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PRESSURE DROP IN A RANDOM PACKED ABSORPTION TOWER: EXTENDING THE ERGUN EQUATION

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Abstract: Pressure drop across a packed column in pilot-scale calculated using the Ergun equation that was developed using experimental data from mono-sized, smooth, non-porous, Raschig particles. New values of Ergun equation constants (33.5 and 1.6) which are applicable to this kind of packing, were found to better approximate pressure drop compared to those used in the original form of the Ergun equation (150 and 1.75).

Keywords: Pressure drop, packed tower, random packing, Ergun equation constants.

1. INTRODUCTION

Packed towers are used widely in chemical industries, for separation and purification purposes. These towers are very applicable because of preparing more interfacial surface for tow phase, gas- liquid and liquid-liquid in gas absorption , distillation, liquid-liquid extraction. High efficiency, high capacity, lower pressure drop, lower energy demand and lower flooding velocity are some reasons to prefer this kind of towers in chemical industries. Despite increase in introduction of new structured packings, usage of random packings are common for its processing in low cost ,especially process that contain diffusion in liquid phase with extremely turbulence flow regime and process with heat effects.

Usually Packed beds are considered as porous media in low Reynolds number and when fluid flow follow Darcy's low. pressure drop across the packing comes from fractional interaction between fluid and solid particles.