

1.2 MONOETHANOLAMINE:

Monoethanolamine is a somewhat viscous hygroscopic liquid with an ammoniacal odor. It is miscible with water and many organic solvents. Its molecule contains both hydroxyl and amine group, thus producing derivative that have characteristic of both types of compounds. It is used as softener and conditioning agent, and in the recovery and extraction of carbon dioxide and hydrogen sulfide from industrial gases. It is also used as an intermediate in the manufacturing of rubber accelerator and dyestuffs. Its soaps with fatty acids are excellent emulsifiers for waxes.

1.21 TYPICAL PROPERTIES AND SPECIFICATIONS:

Boiling point	172.2 °C
Coefficient of expansion	0.00077(per°C)
Dissociation constant	5×10^{-5}
Equivalent weight	61.08
Flash point	93° C
Heat of evaporation	199 cal/g
Refractive index	1.4539
Specific gravity	1.018
Specific heat	0.665 cal/g
Surface tension	51 dynes/cm
Viscosity	3.4 poises
Vapor pressure	0.67 mm Hg
Weight per gallon	8.472 lbs
Boiling range	165 to 173°C
Color	Water-white
pH 25% solution	12.1
Solubility in water	complete

1.22 CHEMICAL PROPERTIES OF MEA:

Ethanolamines contain both amine group and hydroxyl group. Because of their basic nitrogen atom and the hydroxyl group, ethanolamines have chemical properties resembling to those of both amines and alcohols. They form salts with acids and the hydroxyl group permits the formation of ester. When mono and diethanolamine react with organic acids, salt formation always takes place in preference to ester formation. With weak acids ex. H_2S and CO_2 thermally unstable salts are formed in aqueous solution. This reaction of ethanolamine is the basic for their application in purification of acidic natural gas, refinery gas and synthesis gas.

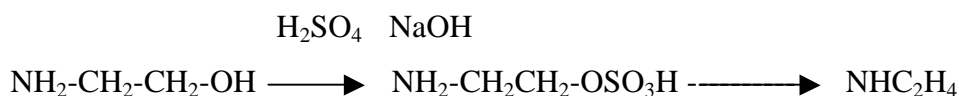
1. In absence of water MEA reacts with water to form carbamates:



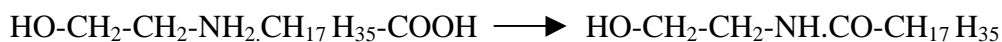
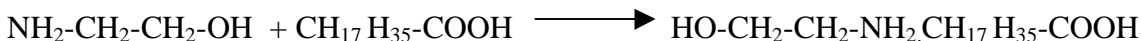
2. MEA reacts with ammonia in presence of hydrogen, the hydroxyl group of MEA can be replaced by an amine group to form ethylenediamine



3. MEA can be converted to ethylenimine by adding sulfuric acid and cyclizing the hydrogen sulfate with sodium hydroxide.



4. MEA reacts with stearic acid to form a salt, which can be dehydrated to the amide by heating:



5. MEA can also be used as the amine component in aminoalkylation, the so called reaction Mannich reaction which is very important in the bio-synthesis of many alkaloids.

