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Chapter VI

CONCLUSIONS

A fluidized-bed column which had relative long distance of the absorption zone and consisted of low density spherical packing were designed. The liquid and gas distributors were specially designed to prevent nonuniformity in the movement of the spheres.

It can be concluded from the study of hydrodynamic properties and mass transfer coefficient of ammonia in fluidized-bed column that

1. The fluidized-bed column make it possible to obtain high values of superficial liquid and gas velocities at modest pressure drop.

2. The most uniform and intensive agitation of the packing without slugging or sharp fluctuation of the dynamic bed height, were obtained in columns with static bed height below diameter of the column.

3. The linear plot of aerated bed height with gas mass velocities can be extrapolated to the point of bed height equal to static bed height. The abscissa of this point is the minimum fluidization velocity.

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4. Gas hold-up and liquid hold-up were determined and the results were correlated well with Kito, et al.'s correlation.

5. Over all gas mass transfer coefficient (K_Ga) increased with increasing gas velocity and liquid velocity but decreased with increasing bed height and approximately represented by

$$Sh = 7.17\times10^{9}\ Fr^{0.495} \cdot Re_L^{\ 0.442} \cdot \left(\frac{D_c}{H_s}\right)^{0.621}$$

6. Over all gas mass transfer coefficient were slightly effected by ammonia mole fraction in the range that were studied.

It should be note that in designing such system adequate of gas and liquid flow rates were essential. Too large a tower diameter may result in low gas and liquid rate and therefore inadequate turbulent flow with correspondingly lower absorption efficiency. This equipment is essentially nonclogging and can be useful when a solid phase in present or formed by reaction of the contacting fluids.

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