

2.PROPERTIES AND USES

Cumene is a colourless liquid, soluble in alcohol, carbon tetra chloride, ether and benzene. It is insoluble in water.

PHYSICAL PROPERTIES OF CUMENE

PROPERTY	VALUE
Molecular weight	120.19
Boiling Point, °C	152.39
Freezing point, °C	-96.03
Density, g/cm ³	
0°C	0.8786
20°C	0.8169
40°C	0.8450
Refractive Index	
N _D ²⁰	1.4915
Thermal conductivity, w/m.k	
25°C	0.124
Viscosity, mPa.s (=cp)	
0°C	1.076
20°C	0.791
40°C	0.612
Surface tension, mN/m	
20°C	0.791
Flash point, °C	44
Autoignition temperature, °C	523

Vapour Pressure, Kpa

Viscosity, mPa.s (=cp)

35°C	1
100°C	19
120°C	37
140°C	68
180°C	185

Antoine Constants

A	13.99
B	3400
C	207.78

Flammable limits in air, vol%

Lower	0.9
Upper	6.5

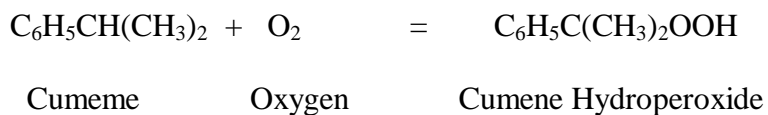
THERMODYNAMIC PROPERTIES OF CUMENE

PROPERTY	VALUE
Relative molar mass	120.2
Critical temperature, °C	351.4
Critical pressure, Kpa	3220
Critical density, g/ cm ³	0.280
Heat of vapourisation at bp, J/g	312
Heat of vapourisation at 25°C, J/g	367
Heat of formation, J/mol	

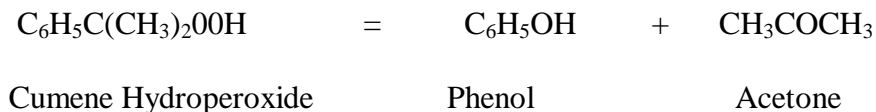
Liquid at 25°C	- 44,150
Free energy, J/mol	
Vapour at 25°C	137,000
Heat of combustion at constant pressure and 25°C, J/g	
Gross (product water as liquid)	43,370
Net (product water as vapour)	41,170
Heat capacity, J/mol.K	
Ideal vapour at 25°C	153
Liquid at 25°C	197
Odor threshold, PPMv	1.2
Threshold limit value, PPMv	50

CHEMICAL PROPERTIES:

1. Cumene undergoes oxidation to give cumene hydroperoxide by means of air or oxygen



2. By the catalytic action of dilute sulphuric acid, cumene hydroperoxide is split into phenol and acetone



USES:

Cumene is used

1. As feed back for the production of Phenol and its co-product acetone
2. The cumene oxidation process for phenol synthesis has been growing in popularity since the 1960's and is prominent today. The first step of this process is the formation of cumene hydroperoxide. The hydroperoxide is then selectively cleaved to Phenol and acetone.
3. Phenol in its various formaldehyde resins to bond construction materials like plywood and composition board (40% of the phenol produced) for the bisphenol A employed in making epoxy resins and polycarbonate (30%) and for caprolactum, the starting material for nylon-6 (20%). Minor amounts are used for alkylphenols and pharmaceuticals.
4. The largest use for acetone is in solvents although increasing amounts are used to make bisphenol A and methylacrylate.
5. α - Methylstyrene is produced in controlled quantities from the cleavage of cumene hydroperoxide, or it can be made directly by the dehydrogenation of cumene.
6. Cumene in minor amounts is used as a thinner for paints, enamels and lacquers and to produce acetophenone, the chemical intermediate dicumylperoxide and diiso propyl benzene.
7. Cumene is also used as a solvent for fats and raisins.