# Investigating Flow in Rotating Cylindrical Tubes

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This work studies air flow in a special centrifugal pump design that uses straight tubes rather than the usual expanding passages between the inlet and exit flow. Three effects are evaluated: the effect of tube diameter on flow, the effect of tube length on flow and the effect of rotational speed on flow leading to the following findings: 1) Flow increases proportional to tube area because a larger area means more air can be drawn into the tube. 2) Flow increases proportional to tube length because the exit pressure increases proportional to tube length. 3) Flow increases faster than RPM. This appears to be because in the straight tubes there is a process that builds up the pressure faster than in expanding passages. A possible explanation is offered involving the Coriolis force that may act against the centrifugal force to build up the pressure. Because the flow increases faster than RPM (unlike in traditional centrifugal devices) it may be possible to use this new approach to build a more compact pump that moves more air and produces higher pressures than ordinary centrifugal pumps.

**Awards Won:**