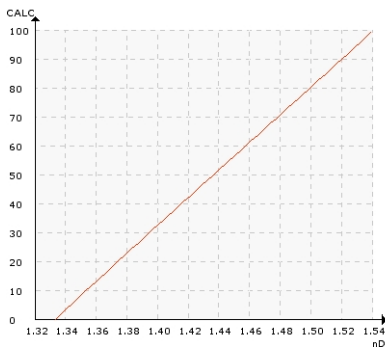


PHENOL C_6H_5OH , CUMENE HYDROPEROXIDE $C_6H_5C(CH_3)_2O_2H$, ACETONE CH_3COCH_3

Typical end products

Phenolic resins, bisphenol A, caprolactam, alkyphenols, nylon, dyes, pharmaceuticals, perfumes

Chemical curve: Phenol R.I. per Conc% b.w. at Ref. Temp. of 20°C



Introduction

Phenol (C_6H_5OH) is a white, crystalline mass. It has a distinctive sweet, tarry odor and a burning taste.

Application

The cumene oxidation route is the leading commercial process of synthetic phenol production, accounting for more than 95% of phenol produced in the world. The remaining 5% is manufactured with a toluene-benzoic acid process.

Cumene Process

A typical phenol plant can be divided into two main areas. In the reaction area, cumene is oxidized to form cumene hydroperoxide (CHP). The cumene hydroperoxide is concentrated and the concentrated solution is fed to the cleavage reaction, which is carried out in the presence of an acid catalyst (e.g. sulfuric acid). The by-products of the cleavage reactions, as well as the catalyst, must be neutralized and extracted to avoid corrosion problems downstream.

The recovery area of the plant employs fractionation to recover and purify the phenol and acetone products. Alpha-methylstyrene (AMS) is also recovered in this section. The AMS may be hydrogenated back to cumene or retained as a product. The recovered cumene (hydrogenated AMS) is recycled as feedstock to the reaction area.


Installation

The K-Patents Process Refractometer is used to measure CHP concentration after the reactor and in the evaporator for safety purposes, and also for process optimization. Typical measurement range after the reactor is 10-50% and temperature 100°C (212°F). Following evaporation the numbers are 90% and 90°C (194°F) respectively. The K-Patents

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refractometer is also used to measure phenol and acetone concentrations.

Appropriate equipment with hazardous and intrinsic safety approvals are available when required.

Instrumentation	Description
	<p>K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.</p>
<p>Area classification:</p>	<p>Intrinsic safety and hazardous area approvals available.</p>
<p>Measurement range:</p>	<p>Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.</p>