



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

Technical Specifications of Laboratory model of reversible hot-air engine

RFx No. 6100001228 (Reference No. 1000027903)

1. The requirement is for a “reversible” hot air engine that can run in both “heat engine” and “refrigeration” mode for demonstrating thermodynamic cycles in a teaching laboratory.
2. The equipment should have sensors and be interfaceable to a standard laptop/PC for recording the p-V diagram during operation.
3. Experimental setup should be able to perform following experiments:
 - A. Frictional losses in the hot-air engine
 - B. Determining the efficiency of the hot-air engine as a heat engine
 - C. Determining the efficiency of the hot-air engine as a refrigerator
 - D. pV diagram of the hot-air engine as a heat engine
4. Experiment setup must include following parts
 - A. Hot-air engine with accessories for quantitative determination of the power balance, mechanical power braking, contact-free measurement of speed of rotation, throttling measurement, temperature measurement of the cooling-water and electric compensation of the refrigerating capacity.
 - B. Piston capacity approximately 150 cc (or more), Heat output approximately. 300 W.
 - C. When operated as a thermal engine, power 10 W or better should be delivered.
 - D. As a heat pump, attainable ultimate temperature +100°C approx.
 - E. As a refrigerating machine, ultimate temperature -30°C or lower and the sensors
 - F. Temperature, pressure & rotation sensors necessary for recording the pV diagram and temperatures reached at various points. This should include all the power supplies, connectors etc needed to power the system and the sensors.
 - G. All electrical systems should be configured to run from Indian mains supply (230V AC/50 Hz)
5. Warranty : One year from the date of installation and commissioning.