alternative would be to replace the entire PA bypass equipped with a correct sized spring that is preset for a specific identified PSID.

Begin the process again, starting with step #1.

- B. What if the pump does not pull down and/or have excessive pressure?

Continue to slowly close off the liquid riser valve or manual bypass valve until completely closed. Go to step #6.

6. While bypassing is occurring record the pressure on the 0-400 psi gauge located in the discharge side of the pump. This is referred to as the **BYPASS PRESSURE**.
7. Shut off the pump.
8. Performed the following calculation:

$$\text{Bypass Pressure} - \text{Static Pressure} = \text{PSID}$$

The PSID should be in the range of 30 to 50 without any notable pull down on the pump.

Document the date, **BYPASS** and **STATIC PRESSURE** and the resulting PSID for MDA review or future reference.

**Note:** the manual bypass must remain closed during normal operations to allow the PA bypass to perform its intended function.

Contact the Minnesota Department of Agriculture if you have questions.