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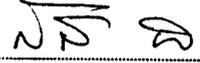
KEW WORD: ULTRASONIC TECHNIQUE / HOLD-UP / ROTATING DISK CONTACTOR /
EXTRACTION / DISPERSED-PHASE
SMITH CHHATRABHUTI : ULTRASONIC TECHNIQUE FOR HOLD-UP MEASUREMENTS
IN A ROTATING DISK CONTACTOR EXTRACTION COLUMN. THESIS ADVISOR:ASSIST.
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ASSIST. PROF. LURSUANG MEKASUT, Dr.Ing. 96 pp. ISBN 974-639-431-2.

This study used ultrasonic technique with a rotating disk contactor extraction column (RDC) to study the feasibility of the technique for determining dispersed phase hold-up . The measurement was done in a 5.05 cm. inner diameter RDC column, 108 cm. length and diameter of rotating disks and stator rings were 2.4 and 3.0 cm., respectively. The column consists of 43 rotating disks, 44 stator rings and height between disk and stator ring, 2.0 cm. Active surface's ultrasonic transducer is 1.5 cm., with ultrasonic transducer of frequency 1 MHz. The toluene (dispersed)- water system was used throughout the study. The flow of dispersed phase and continuous phase were introduced, with the rate of 0.01-0.08 L/min and 0.1-0.8 L/min, respectively. The rotating disks were operated at 300-800 rpm.

The results showed that when the flow rate of continuous phase and rotating speed are constant, the flow rate of dispersed phase have an effect on hold-up of dispersed phase. Hold-up has increased with the increasing of dispersed phase flow. When the dispersed phase flow and rotating speed are constant, the increasing of the continuous phase flow caused the hold-up to decrease. The increasing of rotor speed have a slight effect on the hold-up. The values of dispersed phase hold-up obtained from ultrasonic and direct volume measurement method were compared in miniaturized RDC that have column geometry similar to RDC. The study found that the values of hold-up from both methods were reliable and somewhat accuracy, the average of the difference of hold-up of 0.019. The hold-up values were measured by means of ultrasonic technique in RDC are between 0.010-0.499. The relation of hold-up expressed in term of dispersed phase flow rate and continuous phase flow rate can be represented as follows:

$$\phi = 0.7188(Q_c/Q_d)^{-0.7604}$$

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