

Secondary flow in a vortex tube

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A novel Pitot probe was used to measure the axial and azimuthal velocities in a vortex tube. The probe has only a single measuring port and is hence smaller than standard devices. It monitors stagnation and reference pressure sequentially as the probe is rotated around its axis. From the measured velocity field in the 25 mm diameter vortex tube the local mass flux was determined and it was observed that the return flow at the center of the tube is much larger than the cold mass flow emerging out of the cold end. Therefore, the vortex tube must have a secondary circulation imbedded into the primary vortex, which moves fluid from the back flow core to the outer regions.

Ranque Hilsch tube Secondary circulation Velocity measurements Velocity vector angle

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