

EXECUTIVE SUMMARY

0.1 THE PRODUCT

Carbon tetrachloride was one of the first organic chemicals produced on commercial scale.

Chlorofluorocarbons CFC-11, CFC-12 were developed from carbon tetrachloride and they were found to be excellent refrigerants and aerosol propellants. This increased the requirement of carbon tetrachloride manifold from 1944 to 1974.

It was discovered in 1974 that CFC-11, CFC-12 and carbon tetrachloride are detrimental to the stratospheric ozone layer.

Montreal protocol calls for phasing out of production of CFC-11, CFC12 and carbon tetrachloride by the year 2000 by the developed countries, and by the year 2010 by the developing countries.

USA was producing nearly half of the total carbon tetrachloride production in the world. Manufacturers of carbon tetrachloride in USA have drastically reduced their production and the U.S. government has decided to phase it out by the year 1996.

0.2 MANUFACTURE

Carbon tetrachloride is produced industrially by main six routes. These routes are given below.

1. Thermal chlorination of methane.
2. Hydrochlorination of methanol and chlorination of methyl chloride.
3. Chlorination of carbon disulphate.
4. Perchlorination of 1-3 carbon hydrocarbons.
5. Chlorinolysis of chlorinated hydrocarbon residues.
6. Oxychlorination of methane.

Out of these process routes, the first two and the last give a mixture of all the four chloromethanes.

The first two process routes are extensively used by the industry.

Out of the other processes perchlorination of 1-3 carbon hydrocarbons is used by many manufacturers in the world. Chlorinolysis of chlorinated hydrocarbon residues uses waste streams and is claimed to be more economical. Chlorination of carbon disulphide is preferred by Rayon manufacturers.

The selection of process route depends upon the availability of feed.

0.3

STATUS OF INDIAN INDUSTRY

The Indian manufacturers have utilised process routes (1), (2) and (3) viz., thermal chlorination of methane, hydrochlorination of methanol and chlorination of methyl chloride, and chlorination of carbon disulphide.

The technologies of Indian manufacturers using methane and methanol are comparable with the world standard. The performance can be marginally improved by operational measures.

The technology based on carbon disulphide is not efficient. The performance can be improved by modifying the process and engineering design. However, it will require huge investment and the cost of production will be higher than that of other processes.

The indigenous consumption is stable at about 10,000 TPA for the last 5 years.

India has signed the Montreal protocol and accepted to phase out the production of CFC-11 CFC-12 and carbon tetrachloride by the year 2010.

RECOMMENDATIONS

In the light of the above the following recommendations are made:

- a) No new capacity may be created in India only for carbon tetrachloride.
- b) Import of technology for carbon tetrachloride is not advisable neither is it possible.
- c) The performance of plants using methane and methanol processes, may be marginally improved by operational measures.
- d) The plants using carbon disulphide process may be closed down first.
- e) The plants producing chloromethanes will have to curtail production of carbon tetrachloride after the year 2000. The operating conditions will have to be changed to minimize carbon tetrachloride production. Technologies will have to be developed to convert carbon tetrachloride to safer products such as chloroform.

- f) Losses of carbon tetrachloride in the manufacturing plants are to be minimized.
- g) User industries have to conserve carbon tetrachloride.
- h) Ozone safe new solvents are to be developed in place of carbon tetrachloride. Thrust should be in development of substitutes with minimum economic dislocations. Substitutes should be developed as far as practicable, and conservation and recycling projects formulated to offset the costs of the consumers.
- i) Ozone safe substitute refrigerants and aerosol propellants are to be developed.
- j) Refrigeration and air conditioning systems with substitute refrigerant and compatible lubricants are to be developed.
- k) The present manufacturers of carbon tetrachloride may start manufacturing new products-particularly raw materials, for substitute refrigerants and propellants.