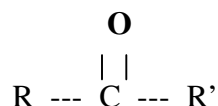


# 1. INTRODUCTION

## 1.1 METHYL ETHYL KETONE:-

Ketones are organic compounds containing one or more carbonyl groups bound to two carbon atoms and are represented by the general formula:



Based on the hydrocarbon ( R , R' ) groups attached to the carbonyl group, ketones can be classified. MEK has the molecular structure :  $\text{CH}_3 - \text{CO} - \text{C}_2\text{H}_5$ .

It is unsymmetric or mixed aliphatic ketone. It's IUPAC name is 2-butanone.

2-Butanone ,methyl ethyl ketone, MEK, is the 2<sup>nd</sup> link in the homologous series of aliphatic ketones and next to acetone, the most important commercially produced ketone.

It is commercially produced by dehydrogenation of the secondary butyl alcohol. It is analogous to the production of acetone by dehydrogenation of isopropyl alcohol on copper or zinc or bronze catalyst at 400 – 500 °C. At 80-95% sec butylalcohol conversion, MEK selectivity is greater than 95%. Butenes (dehydration) and higher ketones (auto condensation) are the by-products.

Methyl Ethyl Ketone (MEK) is a low –boiling, chemically stable compound also known as 2- butanone. MEK is a flammable, colourless liquid possessing a typical ketonic odor.

It has very good solvent properties, a fast evaporation rate, and is miscible with organic solvents. MEK is an excellent solvent for a variety of resin systems used in the preparation of paints and lacquers.

Interest in MEK as a solvent for paints and adhesives has been growing in recent years. It has broad applications as solvent for nitrocellulose, cellulose acetatebutyrate, ethylcellulose, acrylic resins, vinyl acetate and vinyl chloride – vinyl acetate copolymers. Moreover, MEK can be used as an activator for oxidative reactions, as a selective extractant, as a special solvent for dewaxing mineral oil fractions and as a chemical intermediate.

## **1.2 USES:-**

More than half the MEK produced in the United States finds application in surface coatings end uses. Significant volumes are also used in the production of adhesives, magnetic tapes, printing inks, solvent extraction, cleaning fluids, dewaxing agents, and dyes.

In surface coatings MEK is widely used as a component in vinyl lacquer solvent systems. Its active solvency for vinyl acetate and vinyl chloride – vinyl acetate copolymers makes it possible to formulate high solids lacquers containing large amounts of economical hydrocarbon diluents. In addition, it is a strong, active solvent for nitrocellulose and is extensively used in furniture and automotive lacquers. The low specific gravity of MEK enables formulators to produce larger volumes of base lacquers or thinners per pound than is possible with heavier solvents. MEK is also a coatings solvent for many resin systems including alkyds and air-dried epoxies. It performs extremely well in fast-drying traffic paints and has become an important component in replacing air pollution regulated solvents, such as toluene, which are frequently used in these alkyd formulations.

MEK is a dewaxing agent in the refining of lubricating oils and is a solvent for adhesives, rubber, cement, printing inks, paint removers and cleaning solutions. It is used in vegetable oil extraction process and in azeotropic separation schemes in refinery.

### **1.3 ECONOMIC ASPECT:-**

Demand for MEK has increased at a rate of 6.5% per year and is continued to grow at about this rate in future. Apparently the long term decrease in demand owing to increase in solventless coatings has not materialized .

The percentage sales distribution for MEK is as follows :

Paints, lacquers, printing inks, aluminium foils – 40%.

Coating and printing of plastics – 20%

Chemical industry, pharmaceutical industry – 13%

Adhesives – 11%

Miscellaneous – 16%

### **1.4 TOXICOLOGY :**

The inhalation of MEK vapours has narcotic effects. The vapour irritates the eyes and the nasal and pharyngeal membranes. Frequent and prolonged contact with MEK causes skin moisture loss and slight irritation .Sensitive persons may develop dermatoses .Liquid MEK temporarily irritates eyes and corneas .MEK is usually absorbed through the respiratory track. It may also be absorbed through the skin.

The odour threshold for MEK is 10 ppm .

Toxic concentration for water organisms :

Average lethal concentration for fish – 5600 mg / lit

Maximum permissible concentration for *pseudomonas putida* – 1150 mg / lit

Maximum permissible concentration for *scendesmus quadricanda* – 120 mg / lit

Maximum permissible concentration for small crabs -- 2500 mg / lit