

## POLLUTION AND SAFETY IN PROCESS INDUSTRIES

### **6.1 Health and safety factors:**

The main toxic effect of acetaldehyde is irritation of the skin and mucous membrane. Anesthesia is the dominant effect of acetaldehyde. As an example, paraldehyde (acetaldehyde trimer) is an extremely safe hypnotic, but its objectionable odor and taste have restricted its use.

During ordinary industrial exposure, acetaldehyde vapors produce local irritation to the eyes and, to a lesser extent, to the throat and nose. Coughing, burning sensation, headaches, and stupefaction are symptoms of gross exposure. The maximum allowable concentration in air has been set at 200 ppm. There have not been any published reports of severe injury from the use of acetaldehyde, and one can conclude that in handling acetaldehyde if logical safety precautions are taken.

Mixtures of acetaldehyde vapors with air are flammable if the concentration of acetaldehyde and oxygen are higher than 4 and 9%, respectively. Acetaldehyde is very volatile, has a low flash point, oxidizes readily, and may form highly explosive peroxides.

### **6.2 Handling:**

In handling acetaldehyde, one has to remember that it is an extremely reactive compounds that can easily oxidized, reduced, or polymerized, and us highly reactive with oxygen. It has to be treated as a volatile, flammable, and toxic material. The following is a list of precautions recommended when handling acetaldehyde:

1. Nitrogen or other inert gases should be used as a blanketing material whenever exposure to air is a possibility.
2. Safety goggles should be used.
3. Transfers should be made in open air structures or using suitable gas mask or self contained breathing equipment if necessary.
4. Drums should be stored out of doors, avoiding direct exposure to sunlight and
5. Acetaldehyde should be chilled before transferring and a nitrogen blanket should be used.

### **6.3 Shipping and storage:**

Acetaldehyde is shipped in 5-10, or 55-gal drums, insulated tank trucks, and insulated tank cars. Acetaldehyde in the liquid state is noncorrosive to most metals, but it can easily be oxidized to acetic acid, especially in the vapor phase. Suitable materials of constructions are stainless steel and aluminum. Drums coated with phenolic resins have also been used. If a darker color and some iron contamination are not objectionable, carbon steel may be used. Because acetaldehyde classified has a flammable liquid, it requires a *red* DOT (Department Of Transportation) shipping lable.

Bulk storage held at low temperature and pressure is recommended over storage in pressure vessel.