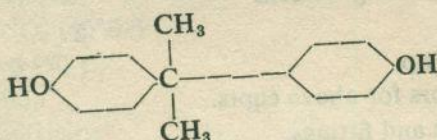


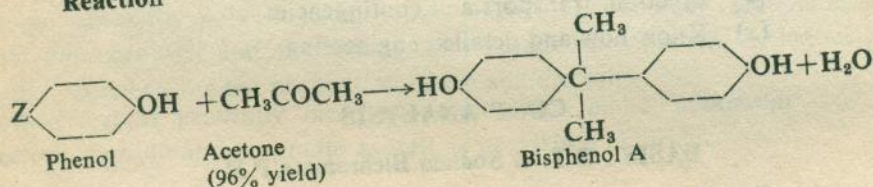
Bisphenol A

(4, 4'-Isopropylidene Diphenol)



Bisphenol A from Phenol and Acetone

Reaction



Material Requirement

Basis : 1 M.T. Bisphenol A	
Phenol	875 kg.
Acetone	265 kg.
Hydrochloric Acid	small quantity
Lime	small quantity
Methyl Mercaptan	small quantity

Process

Bisphenol A is made by reacting phenol with acetone in the presence of acid catalyst. Phenol and acetone in a 3 : 1 molar ratio are charged to a glass lined stirred reactor. A small amount of catalyst promoter, usually methyl mercaptan, is added, and then the catalyst, dry hydrogen chloride gas, is bubbled through the mixture. The temperature is maintained at about 50°C for 8 to 12 hours, crystalline bisphenol A is formed to yield a slurry. When the reaction is completed, the slurry is dropped

to a combination neutralization tank and still, where slurry is washed with water, neutralized with milk of lime, and then distilled to remove water and excess of phenol. The distillation is carried out under vacuum at 60 to 150°C. Water comes off first, followed by phenol. The molten product remaining in the still is sparged with steam at 150°C to remove final traces of the odorous mercaptan promoter.

The deodorized melt is quenched in large volume of water, washed, filtered, and dried. The product may be further purified by recrystallization.

Properties

White to tan crystals, slightly soluble in water (0.34% at 83°C). Soluble in ketones and alcohols. Molecular weight 228.28, Specific gravity 1.195 (at 25°C), Melting point 157°C, Boiling point 230°C.

Uses

In epoxy resins, polycarbonate resins.

Economic Aspects

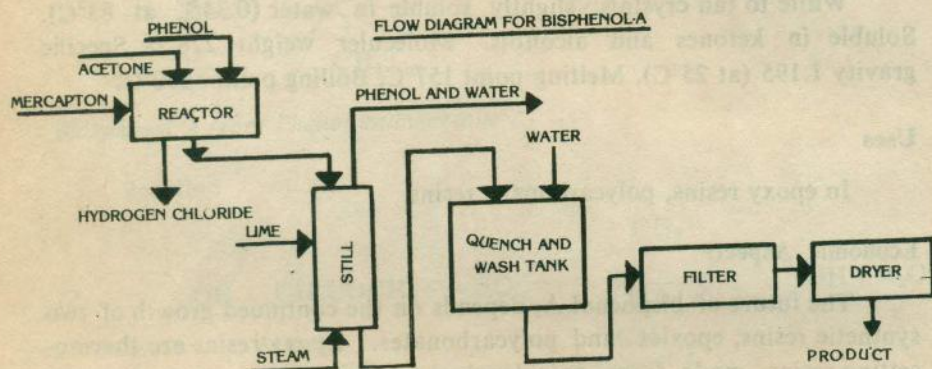
The future of bisphenol A, depends on the continued growth of two synthetic resins, epoxies and polycarbonates. Epoxy resins are thermosetting resins made from epichlorohydrin and bisphenol A. Actually bisphenol A makes up 70% by weight of the resin. Epoxies are chiefly used for coating and adhesives, but continued growth will be function of other uses. Expanded use of epoxy resins and adhesives in reinforced plastics is predicted. However uses include epoxy adhesives in high pressure refrigeration coils, dehumidifiers, and room air conditioners, metal bonders in the automotive and aircraft industries, specially designed electrical grade resins; and industrial and decorative building applications. Polycarbonates are thermoplastics and are made by reacting bisphenol A with phosgene. Polycarbonates have high impact strength and exceptional heat resistance for thermoplastics resins. Currently, they are used primarily in injection moulding and as an extrusion compound for electrical and electronic components, in cast film form as electrical foil, and as base for photographic film. Consumption of bisphenol A in polycarbonates is increasing rapidly.

A third possible outlet for bisphenol A is the thermoplastic 'phenoxy' resin also made from epichlorohydrin and bisphenol A. It is also used as flame retardants and in rubber chemicals.

Material and Equipment Requirement for production of 1 ton Bisphenol A per day.

Details of Plant and Machineries

	Nos.
Reactor	1
Dryer	1
Washing and storage tanks	1
Pump and Motor	1
Heat Exchanger	1



COST ANALYSIS

BASIS : 30 T. of Bisphenol A P.M.

1. Covered Area Required		600 m ²
2. No. of Employees		16
3. Land & Building	Rs.	3,41,000
4. Plant & Machinery	Rs.	1,52,900
5. Fixed Capital	Rs.	4,93,900
6. Working Capital for One Month	Rs.	4,51,275
7. Working Capital for 3 Months	Rs.	13,53,825
8. Total Capital Investment	Rs.	18,47,725
9. Cost of Production Per Annum	Rs.	57,61,668
10. Receipt Per Annum	Rs.	66,30,468
11. Profit Per Annum	Rs.	8,68,800