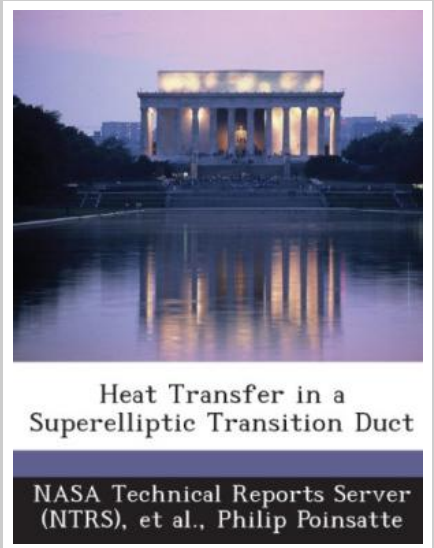


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Heat Transfer in a Superelliptic Transition Duct

By Philip Poinsatte

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 28 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Local heat transfer measurements were experimentally mapped using a transient liquid-crystal heat transfer technique on the surface of a circular-to-rectangular transition duct. The transition duct had a length-to-diameter ratio of 1. 5 and an exit-plane aspect ratio of 3. The crosssectional geometry was defined by the equation of a superellipse. The cross-sectional area was the same at the inlet and exit but varied up to 15 percent higher through the transition. The duct was preheated to a uniform temperature (nominally 64 C) before allowing room temperature air to be suddenly drawn through it. As the surface cooled, the resulting isothermal contours on the duct surface were revealed using a surface coating of thermochromic liquid crystals that display distinctive colors at particular temperatures. A video record was made of the surface temperature and time data for all points on the duct surfaces during each test. Using this surface temperature-time data together with the temperature of the air flowing through the model and the initial temperature of the model wall, the heat transfer coefficient was calculated by employing the classic one-dimensional, semi-infinite wall...

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