

ABSTRACT

Nearly all the carbon disulphide fed into the viscose rayon manufacturing process leaves the factory with the exhaust air passed on to the chimney, as a result of which, the concentration of carbon disulphide in and around a viscose rayon plant exceeds the threshold limit value of 20 ppm. The present investigation deals with some theoretical and experimental aspects of the abatement of carbon disulphide pollution, by absorption in spray columns using alkaline solutions containing oxidation catalysts.

A low pressure centrifugal atomiser^① has been developed, which operates at pressures substantially lower than commercial centrifugal nozzles, has a higher value of atomisation efficiency, and produces coarser drops without sacrificing uniformity. The nozzle can be effectively deployed for absorption in spray columns. A model for drop formation has also been proposed.

A theoretical model for absorption into drops has been developed and compared with experimental results.^②

Initial studies on the absorption of carbon disulphide have been conducted in a single stage spray column. The effect of liquid flow rate, gas flow rate, pH of the absorbing liquor, composition of the absorbing liquor, and concentration of catalysts in the liquor, on the percentage removal have been studied.

Studies on absorption of carbon disulphide in a gas-liquid ejector have also been presented for a qualitative comparison between the removal efficiencies of the two completely different types of equipment - the spray column (liquid side dispersed), and the gas-liquid ejector (gas side dispersed).

Studies on the effect of cascading the stages have also been presented. The values of percentage removal predicted from single stage results matched very well with those obtained in the two stage column.

Key Words : air pollution, abatement, absorption, chemical reaction, drops, spray, ejector, cascade