

# CENTRIFUGAL BLOWER TEST RIG

**Ex no:**

**Date:**

**Aim:**

To study the performance characteristics of centrifugal blower test rig .

## Apparatus Required:

1. Stopwatch
2. Anemometer

## Formulae Used:

Total fan efficiency  $\eta_f = \frac{\text{Power output}}{\text{Power input}}$

1. Power output =  $\frac{n}{n-1} P_1 V_1 [(P_2/P_1)^{\frac{n-1}{n}} - 1]$

2. Power input =  $\frac{Nc \times 3600}{z \times E_{mc}}$

where

n	=	1.4
$P_1$	-	Air intake pressure N/m <sup>2</sup>
$V_1$	-	Rate of volume of compressed air
$P_2$	-	Delivery pressure in N/mm <sup>2</sup>
Nc	-	No of revolutions of energy meter
z	-	Time in seconds
$E_{mc}$	-	Energy meter constant

3. Pressure from height of water

$$P = \rho_w Hw g$$

Where

$\rho_w$  - density of water (1000 kg/m<sup>3</sup>)

## Observation and Tabulation :

Room temperature : .....°C

Barometric pressure : ..... mm to Hg

Energy meter constant : ..... revolutions / KWh

Diameter of Suction pipe : ..... mm

Area of Suction Pipe (A) : ..... m<sup>2</sup>

S.No	Manometer reading in (mm) for water inlet side (suction)	Manometer reading in mm for water outlet side	Time in sec required for 10 rev of energy meter	Velocity of air in m/sec measured by anemometer (V)

S.No	Delivery Pressure	Power Input	Power Output	Blower capacity	Efficiency (%)



H<sub>w</sub> - Height of water in mm  
G - acceleration due to gravity = 9.81 m / s<sup>2</sup>

Suction pressure P<sub>1</sub> - Atm pressure +P<sub>1</sub>

Delivery pressure P<sub>2</sub> - Atm pressure +P<sub>2</sub>

Atmospheric pressure - 1.0133 bar

**Procedure :**

- Note down the barometric pressure in mm of Hg and room temperature in °C.
- Start the blower.

- Adjust the delivery pressure by adjusting throttle at outlet side.
- To measure volume of air flow rate , measure velocity of suction air by using anemometer.
- Measure speed of blower by tachometer.
- Note the time in sec required for 5 revolutions of energy meter to measure power at inlet .
- Repeat same procedure 3 to 6 times for different pressure.

**Result:**

Power input = .....

Power output = .....

Efficiency = ..... %

