



NATIONAL FERTILIZERS LIMITED

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Materials Department

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Specification sheet of Material SPX/2024/1

Sr. No.	Material Code	Description of Material	UoM	Qty.
1	8601524	<p>DESIGN, MANUFACTURE, TESTING AT WORKS AND SUPPLY IN WELL PACKED CONDITION :- THREE PHASE SQUIRREL CAGE INDUCTION MOTOR OF 55 KW, 1500RPM (SYN), FRAME SIZE NV-250M, FLANGE MOUNTED DE SIDE IM3011 (IMV1), (EX-ec or above), IE-3 SERIES, 415V, DELTA CONNECTED, IP-55. APPLICATION - CARBAMATE SOLUTION HANDLING FOR 10PC-5 /10PC-10 in Urea plant.</p> <p>TECHNIAL SPECIFICATIONS OF MOTORS SHOULD BE AS PER THE ATTACHED ANNEXURE - I AND EXISTING DRAWING GIVEN IN ANNEXURE-II. BIDDER SHOULD SUBMIT THEIR OFFER ALONG WITH THE FILLED ANNEXURE-I and Annexure-III & SUBMIT CERTIFICATES AS PER NIT.</p>	NO	2

Note: - (1).You shall submit your offer along with duly filled Annexure-I, III .Offer without filled Annexure-1 & III straight way rejected and no correspondence in this regards shall be entertained

(2). Incase bidder is a manufacturer OF LOW VOLTAGE INDUCTION MOTOR,he will submit **self-declaration on his letter head**. If the Bidder is authorized dealer then **tender specific authorization** shall be submitted along with their bid.

(3). Bidder shall submit self-attested copy of Two successfully completed Purchase Order during last seven year ending last day of previous month in which the NIT has been issued. Similar item means ie low voltage induction motor of rating 55KW or above.

ANNEXURE - I
TECHNICAL REQUIREMENT OF INDUCTION MOTOR [55 KW]

SPx/2024/1

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SNO.	Technical Requirement	Confirmation from vendor
1.	Scope: Design, manufacture, testing at works and delivery in well-packed condition of 3 phase Induction motors of following ratings :-	
a)	Power Rating : 55KW	
b)	Voltage Rating : 415V \pm 10% (3 Phase), Delta connected	
c)	RPM : 1500 RPM (Syn)	
d)	Rated Frequency : 50 Hz \pm 5%	
e)	Frame Size : NV250M (IM3011-V1) Flange mounted (DE side)	
2.	SPECS :	
a)	Motors shall be energy efficient type of efficiency class of minimum 'IE3' as per IS 12615.	
b)	Motor's execution should be of Ex-ec class or above	
c)	Motors shall be suitable for Hazardous Area Classification : Zone 2	
d)	Gas Group : IIA/IIB or higher	
e)	Temp. Class : T3	
f)	Degree of Protection : IP55	
3.	STANDARDS	
a)	IS-325 amended up to date or equivalent IEC standards.	
b)	Wherever any requirement laid down in this standard differs from that in Indian Standard Specifications, the requirement specified herein shall prevail.	
4.	Enclosure:	
a)	Motors are outdoor service shall be provided with special seals for the enclosure, joints, bearing housing, terminal boxes etc. so that no extra protective covering for ingress of water shall be required.	
b)	All external hardware less than 8 mm shall be SS and more than 8mm shall be zinc passivated or Cadmium plated.	
c)	The enclosure shall be provided with threaded metallic plug to permit drainage of condensed water from the inside.	
5.	Cooling	
a)	All LV motors shall be totally enclosed fan cooled (TEFC) conforming to IC-411 as per IS: 6362.	
b)	The cooling fans shall be suitable for bidirectional rotation of motors. These shall be fastened to the motor shaft by means of compensating rings or will be balanced Independent of the motor. Guide key or reference points shall be supplied to prevent Wrong assembly. The cooling air shall be sucked from the non-driving end.	
c)	The cooling fans shall be made of materials such as cast Aluminum (LM-6 alloy) / cast iron /Cast Steel.	
6.	Direction of Rotation	
	Motors shall be suitable for both directions of rotation.	
7.	Stator	
a)	The stator laminations shall be made from suitable magnetic sheet iron varnished on Both sides. Where ventilation is required, these shall be arranged in suitable packs, Each pack being separated by spacers to form ventilating ducts for circulation of air.	

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TECHNICAL REQUIREMENT OF INDUCTION MOTOR [55 KW]

b)	The slot shall be open type with coils so arranged that the coils can be easily removed for inspection and repair.	
8.	Rotor	
a)	The rotor shall be of squirrel cage construction,	
b)	For small motors, the squirrel cage shall preferably be of pressure die-cast Construction. For large motors, the rotor bars and the end rings shall be of copper or Copper alloy. The bars shall be firmly placed in slots to prevent vibration during startup / locked rotor condition. Conductor ends shall be securely fixed to the end rings using The latest brazing techniques. Retaining rings shall be provided for high speed Machines for the end rings. The rotor cage shall be designed for the required starting And duty cycles.	
c)	The rotor shall be dynamically balanced and shall rotate perfectly with no preferential Stop points. The rotor shall be constructed such as to allow the removal or addition of Material for balancing.	
d)	The rotor shaft shall be electrically and magnetically so balanced that the induced shaft voltage does not exceed 200 millivolt. Otherwise the bearing housing at non-driving end shall be insulated for 2 KV.	
e)	Rotor magnetic center shall be clearly marked on floating type bearings.	
f)	The existing motors have additional cuts in shaft. Rotor shaft dimensions shall match as per the drawing shown in page 3 of 3 of Annexure-II	
9.	Windings and Insulation	
a)	The motor coils shall be made out of insulated electrolytic grade copper conductor. Successive coils shall be connected by accessible joints, well brazed and finished smooth to prevent damage to insulation.	
b)	All motors shall be insulated with Class F insulated with temperature rise limited to that of Class B.	
c)	The winding coils shall be dried, properly vacuum impregnated with suitable varnishes to withstand the site conditions and properly baked. At least two additional impregnations and baking shall be applied to the assembled stator coil, making a total of three impregnations and baking. Finally the windings shall be painted with special anti-acid and anti-alkali paints to withstand the site conditions.	
d)	The windings shall be well brazed and capable of withstanding thermally and mechanically the transient disturbances	
10.	Bearings	
a)	All motors shall be provided with bearings suitable for the application. The bearings must be guaranteed to ensure a smooth operation and a life not shorter than 20,000 hrs.	
b)	The bearing housing shall be effectively sealed against ingress of dust and water and creep age of lubricants along the shaft.	
c)	The bearing shall be suitable for both directions of rotation of the motor.	

ANNEXURE - I
TECHNICAL REQUIREMENT OF INDUCTION MOTOR [55 KW]

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d)	The motors shall be provided with on-line grease lubrication arrangement. The arrangement shall be complete with grease nipple and drain plug located at convenient locations.	
e)	The manufacturer shall specify the type of lubricant and the time interval of lubrication for the bearings of each motor.	
f)	The bearing temperature shall not exceed 65°C for grease lubricated bearings and 50°C for oil lubricated bearings.	
g)	Greasing path shall be such that grease do not enter the winding. Grease inlet and out shall be fitted with replaceable dust protection covers.	
11.	Terminal Box	
a)	All the terminal boxes shall have identical degree of protection as that of the motor.	
b)	The power terminal box shall be mounted side wise of the motor as shown in page 2 of 3 of Annexure-II.	
c)	Design of terminal boxes shall be such that it may be possible to arrange proper entry of cables at site. (Power cable : 3CX120 Sq-mm)	
d)	The power terminal boxes shall be standard box with epoxy or SRBF moulded Terminal as per Manufacturer's standard.	
e)	All the six leads of the motors shall be taken out to a common Terminal box. Shorting links for delta connections shall be provided in the terminal box.	
f)	The power terminal boxes shall have adequate clearances in between the terminals and also between the terminals and cable gland for proper termination of cables. Where more than one cable is required to be terminated in parallel, the spacing in the box shall be adequate for easy termination.	
h)	Space heater of single phase and suitable power rating shall be provided for motors.	
i)	Separate terminal boxes shall be provided for connection of power, control and space heater cables.	
j)	The cable lugs shall be of tinned copper and suitable for crimping.	
12.	Starting	
a)	The motors shall be capable of being started direct-on-line.	
b)	The starting torque of each motor shall be higher than the initial resisting torque of the driven load throughout the starting period even at a feeding voltage of 80% of the rated voltage for normal purpose motor.	
c)	The starting current i.e. breakaway current of 415V motor shall not exceed the values indicated in IS: 12615.	
d)	The motors shall be suitable for the following starting cycle: a) With the motor at ambient temperature - 2 successive starts and 3rd start after 5 minutes. b) With the motor at steady state load temperature - 1 immediate start and 2nd start after 5 minutes. This sequence shall be repeated in the next hour.	

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ANNEXURE - I
TECHNICAL REQUIREMENT OF INDUCTION MOTOR [55 KW]

13.	Locked Rotor Condition	
	The locked rotor withstand time (t_E), under hot condition at 110% of rated voltage shall be more than the starting time of the motor coupled to the load even at the lowest stipulated starting voltage by 2 secs. For motors, having starting time up to 10 secs. and By 5 secs. for motors, having starting time more than 10 secs	
14.	Running	
a)	All motors shall be continuous (S1 duty) as per IS: 325.	
b)	The motors shall be capable of delivering the rated output without exceeding the specified temperature rise under the system voltage and frequency variation conditions.	
c)	The motors shall be suitable for running at the rated load for 5 minutes duration at 80% voltage and for 1 Sec. duration at 70% voltage, without exceeding the specified temperature rise	
15.	VIBRATIONS	
	The motor vibrations measured at the bearings must not exceed the limits specified in IS: 12075	
16.	NOISE LEVEL	
	The motor noise level shall not exceed the limits as specified in IS : 12065 at a distance of 1 meter from the motor.	
17.	PAINTING	
a)	Enclosures of the motor and its accessories shall be painted with two coats of anti-rust paint and two coats of anti-corrosive paint after suitable pre-treatment.	
b)	The finishing shade shall be light grey having shade No.631 as per IS: 5 or RAL7035 Siemens Gray.	
18.	Party shall submit the GA drawing, Characteristics Curves for approval within 15 days from the date of PO.	
19.	TESTS AND INSPECTION	
	Motor shall be routine tested as per relevant standards and reports shall be submitted along with supply.	
20.	DEVIATIONS	
	Deviations, if any, from this standard shall be clearly indicated in the offer with reasoning.	





Existing Details of 55 KW Induction Motor-10PC-5N/R

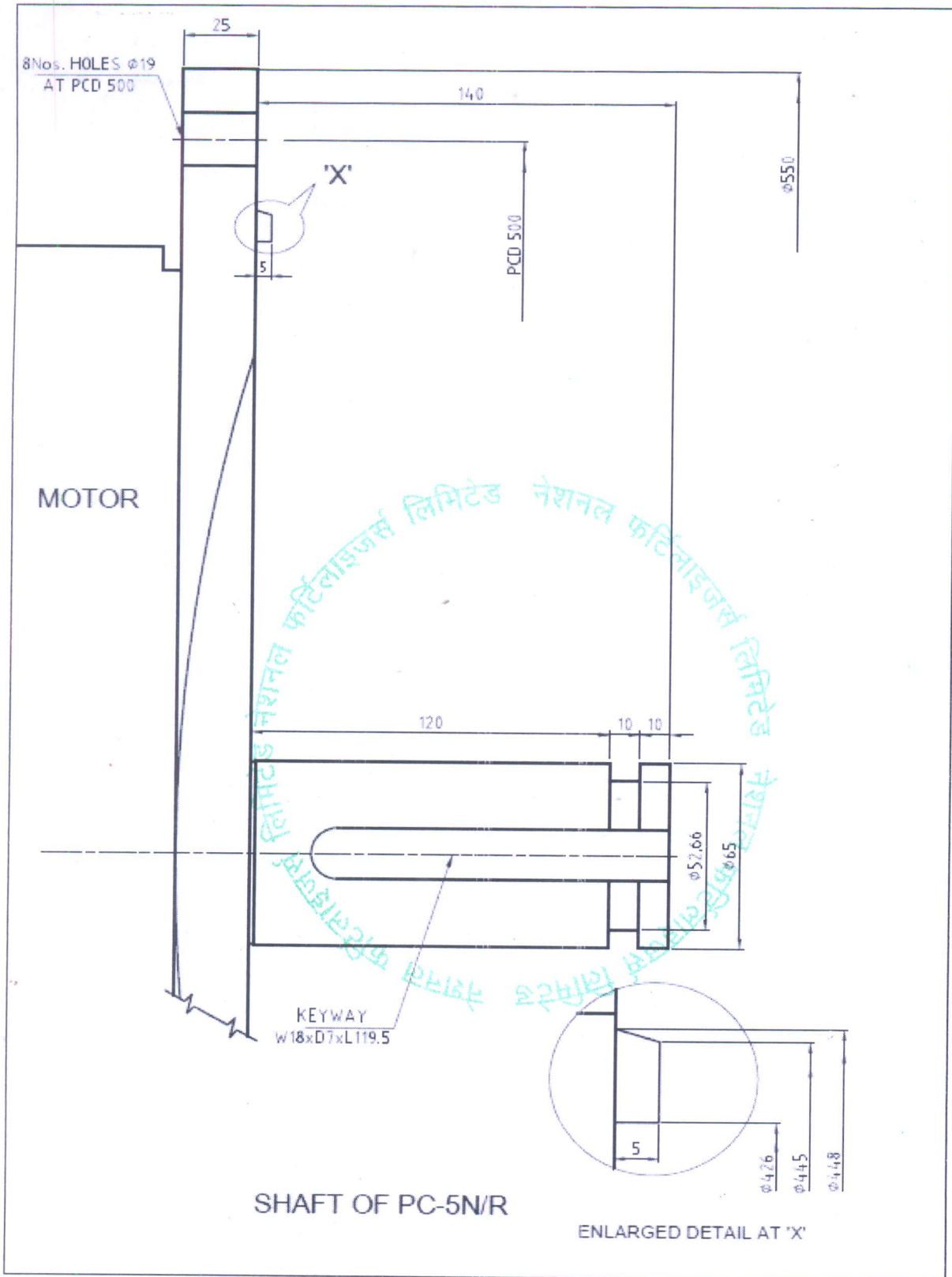
S. No	Existing motor's specifications	<u>10PC-5N/R</u>
1	Motor	Induction Motor
2	Frame Size	NV-250M
3	Execution	IE-2 increase safety
4	Rated Power	55 KW
5	Rated Voltage	415 V± 10 %
6	Connection	DELTA
7	Rated RPM	1475
8	No. of poles	4
9	Duty	S1
10	Insulation Class	F
11	Ambient Temperature	45 °C
12	Rotation	CW and CCW
13	Starting	DOL
14	Cooling Method	IC 411
15	Degree of Protection	IP 55
16	Noise	85 dB (A)
17	Motor Space Heater	Required
18	Mounting	MA Flange mounted DE side cover(V1) IM3011(IMV1)
19	Terminal Box	Side wise as per attached view from DE side (Cable size 3CX120 Sq. mm.)

A	140 mm			
B	65 mm		X	430 mm
C	450 mm		Y	450 mm
D	550 mm		Z	500 mm
E	10 mm			
F	10 mm			

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ANNEXURE- III

TECHNICAL PARTICULARS OF INDUCTION MOTOR TO BE FILLED BY BIDDER [55 KW]

S. No.	Description	To be filled by the Bidder
1.0	General	
1.1	Make	
1.2	Enclosure Type (Ex-ec or above)	
1.3	Gas Group	
2.0	Electrical Data	
2.1	Rated Output Power (KW)	
2.2	Rated Voltage (V)	
2.3	Rated Current (Amp)	
2.4	Frequency (Hz)	
2.5	No of poles	
2.6	Rated Speed (RPM)	
2.7	Frame Size	
2.8	Mounting	
2.9	Duty	
2.10	Temperature Class	
2.11	Class of Insulation	
2.12	Degree of Protection	
2.13	No. of Starts - Hot / Cold	
2.14	Rated Torque (Kg-m)	
2.15	Starting Torque	_____ % FLT
2.16	Pullout Torque	_____ % FLT
2.17	Starting Time at 100% Voltage in secs	
2.18	Amb. Temp. Temp. Rise at Full Load	
2.19	Locked rotor current	_____ % FLC
2.20	Locked rotor withstand time (Hot) in secs	
2.21	Locked rotor withstand time (Cold) in secs	
2.22	Efficiency at 100% load / 75% Load / 50% load	
2.23	Power Factor at 100% / 75% / 50% Load	
2.24	Heating Time Constant	
2.25	Cooling Time Constant	
2.26	Method of Starting	
2.27	Winding Connection	
2.28	Number of Terminals	
2.29	Cable size suitable for entry in main TB	
2.30	Terminal box position	
2.31	Space heater Rating in wattage	
3.0	Mechanical Data	
3.1	Motor Weight	
3.2	Method of cooling	
3.3	Rotor GD2 in Kg-m ²	
3.4	Suitable for Outdoor Use	
3.5	Direction of Rotation	

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ANNEXURE- III

3.6	Max vibration limit	
3.7	Max Noise Level	
3.8	Type & Material of Fan	
3.9	Lubrication Type	
3.10	Interval of Lubrication (Hrs)	
3.11	Provision of On Line Lubrication	
3.12	Bearing Nos	
a)	DE	
b)	NDE	

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