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KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	SPECIFICATION FOR INDUCTION MOTORS (PROJECT STANDARDS AND SPECIFICATIONS)	

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SCOPE

This Project Standard and Specification covers the minimum requirements for design, construction, inspection and testing of electric induction motors.

REFERENCES

Unless otherwise specified, induction motors shall conform to the requirements of the following standards.

1. American National Standards Institute (ANSI)

ANSI/AFBMA B3.15 Load Ratings and Fatigue Life for Ball Bearings

ANSI/AFBMA B3.16 Load Ratings and Fatigue Life for Roller Bearings

2. International Electrotechnical Commission (IEC)

3. Institute of Electrical and Electronics Engineers (IEEE)

ANSI/EEE 43-19 Testing Insulation Resistance of Rotating Machinery

IEEE 85 Test Procedures for Air Borne Sound Measurements on Rotating Electric Machinery

IEEE 112-1978 Test Procedure for Polyphase Induction Motors and Generator

4. National Electrical Manufacturers Association (NEMA)

ANSI/NEMA MG1 Motors and Generators

ANSI/NEMA MG2 Safety Standards for Construction Guide for Selection, Installation and use of Electric Motors and Generators

Motors for installation in hazardous areas shall be certified and approved for the particular hazard classification according to the requirements of a competent national testing and certification authority.

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DESIGN CONDITION

Service Condition

1. Ambient Condition

Electrical system shall be designed for use under the following ambient conditions, unless otherwise specified in the specific data sheet.

- a. Altitude : Below 1000m above sea level
- b. Ambient air temperature : 19°C up to and including 40°C
- c. Relative humidity : 60% to close to 100%
- d. Special atmospheric conditions : Corrosive & sulfurous.
- e. Rainfall
 - Maximum rainfall for 24 hours : 134.44 mm
 - period
 - Annual average (per year) : 1,737.8 mm
- f. Wind : Basic wind speed; 220km/hr: Wind Zone II, Exposure Category C
- g. Seismic conditions : Seismic Zone 4

2. Power Supply Conditions

Electrical system shall be designed to operate satisfactorily at the rated load with the following variations in the power supply. Performance in these cases need not necessarily be in accordance with those established for operation at the rated voltage and the rated frequency.

- a. Voltage variation : $\pm 10\%$ of the rated voltage
- b. Frequency variation : $\pm 5\%$ of the rated frequency
- c. Combined voltage and frequency variation: such that the sum of the absolute percentages of the two variations is 10% or less, provided that frequency variation does not exceed 5%.

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Rating

Motors shall be designed to give at least two years continuous running without maintenance.

<u>Motor Rated Voltages (V)</u>	<u>Phase</u>	<u>Frequency(Hz)</u>	<u>Output (kW)</u>
6,600	3	60	160kW & Above
460	3	60	Below 160kW

Special motors such as electric fans, ventilators, refrigerators, air conditioners, machine tools, powered hand tools, motors used for crane, motor operated valve (MOV) actuators, sirens, testing or experimental equipment, or controllers are excluded from this specification.

Noise

Noise level of motors shall be referred to the equipment specification unless otherwise specified on the motor data sheets.

ELECTRICAL DESIGN FEATURES

Starting Duties

Motor shall be designed to allow at least three starts in quick succession from cold against full load torque (total time for the 3 starts not exceeding 4 minutes), without injurious heating to the motor windings. This starting procedure would be followed by a cooling period of 30 minutes before attempting another starting sequence, and the motor shall be able to withstand indefinite repetition of the above starting procedure. Motors shall be capable of withstanding, without damage the effect of automatic reacceleration following voltage dip or momentary interruption.

Speed-Torque Requirements

Motors shall satisfy the speed-torque requirements of the driven equipment over its entire starting and operating range. Generally, the motor torque at 80 percent of rated motor voltage shall be sufficient to overcome load inertia on starting and to accelerate the load to rated speed without exceeding rated temperature rise. The locked rotor withstand time of motor at 80% voltage at motor terminal shall be more than the acceleration time of motor.