

BHEL HYDERABAD	Annex-16: AC MOTOR										
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<u>TECHNICAL DETAILS OF LT AC MOTOR</u> (FGD LUBE OIL SYSTEM) - Squirrel cage induction motor suitable for direct-on-line starting. Further, continuous duty LT motors up to 200 kW Output rating (at 50°C ambient temperature), shall be Premium Efficiency class-IE3, conforming to IS 12615, or IEC:60034-30. - Crane duty motors shall be slip ring/ squirrel cage with VVVF type induction motor. Motor operating through variable frequency drives shall be suitable for inverter duty. Also these motors shall comply the requirements stipulated in IEC: 60034-18-41 and IEC: 60034-18-42 as applicable. 5.4.4 Rating i) Continuously rated (S1). However, crane motors shall be rated for S4 duty i.e. 40% cyclic duration factor. ii) Maximum continuous motor ratings shall be at least 10% above the maximum load demand of the driven equipment unless otherwise specified, under entire operating range including voltage and frequency variations. iii) Motors starting shall be as per IEC-60034 (part12) 5.4.5 Temperature Rise Motor shall have insulation class F with following temperature rise- <table border="1"> <tr> <td>Air cooled motors</td> <td>70 C by resistance method</td> </tr> </table> <table border="1"> <tr> <td>Frequency variation</td> <td>(±) 5%</td> </tr> <tr> <td>Voltage variation</td> <td>a. (±) 10% for 11kV, 3.3kV b. (±) 10% for 415 V</td> </tr> <tr> <td>Combined variation of voltage and frequency.</td> <td>10% (absolute sum)</td> </tr> </table>				Air cooled motors	70 C by resistance method	Frequency variation	(±) 5%	Voltage variation	a. (±) 10% for 11kV, 3.3kV b. (±) 10% for 415 V	Combined variation of voltage and frequency.	10% (absolute sum)
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5.4.6 Operational Requirements i) Starting Time a) For motors with starting time up to 20 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 2.5 secs. more than starting time. b) For motors with starting time more than 20secs. and up to 45secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 5 secs. more than starting time. c) For motors with starting time more than 45secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be more than starting time by at least 10% of the starting time. d) Speed switches mounted on the motor shaft shall be provided in cases where above requirements are not met. ii) Torque Requirements a) Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque. b) Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors. iii) Starting voltage requirement a) All motors (except mill motors): 80% of rated voltage for motors up to 4000 kW 75% of rated voltage for motors above 4000 kW b) For mill motors 85% of rated voltage for motors above 1000 kW 90% of rated voltage for motors below 1000 kW Winding and insulation class shall be F.			
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LT Motors
(To be furnished for each rating of Motor)

Sl.No.	Description	Specified Data	Details by Bidder
1.	Make and place of manufacture		
2.	Application		
3.	Quantity		
4.	Type of motor	Squirrel cage	
5.	Duty	S1	
6.	Applicable standard	IS:325	
7.	Frame size		
8.	Required BkW rating of the driven equipment	kW	

Sl.No.	Description	Specified Data	Details by Bidder
9.	Design margin considered	Minimum 10%	
10.	Rated continuous output of motor at 50°C ambient	kW	
11.	Rated voltage and frequency	415V, 50Hz	
12.	Full load current	 Amps	
13.	Efficiency at 100% load	%	
14.	Energy efficient rating		
15.	Type of starting	DOL	
16.	No. of hot / cold starts	3/2	
17.	Degree of protection of enclosure	IP55	
18.	Method of cooling	TEFC	
19.	Insulation class	F	
20.	Temperature rise over 50°C ambient. (by resistance)	70°C	
21.	Electric Actuator		
	• Make		
	• Type (with integral starter)		
	• Model no.		
	• Rating		

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Tests a) Type Tests: Reports of all type tests shall be submitted before dispatch for approval. In case type test report on similar equipment (conducted within 5 years as on the date of bid opening) is not available, these tests shall be carried out. The bidder shall clearly indicate in his tender whether he would be furnishing the type tests reports or he shall be conducting the tests along with the additional cost for such tests, if any. The purchaser reserves the right either to waive the type tests or get these type tests conducted. b) Routine tests: All routine tests as per relevant standards shall be conducted on the assembly and the various components. The successful bidder shall submit five (5) copies of certified test reports on all routine tests before dispatch for approval. c) The purchaser reserves the right to witness all the tests. The tenderer shall give at least three weeks clear notice prior to conducting these tests to enable the purchaser and/or his representative to be present to witness the test.			
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