

<b>RAIL COACH FACTORY, KAPURTHALA</b>		
<b>Specification No.</b>	<b>Description</b>	<b>Covering Page</b>
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	

<b>Designation</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>	<b>Level</b>
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<b>Issue/ Rev</b>	<b>Changes</b>	<b>Date</b>

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	1 of 11	17.12.2018

## 1.0 IMPORTANT INSTRUCTIONS TO TENDERERS FOR FILLING TECHNICAL BID

- 1.1 Bidders are required to give clause wise comments on the technical specifications, confirming compliance/non-compliance with details of deviations if any along with their effect on the performance. Back references to be avoided, offers are likely to be ignored in case of non-compliance of these instructions for furnishing the information.
- 1.2 Unless otherwise stated, latest alterations/ revisions of specifications/ standards/ drawings shall be applicable. In respect of safety standards and environmental standards relevant to the machine, the machine manufacturers shall ensure compliance with international (CE/ISO/DIN/JIS)/National standards (IS) (wherever applicable).
- 1.3 Tenderers should offer and quote for all the specified concomitant accessories, as these are considered essential for commissioning and utilization of the machine. Even if bidder does not recommend the purchase any of these accessories, the price must be quoted for comparison purposes and their recommendation/suggestion indicated in the offer. Tenderers should also quote for optional accessories, spares and consumable spares as asked in the specifications.
- 1.4 In case, any item is required in sets, please specify nos./pieces per set. This is essential for proper technical evaluation of the offer. Offers received without this may be considered as incomplete and liable to be rejected.
- 1.5 The bidder should quote only for the specified make of sub-assemblies and equipment wherever specified. Makes of sub-systems other than the specified ones will normally not be acceptable. In case, some other make is quoted, specific reasons for the same including its features/advantages over specified makes must be brought out in the offer.
- 1.6 In case there is a contradiction in any information provided (some parametric values given in the specification and those given in the brochure or some other document enclosed by the tenderer), unless specifically mentioned in the deviation cum confirmation statement the values as given in the specification shall be taken as confirmed by the tenderer and offer evaluated accordingly.
- 1.7 The Purchaser may accept internationally accepted alternative specifications which ensure equal or higher quality than the specifications mentioned in the Technical Specification. However, the decision of the Purchaser in this regard shall be final.
- 1.8 Purchaser reserves the right to verify the details submitted by the bidder by actual site visits.
- 1.9 Other terms & condition of the contract will be as per Indian Railway General conditions of contract.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	2 of 11	17.12.2018

## 2.0 PURPOSE

Water Cooled Screw Chiller similar to Model 30 HXC having Capacity-190 to 200 TR of any reputed make such as Carrier, Bluestar, Voltas , Daikin is required in the Administration Block of Rail Coach Factory, Kapurthala. This would be required to work in sync with the other 04 chiller units of same capacity i.e 190 TR and 01 no. chiller unit of capacity 125 TR.

## 3.0 DESCRIPTION AND SCOPE OF SUPPLY

### 3.1 The scope of supply shall include

- a. Removing of the old chiller plant which is to be replaced by this unit.
- b. The necessary modification of the existing foundation to suit the new plant as well connection the existing HVAC system. It shall also include the RCC /cement concrete foundation work required for installing the complete chilling unit in all respects for the operating parameters as provided in this specifications.
- c. Design, supply, installation and commissioning of new Water Cooled Screw Chiller plant in existing location as per the major parameters in Schedule-I.
- d. Supplying laying / fixing, testing and commissioning of nominal sizes of 125 mm dia. (32 mm thick insulation) chiller water piping (Make Jindal, Tata) inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainer, gauges etc.).
- e. The above piping shall be duly insulated with closed cell elastomeric Nitrile rubber of minimum 45kg /m<sup>3</sup> density, thermal conductivity 0.037W/MK or better at 20 deg mean temperature class 'O' insulation completely applied by suitable adhesive including the repair of damage to building while installation of pipes etc..
- f. The supply shall also include all equipments and accessories which the manufacturer considers essential to make the equipment fully functional when installed and put into operation.
- g. Other concomitant accessories/ equipment which the manufacturer considers essential to make the machine fully operational when installed and commissioned with requirement of utilities, etc if any, should be clearly indicated by tenderer in the offer.

### 3.2 The total value of the offer will be calculated on.

- i. The cost of the basic machine.
- ii. Cost of the concomitant accessories according to tenderer specification.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	3 of 11	17.12.2018

- iii. Cost of any other accessory treated as concomitant accessory.
  - iv. Applicable duties and taxes, insurance, freight and installation and Commissioning charges.
- 3.3 Technical experts of the manufacturer during commissioning of machine will fully and adequately train the operators/ maintenance staff nominated by the consignee including repairs of electronic gadgets, sub-assemblies and Printed Circuit Boards up to component level.

#### 4.0 GENERAL CHARACTERSTICS

- 4.1 It shall include all the Refrigerant piping fittings, valves and accessories required to connect compressor, condenser, chillers and expansion valve etc.
- 4.2 It shall include all Refrigerant line accessories comprising of safety valves, angle valve, liquid line indications, liquid level control etc.
- 4.3 It shall include the Water flow switches at outlet of condenser, chiller, water drain & air purge valves, thermometers and pressure gauges shall be installed wherever such monitoring is required.
- 4.4 Suction line and chiller insulation shall be completely done as required with minimum 19mm thick Polyvinyl Nitrile Rubber insulation.
- 4.5 It shall include the complete Frame work for mounting the condenser, chiller, compressor and motor with base plate with anti vibration mounting pads (AVM should be preferably of Resisto flex or equivalent make)
- 4.6 It shall include Initial / first charge of refrigerant gas & compressor oil as required for maximum efficiency of the unit.
- 4.7 The chiller shall be fully assembled at works and shall have necessary ASME stamping on heat exchangers.
- 4.8 The Chillers shall be AHRI Certified and will be tested at 100% load to certify IKW/TR on AHRI Certified test bed at manufacture facility before dispatch.

#### Condenser Water Piping

- 4.9 It shall include the supply, laying and installation of MS heavy class pipes of minimum dia 150 mm and thickness 6.35 mm as per IS1239 (200 mm and above dia as per IS : 3589) in position and cut to required lengths with all welded joints.
- 4.10 It shall also include necessary fittings like elbows, tees and reducers mating flanges & sockets with supporting structure as per specification.

#### Valves

- 4.11 Supplying, fixing testing and commissioning of valves, strainers, gauges in the water cooled screw chiller unit.
- 4.12 Plumbing shall be duly insulated to the same specification as the connected piping and adequately supported as per requirement.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	4 of 11	17.12.2018

- 4.13 Butterfly Valve (Manual) 150mm dia (125 mm dia with insulation) with CI body SS Disc, Nitrile Rubber seal & O- Ring (PN 16 pressure rating) for water circulations over chiller unit of Advance, Sant, Kartar Make.
- 4.14 Balancing valve with built in measuring facility of 150mm dia. (125 mm dia. with insulation) CI body flanged construction with EPDM coated disk with long pitch and protected outer pipe insulation (PN 16 Pressure Rating) for chiller water circulation of Advance, Sant, Kartar Make.
- 4.15 Providing and fixing in position the Y' Strainer of 150mm dia. (125 mm dia. with insulation) of Advance, Sant, Kartar Make.
- 4.16 Providing and fixing in position the industrial type pressure gauges with gun metal / brass valves complete as required. Make –H Guru.
- 4.17 Providing & fixing in position the mercury in glass industrial type thermometers Make –H Guru.
- 4.18 Providing & fixing of pedal type water flow switch. Make Honeywell, Rapid cool.
- 4.19 Providing & fixing in position the air release valve. Make Sant, Rapid cool
- 4.20 Providing & fixing of junction box for existing cable termination.

## 5.0 CONCOMITANT ACCESSORIES

The price of equipment should include the cost of all accessories as given below.

- 5.1 Lubrication device consisting of automatic electric oil pump, oil cooler, head tank, oil Strainer, and automatic pressure regulating valve, oil heater, oil heater thermal switch etc as per requirement–1 set.
- 5.2 Matching shell land tube water cooled condenser of M.S. shell and integrally finned copper tubes with ASME stamping 1 no.
- 5.3 Matching shell & tube flooded type chillers for screw type units of MS shell and copper tubes with ASME stamping–1 no.
- 5.4 Microprocessor based control panel complete with accessories as per specifications– 1 set.

## 6.0 OPTIONAL ACCESSORIES

Any other accessory, which is in the opinion of the tenderer can contribute to higher production rates, should be indicated and quoted separately mentioning prices of each accessory.

## 7.0 SPARES

- 7.1 The tenderer should furnish details of spares covered under warranty.
- 7.2 List of important spare parts and accessories with their part number and costing.
- 7.3 The tenderer should be furnishing the price list of spare parts required for two years normal maintenance of the equipment. Sources of supply of spares used other than that of manufacturer should be furnished by the tenderer.
- 7.4 List of recommended spares for normal maintenance after expiry of warranty period to till useful life of the equipment and these spares should be readily available in the market with your authorised stockists.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	5 of 11	17.12.2018

- 7.5 List of recommended consumables for two years shall be quoted separately.
- 7.6 Useful life estimated/expected for each equipment and its sub assembly should be indicated by the tenderers.

## **8.0 INSPECTION, INSTALLATION, COMMISSIONING AND PROVING OUT**

### **8.1 Inspection of Equipment & Testing at Manufacturers Works**

- 8.1.1 Manufacturers must have suitable facilities at their works for carrying out various performance tests on the equipment. The tenderer should clearly confirm that all the facilities exists and shall be made available to the inspecting authority.
- 8.1.2 A load and functional test must be carried out at the manufacturer's works. Reliability of the equipment shall be demonstrated to the satisfaction of the appointed inspector or inspecting agency.
- 8.1.3 A sample inspection chart for inspecting the equipment should be supplied along with the bid.

### **8.2 Installation Commissioning and Proving Tests**

- 8.2.1 The contractor or his agent shall be required to carry out a joint check at the consignee's end along with the consignee before unpacking is done to avoid subsequent complaints regarding short shipment or transit damages. It is necessary that consignee to avoid commissioning delays due to shortages/transit damages do this joint inspection immediately on receipt of the machine.
- 8.2.2 The Successful tenderer shall have to commission the machine within 90 days from the date of receipt of machine at RCF, Kapurthala.
- 8.2.3 The successful tenderer shall have to prove out the performance of the machine at RCF premises to the entire satisfaction of the consignee.
- 8.2.4 The supplier should take full responsibility of commissioning the unit & training of the Intended user.
- 8.2.5 User shall also be trained in using day to day maintenance & cleaning of unit.
- 8.2.6 Any precaution & extra care intended in the use of the equipment should be explicitly informed.
- 8.2.7 If an assembly/sub assembly is required to be taken back to the manufacturer's premises for repair/replacement either before commissioning or during warranty, the manufacturer or his agent would be required to submit an Indemnity Bond. In case the entire machine has to be taken back, a Bank Guarantee would have to be submitted. The Indemnity Bond/Bank Guarantee should be of adequate value so as to cover the cost of the assembly/subassembly/paid-up cost of the machine.

## **9.0 ELIGIBILITY CRITERIA**

- 9.1 The tenderer shall be registered on IREPS website ([www.ireps.gov.in](http://www.ireps.gov.in)) to participate in the tendering process.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	6 of 11	17.12.2018

- 9.2 The tenderer shall have established quality control system and organization to ensure adequate control at all stages of the manufacturing process.
- 9.3 The tenderer shall provide a performance statement giving a list of major supplies of same/similar equipments effected in last 5 years to the reputed organizations giving details of the order no. and date and the quantity supplied and whether the supply was made within the delivery schedule. Such period shall be reckoned from the date of opening of tender. Tenderer should also provide the prove out test certificate of his supply/supplies.
- 9.4 Only OEM of the Chiller plant or their authorized dealers can only participate in the tender.
- 9.5 Tenderer not submitting the requisite information may note that his offer is liable to be ignored.

#### **10.0 TECHNICAL LITERATURE**

- 10.1 One copy of the printed illustrative catalogue showing isometric view/sketch & features of the machine and its elements must be enclosed with each copy of the bid.
- 10.2 The successful tenderer will have to furnish for each machine 02 copies of spare parts catalogue giving the part list number of each component with exploded views and assembly drawings, maintenance manual, trouble shooting guide, operational manual of the machine.
- 10.3 Document in the service / technical manual. Firm shall also provide time within which all service calls shall be attended.
- 10.4 A Circuit diagram for sequence of operations must be supplied in maintenance & operation manuals. Each element in the diagram should be suitably numbered & correspondingly labelled for the convenience of the operating & maintenance staff.

#### **11.0 SPECIAL FEATURES**

Special features incorporated into the machine, if any shall be indicated separately by the tenderer, clearly indicating the advantage of these features.

#### **12.0 MAKE**

- 12.1 The supplier shall clearly mention whether the system quoted is Indian make or imported. If Indian make, the tender should be accompanied by duly sanctioned factory license & relevant documents & also produce records of installation & satisfactory after sales service performance of their equipment from at least one govt. Institution of similar or large size for duration at least 3 Years duration.
- 12.2 If imported item, the OEM firm should be registered for operations in India for a minimum period of last 3 years. In case this is not so, the dealer should be authorised regional supplier & service provide for the late 3 years. He should also produce installation & satisfactory after sales service record of duration at least last 3 years from at least one govt. Institution for a system of similar or larger

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	7 of 11	17.12.2018

size. Further the tender should be accompanied by authorisation certificate from OEM.

- 12.3 The supplier shall furnish the complete details of Model No. Make & Manufacturer's details/ address, Country and authorization details of Dealership.
- 12.4 The firm shall provide the calibration certificate of National / International Traceability along with validity of at least two years.

### 13.0 **SERVICING FACILITIES**

- 13.1 Service facility in Punjab, Address and contract details including phone and fax no. to be provided. The facility should have the necessary equipments recommended by the manufacture to carry out preventive maintenance test as per guideline provided in the service / maintenance manual. Firm should provide list of equipment available for providing calibrations and routine maintenance support as per manufacturer.
- 13.2 Supplier will undertake for service repairs & replacement of any needed part as & when needed.
- 13.3 Maintenance contract to be quoted after the expiry of maintenance period quoted above with details of scheduled visits, part covered under contract & cost of parts not covered as well.
- 13.4 The tenderer shall clearly spell out in the offer about the facility available with him or his agent/dealer for providing adequate after sales service in Punjab during warranty period.
- 13.5 The tenderer shall also indicate the service organization located at various places in India and availability of trained staff, maintenance spares etc.
- 13.6 The contractor shall give a comprehensive spare part list with OEM details and price for all the sub systems.
- 13.7 The tenderer/contractor shall provide list of spares, consumables required for maintenance for 5 years after completion of warranty period
- 13.8 For maintenance during warranty following criteria shall be considered.
- A) Service engineer of the supplier shall be available for attending to the system faults during first 07 days after successful commissioning of equipments during 09.00 - 17.00 hrs on all working days including Saturdays.
  - B) Service engineers shall visit RCF on quarterly basis thereafter till the end of warranty/extended warranty period for Preventive Maintenance at least for one full day at a time.
  - C) In case of any breakdown affecting the performance of the system completely or partly, firm shall depute its service engineer as soon as and when informed by any suitable means like Fax, SMS or email possible after receiving such call.
  - D) Breakdown period shall be calculated from 8 hours after it's reporting to the firm upto the time it is attended. If intimation to the firm is delayed from



RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	8 of 11	17.12.2018

Railway's side, then the breakdown period calculation will start from the time by which it is reported to the firm.

- 13.9 Total up time of the system should be at least 90%. Up time shall be counted in following manner:-
- A) Total breakdown of less than 8 hours shall be ignored for the purpose of this calculation.
  - B) Penalty may be imposed if the down time is more than 10% without any valid reasons. The levy of token penalty as deemed fit based on the merit of the case may also be consider as per clause 17 (b) of GCC -201.
- 13.10 Warranty period for part or machine shall be extended after completion of warranty period by the duration under which the part or machine remains under breakdown during warranty.
- 13.11 Tenderer shall provide list of spares, consumables required for maintenance for 5 years after completion of warranty period as per annexure-A
- 13.12 Tenderer shall provide expected life for the components of the system and provide the maintenance schedule required for 10years for as per annexure -A
- 13.13 Tenderer shall provide the service charges /per day/per man for deputing service engineer on the machine on requirement separately for Indian and Foreign engineer.

#### 14.0 DEVIATIONS:

The tenderer should clearly certify that the machine offered fully meets the specification various design features incorporated in the machine to fulfil different technical performance requirements should be fully explained in the offer. However, minor deviations from this specification, which do not affect or in any way interfere with the stipulated performance standards, or would result in improved safety/reliability or would reduce recurring maintenance/operating cost of the machine, can be considered for acceptance.

#### 15.0 SCHEDULE OF ANNUAL MAINTENANCE CONTRACT (AMC) FOR PERIOD OF 5 YEARS AFTER COMPLETION OF WARRANTY PERIOD

- 15.1 Tenderer shall provide proposal for 5 year Annual Preventive Maintenance schedule to be executed after completion of warranty period in the format as per annexure-B.
- 15.2 The firm shall maintain the machine in good working condition during the contract period and shall correct the fault or failures, repair or replace the worn or defective parts/equipment during the normal working hours of shop where the equipment has been installed. Unserviceable parts/equipment need to be replaced at no extra cost with brand new parts/equivalent or superior specification.
- 15.3 The firm shall respond by deputing service personal to oral / telephonic/ or other modes of intimation for repair and maintenance of the said machines within 2 hours.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	9 of 11	17.12.2018

- 15.4 The firm shall ensure that the machine is in proper working condition, to the full capacity, after repair and maintenance.
- 15.5 To have a timely supply of spares during AMC, the contractor shall furnish a total list of spares which should contain list of spares that shall be arranged by the firm, both chargeable, duly mentioning the charge against each item, and spares which shall be non-chargeable, and list of spares to be held by RCF.
- 15.6 The contractor shall clearly list-out the list of consumables required for day-to-day operation of the machine. It shall be the scope of RCF to arrange the consumables once the completion certificate is issued for the retrofitted machine.
- 15.7 The tenderer/contractor shall provide suitable standby when repairs exceeds 2 hours. When any equipment is taken for repair to the tenderer/contractor's premises suitable standby equipment should be provided.
- 15.8 Besides attending the breakdown calls, the firm shall attend to the corrective and preventive maintenance of the machines once in a month.
- 15.9 The AMC is valid for five years from the date of completion of the warranty period . No freight is admissible.
- 15.10 During the AMC period, whatever equipment is defective shall be handed over to RCF. During completion of the AMC period the machines should be handed over in full working condition to its full capacity.
- 15.11 The firm should maintain a register duly indicating the nature of defects and repair attended and got signed by RCF authority. Preventive maintenance schedule should be made. The schedule should be made in such a way that more than one machine should not be attended on the same day. A copy of the schedule should be given to RCF at the beginning of the AMC and the schedule should be strictly followed and on carrying out the preventive maintenance the same should be entered in the register and got signed by RCF authority.
- 15.12 AMC charges shall be paid quarterly as one quarter of the total AMC charges applicable for that year on submission of bills duly certified by the engineers in charge with regard to the satisfactory execution of AMC during the period for which the bill is claimed. Duties & taxes as applicable at the time of payment shall be deducted at source.

ANNEXURE-A

S.N.	ITEM	PART NO.	SERVICE LIFE	PRICE

ANNEXURE -B

S.N.	YEAR	AMC CHARGES
1.	IST YEAR	
2.	IIND YEAR	
3.	IIIRD YEAR	
4.	IVTH YEAR	
5.	VTH YEAR	

<b>RAIL COACH FACTORY, KAPURTHALA</b>			
<b>Specification No.</b>	<b>Description</b>	<b>Page No.</b>	<b>Date</b>
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	10 of 11	17.12.2018

**16.0 WARRANTY**

As per IRS conditions or as quoted by the tenderer whichever is later.

RAIL COACH FACTORY, KAPURTHALA			
Specification No.	Description	Page No.	Date
Mech/M&P/3400/GM/09 Rev.- NIL	Water Cooled Screw Chiller having Capacity-190 TR	11 of 11	17.12.2018

### SCHEDULE-I

S.No.	Parameter	Value
1.	Starter	Star Delta starter
2.	Compressor	Screw type Semi Hermetically sealed compressor with automatic capacity control safety switches, forced feed lubrication system etc. as per requirement
3.	Motor	Suitable capacity squirrel cage induction motor with class 'B' insulation suitable for operation on 415+- 10% volts, 50 hz, A.C supply.
4.	Chilling machine Water Inlet/outlet Temp.	12.22°C/6.7°C
5.	Fouling Factor Chiller	0.0005 FPS
6.	Condenser water inlet/outlet Temp.	32.2°C/36.4°C
7.	Fouling Factor Condenser	0.001 FPS
8.	Refrigerant	R-134a
9.	Certification	AHRI Certified
10.	Make	Carrier, Blue Star, Voltas, Daikin
11.	Chiller Capacity	190-200 TR
12.	COP	6.0 at AHRI( minimum)
13.	Maximum IKW/TR AT operating conditions	0.67KW /TR
14.	NPLV	Not more than 0.47

**Note:** Tenderer to furnish following detail of the Water Cooled Screw Chiller having Capacity-190 TR offered

S.no.	Technical Parameter	Offered by Tenderer