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Heat-Transfer Data for Hydrogen

Experimental heat-transfer data have been compiled for the turbulent flow of hydrogen within straight, electrically heated, round cross-section tubes. Tube inner diameters ranged from 0.0945 to 0.480 in. Tube materials were nickel, stainless steel 321 (with or without copper plating), or molybdenum. The data collected during the 276 separate experiments cover the gaseous region (bulk inlet temperature exceeding 135°R). Heat fluxes reached 28.4 Btu/in^2-sec, and test-section inlet pressures reached 2500 lb/in^2 absolute.

The following information for each run is presented: pressure at the inlet-end bus bar (lb/in^2, absolute); drop in pressure between the two bus bars (lb/in^2); flow rate (lb/sec); total electrical heat generated (Btu/sec); and heat balance (percentage). A heat balance of 0% represents a perfect accounting for the energy transferred in the test section; values lower than about 5% reflect particularly good tests. The absolute heat balance reported averaged 4.83% for all experiments.

Notes:

Requests for further information may be directed to:

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Patent status:

No patent action is contemplated by NASA.

Source: J. R. McCarthy, W. S. Miller, A. S. Okuda, and J. D. Seader of North American Rockwell Corp. under contract to Marshall Space Flight Center (MFS-18754)

Category 03

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