Development and Testing of a Probe to Monitor Gas-Side Fouling in Cross Flow

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Abstract

A probe to monitor gas-side fouling in cross flow has been developed and tested in laboratory experiments. The probe is suitable for monitoring both the heat flux and the mass accumulated on the front and rear side of a cylinder in cross flow. A procedure for converting the mass accumulation measurements to thermal resistance is developed. Experimental results obtained using the mass accumulation method are compared to data obtained by heat flux measurements, and show good agreement in terms of the thermal fouling factor. It is also shown that the test results are in good agreement with other experimental results found in the literature. The probe is well suited for distinguishing the thermal effect (thermophoresis) from the other forces contributing to fouling. It is also useful for nonfouling heat transfer studies, providing average heat transfer coefficients on the front and rear sides of a cylinder.

Keywords: