

 बी एच ई एल CBU BHEL	PURCHASE SPECIFICATION AIR COMPRESSOR 211 CFM @7 BAR OIL FREE	Spec. No	EP:PVM:EQS:09
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**TECHNICAL SPECIFICATION
FOR
AIR COMPRESSOR 211 CFM @ 7 BAR
OIL FREE TYPE**

**ELECTROPORCELAINS DIVISION,
BHARAT HEAVY ELECTRICALS LTD.,
IISc POST, BANGALORE, INDIA 560012**

REVISION (00)	DETAILS:	PREPARED	DATE 30.11.2015
		APPROVED	

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A	SCOPE	Supply, Installation & Commissioning of min 211 CFM capacity, oil free, Stationary, Air cooled, Screw Compressor with refrigerated Air drier, pre and after filters for providing clean and dry compressed air as plant utility.	
B	TECHNICAL SPECIFICATIONS:	Offer shall be corresponding to the parameters under the specifications below and point wise compliance to the following specification is required	
C	Quantity	4 no's (FOUR)	
SL NO	DESCRIPTION	Vendor's Confirmation	
1.0	SCOPE		
	The specification governs the general requirements of design, manufacturing, supply, installation and commissioning of min 211 CFM capacity Oil free compressor, air cooled along with refrigerated air drier, pre-filter, after filter complete in all respect.		
2.0	GENERAL FEATURES		
2.1	An independent stationary skid mounted, two stage, air cooled screw type Air Compressor unit capable of continuously supplying compressed air at the rated capacity, along with the refrigerated air drier and filtration system, powered by a 3 phase A.C. electric motor.		
3.0	SCOPE OF SUPPLY		
3.1	The Compressor Package includes the following : <ul style="list-style-type: none"> - 2 Stage oil free complete compressor package, pre-piped and wired, ready for operation. - Sound attenuating enclosure, with provision for easy accessibility - Compression modules with heavy duty air ends - Direct drive with suitable coupling and speed reducers. - Inbuilt lubrication system with min. 10μ full flow oil filter - On / Off regulation with automatic compressor re-start - Main motor and fan motor with insulation class F windings - Intercooler and after cooler with moisture separator and automatic condensate drains with manual by pass valves. 		

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	<ul style="list-style-type: none"> - Pulsation dampers after each stage for ensuring continuous flow - Oil cooler with thermostatic valve control - Interconnect air piping of stainless steel make - Discharge check valve - Vibration isolation pads - Microprocessor based control system housed in IP-54 enclosure with full protection, alarm and warning annunciation - Safety pressure relief for inter, after and oil cooler protection - Dry type inlet filter of min 3 μ - min 99.9 % retention 	
3.2	<p>Standard accessories: The indicative standard accessories are listed below, bidders to confirm and also provide additional accessories as required for enhancing the performance, safety and efficiency.</p> <ul style="list-style-type: none"> - Oil sight glass - Non-return valve - Auto drain valve - High temperature shut down sensor system 	
3.3	<p>Prime Mover : Heavy duty, IE3/energy efficient Induction Motor with TEFC IP 55 enclosure of required KW/HP capacity. Preferred Makes : Siemens /ABB/Alstom/CGL/Bharat Bijlee</p>	
3.4	Duty Rating : Continuous	
3.5	<p>Compressed Air Quality at delivery:</p> <p>a) Fine Filtration: Residual Oil Content: Max 0.1 mg / meter cube at 21 deg. c.</p> <p>b) Activated Carbon Filtration: Residual Oil Content: Max 0.003 mg / meter cube at 21 deg. c.</p>	
3.6	Noise level(1meter away from compressor): 83 db (max)	
3.7	Air receiver capacity 1 Cubic Meter : Designed and manufactured complying to Pressure Vessel rules, Tested and Certified by competent person.	
3.8	After Cooler CTD :11 Deg C	

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4.0	Control system and panel Microprocessor based control system for monitoring and displaying the compressor operational parameters through an HMI. The indicative parameters for monitoring and display are as follows : <ol style="list-style-type: none"> 1. First stage discharge temperature 2. Second stage inlet and discharge temperature & pressure 3. Bearing oil pressure & temperature 4. Package discharge pressure & temperature 5. Inlet vacuum & filter status 6. Operating hours and loaded operating hours 7. Oil filter status 8. Service schedule alert The indicative parameters for warning annunciation & shutdown as required are as follows: <ol style="list-style-type: none"> 1. First stage high temperature 2. Intercooler high temperature and pressure 3. Second stage high temperature 4. Low bearing oil pressure 5. Alarm for set pressure – high 6. Blocked inlet filter 7. Wrong rotation 8. Sensor failure 9. Starter fault 10. Main motor overload 11. Fan motor overload 12. Emergency stop The indicative parameters for operator setting are as follows: <ol style="list-style-type: none"> 1. Line pressure ON / OFF 2. Lead – Lag ON / OFF 3. Auto start / stop shutdown time 4. Condensate drain interval & discharge time 5. Sequence control
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5.0	MECHANICAL SAFETY SYSTEMS: The indicative Mechanical Safety feature should be incorporated for safety of operator and the compressor. Additional features which can enhance the safety performance shall also be indicated and incorporated: <ol style="list-style-type: none"> 1. Interstage pressure relief valve 2. Discharge pressure relief valve 3. Oil pressure relief valve 4. Air receiver high pressure relief valve 	
6.0	<u>TOOLS FOR ERECTION, OPERATION & MAINTENANCE</u> Set of standard and special tools and tackles required for general operation and maintenance of the compressor should be supplied. List of such tools should be submitted with the techno-commercial offer.	
7.0	WARRANTY The warranty for the equipment shall be for a period of 24 months from the date of commissioning or 30 months from the date of supply whichever is earlier. Supplier should indicate replacement parts & consumables for 2 years continuous operation (@ 24 hr / day basis). However, during the period of warranty, these spares and consumables are to the scope of supplier. List of spares& consumables is to be provided along with the techno-commercial offer for reference.	
8.0	DOCUMENTATION : Three sets of following documents (Hard copies) in English language should be supplied along with the compressor.	
8.1	Operating & Maintenance manuals	
8.2	Electrical circuit diagram	
8.3	Specification and make of consumables	

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8.4	EQUIPMENT LAYOUT AND HOUSING Vendor shall submit the layout drawing for, the layout should consist of all requirements pertaining to complete compressor including space requirement for any accessories. Foundation and grouting if necessary shall be indicated for BHEL to arrange.
9.0	INSTALLATION AND COMMISSIONING The scope of vendor includes installation and commissioning. Vendor to make necessary preparatory arrangement for carrying out the erection, start up, testing of compressor, its control & all types of other auxiliary equipment. Service requirement like power, air & water shall be provided by BHEL and the requirement to be indicated by vendor. Other material handling requirements shall also be provided by BHEL for transportation and placement of Compressor and its accessories at designated place under the supervision of the vendors representative.
9.1	Commissioning spares, required for commissioning of the compressor within stipulated time, shall be brought by the supplier on returnable basis.
9.2	Schedule of Erection and commissioning shall be submitted with the techno-commercial offer.
10.0	OPERATING CONDITINONS Compressor should work satisfactorily and within the defined parameters under following operating & environmental conditions with specified accuracies. Power Supply: Voltage: 415v-10%, +10% Frequency: 50 Hz +3%, Ambient Conditions: Temperature: 15 to 45 degree Celsius Relative Humidity: 95% max. (Vendor to confirm that compressor is suitable for above and details of provisions on the compressor for the same are to be furnished by vendor) BIDDERS TO INDICATE THE SPECIFIC POWER CONSUMPTION, SPECIFIC OIL CONSUMPTION AT RATED PRESSURE AND OUTPUT. DUE WEIGHTAGE FOR EFFICIENCY SHALL BE PROVIDED WHILE EVALUATION AND SELECTION OF THE SUCCESSFUL BIDDER.

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10.1	Weather conditions are tropical atmosphere and moderately dust laden. Compressor shall be kept in the normal shop floor condition. The selection and deployment of the suitable intake filters shall be done and indicated in the techno-commercial offer.	
11.0	COMPRESSOR ACCEPTANCE (Tests/Activities to be Performed by Vendor)	
11.1	Test / Activities to be witnessed by BHEL representatives at supplier's works on the compressor during pre-despatch inspection:	
11.2	Test certificates, Specifications compliance and performance of the complete supplied system.	
11.3	Demonstration of all features of the compressor control system & accessories. Operational & Safety features.	
11.4	Tests/ Activities to be carried out at BHEL works while commissioning the compressor:	
11.5	Demonstration of all features of the compressor, control system & accessories for compliance to the defined compressor specification and parameters.	
11.6	Training of BHEL compressor operators/maintenance personnel in operation/maintenance of complete compressor & accessories by the supplier's engineers during the commissioning period.	
11.7	Demonstration by actual use of all supplied auxiliaries and accessories to their rated capacity.	
12.0	FINAL ACCEPTANCE Final acceptance shall be after installation and commissioning of the complete air compressor system at BHEL by the vendor to the full compliance to set specification and parameters. The criteria shall be "satisfying all the clauses of Technical specification" given above	
13.0	PACKING Suitable & rigid packing for all items of complete compressor, all accessories and other supplied items to avoid any damage/loss in transit. When compressor is dispatched in containers, all small loose items shall be suitably packed in boxes	

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14.0	GENERAL : The bidder should submit the following information in the techno-commercial bids:	
14.1	Compressor Model and its product catalogue.	
14.2	Dimensional details of compressor and its accessories	
14.3	Weight of the compressor and its accessories	
15.0	Air Drier - Refrigerant Type : Refrigerant type air drier of matching capacity shall be offered along with the compressor. The refrigerant type air drier shall have full feature electronic control system for ensuring efficient operation of the compressed air system. The following indicative features shall be incorporated in the drier offered, additional features for enhancing the performance and efficiency may be offered and details provided. <ul style="list-style-type: none"> a. Auto shut OFF / ON for energy saving b. Alarm display for high and low dew point c. Programmable electronic drain valve d. Inbuilt strainer with quick access for maintenance The refrigerant type air drier shall use only eco-friendly non-CFC refrigerant, details to be provided. The brought out components shall be of industry standard and good quality makes, and the details of such bought out components like refrigerant compressor, auto drain valves, control and indication instrumentation shall be provided. BHEL at its discretion may opt for standard or preferred make of such brought out components. The warranty, spares and service support for the refrigerant type air drier shall be same as that of the compressor unit.	
16.0	Pre and After Filtration System : The compressor shall be offered along with a suitable and matching rated pre & after filtration system to ensure clean air. The indicative features of the filtration system is given below, additional features for enhancing the performance and filtration efficiency shall also be offered and details provided: <ul style="list-style-type: none"> a. High efficiency – low pressure drop throughout the designated operating life b. Combination of metallic and composite filtration elements for withstanding high operating pressure and rupture proof. 	

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	<ul style="list-style-type: none"> c. Ease of replacement of filtration elements d. Clear indication / display system for health of filter elements. e. With activated carbon filtration for oil vapour and odour removal. f. Pre-filter for particulate removal down to 1 μ including coalesced liquid, water and oil. g. After filter for removal of particulates down to 0.01 μ 	
17.0	<u>QUALIFYING CRITERIA</u>	
17.1	BIDDER SHOULD BE ORIGINAL EQUIPMENT MANUFACTURER (OEM) OF THE QUOTED ITEM OR THEIR AUTHORISED DEALERS. BIDDER TO SUBMIT COMPANY CREDENTIALS TO PROVE AS OEM. REGISTRATION CERTIFICATE AS A MANUFACTURER OR ANY OTHER DOCUMENT TO ESTABLISH THE BIDDER AS OEM OR AUTHORISED REPRESENTATIVE.	
17.2	BIDDER SHOULD HAVE MANUFACTURED, SUPPLIED AND SUCCESSFULLY COMMISSIONED COMPRESSOR OF THE RATED CAPACITY MINIMUM OF FIVE (5) NUMBERS IN THE LAST 3 YEARS. BIDDER TO SUBMIT COPY OF PURCHASE ORDERS, COMMISSIONING CERTIFICATE & PERFORMANCE CERTIFICATE FOR THE SUPPLY WITH CONTACT DETAILS OF THE CUSTOMER. BHEL RESERVES THE RIGHT FOR INDEPENDENT VERIFICATION OF THE REFERENCE PROVIDED.	
17.3	THE VENDOR SHALL SUBMIT AUDITED BALANCE SHEET OR TAX RETURNS OR PROFIT LOSS ACCOUNT FOR THE LAST 3 YEARS	
17.4	OFFER SHALL BE FOR NEW EQUIPMENT AND NOT FOR ANY REFURBISHED OR USED EQUIPMENT.	

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