

**TECHNICAL NOTE 04-01**  
**OLEORESIN CAPSICUM DIFFERENCES**  
**METHYLENE CHLORIDE OC vs. WATER-BASED OC**

Dated: April 30, 2001

The original OC refilling solution for the ProtectoJet Model 5(M-5), as sold by Advanced Materials Laboratories and ISPRA, utilized an oil based oleoresin capsicum(OC) with a methylene chloride solvent and a CO<sub>2</sub> propellant. Methylene Chloride is suggested by OSHA to be a known carcinogen. *Hydro-Force, Inc.*'s policy is that we will not sell dangerous chemicals. Therefore, we do not represent or sell the original OC formula containing Methylene Chloride.

At the request of *Hydro-Force, Inc.*, Dr Jacobson and Advanced Materials Laboratory(AMLI) produced a water-based solution for the Model 5 ProtectoJet. The components of the water-based oleoresin capsicum are approximately the same as found in the *Hydro-Force X-10 Barricade Removal Device(BRD)* according to the Material Safety Data Sheets(MSDS).

Unfortunately, Advanced Materials Laboratory's M-5 ProtectoJet uses a carbon-based steel tank and carbon-based steel components. Because the steel components rust when exposed with water-based solution, Dr. Jacobson and AMLI elected to coat the inside of the bottle. This plastic coating protects the bottle but not the other components, which results in a potential for rust. The rust may reduce the life of the steel components and threads.

By contrast, the *Hydro-Force X-10 Barricade Removal Device(BRD)* uses an aluminum bottle with brass and stainless steel mechanical components which are not effected by the OC water-based solution.

### **Information about Methylene Chloride**

According to OSHA regulations (Standards – 29 CFR) Methylene Chloride (MC) is used as a solvent, especially where high volatility is required. It is a good solvent for oils, fats, waxes, resins, bitumen, rubber and cellulose acetate and is a useful paint stripper and degreaser. It is used in paint removers, in propellant mixtures for aerosol containers, as a solvent for plastics, as a degreasing agent, as an extracting agent in the pharmaceutical industry and as a blowing agent in polyurethane foams. Its solvent property is sometimes increased by mixing with methanol, petroleum naphtha or tetrachloroethylene.

The best evidence that MC causes cancer is from laboratory studies in which rats, mice and hamsters inhaled MC 6 hours per day, 5 days per week for 2 years. MC exposure produced lung and liver tumors in mice and mammary tumors in rats. No carcinogenic effects were found in hamsters.

There are also some human epidemiological studies which show an association between occupational exposure to MC and increases in biliary (bile duct) cancer and a type of brain cancer. Other epidemiological studies have not observed a relationship between MC exposure and cancer. OSHA interprets these results to mean that the report is suggestive (but not absolute) evidence that MC is a human carcinogen.

Liquid MC is painful and irritating if splashed in the eyes or if confined on the skin by gloves, clothing, or shoes. Vapors in high concentrations may cause narcosis and death. Prolonged exposure to vapors may cause cancer or exacerbate cardiac disease.