

SUCHAT KUNTABUTR : THEORY OF PARTICLE CAPTURE IN HIGH GRADIENT
MAGNETIC FIELD : THESIS ADVISOR : ASST. PROF. MAYUREE NATENAPIT,
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In describing motion of magnetic particles of micron size in fluid carrier and prediction of capture efficiency of axial cylindrical magnetic filter with satisfactory agreement with experiment, depends on approximation of magnetic field around any collector which is randomly distributed in magnetic filter. Theory of particle capture in axial cylindrical magnetic filter was first developed by using the single collector model for approximation of magnetic field around a representative collector from Gerber's theory. This theory was limited by small collector packing fraction, approximately about 5 %, and the applied magnetic field intensity was not too high. Otherwise, capture area of the representative collector overlaps with capture area of neighbouring collector and magnetic-filter efficiency is obtained as monotonic increasing function with increasing of normalized capture length or packing fraction.

In this research, we develop Gerber's theory by using magnetic field intensity around a representative collector determined by effective medium approach, which is applied to spherical magnetic filter. In this research, the calculated result of magnetic-filter efficiency has the tendency of saturated type when the normalized capture length or packing fraction increases more than the specific value which corresponds to the experiment of Birss and the theory of Greiner and Hoffmann.