

**Bharat Heavy Electricals Limited  
Ramachandrapuram :: Hyd-32**

**ANNEXURE - I**

**SCOPE OF WORK**

**VACCUM SYSTEM**

- a. Cleaning of vacuum pumps. Draining water contacted in the pumps. Top up/ replace as per the condition of the oil.
- b. Cleaning of moisture separators and condenser's after every impregnation.
- c. Check for proper functioning of vacuum valve of PEIFFER UNO 250A Vacuum pumps and Roots pump WKP 2000.
- d. Check for proper functioning of pneumatically operated valve in the vacuum Circuit.

**1 RESIN SYSTEM**

- e. Check for proper functioning of pneumatically operated valves in the resin circuit.
- f. Check the insulation of resin piping and replace if necessary.
- g. Dismantling and cleaning of resin pipelines of any deposits of resin wherever necessary.
- h. Cleaning resin outlets at storage tanks. Collect resin samples as and when required for testing.

**2 TROLLEYS**

- i. Clean and ensure free movement of wheels of job transport trolley, preheating furnace trolley and post heating furnace trolley.
- j. Check the drives for the trolley for proper functioning. Top up oil levels in the gear boxes.
- k. Clean the trolleys after every impregnation.

**3 CHILLING PLANT.**

- l. Check the brine pumps for any leakages and arrest.
- m. Ensure free movement of manually operated gate valves in the water and glycol lines.
- n. Clean brine tanks and cooling towers once in a quarter.
- o. Maintaining brine water mix (glycol and water) in required proportion

**4 JOB ROTATOR**

- a. Check the free movement of rollers.
- b. Check and top up oil levels in all gear boxes of the drive.
- c. Clean the covers and the rotator of any deposits of resin after every impregnation.

**5 NITROGEN STORAGE TANK.**

- p. Drain out the water collected every quarter.
- q. Nitrogen leakages in pneumatic panel after every impregnation.
- r. Maintenance of nitrogen dryer.

**6 INSTRUMENTATION.**

- s. Coordinate repair and calibration of all the instruments of impregnation plant, preheating oven and post –curing Ovens. Instruments include vacuum meters, pressure gauges and temperature gauges etc.

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### **8. PRE HEATING FURNACE;**

- (a) Check and arrest the steam leakages
- (b) Check the electrical heating system
- (c) Check the circulation blowers, door operation for proper functioning

### **9. POST HEATING FURNACE**

- t. Check the brick lining of combustion chambers
- u. Check for proper functioning of circulating blowers, exhaust blowers, pilot ignition system
- v . Check the hand and pneumatic operated valves
- w. Check the insulation of ducting and repair where necessary.
- x . Check for leakage in heat exchangers.
- y . Vacuum leak rate test of vacuum system and resin tanks once in a quarter.
- z. Check the hydraulic systems for door opening for vertical and horizontal impregnation for impregnation tanks.

### **10. Miscellaneous**

- aa. Check the platform lifting mechanism.
- bb. Clean all sight glasses in resin storage tanks once in quarter and once after every impregnation for impregnation tanks.
- cc. Maintaining the leak rate by plugging the leakages in the vacuum system and resin tanks.
- dd. Cleaning the pits of water and other wastes once in a month.
- ee. Maintaining the proper lighting in control room, pits and other plant lighting other than roof lighting.
- ff. Resin leakages from pipe lines to be arrested.
- gg. Scrap and clean Impregnation tanks of resin material once in a quarter.
- hh. After every impregnation door gaskets should be cleaned.
- ii. Cleaning the tubs after every impregnation .Cleaning the job handling nylon belt slings after every impregnation

### **(11). WORK INVOLVED**

Breakdown and Preventive maintenance of V.P.I. Plant item no 02-1676, steam furnace for preheating, producer gas fired furnace for post curing and job rotator. During the impregnation cycle plant should be manned by one fitter and one electrician round the clock to attend to any breakdown on the plant. When the plant is idle sufficient manpower to be employed to carry out preventive maintenance

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as per the checklist. In addition one supervisor to guide during breakdowns and during preventive maintenance.

### **12. BREAKDOWN MAINTENANCE**

The work involves attending regular break-down maintenance both Mechanical and Electrical, of any nature, for example;

- i) Jamming /Leakage of Resin valves, Water line valves, Stem valves and pneumatic valves provided in the system.
- ii) Leakage of brine through pipes, pump seals, valves etc. Needle replacement of certain pipe length.
- iii) Leakage of vacuum in Vertical/Horizontal Impregnation Tanks, Resin storage Tanks or in system.
- iv) Break-down maintenance of vacuum pumps compressors, air-dryer brine pumps resin filters, separators condensers, heat exchangers, agitator system of resin storage tanks, hydraulic system, for Imp. Tanks door closing/opening, water circulating pumps and cooling towers of water cooling system etc. Provided in the system.
- v) Break-down maintenance of pneumatic system and pneumatic actuators of pneumatic operated valves
- vi) B/D maintenance of hot and cold pipes lines along with their insulation.
- vii) Electrical break-down maintenance of the plant involving approx...3.1 motors of rating from 2.2 KW to 18.5kw, lighting and heating system, control and protection equipment's etc.
- viii) Electrical and Mechanical breakdown of pre heating and post curing furnaces.
- ix) B/D of LPG Gas line, airline and their valves, combustion chamber, heat exchanger, hot ducting and their insulation.
- X) Proper housekeeping at and around the area of VPI Plant and ovens.

**13. PREVENTIVE MAINTENANCE:** The preventive maintenance as per check list to be issued by BHEL has to be carried out at least once in a year under the supervision of BHEL Maintenance Engineer.

A detail of preventive maintenance work to be carried out is enclosed separately.

- i) Cleaning of Resin filters, condensers of dry air compressor, separators/condensers of vacuum system, cooling towers, brine tanks, control panels etc.
- ii) Oil change of vacuum pumps,hydraulic system
- iii) Vacuum leak rate test of vertical/Horizontal Imp. Tanks, resin storage tanks.
- iv) Getting calibration done of instrument and gauges of the system, calibration will be done by BHEL.
- v) Megger test of all motors.
- vi) Overall cleaning of all the equipments /parts of plant & ovens

### **14. OPERATIONAL ASSISTANCE**

During impregnation cycle contractor should engage sufficient no. of skilled and unskilled workers to assist departmental employee in the operation of impregnation plant, preheating furnace and post

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curing furnace round the clock till the process completion in addition to attending any breakdowns during the process.

### **15. INSPECTION**

- i) The tenderers can inspect the plant before quoting if they desire on any working day before the last date before the last date for submission of tenders.
- ii) In the event of acceptance of tender, and if the contractor fails to commence work within prescribed period, bhel shall ,without prejudice to any other right or remedy ,be at a liberty to forfeit the said earnest money absolutely.
- iii) Accepting authority reserves the right to reject any or all quotations without assigning any reasons thereof.

### **16. GENERAL**

- i) It will be the responsibility of the firm to provide sufficient number of skills fitter and electrician for operation of the plant and break-down maintenance immediately without any interruption. One supervisor should be engaged daily for supervisor for supervision and technical guidance of maintenance activity.
- ii) All spares, consumables, oil and facility of crane, gas, welding set etc. required for carrying out break-down and preventive maintenance will be supplied by bhel free of cost. However the contractor should make his own arrangement grinders, scrapping tools etc. along with the necessary tooling, general purpose measuring instrument, straight edges etc. . Firm has to identify the sparse required for break-down and preventive maintenance and intimate the same to maintenance engineer within six weak of award of contract.
- iii) Break –down maintenance is to be attended on regular basis on receipt of maintenance requisitions from plant in charge.
- iv) Sufficient number of unskilled laborers are to be engaged for cleaning and general housekeeping as per the check list for preventive maintenance activity.
- v) Monthly break-down report of both preventive and breakdown activities duly signed by plant in charge is to be submitted to AGM/Prod & Services/ Electrical MACHINES.