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LETTERS TO THE EDITOR

CORRECTION TO "AN INVESTIGATION OF HEAT TRANSFER AND FRICTION FOR RIB-ROUGHENED SURFACES"

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WE WOULD like to point out a correction to our paper [1]. In the paper, the mean velocity found from the integration of the velocity distribution was inadvertently taken for the cylindrical geometry. When the correct plane geometry is used the following expression for the roughness function, Re^+, results:

$$Re^+ = \frac{\sqrt{2}}{f} - 2.5 \ln \frac{D_H}{2e} + 4.23.$$

For cylindrical geometry, the constant on the RHS is 3.75, thus Re^+ is increased by 0.48. For our range of experimental values Re^+ changes by between 5 and 15%. When our data are correlated using the correct expression for Re^+, the final friction correlation becomes

$$Re^+ = 5.4(e^+/35)^m/(10/p/e)^n(\phi/90)^{0.32}(\alpha/45)^{0.52},$$

where

$$\begin{aligned} m &= -0.36, & e^+ &< 35 \\ m &= 0, & e^+ &\geqslant 35 \\ n &= -0.12, & P/e &< 10 \\ n &= 0.49(\alpha/90)^{0.84}, & P/e &\geqslant 10. \end{aligned}$$

The corrected heat-transfer function changes by less than 5% to become

$$\mathrm{He}^+ = 10.48(e^+/35)^i(\alpha/45)^j,$$

where

$$\begin{aligned} i &= 0, & e^+ &< 35 \\ i &= 0.27, & e^+ &\geqslant 35 \\ j &= -0.43, & \alpha &\geqslant 45^\circ \\ j &= 0.48, & \alpha &< 45^\circ. \end{aligned}$$

The modest changes in Re^+ and He^+ do not change the conclusions of our work. Namely, changes in the rib cross-section and the angle of attack have a marked effect on the performance of the surface in terms of heat-transfer coefficient vs flow friction.

The corrected results do not agree exactly with those of Webb, Eckert and Goldstein [2], but the differences are relatively modest, within 10% for Re^+ and 5% for He^+. These differences are far less than those predicted by other investigators for the range of rib height to hydraulic diameters which the two investigations span. Thus, discrepancies are still evident when the data from these two investigations are compared with data reduced by use of a Hall-type transformation.

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