

**PhyMetrix, Inc.**  
**Moisture Measurement Guidelines**

**Contaminants**

Moisture measurement sensing elements are often exposed to a variety of contaminants. The PhyMetrix probe is resilient and can withstand most of these contaminants, however the user should be aware of the effects some of the more relevant contaminants.

Corrosives:

Ammonia (NH<sub>3</sub>), HCl, SO<sub>3</sub> and Chlorine (Cl<sub>2</sub>) should be avoided; H<sub>2</sub>S, NO, NO<sub>2</sub>, N<sub>2</sub>O<sub>3</sub> or SO<sub>2</sub> can be present if the moisture content is below 10 PPMv. Sodium chloride (NaCl) can be present although at high moisture content it may give erroneous readings since it is hygroscopic and it will absorb moisture. Sodium hydroxide (NaOH) is deliquescent and highly corrosive, should be avoided. The combination of these and water can cause severe corrosion, to a point whereby parts can not be just cleaned but must be replaced.

When installing a sensor or connecting a portable instrument to a gas source that has some corrosives; make sure that the sensor and sample cell are dried from any moisture they may have been exposed from the ambient air prior to installation; as this moisture may mix with the corrosives and produce acids harmful to the sensor, seals and sample cell.

Conductive particulates or liquids:

Iron scale from pipe walls  
Carbon from furnaces  
Glycol droplets from glycol dehydrators  
Various conductive liquid droplets  
Mercury vapor

The Phymetrix sensor is designed such that only the porous oxide layer with gold coating is exposed to the media being measured. Therefore conductive contaminants will not effect the measurement. All other known moisture sensors have exposed sections of both conductors of the sensing element thus are greatly effected by conductive contaminants and produce erroneous measurements.

High velocity of high-density particulates should be avoided to prevent abrasion of seals and even the sensor surface. The sensor is shielded to prevent direct exposure to the flow, however depending on the flow path and velocity it may be necessary to alter the path or utilize a stainless steel or PTFE filter.

Non-conductive particulates or liquids:

Organic liquids and Oil droplets

Molecular sieve particles

High velocity of high-density particulates should be avoided to prevent abrasion of seals and even the sensor surface. The sensor is shielded to prevent direct exposure to the flow, however depending on the flow path and velocity it may be necessary to alter the path or utilize a stainless steel or PTFE filter.

In general this category of contaminants does not hinder the sensor performance; however many of these contaminants may have hygroscopic properties thus their presence may cause a slower response to moisture variations.

Slugs of Liquid Water:

The sensor must be dried after it is exposed to liquid water.