

Air entrainment in Angled Curtain Coating

H. Benkreira, R. Patel, M.M.F. ElGadafi

Advanced Materials Engineering Research Group

School of Engineering, Design and Technology

University of Bradford, BD7 1DP

Abstract

In all coating applications, air in contact with a dry solid substrate is displaced by a liquid film. At low substrate speed a thin uniform wetting line is formed on the substrate's surface, but at high speed the wetting line becomes segmented and unsteady as air becomes entrained between the substrate and the liquid. These air bubbles affect the quality of the coated product and any means to postpone this at higher speeds without changing the specifications of the coating liquid is desirable. In this study, we examine the effect of angling-rotating- the curtain die. This idea derives directly from the principles of the dynamic speed of wetting developed by Blake (1) and exploited by Cohu and Benkreira (2). In this study we describe the equipment used –a pilot curtain coater and a rotating die and present data with a range of fluids.

References

1. Blake, T.D. and Ruschak, K.J., "A Maximum Speed of Wetting", *Nature*, 282, 489 (1979)
2. Cohu, O and Benkreira, H., 1998, Air entrainment in angled dip coating, *Chem. Egn. Sci.*, 39, 1357-1364.