



Moisture Sampling and Analysis

Draeger Tube Water Vapour 5/a-P (6728531) measures moisture by changing color when air/gas is passed through the tube. A chemical reaction takes place when water vapor from your air/gas system reacts with selenium dioxide + sulfuric acid to produce a reddish brown stain.

- A reddish-brown color change is a positive indication of moisture as seen in the photo below. Record the reddish-brown color change on your data sheet.
- Ignore any gray or light green stain. A gray or light green stain is NOT a positive indication of moisture.



When TRI receives your tube, we calculate your moisture based on the information you provide on your data sheet and we make sure you broke both ends of the tube properly. No analysis is performed in the lab.

- If your color change is in-between two black lines on the moisture tube estimate the color change.
- If you are testing to the NFPA 1989 specification and you have a color change of greater than seven (7) on your moisture tube, you will fail this specification. Please remember once an air system's desiccant reaches its limits the desiccant material is no longer able to absorb moisture and is in need of changing.
- For low pressure systems (below 200 psi) - if the color change reaches 100 before the time is up, stop the test and record the actual time it took to reach the 100 mark on the tube. This will allow TRI to properly calculate your moisture in ppm.

High Pressure (Desiccant Dryer) Systems - Several reasons you might be failing for moisture

- Desiccant cartridge needs to be changed because it is full.

When air is compressed, liquid water is squeezed out of the air but the air is still at 100% relative humidity while under compression. To remove the remaining moisture, compressors have filtration cartridges. If the filtration cartridge is working properly the air will be very dry. Then over time the filtration cartridge will no longer be able to absorb all the moisture and you will begin to see moisture show up in your air test. A filtration cartridge acts like a sponge and when it cannot absorb any more moisture it will fail to filter out moisture. Whether the air is humid or very dry outside a properly working filtration cartridge will dry your air.

- Cascade or Piping needs purging.

When trouble shooting your moisture problem, you should determine if it's possible you have moist air or liquid water in your cascade and or other piping. Dry air being produced by your compressor is then mixing with this moist air? If so, your cascade system needs to be drained and refilled with dry air. This is the only way you can get rid of the moisture. If you can sample immediately after your dryer, you should be able to confirm if this is happening.

- Long Lengths of hose being used during testing.

Is it possible you are sampling using a long hose >10 ft? Allowing compressed breathing air to flow through a fill hose that is less than or equal to 10 feet in length for 1 minute will purge the hose of room air and contaminates. Rubber and other



Moisture Sampling and Analysis

polymeric materials will slowly pass water vapor through their structure by the process of permeation. A longer length of hose will admit more water vapor into the air stream and could result in moisture levels above specification limits. If one does need to use longer lengths of hose, the hose should be stored with dry air inside and not open to the atmosphere, which contains significant amounts of moisture. Dry air in a stored hose should be at any positive pressure. High pressure is not required and could be dangerous.

- Condensation in Sampling Equipment.

If you collected multiple samples without letting the sampling equipment dry, an accumulation of moisture in the sampling equipment's cold body or aluminum Draeger tube fitting might be the cause. Warm and dry the sampling equipment before each use (after the first use).

Low Pressure (Refrigerated Dryer) Systems - Several reasons you might be failing for moisture

There are several reasons you might be failing for moisture:

- The refrigerator unit is not cooling to a temperature less than 40°F.
- The drain on the water separator might not be working properly.
- The unit is under sized for the air flow you are putting through it.
- Intermittent air flow will cause some units to allow moist air to get through.

You may want to consider changing to a pressure swing adsorption unit, especially if you need air that is dryer than -10°F.



Dr. Edward Golla, Ph.D., CIH, Laboratory Director

