

STUDIES ON IONIC MASS TRANSFER WITH COAXIALLY PLACED DISC AS TURBULENCE PROMOTER IN CIRCULAR CONDUITS

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ABSTRACT

Studies on the effect of coaxially placed entry region disc as turbulence promoter on mass transfer rates in forced convection flow of electrolyte have been conducted. The present study comprises of the evaluation of mass transfer rates at the outer wall of the electrochemical cell. Mass transfer coefficients were evaluated from the measured limiting currents technique. The study covers the influence of various diameters of the disc (D_d). The results have revealed that the mass transfer coefficient increases with increase in velocity and diameter of the disc (D_d). Within the range of variables covered, the augmentations achieved in mass transfer coefficients were up to 5 fold over the tube flow in the absence of a promoter. Mass transfer rates were analyzed with mass transfer roughness function and roughness Reynolds number. The correlations achieved as an out come of the study are as follows

$$g(h^+) = 31.199(Re^+)^{0.484} (\phi_5)^{-0.186} Sc^{-0.722}$$

KEYWORDS: Ionic mass transfer; turbulence promoter; augmentation technique.