



Level



Pressure



Flow



Temperature



Liquid Analysis



Registration



Systems Components



Services



Solutions

# PMP 41 and PMP 131 with Ammonia Gas Measurement- Chemical

## Harmful effects of Ammonia gas on pressure sensors with elastomer seals



Typical chemical plant



Caustic chemical tank storage

To avoid the harmful effects of Ammonia gas on pressure sensors with elastomer seals, a welded metal diaphragm should always be specified.

### Application problem

Investigation of returned defective pressure transmitters used in Ammonia gas applications show signs of corrosion on printed circuit boards and circuits on the back of the ceramic cells while showing no signs of obvious leakage paths of the Ammonia (see drawings on back page).

### Solution

In applications where Ammonia gas may be encountered, use the welded metal diaphragm sensors such as the PMP41-xxxxxxxA (also C and D). Any of the PMP131 transmitters can be used as all are welded assemblies with no elastomers used in wetted areas.

### Specifying a transmitter

The typical procedure for specifying a transmitter in any application where there is contact with chemicals is to check that all wetted materials of construction are compatible with all the chemicals, concentrations and temperatures involved. There are many corrosion reference guides available for this purpose. Endress+Hauser Regional Sales Centers and Technical Support often use the Compass Corrosion Guide<sup>1</sup> and other such tables as corrosion resources.

Wetted materials are those components of the transmitter that come into direct contact with the process fluid (a gas is also a fluid). Infrequent or random contact with other parts of the transmitter, such as spills on the enclosure, does not deem those parts as "wetted". Only the parts in direct contact with the process fluid in the pressure measurement are considered the "wetted" parts.

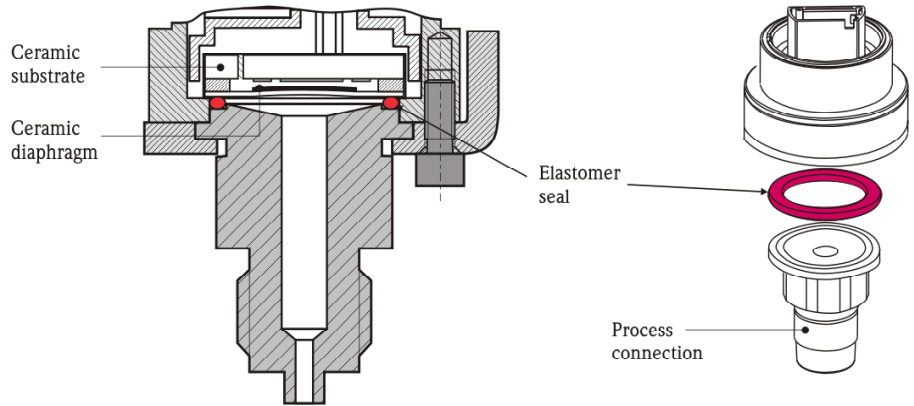
When looking at Ammonia gas for compatibility with many of the elastomers we use, the ratings are satisfactory. That means that Ammonia will not destroy the elastomer. It does NOT mean that the Ammonia will not permeate the elastomer.

Ammonia molecules are very small and have the ability to permeate through the cell structure of all the elastomers we use with our Cerabar T, Cerabar M and Cerabar S transmitters.

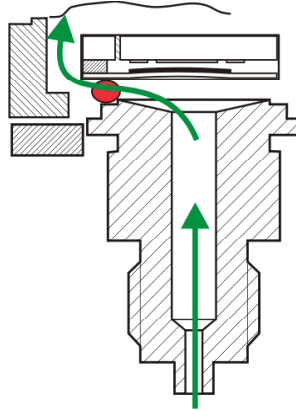
Permeation is the ability of a molecule to pass into, through and out of a solid barrier, in this instance an elastomer such as Viton<sup>®</sup>, Kalrez<sup>®</sup>, NBR, EPDM, etc. The temperature and pressure on the high pressure side of the transmitter determine the rate at which Ammonia will pass through the elastomer. On the low pressure side of the seal, vapors will accumulate and, over time, corrode the internal parts of the pressure transmitter ultimately leading to transmitter failure (see back page).

<sup>1</sup> Compass Corrosion Guide is published by Compass Publications  
Viton<sup>®</sup> fluoroelastomer and Kalrez<sup>®</sup> perfluoroelastomer are registered trademarks of DuPont Dow Elastomers

Cutaway view showing the elastomer seal location inside the pressure sensor.



Graphic showing Ammonia gas filtering through the elastomer seal, into the area of the printed circuit boards and back of the ceramic cell.



ISO 9001:2000 Certified

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