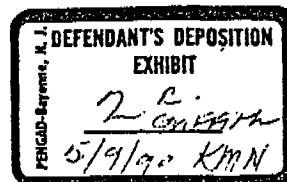


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MANUAL OF LABORATORY SAFETY
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1. Handling of Vinyl Chloride Monomer

Vinyl Chloride Monomer is a compressed gas, and safety in handling this material centers around two considerations: the pressure which the monomer can generate, and the fact that it is flammable, and explosive. The following regulations are based on the potential dangers of the material:

- a) Sample bombs used for Vinyl Chloride Monomer must be tested to 300 psi water pressure and will be checked at least once every five years.
- b) Each gallon sample bomb will be tagged with a metal tag giving its tare weight, and will never be filled with more than 5 lbs. of monomer. This amount of material gives adequate room for liquid expansion within the bomb. Following this rule prevents the possibility of hydrostatic pressure building up within the bomb, rupturing the container walls with great violence. It will be the responsibility of the material handling sample man taking a sample, to see that not more than 5 lbs. of monomer has been added to the bomb.

If the material handling sample man, on weighing the bomb after sampling, finds that he has added more than 5 lbs. of monomer, then he must bleed off monomer until the bomb is under 5 lbs. in weight. This venting step must be done away from any source of flames, sparks, or static spark possibilities. The bomb must be grounded with a "C" clamp and ground strap.

- c) All sample bombs are immersed in water in the control laboratory once per month to check for leaks. The Raw Material Section Leader and the Laboratory Supervisor are responsible for judging when a bomb is in need of

- c) If a bomb is accidentally dropped, then it will be tested immediately by water immersion.
- d) Monomer is poured from a bomb only when the contents of the bomb are below the boiling point of V.C. Monomer minus 13.9°C . A bomb must be stored in the dry ice chest for at least 1 hour prior to pouring a sample from the bomb. Care must be taken to avoid contact of monomer with the skin since it is apt to be at minus 40°C and could cause damage to skin tissue. The cooling effect of evaporation of monomer stored at room temperature could also cause skin tissue damage. Therefore, heavy cotton gloves are used when handling a sample bomb. Goggles must be worn when handling monomer since the material, although not a real danger because of its chemical properties, could injure the eye tissues because of the low temperature or cooling effect on evaporation.
- e) All work with V.C. Monomer is done on a down draft hood. This hood is designed to handle vapors heavier than air and the ventilating system is explosion proof. Pouring the samples and running analytical determinations will all be done in this area.
- f) Normally, scrubbing of vinyl chloride monomer to remove phenol inhibitor is not necessary. However, in the event purchase of monomer from a new supplier or experimental samples require such scrubbing, certain safety precautions must be taken. A caustic solution is cooled to $25^{\circ} + 5^{\circ}\text{C}$. The cold monomer is stirred into the caustic using a motor which is fully enclosed and explosion proof. Since this scrubbing step involves use of a much larger quantity of monomer than any other analytical procedure, the danger is proportionately greater.

illing of Vinyl Chloride Monomer (cont'd.)

- At the temperatures used and the scrubbing system, the worst that could be experienced is a fire. A blinking red light or other means of warning individuals in the vicinity must be employed to avoid the use of heat or spark producing equipment in the immediate vicinity.
- g. Monomer bombs are emptied in the designated area at the rear of the plant. Bombs are allowed to warm up to room temperature before emptying. The bomb is grounded with "C" clamp and ground strap. The bomb will then be inverted and the bottom valve opened. Gas pressure forces the liquid from the nipple on the bomb. The person emptying the bomb will stand on the upwind side of the evaporating monomer. If you get a pronounced monomer odor, then stop the flow of monomer by closing the valve and allow the air to dissipate the fumes. Care must be taken to avoid breathing monomer vapor since it has anesthetic properties and could, in these quantities, render you unconscious. If there is any work being done in the designated disposal area which could ignite the vapor, flames, drilling equipment, etc., then the bombs will not be emptied. It is unlikely that the latter situation will be encountered in this area. However, it is critically necessary that no monomer be allowed to escape from a bomb when there is any possibility of the vapors being ignited.
- h) Protective screens are provided to contain any polymerization retorts that are under pressure, due to the V.C. Monomer. These screens prevent glass scattering about the lab area, should one of the retorts fail under pressure. We have had two examples of these screens containing glass from bottles that had ruptured due to pressure failure of the glass retort.

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