

STUDIES ON MOMENTUM TRANSFER WITH COAXIALLY PLACED TWISTED TAPE - DISC ASSEMBLY AS TURBULENCE PROMOTER IN CIRCULAR CONDUIT

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ABSTRACT

Studies were conducted on the effect of coaxially placed entry region twisted tape-disc assembly as turbulence promoter on momentum transfer rates in forced convection flow of electrolyte. The study covers a wide range of geometric parameters such as pitch of the tape (T_p), length of the tape (T_L), width of the tape (T_w), diameter of the disc (D_d), and tape-disc distance (h). The results revealed that the friction factor increased with increase in diameter of the disc (D_d), length of the tape (T_L), width of the tape (T_w) and decreased with increase in pitch of the tape (T_p) and tape-disc distance (h). Within the range of variables covered, the increase in friction factors due to the presence of the promoter assembly was significant. Velocity at 0.224m/s, it was found that for the maximum augmented promoter assembly, the increase was 28.5 times more than the smooth tube and for the minimum augmented promoter assembly the increase over the smooth tube was 27.2 times more. Momentum transfer rates were analyzed with *momentum transfer roughness function* $R(h^+)$ and *roughness Reynolds number* (Re^+). The following correlations were reported out of the study.

$$R(h^+) = 3.573 (Re^+)^{0.068} (\phi_1)^{0.050} (\phi_2)^{-0.033} (\phi_3)^{0.012} (\phi_4)^{0.228} (\phi_5)^{-0.037}$$

KEYWORDS: Momentum transfer, Turbulence promoter, Twisted tape- Disc assembly