



Effusion/Corrosion for PTFE Hose Assemblies

Effusion is the process by which molecules of a chemical will move through PTFE wall and escape from a hose or hose assembly. The rate at which this effusion occurs depends upon temperature, pressure, wall thickness, and the hose material.

The following is a list of chemicals which can effuse through PTFE under certain conditions.

The face that effusion occurs is not the problem. Effusion will occur with almost all media in about all hose materials.

The issue is:

1. What rate will the effusion take place? This is a function of the media, temperature, and pressure.
2. How hazardous is the media?
3. What is the environment in which the effusion will take place, i.e., a closed room, outside, etc.

The list is broken down into three categories:

- I. Effusion without corrosion
- II. Possible effusion with corrosion and/or safety hazards
- III. Probable effusion with corrosion and /or safety hazards

Category I

Our primary concern with chemicals in Category I is the effusion when the application is in a confined area, i.e., the displacement of breathable air.

- Argon
- Carbon Dioxide
- Freon
- Helium
- Krypton
- Neon
- Nitrogen
- Oxygen
- Steam
- Xenon

Category II

Our primary concern with chemicals in Category II is not the chemicals themselves, but rather the fact that after effusion they can corrode the braid and/or injure those people in the area.

It is important to note that for these chemicals, effusion is especially significant when "vapor phase" exists, i.e. when they reach their boiling point of approximately 124°F at atmospheric pressure.

- Acetaldehyde (Flammable, toxic)
- Benzene (Flammable, toxic)
- Carbon Disulfide (Flammable, toxic)
- Diethyl Ether (Flammable, narcotic)
- Ethyl Mercaptan (Flammable, toxic)
- Hydrochloric Acid (Corrosive, toxic)
- Lacquer Solvents (Flammable)
- Liquid Butane (Flammable)
- Liquid Chlorine (Corrosive, toxic)
- Liquid Propane (Flammable)
- Methyl Bromide (Flammable, toxic, corrosive)
- Methyl Formate (Flammable, toxic)
- Methylene Chloride (Toxic)
- Sulphur Trioxide (Corrosive, toxic)

Category III

The following list of chemicals has the potential for effusion through the inner core as well as the danger that the effusion can cause corrosion of the hose braid reinforcement. These chemicals are all gasses at atmospheric pressures and at temperatures of 56° F or lower.

- Acetylene (Flammable)
- Blast Furnace Gas (Flammable, toxic)
- Butadiene (Flammable)
- Butane Gas (Flammable)
- Carbon Monoxide (Toxic, flammable)
- Chlorine Trifluoride (Toxic, corrosive)
- Chlorine (Toxic, corrosive)
- Coke Oven Gas (Flammable, toxic)
- Ethyl Chloride (Toxic, corrosive)
- Hydro Cyanic Acid (Flammable, toxic)
- Hydrogen Chloride (Corrosive, toxic)
- Hydrogen Cyanide (Flammable, toxic)
- Hydrogen Sulfide (Flammable, toxic)
- Hydrogen (Flammable)
- Natural Gas (Flammable, toxic)
- Propane Gas (Flammable)
- Sulfur Dioxide (Corrosive)
- Vinyl Chloride Monomer (Toxic, corrosive)