



# NSIC

## MOTOR AND PUMP TESTING LABORATORY

(India's No.1 Fully Automated Testing Laboratory)



### PUMP TESTING

Horizontal centrifugal pumps for clear, cold water	IS-6595 (Part 1): 2002 IS-6595 (Part 2): 1993
Submersible pump sets	IS-IS-8034:2002 Cl.16.1
Pumps- regenerative for clear cold water	IS-8472:1998 Cl.17
Electrical moonset pumps for clear cold water for agricultural and water supply purposes	IS-9079:2002 Cl.16.1
Motors for submersible pump sets	IS-9283:1995 Cl.15.1, Cl.15.2
Engine moonset pumps for clear cold fresh water for agricultural purposes	IS-11501 (Part 1): IS-2002 Cl.14
Open well submersible pump sets	IS-14220:1984 Cl.11

### MOTOR TESTING

Single phase small AC and universal electrical motors	IS-996:1979
Energy efficient induction motors – three phase squirrel cage	IS 12615:2011
Three phase squirrel cage induction motors for centrifugal pumps for agricultural applications	IS 7538:1996
Single phase small AC electric motors for centrifugal pumps for agricultural applications	IS 14582:1998
Single phase AC induction motors for general purpose	IS 996:2009
Single phase small AC and universal electrical motors Agricultural and Rural Water Supply Purposes	IS-996:1979

## SCOPE OF MOTOR TESTING:

- Testing of single and three phase induction motors 5Hp to max. 150 HP capacity in different frequency range from 20 Hz. to 60 Hz.
- Testing of motor speed 500 to 3600 RPM
- Testing of motors from 132S to 315L frame size
- Testing capacity of torque upto 5Nm to 2000 Nm.

- Motor resting table with hydraulic/pneumatic system upto 300 mm (minimum).

All the test to be performed as per IS 996, IS 325, IS 12615 by automatic mode. The instruments and transducers/sensors following tests are integrated with control panel assembly and test bench rig.

- I.R (Insulation resistance) test
- Measurement of resistance of windings of stator and wound rotor
- H.V test
- No load test at rated and various voltage to determine input power, current and speed.

- Open circuit voltage ratio of wound rotor motors (slip ring motors)
- Reduce voltage running up test at no load (for squirrel cage motors upto 37 KW)

- Locked rotor readings of voltage, current & power input at suitable reduced voltage
- Full load test to determine efficiency, power & slip

- Full load test at various voltages with output keeping constant
- Locked rotor test to determine breakaway torque
- Pull-up & Pull-out torque test
- Surface temperature measurement of motor at various location
- Temperature rise test
- Momentary overload test
- Over speed test
- Occasional excess current test (1.5 time of rated current upto min. 2 minutes))
- Load test at various load upto 150%

- Direction of rotation

Measurement facility of following parameters:

- Single & three phase voltage. (Ph. to Nu & Ph. to Ph.)
- Single & three phase ampere. (Per Ph. & Total Average)

- Single & three phase active, reactive and apparent power. (Per Ph. & Total average)
- Frequency (Hz) and power factor

- RPM, %Slip
- Torque measurement

- Resistance of winding
- Temperature

### TEST PROCESS:

Induction motor test are controlled by software with help of data acquisition system, as per scope of testing. Test data will be measured by control panel (includes power analyzer and other instruments) interfaced through USB/RS-485/RS-232 to computer, to provide data. Software installed in computer receives all data from instruments and generate reports and graphs accordingly.

### OUTPUT FROM SOFTWARE: Motor performance report

Curve for load current Vs output	Torque Vs Speed at various load at rated voltage of motor	Efficiency Vs output	Power factor Vs output
% Slip Vs. output	Load current Vs Slip	NL voltage Vs NL current	I/p Power Vs Speed at constant torque

## SCOPE OF PUMP TESTING:

- Testing of pump sets from 0.5 HP to 150 HP max. Capacity.
- Delivery size from 1" to 6".
- Flow rate range for pump is 30 lpm to 6000 lpm
- Max. Head measurement up to 500 mtrs. (50 Kg./cm<sup>2</sup>)
- Suction (Vacuum) measurement. (1 bar)
- SS Pipe line for delivery of pump to outlet, with valve & flow meter & cam lock couplings for easy installation.
- RPM measurement 500 to 3000 RPM

Suitable Resting Table for Testing of Pumps under IS 9079, 6595(part1) & 8472 are provided.

Test covered:

Test of all kinds of pumps should be performed as per Indian Standards i.e. 8034, 14220, 9079, 6595(Part1) & 8472.

Following parameter should be measured:

- Single & three phase voltage. (Ph to Nu & Ph. to Ph.)
- Single & three phase ampere. (Per Ph. & Total Average)
- Single & three phase active, reactive and apparent power. (Per Ph. & Total Average)
- Frequency (Hz) and power factor
- RPM, %Slip,
- Pressure measurement (upto 50bar.)
- Flow rate Indicator (Digital O/P)
- Temperature. (Water temp. in water tank) and resistance measurement

### TEST PROCESS:

Pump test are controlled by software with help of data acquisition system, as per scope of testing. Test data to be measured by its power analyzer and other instruments. Control panel (includes power analyzer and other instruments) to be equipped with USB/RS-485/RS-232 to computer interface which provide data to PC. Customized software to record test result and generate report according to the scope of testing.

### OUTPUT FROM SOFTWARE: Pump performance report

Curve for Discharge V/s Head,	Discharge V/s Current	Discharge V/s efficiency	Discharge V/s power
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**For Further Details contact,**  
**N.K.SUBRAMANI, Deputy General Manager,**  
**NSIC TECHNICAL SERVICES CENTRE**  
**Sector B-24, Guindy Industrial Estate, Ekkaduthangal, Chennai – 600 032**  
**Ph:9884052661, 044-22251254 , Email ; nsic\_energy@nsic.co.in**