रेल पहिया कारखाना बेला

Rail Wheel Plant Bela

सारण बिहार

Saran Bihar

Expression of Interest along with Budgetary Quotation

for

"Maintenance of the Cold Wheel Line of WFPS at RWP Bela"

EOI Notification No.: WFPS/2026

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Issued By:

Dy. Chief Mechanical Engineer,
Wheel Final Process Shop
Rail Wheel Plant Bela
Dated: 22nd January 2026

Invitation for Expression of Interest (EOI) along with Budgetary Quotation

Maintenance of Cold Wheel Line – Rail Wheel Plant, Bela

Rail Wheel Plant, Bela invites **Expression of Interest (EOI)** from experienced and competent agencies/firms for undertaking the **maintenance of the Cold Wheel Line** at Rail Wheel Plant, Bela. Along with the EOI, interested agencies are also requested to submit a **budgetary quotation** for the **defined scope of work (attached separately)**.

The scope of work shall broadly include **preventive maintenance, breakdown maintenance, routine inspection, and upkeep** of mechanical, electrical, hydraulic, pneumatic, and associated systems of the Cold Wheel Line, as detailed in the scope document provided.

Agencies having proven experience in maintenance of **heavy engineering equipment, rolling mills, rail wheel/axle plants, or similar industrial installations** are encouraged to participate.

The EOI submission should include:

- Company profile and organizational details
- Relevant experience in similar maintenance works
- Details of technical expertise and manpower deployment
- Financial credentials
- **Budgetary quotation** indicating approximate cost for the defined scope of work (for estimation and planning purposes only)

The budgetary quotation submitted at this stage will be used **only for assessment and budgeting purposes** and shall not be treated as a commercial bid. Submission of EOI and budgetary quotation does not confer any right for award of work.

Rail Wheel Plant, Bela reserves the right to accept or reject any or all EOIs without assigning any reason.

Interested agencies are requested to submit their EOI along with the budgetary quotation within the stipulated timeframe (15 days from the date of publication on RWP/Bela Site).

Budgetary quotation may be provided in the following price schedule:

S No	Item Description	Item Quantity	Units	Price per unit	Total Price

1.	Supervisor Mechanical	36	Man-month		
2.	Supervisor Electrical	36	Man-month		
3.	Skilled manpower (Mechanical)	216	Man-month		
4.	Skilled manpower (Electrical)	144	Man-month		
5.	Material Cost for Mechanical Schedule	As per list of material attached in Schedule-1 (Mechanical Maintenance)	Lumpsum	Unit cost may be quoted in the items list provided in respective schedule	
6.	Material Cost for Electrical Schedule	As per list attached in Schedule-2 (Electrical Maintenance)	Lumpsum		
7.	**Total price for AMC**				

In case of any query/doubt wrt scope of work please feel free to reach out at a time of your convenience.

An early response is requested.

DA: Scope of work

22.01.2026.

Narender Deswal (IRSME)
Dy CME/WFPS
Rail Wheel Plant/Bela

Scope of Work

Name of work: "***Revamping of Cold Wheel Area Conveyor Line along with associated Machinesof WFPS*.**"

Purpose: This scope is prepared for the Revamping of Existing cold wheel area conveyor line along with the associated machines of Wheel final processing shop. Scope includes maintenance of **Flat Roller Conveyor (FRC)** for transportation of wheels from one working station to another one. This scope shall also cover the maintenance of associated machines such as Cleaning Machine, BHN Testing machine, MPI station, warpage station, wheel peening machine, grinding stations and associated turntables, upenders, downenders etc.
The uptime for machines is to be maintained at 98%.

Scope is detailed below:

Schedule 1: Mechanical Maintenance

1. The schedule wise details along with involved Quantity that shall be covered under this contract for work of "**Revamping of Cold Wheel Area Conveyor Line of WFPS at RWP, Bela as per the scope of work"** are tabulated as under:

SN	Description of work	Unit	Qty
FOR LINE 4 AND ITS GRINDING LINES(GL 3 & 4 including warppage-2) These lines needs to be overhauled completely wrt scope given in Para 1 to Below and then AMC is to be processed in line with the requirements of maintenance practices which will be similar to requirements given in Para 1 to 10 below:			
1	**Overhauling of Turn Table cum Kicker.** Overhauling work include: (i) Changing of flexible hose pipes & seamless metallic pipes (3/8 inch and ½ inch) (ii) Servicing of pneumatic cylinder (2 nos.). (iii) Replacement and fitment of central bearings (02 nos.) and bushes (02 nos.). (iv) Alignment of main rail, guide rail, supporting angles and frame structure with forward and backward gravity conveyor. (v) Replacement and fitment of Flow regulator lubricator valves (1 No), shut off valve (1 no), flow control valve (4	**Nos.**	**9**

	nos) and DC solenoid valves (2 nos) with tuning as per requirement. (vi) Fitment of PU pads in kicker**.** (vii) **Replacement of solid journal bearing (02 nos)** **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**		
2	**Overhauling of kicker cum Wheel Lifter**. Overhauling work includes: (i) Changing of flexible hose pipes & seamless metallic pipes. (3/8 inch and ½ inch). (ii) Servicing of pneumatic cylinder (02 nos.). (iii) Replacement and fitment of solid journal bearings (02 nos.). (iv) Alignment of main rail, guide rail, supporting angles and frame structure with forward and backward Gravity conveyor. (v) Replacement and fitment of Flow regulator lubricator valves (1 No), shut off valve (1 no), flow control valve (4 nos) and DC solenoid valves (2 nos) with tuning as per requirement. (vi) Fitment of PU pad in kicker. (vii) Servicing of needle rollers for lifting arrangement (08 nos.) **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air.**	**Nos.**	**1**
3	**Overhauling of escapement**. Overhauling work include – (i) Servicing of cylinder – (01 no). (ii) Alignment of main rail, guide rail, supporting rail and frame structure with forward and backward side gravity conveyor. (iii) Replacement and fitment of solid journal bush bearing (02nos). (iv) Replacement and fitment of Flow regulator lubricator valves(01 no), shut off valve(01 nos), flow control valve(02 nos) and DC solenoid(01 nos) valves with tuning as per requirement. **Overhauling work will not be considered completed until**	**Nos.**	**6**

	proper movement of wheel without any leakage of compressed air		
4	**Overhauling of Lifter cum Kicker cum Turn Table**. Overhauling work include – (i) Servicing of Pneumatic cylinders (03 nos.). (ii) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward gravity conveyor. (iii) Replacement and fitment of Flow regulator lubricator valves (01 no), shut off valve (01 nos), flow control valve (06 nos) and DC solenoid (03 nos) valves with tuning as per requirement. (iv) Replacement and fitment of bearings (02 nos.) and bushes (02 nos.). (v) Servicing of rollers (08 nos.) provided for lifting arrangement. (vi) Replacement and fitment of flexible hoses and seamless metallic pipes. (size-3/8 inch and ½ inch). **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**3**
5	**Overhauling of kicker cum lifter cum turn table with pitching arrangement**. Overhauling work includes – (i) Servicing of cylinder (04 nos.). (ii) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward gravity conveyor. (iii) Replacement and fitment of Flow regulator lubricator valves(01 no), shut off valve(01 nos), flow control valve(08 nos) and DC solenoid(04 nos) valves with tuning as per requirement. (iv) Replacement and fitment of bearings (02nos.) and bushes (02 nos.). (v) Servicing of rollers (08 nos.) provided for lifting arrangement. (vi) Replacement and fitment of flexible hoses and metallic pipes((3/8 inch and ½ inch.) (vii) Servicing of pitching arrangement. **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**1**

6	**Overhauling of Warpage station**. Overhauling work include – (i) Servicing of cylinder (04 nos.). (ii) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward upender/ downender arrangement. (iii) Replacement and fitment of Filter regulator lubricators (01), flow control valves (08), wheel stopper (01) and DC solenoid valves (04) with tuning as per requirement. (iv) Replacement of pillow block bearing (02 nos) (v) Replacement of cantering rollers (04 nos). (vi) Servicing of pitching arrangement. (vii) Servicing of rollers (28 nos.). **(viii)** Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch). **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**1**
7	**Overhauling of upender and downender arrangement**. Overhauling work includes – (i) Servicing of cylinder (7 nos.). (ii) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward upender/ downender arrangement. (iii) Replacement and fitment of Filter regulator lubricators(02 nos), flow control valves(14 nos),shut off valve(02 nos) and DC solenoid valves(07 nos) with tuning as per requirement. (iv) Replacement and fitment of solid journal bush bearings (02 nos.), gear box, simplex chain and sprockets. (v) Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) (vi) Servicing of Live rollers (24 nos.). (vii) Servicing of gear box (01 no.). **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**2**
8	Alignment of gravity conveyor (60 meters) with foundation bolt tightening. Overhauling work includes alignment of main rail, guide rail, supporting angle and frame structure with forward and backward turn tables /escapements.	**Nos.**	**1**
9	**Magnaglow station** – (i) Fitment of gear box (01 no), Wheel rotator shaft assembly (02 nos.), water pump (01 no) and Boom (01 no.).	**Nos.**	**1**

	(ii) Servicing of wheel kicking arrangement. (iii) Servicing of circulation system of water mixed with magnetic powder. (iv) Servicing of cylinder (02 nos.). (v) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward sides. (vi) Replacement and fitment of Filter regulator lubricators(02 nos), flow control valves(04 nos) and DC solenoid valves(02 nos) with tuning as per requirement. (vii) Replacement and fitment of bearings (02 nos.), bushes (02 nos.), simplex chain and sprockets. (viii) Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) **Note – Whole work will be carried out as per instruction of SSE/IC/MWFPS.**		
10	**Overhauling of Grinding station**. Overhauling work includes – (i) Replacement and fitment of bearings (06 nos.), wheel rotators (02 nos.), Bush bearing (04 nos.), foot operated valves and hand operated valves (03 nos.), Air motor (01 nos.), Simplex chain (01 nos.), Sprocket (02 no.), Wheel support rollers (02 nos.) and PU pad (02 nos.) (ii) Servicing of Pneumatic cylinders (03 nos.). (iii) Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) metallic seamless pipe should be changed into ½ inch and ¾ inch respectively). (iv) Replacement and fitment of Filter regulator lubricators (01 no), flow control valves(03 nos) and DC solenoid valves(03 nos) with tuning as per requirement. **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**4**
	FOR MAIN LINE 1 & 2 AND ITS GRINDING LINE		
11	**Wheel loading station –** Overhauling work of loader – Overhauling work includes (i) Replacement of flexible hoses. Seamless pipe, Pneumatic cylinders(02 nos), flow regulator lubricator valve(02 nos), shut off valves(02 nos), DC solenoid valves(02 nos), flow control valves(04 nos). (ii) Repairing of damage portion of structure of loaders and its proper alignment of rails with next conveyor lines.	**Nos.**	**2**
12	**BHN Machine –** Overhauling work of BHN machine – Overhauling work includes	**Nos.**	**2**

	(i) Replacement of flexible hoses. Seamless pipe, Pneumatic cylinders(06 nos), flow regulator lubricator valves(01 no), shut off valves(01 no), DC solenoid valves(06 nos) and flow control valves (12 nos). (ii) Replacement of all guide rails, angles, main rail, supporting frame with proper alignment for smooth movement of wheels. (iii) Replacement of kicker, bushes, shaft, rollers and pins. (iv) Making of main rail of BHN machine. (v) Complete overhauling of kicking arrangement system.		

13	**Overhauling of turn table cum kickers –** Overhauling work includes (i) Replacement of flexible hose pipes and seamless pipes. (ii) Replacement of defective Pneumatic cylinder (02 nos), shafts, central bearings (02 nos.) and bushes (02 nos.). (iii) Alignment of main rail, guide rails, supporting angles and frame structure with forward and backward gravity conveyors. (iv) Replacement of flow regulator lubricator valves(01 no), shut off valves (01nos), flow control valves(04 nos) and DC solenoid valves(02 nos) with tuning as per requirement. (v) Fitment of PU pad in kicker.	**Nos.**	**10**
14	**Overhauling of Escapement –** Overhauling work includes (i) Replacement of flexible hose pipes and seamless pipes. (ii) Replacement of Pneumatic cylinder (01 no) and repairing of kickers. (iii) Alignment of main rail, guide rail, supporting angles and frame structure with forward and backward gravity conveyors. (iv) Replacement of flow regulator lubricator valves (01 no), shut off valves(01no), flow control valves (02nos) and DC solenoid valves (01 no) with tuning as per requirement	**Nos.**	**22**
15	**Overhauling of Lifter cum kicker cum turn table –** Overhauling work includes – (i) Replacement of flexible hose pipes and seamless pipes. (ii) Replacement of defective Pneumatic cylinder(03 nos), shafts, central bearings (02 nos.) and bushes (02 nos.). (iii) Alignment of main rail, guide rail, supporting angles and frame structure with forward and backward gravity	**Nos.**	**4**

	conveyors. (iv) Replacement of flow regulator lubricator valves (01 no), shut off valves (01no), flow control valves (06nos) and DC solenoid valves (03 no) with tuning as per requirement. (v) Fitment of PU pad in kicker. (vi) Servicing of roller for lifting arrangement (08 nos.).		
16	**Overhauling of Lifter cum kicker cum turn table with Pitching arrangement –** Overhauling work includes – (i) Replacement of flexible hose pipes and seamless pipes. (ii) Replacement of defective Pneumatic cylinder (04 nos), shafts, central bearings (02 nos.) and bushes (02 nos.). (iii) Alignment of main rail, guide rail, supporting angles and frame structure with forward and backward gravity conveyors. (iv) Replacement of flow regulator lubricator valves (01 no), shut off valves (01no), flow control valves(08nos) and DC solenoid valves (04 no) with tuning as per requirement. (v) Fitment of PU pad in kicker. (vi) Servicing of needle roller provided for lifting arrangement (08 nos.). (vii) Servicing of pitching arrangement.	**Nos.**	**5**
17	**Overhauling of Warpage station –** Overhauling work includes (i) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward upender / downender arrangement. (ii) Replacement and fitment of Filter regulator lubricators(01), flow control valves(08), wheel stopper(01) and DC solenoid valves(04) with tuning as per requirement. (iii) Replacement and fitment of bearings (02 nos.) and bushes (02 nos.). (iv) Replacement of cantering rollers (04 nos). (v) Replacement of pillow block bearing(02 nos) (vi) Servicing of Live rollers (32 nos.). (vii) Replacement of defective pneumatic cylinders(04nos), flexible hose pipes and metallic pipes. (viii) Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch).	**Nos.**	**1**

18	**Overhauling of Upender and Downender arrangement –**	**Nos.**	**1**

	Overhauling work includes – **(i)** Servicing of cylinder (7 nos.). **(ii)** Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward upender/ downender arrangement. **(iii)** Replacement and fitment of Filter regulator lubricators(02 nos), flow control valves(14 nos),shut off valve(02 nos) and DC solenoid valves(07 nos) with tuning as per requirement. **(iv)** Replacement and fitment of solid journal bush bearings (02 nos.), gear box, simplex chain and sprockets. **(v)** Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) **(vi)** Servicing of Live rollers (24 nos.). **(vii)**Servicing of gear box (01 no.). **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**		
19	**Overhauling of Magnaglow station–** Overhauling work includes– (i) Fitment of gear box (01 no), Wheel rotator shaft assembly (02 nos.), water pump (01 no) and Boom (01 no.). (ii) Servicing of wheel kicking arrangement. (iii) Servicing of circulation system of water mixed with magnetic powder. (iv) Servicing of cylinder (02 nos.). (v) Alignment of main rail, guide rail, supporting angle and frame structure with forward and backward sides. (vi) Replacement and fitment of Filter regulator lubricators (02 nos), flow control valves (04 nos) and DC solenoid valves (02 nos) with tuning as per requirement. (vii) Replacement and fitment of bearings (02 nos.), bushes (02 nos.), simplex chain and sprockets. (viii) Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) **Note – Whole work will be carried out as per instruction of SSE/IC/MWFPS.**	**Nos.**	**3**
20	**Overhauling of UT station –** Overhauling work includes – (i) Replacement of defective cylinders (06 nos) , shut off valves (01no), DC solenoid valves (06 nos), flexible pipes, metallic pipes, flow regulator lubricator (01 no) and flow control valves (12 nos). (ii) Servicing of wheel rotating assembly and wheel kicking	**Nos.**	**3**

	arrangement system. (iii) Complete cleaning of UT system and drainage system. (iv) Alignment of UT conveyor system for smooth moving of wheels. (v) Servicing of 12 nos. rollers. (vi) Replacement of damage main rail, guide rails, angles and repaired of structure of UT.		
21	**Overhauling work of Grinding station–** Overhauling work includes– **(i)** Replacement and fitment of bearings (06 nos.), wheel rotators (02 nos.), Bush bearing (04 nos.), foot operated valves and hand operated valves (03 nos.), Air motor (01 nos.), Simplex chain (01 nos.), Sprocket (02 no.), Wheel support rollers (02 nos.) and PU pad (02 nos.) **(ii)** Servicing of Pneumatic cylinders (03 nos.). **(iii)** Replacement and fitment of flexible hoses and metallic pipes (size-3/8 inch and ½ inch) metallic seamless pipe should be changed into ½ inch and ¾ inch respectively). **(iv)** Replacement and fitment of Filter regulator lubricators (01 no), flow control valves (03 nos) and DC solenoid valves (03 nos) with tuning as per requirement. **Overhauling work will not be considered completed until proper movement of wheel without any leakage of compressed air**	**Nos.**	**3**
22	Alignment of gravity conveyor (175 meters) with foundation bolt tightening. Overhauling work includes alignment of main rail, guide rail, supporting angle and frame structure with forward and backward turn tables /escapements.	**Nos.**	**1**

2. Scope of work for AMC of BHN Machines (Mechanical Work Of BHN-1 & BHN-2)

OEM for Machine: Tenious Olsen

Weekly maintenance:

1. Check the leakages from the pneumatic air supply pipes, solenoid valve and precision control regulator. Replace if any damaged parts founds.
2. Remove the moisture from the regulator.
3. Drain out the water from FRL.
4. Check the leakage from head assembly. If leakage then repair it.
5. Check for initial pressure (200 kg) and final pressure(3000kg). If not found as per required corrective action should be taken

Annual maintenance:

1. Replace the FRL from air supply line.
2. Replace the pipes with its fitting.
3. Replace the air supply pipe provided for head.
4. Replace the regulators and solenoid valves.
5. Servicing of head assembly. Servicing work includes replacement of bellow, PU pipes & it's fitting, gauge, ramraged and spring. There should be no leakage from head after servicing during process.
6. Calibration of BHN machine.

3. SCOPE OF WORK for AMC of CLEANING MACHINE 1&2 (MECHANICAL WORK OF CLEANING MACHINE)

OEM for Machine: Pangborn

Quantities referred below are for each machine

S. No.	Schedule of works	Unit	Qty
Mechanical Works			
1.	Removal of all guide rails, worn -out support angles & bottom rails fitted at all the 3 (entry, blast and exit) chambers.	Set	01
2.	Removal of work rotator shafts and bearings (both drive and idler) and all connecting mechanical link parts.	set	01
3.	Removal of ejector arm assembly with shafts, bearings, cylinders and all accessories.	set	01
4.	Removal of Scalping drums and Screw conveyor with shaft, bearings and gearbox.	Set	01
5.	Removal of all wears plates fitted in blasting chamber, exit & entry chamber, inspection doors, entry & exit doors along with cylinders and accessories.	set	01
6.	i) Dismantling of Rotoblast Units with metering gate assembly and repairing of Rotoblast chamber damaged part with replacement of new wear plates and bearing. ii) Overhauling of metering gates. ii) Fitment of serviced Rotoblast units with metering gate assembly.	set	01
7.	Repairing of shell body damages of Entry, Blast & Exit chamber both from inside and outside. (Complete arrest of shorts leakage from machine should be insured).	Set	01
8.	Fitment of all wears plates in blasting chamber, exit & entry chamber, inspection doors, entry & exit doors along with cylinders and accessories.	Set	01
9.	Removal of damaged perforated sheets and fitment with new one after giving proper supports by angles at Entry, Blast and Exit chamber	set	01

10	Fitment of ejector arm along with new shafts and bearings with serviced/new Cylinders with accessories.	set	01
11	Fitment of work rotators drive and idler shaft with new bearings & shaft with proper alignment and cover plates including Rotator gear box, sprocket and coupling.	set	01
12	Supply and fitment of Entry and Exit doors with wear plate as per fitted in machine. (Material of plate- EN 19, thickness- 6mm and material for wear plate – IS-4771 TYPE 2. MTC must be submitted by firm from NABL approved lab)	set	01
13	Fitment of main rails, guide rails and alignment with proper support of guide angles. (Rails to be fabricated with 25 mm manganese plate & guide angles fabricated by 10 mm manganese plate.	Set	01
14	Repair of damaged bucket elevator shell body with proper stiffeners. Replacement of bucket elevator belt assembly with Buckets, Gearbox, elevator top pulley, boot pulley, shaft, bearings and drive arrangement.	set	01
15	Removal of all old grating plate surrounding machine area and fitment of new grating plates with proper support by angle.	set	01
16	Painting of entire machine with one coat of primer and one coat of anti rust paint (apple green) of reputed make after proper cleaning of machine.	set	01

4. (MECHANICAL WORK OF PEENING MACHINE-1 & 2)

OEM for Machine: Pangborn

Quantities referred below are for each machine

S. No.	Schedule of works	Unit	Qty
1.	Removal of all guide rails, worn -out support angles & bottom rails fitted at all the 3 (entry, blast and exit) chambers	Set	01
2.	Removal of work rotator shafts and bearings (both drive and idler) and all connecting mechanical link parts.	Set	01
3.	Removal of ejector arm assembly with shafts, bearings, cylinders and all accessories.	Set	01
4.	Removal of Scalping drums and Screw conveyor with shaft, bearings and gearbox.	Set	01
5.	Removal of all wears plates fitted in blasting chamber, exit & entry chamber, inspection doors, entry & exit doors along with cylinders and accessories.	Set	01
6.	i) Dismantling of Rotoblast Units (02 nos) with metering gate assembly and repairing of Rotoblast chamber damaged part with replacement of new wear plates. ii) Overhauling of metering gates (03nos). ii) Fitment of serviced Rotoblast units with metering gate assembly.	Set	01
7.	Repairing of shell body damages of Entry, Blast & Exit chamber both from inside and outside. (Complete arrest of shorts leakage from machine should be insured).	Set	01
8.	Fitment of all wears plates in blasting chamber, exit & entry chamber, inspection doors, entry & exit doors along with cylinders and accessories.	Set	01
9.	Removal of damaged perforated sheets and fitment with new one after giving proper supports by angles at Entry, Blast and Exit chamber.	Set	01

10	Fitment of ejector arm along with new shafts and bearings with serviced/new Cylinders with accessories.	Set	01
11	Fitment of work rotators drive and idler shaft with new bearings & shaft with proper alignment and cover plates including Rotator gear box, sprocket and coupling.	Set	01
12	Supply and fitment of Entry and Exit doors with wear plate as per fitted in machine. (Material of plate- EN 19, thickness- 6mm and material for wear plate – IS-4771 TYPE 2. MTC must be submitted by firm from NABL approved lab).	Set	01
13	Fitment of main rails, guide rails and align with proper support of guide angles. (Rails to be fabricated with 25 mm manganese plate & guide angles fabricated by 10 mm manganese plate).	Set	01
14	Repair of damaged bucket elevator shell body with proper stiffeners. Replacement of bucket elevator belt assembly with Buckets, Gearbox, elevator top pulley, boot pulley, shaft, bearings and drive arrangement.	Set	01
15	Removal of all old grating plate surrounding machine area and fitment of new grating plates with proper support by angle.	Set	01
16	Cleaning of entire duct pipes from peening machine to dust collecting machine.	Set	01
17	Overhauling of Classifier fitted in machine.	No	01
18	Painting of entire machine with one coat of primer and one coat of anti-rust paint (apple green) of reputed make after proper cleaning of machine.	Set	01

5. Any other work/activities which have not been mentioned above but are otherwise considered necessary for completeness of this work shall be assumed to be included in scope of work.

MANPOWER REQUIRED:

Minimum manpower required for smooth working of the entire above machine in each shift is detailed below:

Key-personnel Level	**Manpower required**	**Minimum Educational Qualification and Experience required for the job**
Supervisory level	1 in each shift	**Educational Qualification:** B.E./ B. Tech (Electrical/Mechanical). B.E./B.Tech + MBA shall be preferred. **Experience Required:** Minimum 10 years of experience in Maintenance of Pneumatic/ Hydraulic Machines.
Skilled	6 in each shift	**Educational Qualification:** Diploma (Electrical/Mechanical)/ ITI (Mechanical/Electrical). **Experience Required:** Minimum 3 years of experience in Maintenance of Pneumatic/ Hydraulic Machines.

LIST OF MATERIALS REQUIRED ANNUALLY FOR WORK(COLD WHEEL CONVEYOR LINES)

S No	Location	Item Description along with details	Allowed Make	Quantity required for replacement	Unit Cost
1.	Escapement wheel inspection station BI-directional gravity conveyor, Stopper/kicker pitching	PNUEUMATIC CYLINDER 8.00CBB-2AUV14AC12.00 , parker	Parker	5 Nos	
2.	Loader, Lowerator, LIFT, 90*Turn table, Lift cum rotator, BHN, Warpage stn kicker, stopper/ kicker, up/down ender kicker/stopper	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC12.00 , parker	Parker	7 Nos	
3.	Lift, Lowerator, Lift cum rotator, Lift cum rotator with pitching	PNUEUMATIC CYLINDER 10.00CD-2AUV14AC12.00 , parker	Parker	1 Nos	
4.	Lift	PNUEUMATIC CYLINDER 10.00CD-2AUV14AC33.00 , parker	Parker	1 Nos	
5.	Lift, BHN Tester, Lifting	PNUEUMATIC CYLINDER 10.00CD-2AUV34AC55.00 , parker	Parker	1 Nos	

6.	90*Turn table, 90*Turn table with pitching, Lift cum rotator, Lift cum rotator with pitching	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC18.00 , parker	Parker	7 Nos	
7.	90*Turn table with pitching, 180*Turn table with pitching, Lift cum rotator with pitching, BHN Tester	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC3.00 , parker	Parker	3 Nos	
8.	90*Turn table, 180*Turn table with pitching, Lift cum rotator with pitching, warpage stn	PNUEUMATIC CYLINDER 6.00CBB-2AUV14AC1.500 , parker	Parker	3 Nos	
9.	90*Turn table with pitching, 180*Turn table with pitching, Lift cum rotator with pitching, BHN Tester, warpage stn	PNUEUMATIC CYLINDER 4.00CH-2AUV14AC5.00 , parker	Parker	1 Nos	
10.	90*Turn table with pitching, Lift cum rotator with pitching	PNUEUMATIC CYLINDER 4.00CH-2AUV14AC10.00 , parker	Parker	1 Nos	
11.	180*Turn table with pitching	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC25.00 , parker	Parker	1 Nos	
12.	Cope grinder, Drag grinder, BHN Tester	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC7.00 , parker	Parker	2 Nos	

13.	Cope grinder, Drag grinder, Apex grinder, Magnaglow	PNUEUMATIC CYLINDER 6.00CBB-2AUV34AC12.00 , parker	Parker	3 Nos	
14.	Apex grinder, warpage stn, Grinding wheel lift, Gauge positioning	PNUEUMATIC CYLINDER 3.25CBB-2AUV34AC22.00 , parker	Parker	1 Nos	
15.	Ultrasonic Tester Clamping	PNUEUMATIC CYLINDER 4.00BB-2AUV14AC3.00 , parker	Parker	1 Nos	
16.	Ultrasonic Tester	PNUEUMATIC CYLINDER 4.00BB-2AUV14AC12.00 , parker	Parker	1 Nos	
17.	Ultrasonic Tester	PNUEUMATIC CYLINDER 6.00BB-2AUV14AC8.00 , parker	Parker	2 Nos	
18.	BHN Tester	PNUEUMATIC CYLINDER 14.00CJB-2AUV14AC3.00 , parker	Parker	1 Nos	
19.	Warpage stn	PNUEUMATIC CYLINDER 4.00CD-2AUV14AC3.00 , parker	Parker	1 Nos	
20.	Warpage stn	PNUEUMATIC CYLINDER 12.00CDD-2AUV44AC24.00 , parker	Parker	1 Nos	

21.	Warpage stn	PNUEUMATIC CYLINDER 5.00CBB-2AUV14AC15.00 , parker	Parker	1 Nos	
22.	ROLLER UP & DOWN	PNUEUMATIC CYLINDER 4.00 CH2AUV14AC 5.000	Parker	1 Nos	
23.	90*Turn table, 90*Turn table with pitching, Lift cum rotator, Lift cum rotator with pitching	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC18.00 , parker	Parker	1 Nos	
24.	90*turn table 180*turn table With pitching, Lift cum rotator with pitching, warpage Station	PNUEUMATIC CYLINDER 6.00CBB-2AUV14AC1.50 Parker	Parker	1 Nos	
25.	90* turn table pitching lift cum rotator with pitching	PNUEUMATIC CYLINDER 4.00CH-2AUV14AC 10.00 parker	Parker	1 Nos	
26.	180* turn table with pitching	PNUEUMATIC CYLINDER 4.00CBB-2AUV14AC 25.00 parker	Parker	1 Nos	
27.	CONVEYER LINE	ESCAPEMENT		5 Nos	
28.	CONVEYER LINE	KICKER		7 Nos	
29.	UT	UT WHEEL ROTATOR ROLLER		1 Nos	
30.	MG STATION	MG WHEEL ROTATOR ROLLER		2 Nos	

31.	UT	UT CLAMPING ROLLER SET		1 Nos	
32.	UT	UT GRAVITY ROLLER		5 Nos	
33.	CONVEYOR LINE	½ INCH FLOW CONTROL VALVE	Asco Numatic	16 Nos	
34.	CONVEYOR LINE	¾ INCH FLOW CONTROL VALVE	Asco Numatic	150 Nos	
35.	CONVEYOR LINE	1 INCH FLOW CONTROL VALVE	Asco Numatic	06 Nos	
36.	CONVEYOR LINE	½ INCH SIZE FRL	Asco Numatic	O2 Nos	
37.	CONVEYOR LINE	½ INCH SEAMLESS PIPE	Parker	50 Meters	
38.	CONVEYOR LINE	1 INCH SEAMLESS PIPE	Parker	50 Meters	
39.	CONVEYOR LINE	PNEUMATIC HOSE PIPE ¾ INCH	Parker	150 Meter	
40.	CONVEYOR LINE	PNEUMATIC HOSE PIPE ½ INCH	Parker	150 Meter	
41.	CONVEYOR LINE	FRCLM 176534/W	Asco Numatic	85 Nos	
42.	Grinding line	Air motor		2 Nos	
43.	UT station	Gravity Roller Bearing 6207ZZ	SKF	90 Nos	
44.	Grinding line	Hand operated valve 3322MH	Parker	12 Nos	
45.	Grinding line	Foot valve 3322MFL	Parker	07 Nos	
46.	Grinding line	Michigan M09564643	Parker	07 Nos	
47.	CONVEYOR LINE	silencer ¾ NPT	Parker	320 Nos	
48.	CONVEYOR LINE	Pressure Gauge 0.25 inch NPT 2 (0-160psi)	Parker	02 Nos	

49.	KICKER	Bosh bearing Size-76	SKF	25 Nos	
50.	Turn table	Plummer block F4B-E-211R	SKF	7 Nos	
51.	Turn table	Plummer block F4BSCM211	SKF	7 Nos	
52.	Grinding line	Plummer block F4BSCM211	SKF	5 Nos	
53.	FINAL STATION	Plummer block SN516	SKF	2 Nos	
54.	CONVEYER LINE	P U Pad for kickers Size-6 inch		124 Nos	
55.	CONVEYOR LINE	DC SOLENOID VALVE 555 SS43AK00030	Asco Numatic	17 Nos	
56.	CONVEYOR LINE	DC SOLENOID VALVE 554 SS43AK000030	Asco Numatic	15 Nos	
57.	UT	DC SOLENOID VALVE 555 SA43AK000030	Asco Numatic	3 Nos	
58.	CONVEYOR LINE	GAUGE 0.25 INCH NTP 0.25 INCH NTP	Parker	85 Nos	
59.	UT	GEAR BOX		1 Nos	
60.	MAGNA GLOW STATION	GEAR BOX		1 Nos	
61.	MAGNA GLOW	CORRUGATED HOSE PIPE		8 Nos	
62.	UT	NILON BUSH OD 90MM ID 50MM		06 Nos	
63.	CONVEYOR LINE	TWO WAY VALVE AIR LINE	Asco Numatic	85 Nos	
64.	CONVEYOR LINE	MS ANGLE 50*50*6MM		50 Meters	

65.	CONVEYOR LINE	MS CHANEL 100X70MM		50 Meters	
66.	BHN,APEX GRINDER,TURN TABLE	SLIDER ROLLER		5 Nos	
67.	MG STN,UT STN,APEX GRINDER	BEARING 22215 E1-K	SKF	32 Nos	
68.	MG STN,UT STN,APEX GRINDER	PLUMMER BLOCK SAF515	SKF	6 Nos	
69.	CONVEYOR LINE & GRINDING STATION	HAND OPERATED VALVE 3322MFL, MAKE- PARKER	Parker	7 Nos	
70.	CONVEYOR LINE & GRINDING STATION	FOOT OPERATED VALVE	Parker	7 Nos	
71.	BHN Machine	BHN Head Assy ,Size		2 Nos	
72.	BHN Machine	Elbow Size¼'' X 3/8'' Tube	Parker	4 Nos	
73.	BHN Machine	Union Tee Fitting Size¼'' Tube	Parker	10 Nos	
74.	BHN Machine	Union Tee Fitting Size 3/8'' x ¼''	Parker	10 Nos	
75.	BHN Machine	Coupling Size¼'' NPT	Parker	04 Nos	
76.	BHN Machine	Ram Reggedizod		02 Nos	
77.	BHN Machine	Air Pilot valve 250 AE13 10 20 VAI 210 50 - 60	Hamphary	4 Nos	
78.	BHN Machine	Regulator 0-50 PSI	Siemens	02 Nos	
79.	BHN Machine	Regulator 0-100 PSI	Siemens	02 Nos	

80.	BHN Machine	BHN Grinding wheel	Carborandam	02 Nos	
81.	BHN Machine	BHN Diaphragm		02 Nos	
82.	GR STATION	GR WHEEL ROTATOR ROLLER		3 Nos	

LIST OF MATERIALS REQUIRED ANNUALLY FOR CMC/PMC MACHINES WORK

S No	Location	Item Description along with details	Allowed Make	Quantity Required	Unit Cost
1	CMC/PMC	Supply of Bottom Drum of SBPM/SBCM as per Drawing no-**RWP/SK/MECH/MWFPS/TD/01**		04 nos	
2	CMC/PMC	Supply of Bottom Drum of SBPM/SBCM as per Drawing no-**RWP/SK/MECH/MWFPS/BD/01**		04 nos	
3	CMC/PMC	Supply of Wheel Rotator		04 nos	
4	CMC/PMC	Supply of Worm Wheel Assembly GR 50, as per RWP/Bela **drawing**		04 nos	
5	CMC/PMC	Flange Bearing UC-212-38	SKF	08 nos	
6	CMC/PMC	Supply of Worm Wheel Assembly GR 20, as per RWP/Bela **drawing**		04 nos	
7	CMC/PMC	Supply of Driver Flange **(Drawing No:)**		04 nos	
8	CMC/PMC	Supply of bush **(Drawing No:)**		04 nos	
9	CMC/PMC	Rotoblast Clock **(Drawing No:)**		10 nos	
10	CMC/PMC	Flow control Valve 2FC2	ASCO NUMATIC	10 nos	
11	CMC/PMC	Outer Runner Head **(Drawing No:)**	AS PER DRG	10 nos	
12	CMC/PMC	Inner Runner Head		10 nos	
13	CMC/PMC	Rotoblast Vanes Blade		1 set=08 nos population 10 set =80 nos	
14	CMC/PMC	Rotoblast Impeller casing		10 nos	
15	CMC/PMC	Rotoblast Impeller		10 nos	

16	CMC/PMC	Door Cylinder 2.00CCB2ANLU14AC17.000	PARKER	10 nos	
17	CMC/PMC	Full Round Wear Plate (Wheel Rotator Shaft) Part no. 6-720213-A (P41)		08 nos	
18	CMC/PMC	Rotoblast Shaft **(Drawing No:)**		10 nos	
19	CMC/PMC	Ejector Arm **(Drawing No:)**		04 nos	
20	CMC/PMC	Wear Plate Conical Cover Part no. 6-720234		08 nos	
21	CMC/PMC	V Belt 5V 900	FENNER	30 nos	
22	CMC/PMC	Shaft for wheel Rotator **(Drawing No:)**		04 nos	
23	CMC/PMC	DC Solenoid (Double)	ASCO NUMATIC	08 nos	
24	CMC/PMC	Solenoid Valve (Shot Control) 410 -36-120	HAMPHARY	10 nos	
25	CMC/PMC	FRL 1 inch	ASCO NUMATIC	04 nos	
26	CMC/PMC	Half Round Wear Plate (Ejector Bearing Cover) Part no. 6-720214-1 Small **(Drawing No:)**		08 nos	
27	CMC/PMC	Half Round Wear Plate (Wheel Rotator Shaft) Part no. 6-720215-1 Big **(Drawing No:)**		04 nos	
28	CMC/PMC	Entry and Exit Gate Guide Roller assembly		16 nos	
29	CMC/PMC	Bar for Shaft Different sizes 30 MM , 50 MM, 60 MM, 80 MM, 120 MM	SAIL	5 meters each	
30	CMC/PMC	Shots Control Gate Cylinder CMC and PMC		10 nos	
31	CMC/PMC	Mn Plate, 12 MM	SAIL	64 Sq Ft	
32	CMC/PM	Mn Plate, 10 MM	SAIL	64 Sq Ft	

	C				
33	CMC/PMC	Mn Plate, 25 MM	SAIL	64 Sq Ft	
34	CMC/PMC	Perforated Sheet **(Drawing No:)**		75 Sq Ft	
35	CMC/PMC	Bucket Elevator Upper Side Bearing YAR 211-203-2F	SKF	08 nos	
36	CMC/PMC	Bucket Elevator Lower Side Bearing UC 207 – 107	SKF	08 nos	
37	CMC/PMC	Rotoblast Bearing (Smalle One) 22312YMW33W800C4	SKF	10 nos	
38	CMC/PMC	Rotoblast Bearing (Bigger One) 22314 YMW 33 800 C4	SKF	10 nos	
39	CMC/PMC	Wheel Rotator Bearing F4 BRP 215- SRB – SRE (FYRP)	SKF	08 nos	
40	CMC/PMC	Ejector Arm Bearing (Inside) F4BR 215 SRB-SRE (FYR)	SKF	08 nos	
41	CMC/PMC	Ejector Arm Bearing (Outside) UCF218-308	SKF	16 nos	
42	CMC/PMC	Guide Rail Hanger		8 Nos	
43	CMC/PMC	Wheel Rotator Sprocket **(Drawing No:)**		04 nos	
44	CMC/PMC	Wheel Rotator Chain ½ INCH	DIAMOND	04 nos	
45	CMC/PMC	Ejector Cylinder Model no. 06.00 CBB2ALUS33AG 12.000	Make - PARKER	08 nos	
46	CMC/PMC	Bushing all types	Regal Rexnord	10 Nos	
47	CMC/PMC	Pulley Rotoblast **small Model No:**	Regal Rexnord	10 nos	
48	CMC/PMC	Pulley Rotoblast Big **Model No:**	Regal Rexnord	10 nos	
49	CMC/PMC	Wheel Rotator Gear Box 5CT Part no. 005XCTS3X00LEX	WINSMITH	04 nos	
50	CMC/PMC	Gear Box (Sculping Drum) for PMC [HM-830-20-H1-180-31]	REGAL REXNORD	02 nos	
51	CMC/PMC	Gear Box (Sculping Drum) for CMC [HM-842-50-H1-180-35]	REGAL REXNORD	02 nos	

52	CMC/PMC	Gear Box (Bucket Elevator) for PMC [GR-HM-842-20-H-210-35]	REGAL REXNORD	01 nos	
53	CMC/PMC	Inspection Doors		02 Nos	
54	CMC/PMC	Bucket Elevator Drum (PMC) **(Drawing No:)**		02 nos	
55	CMC/PMC	Bucket Elevator Drum (CMC) **(Drawing No:)**		02 nos	
56	CMC/PMC	Sculping drum for Peening Machine		02 nos	
57	CMC/PMC	Sculping drum for Cleaning Machine		02 nos	
58	CMC/PMC	Special Hex nut **(Drawing No:)**		150 Nos	
59	CMC/PMC	Acorn nut **(Drawing No:)**		150 Nos	

Schedule 2: Electrical Maintenance

Name of work: ***Comprehensive Annual Maintenance Contract (CAMC) of Cold Line and its associate machines in WFPS Section of RWP Bela*."**

Sr. No	GENERAL PRACTICE OF PREVENTIVE MAINTENANCE OF THE MACHINES
1	**FR CONVEYOR SYSTEM LINE-1,2,3,4 GRINDING LINE-1,2,3,4,** **DAILY MAINTENANCE SCHEDULE:** **Following work to be done on the work:** **a. Check all section working properly in auto mode.** **b. Clean all operator desk outside by brushes.** **c. Check all indication lamps are working properly.** **d. Visual Check condition of wire, cable, conduits, damage or burnt.** **e. Check the Panel AC is working or not. Take remedial action for mak working.** **WEEKLY MAINTENANCE SCHEDULE.** **Following work to be done on the work:** **a. Check all the limit switch and OTC working smoothly and properly.** **b. Check alignment of the Limit switch arm adjust properly.** **c. Replace defective limit switch/OTC** **d. Clean All Junction boxes externally.** **e. Check the Electrical Panel doors closing and locking properly. Correct if any defect observed.** **MONTHLY MAINTENANCE SCHEDULE** **Following work to be done on the work:** **a. Check emergency buttons working properly. Repair if any defect found.** **b. Check MCR buttons working or not.** **c. Check working of all Amperemeter/voltmeters.** **d. Check all the Electrical panels internally. Panel Internal Cleaning to be done by brush and blowers., wire dressing, to be done.** **e. Check panel light working.** **f. Clean Panel AC Filter.** **g. Check Panel AC temperature cut-in, cut-off properly.** **h. Check all LED indicators working properly or not. Repair if any defect observed.**

	HALF YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check All PLC cards working properly. Replace if any defective found.** **b. Check healthiness of HMI and its working. Take HMI program Backups.** **c. Check PLC processor battery status. Replace if low.** **d. Take PLC program Backup.** **e. Replace all OTC of the conveyor lines with new one.** **f. Repair all the cable terminals and conduit, glands** **g. Servicing of Panel AC as per Panel AC maintenance schedule.** **YEARLY MAINTENANCE SCHEDULE:** **Following work to be done on the work:** **a. Check all the limit switch working properly.** **b. Repair all the cable terminals and conduit, glands.** **c. Check all the Operator desk equipments clean properly. Check condition of all the connectors , replace if damaged.** **a. Check all the push buttons, selector switches panels equipments labels are visible properly or not. Provide new labels if damage or missing.** **d. Check tagging/ferruling of all wire terminals, at panels/ junction boxes/ LBPS/ filed equipment ends are visible properly. Provide if not visible.** **e. Servicing of Panel AC as per Panel AC maintenance schedule.** **f. Painting of all the Junction Boxes and Panel externally.**
2.	**MACHINE NAME: HF Grinder Machine Panel**
	DAILY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check all section working properly in auto mode.** **b. Clean all operator desk outside by brushes.** **c. Check all indication lamps are working properly.** **d. Visual Check condition of wire, cable, conduits, damage or burnt.** **e. Check power terminal of the HF grinder station.**
	WEEKLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check cable terminals at the grinder end. Repair if required.** **b. Functional check of all items.** **c. Measure current and voltage**
	MONTHLY MAINTENANCE SCHEDULE **Following work to be done on the work:**

	a. Check cable terminals at the grinder end. Repair if required. b. Check safety system working properly. c. Clean all the panel internally as well as externally by brush and blowers. d. Check panel light working properly.
	HALF YEARLY MAINTENANCE SCHEDULE. **Following work to be done on the work:** a. Check panel door lock properly. b. Take IR value.
	YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Repair all power cable terminals. b. Painting of all the Junction Boxes and Panel externally.
3.	**Machine name: WARPAGE MACHINE**
	DAILY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check all section working properly in auto mode. b. Clean all operator desk outside by brushes. c. Check all indication lamps are working properly. d. Visual Check condition of wire, cable, conduits, damage or burnt.
	WEEKLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check all the limit switch and OTC working smoothly and properly. b. Check alignment of the Limit switch arm adjust properly. c. Replace defective limit switch/OTC d. Clean All Junction boxes, panels, externally. e. Adjust sensors and equipments. Check the Electrical Panel doors closing and locking properly. Correct if any defect observed.
	MONTHLY MAINTENANCE SCHEDULE **Following work to be done on the work:** a. Check the Electrical Panel doors closing and locking properly. Correct if any defect observed.
	HALF YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check All PLC cards working properly. Replace if any defective found. b. Check PLC processor battery status. Replace if low.
	YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Take PLC program Backup.

	b. Check healthiness of HMI and its working. Take HMI program Backups.
4.	**MACHINE NAME: CLEANING/PEENING MACHINE**
	DAILY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check all section working properly in auto mode.** **b. Clean all operator desk outside by brushes.** **c. Check all indication lamps are working properly.** **d. Visual Check condition of wire, cable, conduits, damage or burnt.** **e. Take motor current and record in log book.**
	WEEKLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check all the limit switch and OTC working smoothly and properly.** **b. Check alignment of the Limit switch arm adjust properly.** **c. Replace defective limit switch/OTC** **d. Clean All Junction boxes, panels, externally.** **e. Check motor terminals for any heating indications. Repair if damage.** **f. Check dust collector pulse jet valve working.** **g. Check all the safety interlocks working properly.**
	MONTHLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Check the Electrical Panel doors closing and locking properly. Correct if any defect observed.** **b. Clean all the panel internally as well as externally by brush and blowers.** **c. Check panel light working properly.**
	HALF YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Take motor IR values. Take remedial action if low.** **b. Check for any motor bearing damage. Replace if found damage.**
	YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Repair all the cable terminals and conduit, glands.** **b. Check all the Operator desk equipments clean properly. Check condition of all the connectors , replace if damaged.** **c. Check all the push buttons, selector switches panels equipments labels are visible properly or not. Provide new labels if damage or missing.** **d. Check tagging/ferruling of all wire terminals, at panels/ junction boxes/ LBPS/ filed equipment ends are visible properly. Provide if**

	not visible. e. Painting of all the Junction Boxes and Panel externally.
5.	**MACHINE NAME: BHN**
	DAILY MAINTENANCE SCHEDULE. **Following work to be done on the work:** a. Check all section working properly in auto mode. b. Clean all operator desks outside by brushes. c. Check all indication lamps are working properly. d. Check BHN sensor head tightness. e. Check BCF value and record it.
	WEEKLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check all field cable and control panel wirings properly. b. Functional check with Test Block.
	MONTHLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check the pressure variations following with the commanded. Recalibrate if found abnormal. b. Clean the BHN control desk, monitor, UPS, Electrical panels internally.
6.	**MACHINE NAME: MPT MACHINE**
	DAILY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check all section working properly in auto mode. b. Clean all operator desk outside by brushes. c. Check all indication lamps are working properly. d. Check all the ampere meters, voltmeters working properly.
	WEEKLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check all limit switches working properly. b. Check automation and its safety interlock. c. Check all white light, UV black light working properly. d. Check light focus. Adjust it if required. e. Visual Check condition of wire, cable, conduits, damage or burnt. f. Take Boom current and record in log book.
	MONTHLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** a. Check the Electrical Panel doors closing and locking properly. Correct if any defect observed. b. Clean all the panel internally as well as externally by brush and blowers.

	c. Check panel light working properly.
	HALF YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Take Boom IR values. Take remedial action if low.** **b. Check for any Insulation damage. Repair, if found damage.**
	YEARLY MAINTENANCE SCHEDULE: **Following work to be done on the work:** **a. Repair all the cable terminals and conduit, glands.** **b. Check all the Operator desk equipments clean properly. Check condition of all the connectors , replace if damaged.** **c. Check all the push buttons, selector switches panels equipments labels are visible properly or not. Provide new labels if damage or missing.** **d. Check tagging/ferruling of all wire terminals, at panels/ junction boxes/ LBPS/ filed equipment ends are visible properly. Provide if not visible.** **e. Painting of all the Junction Boxes and Panel externally.**
7.	**REPAIR OF WARPAGE MACHINES:** a. Repair of **Warpage machine** in panel in all respect to made functional properly. b. Replacement of HMI. c. Program backup to be taken. d. Panel rewiring and field rewiring and equipments of Warpage machines to be done. e. Interface with running conveyor automation.
NOTE: **1. THE CONTRACTOR WILL MAKE LOG BOOK FOR ALL SCHEDULE MAINTENANCE.** **2. ANY Preventive maintenance for any machine practices may be added time to time as per experience basis or OEM guidelines for better performance of the machines.**	

MANPOWER REQUIRED:

Minimum manpower will be required for smooth working of all the above machine as below:

Key-personnel Level	**Manpower required**	**Minimum Educational Qualification and Experience required for the job**
Supervisory level	1 in each shift	**Educational Qualification:** B.E./ B. Tech (Electrical/ Electronics Engineering). B.E./B.Tech + MBA shall be preferred. **Experience Required:** Minimum 10 years of experience in Maintenance of PLC/CNC based machines and having capability of PLC programming in ladder logic.
Skilled	4 in each shift	**Educational Qualification:** Diploma (Electrical/Electronics)/ ITI (Electrical/ Electronics). **Experience Required:** Minimum 3 years of experience in Maintenance of PLC/CNC based machines having good experience in control wirings.

ACCEPTED MAKES

Sr. No.	Items Categories	Accepted Make
1.	PLC	ROCKWELL AUTOMATION(ALLEN BRADLEY
2	SELECTOR SWITCH, PUSH BUTTONS,	L&T, SIEMENS, SCHENIDER, HONEWELL, BCH, HAVELLS, TEKNIC
3	CONTACTOR, MPCB, MCCB, LIMIT SWITCH	L&T, SIEMENS, SCHENIDER, HONEWELL, BCH, HAVELLS, TEKNIC
4	INDICATION LAMPS	L&T, SIEMENS, SCHENIDER, HONEWELL, BCH, HAVELLS, TEKNIC, SURYA, PHILLIPS
5	METERS	AE/IMP/MECO/ENERCON/SATEC/ Schenider, Rishabh
6	PANELS, JUNCTION BOX	BCH, RITTAL, HAVELLS
7	TRANSFORMER	GUPTA, KAPPA OR SIMILAR

Material Required for Electrical Maintenance during AMC

S. No.	CATEGORY	ITEM DESCRIPTION	Cat No/Model No	Existing MAKE	Average requirement for PMS of 01 Years	Unit Cost
1	BUTTONS/SWITCHES	Siemens Push Button, Black (Flush)	3SB3500-0AA11	SIEMENS	**10**	
2	BUTTONS/SWITCHES	Siemens Push Button, Red (Rised)	3SB3500-0BA21	SIEMENS	**4**	
3	BUTTONS/SWITCHES	Siemens Push Button, Red (Mashroom)	3SB3500-1GA21	SIEMENS	**2**	
4	BUTTONS/SWITCHES	ILLUMINATED PUSH BUTTON (GREEN)	3SB12031AC01	SIEMENS	**5**	
5	BUTTONS/SWITCHES	Siemens Red Push to Test Push Button	3SB3500-0BA21	SIEMENS	**2**	
6	BUTTONS/SWITCHES	GREEN PUSH BUTTON 1NO+1NC	3SB12 02 0AE01	SIEMENS	**10**	
7	BUTTONS/SWITCHES	BLACK NORMAL PUSH-BUTTON, 1NO+1NC CONTACT	3SB12 02 0AF01	Siemens	**5**	
8	BUTTONS/SWITCHES	YELLOW NORMAL PUSH-BUTTON, 1NO+1NC CONTACT	3SB12 02 0AF01	Siemens	**8**	
9	BUTTONS/SWITCHES	MUSHROOM HEAD PUSHBUTTON, WITH 1NC CONTACT BLOCK	3SB12 03-1AC01	Siemens	**20**	
10	CONNECTOR/CONTACT	BUSS Power Distribution Block	CPDB-3	**	**2**	
11	CONNECTOR/CONTACT	Siemens Terminal Block, 1 CIR, #18-#10	8WA1011-1BG11	SIEMENS	**150**	
12	CONNECTOR/CONTACT	Siemens End Barrier	8WA1820	SIEMENS	**2**	
13	CONNECTOR/CONTACT	Siemens Terminal Block, 1 CIR, #14-#6	8WA1011-1BK11	SIEMENS	**10**	
14	CONNECTOR/CONTACT	Siemens End Barrier	8WA1821	SIEMENS	**2**	

15	CONNECTOR/CONTACT	Siemens 1 NO contact Block	3SB3400-0B	SIEMENS	**10**	
16	CONNECTOR/CONTACT	Siemens 1 NC contact Block	3SB3400-0C	SIEMENS	**10**	
17	CONNECTOR/CONTACT	Siemens 1 NO-1NC contact Block	3SB3400-0A	SIEMENS	**5**	
18	CONTACTOR	Siemens Mag. Contactor 28A, 120V, 50Hz	3RT1033-1AK60	SIEMENS	**2**	
19	CONTACTOR	Siemens Mag. Contactor 12A, 120V, 50Hz	3RT1024-1AK60	SIEMENS	**2**	
20	CONTACTOR	Siemens Mag. Contactor 9A, 120V, 50Hz	3RT1023-1AK60	SIEMENS	**5**	
21	CONTACTOR	Siemens Mag. Contactor 50A, 120V, 50Hz	3RT1036-1AK60	SIEMENS	**2**	
22	CONTACTOR	Siemens Aux. Contact 2NO-22NC	3RV1901-1J	SIEMENS	**10**	
23	CONTACTOR	Siemens Interlock 2 NO (TOP MTD.)	3RH1921-1LA20	SIEMENS	**10**	
24	CONTACTOR	Siemens Mag. Contactor 65A, 120V, 50Hz	3RT1044-1AK60	SIEMENS	**2**	
25	LAMP	Panel lighting Kit	FLK24T8	**	**4**	
26	LAMP	40W, Fluroscent light		**	**4**	
27	LAMP	Siemens Red Pilot Light 120V	3SB3501-6BA20	SIEMENS	**10**	
28	LAMP	Siemens lamp holder with integrated LED RED	3SB3400-1QB	SIEMENS	**10**	
29	LAMP	Siemens Yellow pilot Light 120V	3SB3501-6BA30	SIEMENS	**4**	
30	LAMP	Siemens lamp holder with integrated LED Yellow	3SB3400-1QA	SIEMENS	**2**	
31	LAMP	Siemens Lampholder	3SB3400-1G	SIEMENS	**2**	
32	LAMP	PANNEL LIGHT, 120V AC		PASOLITE	**15**	
33	LAMP	LED PILOT LAMP, GREEN COLOR, 120VAC 50/60Hz	3SB5285-6HE02	Siemens	**10**	
34	LAMP	LED PILOT	3SB5285-	Siemens	**5**	

		LAMP, WHITE COLOR, 120VAC 50/60Hz	6HG02			
35	LAMP	GREEN COLOR LED TYPE PILOT LAMP	3SB5285-6HE02	Siemens	**15**	
36	LIMIT SWITCH	LIMIT SWITCH, SNAP ACTION WITH 1NO+1NC CONTACT	3SE3020-1A	SIEMENS	**10**	
37	MCB	Siemens 1P, 2A, 240V, Circuit Breaker	5SJ4102-7HG40	SIEMENS	**4**	
38	MCB	Siemens 1P, 10A, 240V, Circuit Breaker	5SJ4110-7HG40	SIEMENS	**4**	
39	MCB	Siemens 1P, 5A, 240V, Circuit Breaker	5SJ4111-7HG40	SIEMENS	**4**	
40	MCB	Siemens 1P, 3A, 240V, Circuit Breaker	5SJ4114-7HG40	SIEMENS	**15**	
41	MCB	MCB 10A, 2 P	5SX421079	SIEMENS	**4**	
42	MCB	MCB 16A, 2 P	5SX421679	SIEMENS	**1**	
43	MCB	MCB 20A, 2 P	5SX422079	SIEMENS	**1**	
44	MCB	Siemens 2P, 1A, 480V, Circuit Breaker	5SY4201-7	SIEMENS	**2**	
45	MCB	Siemens 2P, 5A, 480V, Circuit Breaker	5SY4211-7	SIEMENS	**2**	
46	MCB	DP, MCB, 6A	5SQ2210-7YA06	Siemens	**2**	
47	MCB	DP, MCB, 10A	5SQ2210-7YA10	Siemens	**2**	
48	MCB	DP, MCB, 16A	5SQ2210-7YA16	Siemens	**2**	
49	MCB	DP, MCB, 20A	5SQ2210-7YA20	Siemens	**2**	
50	MCB	DP, MCB, 25A	5SQ2210-7YA25	Siemens	**2**	
51	MCB	DP, MCB, 32A	5SQ2210-7YA32	Siemens	**2**	
52	MCB	DP, MCB, 40A	5SQ2210-7YA40	Siemens	**2**	
53	MCB	SP, MCB, 1A	5SQ2110-7YA01	Siemens	**50**	
54	MCB	SP, MCB, 2A	5SQ2110-7YA02	Siemens	**20**	
55	MCB	SP, MCB, 4A	5SQ2110-7YA04	Siemens	**20**	
56	MCB	SP, MCB, 10A	5SQ2110-	Siemens	**5**	

			7YA10			
57	MCB	SP, MCB, 16A	5SQ2110-7YA16	Siemens	**2**	
58	MCB	SP, MCB, 25A	5SQ2110-7YA25	Siemens	**1**	
59	MCCB	MCCB, 16A, 25KA 415V AC 50HZ	3VT1701-2DC36-0AA0	SIEMENS	**2**	
60	MCCB	MCCB 25A, 415V 50HZ AC	3VT1792-2DC36-0AA0	SIEMENS	**1**	
61	MCCB	MCCB 32A, 415V 50HZ AC	3VT1703-2DC36-0AA0	SIEMENS	**2**	
62	MCCB	C/H 200A, Circuit Breaker	JGE3200AAG	**	**2**	
63	MCCB	C/H Operator Machanism		**	**2**	
64	MCCB	C/H handle Mechanism		**	**2**	
65	MCCB	3P MCCB 160A, 50KA WITH ROTARY HANDLE		BCH / L&T	**3**	
66	METERS	AMMETER 0-75A, Trans. Rated, AMMETER Gasket	016-02AA-LSPB	**	**4**	
67	METERS	VEDDER ROOT, A.C. Hour Meter, 115V, 50 Hz,	C342-2474	**	**2**	
68	MOTOR	3-PH INDUCTION MOTOR, 25 HP, 415VAC, 50HZ		SIEMENS, CGL, BHARAT BIJLI, HAVELLS, NORD	**2**	
69	MOTOR	3-PH INDUCTION MOTOR, 5HP, 415VAC, 50HZ			**1**	
70	MOTOR	3-PH INDUCTION MOTOR, 3HP, 415VAC, 50HZ			**1**	
71	MOTOR	3-PH INDUCTION MOTOR, 1.5HP, 415VAC, 50HZ			**1**	
72	MOTOR	3-PH INDUCTION MOTOR, 20HP, 415VAC, 50HZ			**2**	
73	MOTOR	3-PH INDUCTION MOTOR, 30HP,			**2**	

		415VAC, 50HZ				
74	MPCB	MPCB (Q1, Q2, Q6) 2-3.2Amp	3VU 1340 1MJ00	SIEMENS	**1**	
75	MPCB	Siemens MPCB, 3P, 17-22A, 120V, 50Hz,(EXH.)	3RV1021-4CA10	SIEMENS	**2**	
76	MPCB	Siemens MPCB, 3P, 7.0-10A, (ELEV)	3RV1021-1JA10	SIEMENS	**2**	
77	MPCB	Siemens MPCB, 3P, 4.5-6.3A, (Screw conv.)	3RV1021-1GA10	SIEMENS	**2**	
78	MPCB	Siemens MPCB, 3P, 2.8-4.0A, (Work Rot.)	3RV1021-1EA10	SIEMENS	**2**	
79	MPCB	Siemens MPCB, 3P, 36-50A, (# 1 Roto)	3RB1041-4HA10	SIEMENS	**2**	
80	MPCB	Siemens MPCB, 3P, 45-63A, (# 2 Roto)	3RB1041-4JA10	SIEMENS	**2**	
81	MPCB	Siemens MPCB, 3P, 3.5-5A (Sweco)	3RV1021-1FA10	SIEMENS	**2**	
82	OTHER	DIN Mounting Rail		**	**2**	
83	OTHER	Control Panel Name plate	MS-563001	**	**0**	
84	OTHER	Pangborn Warning Plate	P-040125	**	**0**	
85	OTHER	Pangborn Name Plate	H-800108-1	**	**0**	
86	OTHER	Wiegman Encl. Nema 12	B-24207CH	**	**0**	
87	OTHER	Warning Plate	S-760883	**	**0**	
88	OTHER	COMPACT FAN 6'' I/P VOLTAGE 115VAC, 420CMH, 2800RPM, 26W, NOICE LEVEL 54DB	W2E 143-AB15-01	NADI	**4**	
89	OTHER	DIGITAL BRINNEL SENSOR ASSEMBLY 7-3-770 FOR S/N 300054-1, 3000KGF, AIR-O-BRINNEL FOR BRINNEL HARDNESS		TINIUS OLSEN	**1**	

		TESTING MACHINE, MAKE-TINIUS OLSEN				
90	OTHER	POLYTRON POWER SUPPLY #33-12,+/-12V DC 2AT CASE PART NO. 90003438, MAKE: TINIUS OLSEN		TINIUS OLSEN	**1**	
91	OTHER	Limit Switches, TYPE-LLA, NLLA Make: BCH		BCH	**150**	
92	OTHER	SOLENOID COIL MODEL NO. 228-717, 110 VAC, 0.3AMP,		NUMATICS	**250**	
93	OTHER	JUNCTION BOXES DIFFERENT SIZE		RITTAL, BCH, OTHER	**0**	
94	OTHER	PVC CONDUITS,			**0**	
95	OTHER	OTC			**75**	
96	OTHER	PVC INSULATED FLEXIBLE COPPER WIRE, DIFFERENT SIZE, 0.75 SQMM, 1.0SQMM, 1.5SQMM, 2.5SQMM, 4.0SQMM, 6.0SQMM			**2000**	
97	PANEL	Junction Box wiegman enclosures nema 12, 48w, x 60 inch, x12 inch DP		**	**0**	
98	PANEL	Wiegman Panel	NP6048	**	**0**	
99	PANEL	Wiegman Panel	NP-2420	**	**0**	
100	PLC	CONTROLNET TAP	1786-TPS	ALLEN BRADLEY	**4**	
101	PLC	CHASSIS-10 SLOTS	1756-A10	ALLEN BRADLEY	**1**	
102	PLC	CHASSIS-13 SLOTS	1756-A13	ALLEN BRADLEY	**1**	
103	PLC	CHASSIS-17 SLOTS	1756-A17	ALLEN BRADLEY	**1**	
104	PLC	CONTROL LOGIX PROCESSOR 2MB (CPU1,	1756-L61	ALLEN BRADLEY	**1**	

		CPU2)				
105	PLC	ETHERNET BRIDGE MODULE	1756-ENBT	ALLEN BRADLEY	**1**	
106	PLC	COMPACT FLASH CARD	1784-CF64	ALLEN BRADLEY	**1**	
107	PLC	58-265 VAC POWER SUPPLY 10Amp.	1756-PA72	ALLEN BRADLEY	**1**	
108	PLC	CONTROLNET BRIDGE MODULE	1756-CNB	ALLEN BRADLEY	**1**	
109	PLC	16 POINT DIGITAL INPUT MODULE	1756-IA16	ALLEN BRADLEY	**1**	
110	PLC	32 POINT DIGITAL INPUT MODULE	1756-IA32	ALLEN BRADLEY	**2**	
111	PLC	16 POINT DIGITAL OUTPUT MODULE	1756-OA16	ALLEN BRADLEY	**2**	
112	PLC	36 IN SCREW CLAMP BLOCK	1756-TBCH	ALLEN BRADLEY	**2**	
113	PLC	20 POS SCREW CLAMP BLOCK	1756-TBNH	ALLEN BRADLEY	**2**	
114	PLC	CONTROLNET TAP	1756-TPS	ALLEN BRADLEY	**1**	
115	PLC	EMPTY SLOT FILLER	1756-N2	ALLEN BRADLEY	**2**	
116	PLC	CONTROLNET COAX RG6 CABLE (IN Mts)	1786-RG6F	ALLEN BRADLEY	**2**	
117	PLC	CONTROL NET 75 OHM TERMINATOR PLUG	1786-XT	ALLEN BRADLEY	**1**	
118	PLC	FLEX ADAPTER CONTROLNET	1794-ACN15	ALLEN BRADLEY	**2**	
119	PLC	FLEX 120VAC 16 INPUT	1794-IA16	ALLEN BRADLEY	**5**	
120	PLC	FLEX 120VAC 16 OUTPUT	1794-OA16	ALLEN BRADLEY	**2**	
121	PLC	TERMINAL BLOCKS (TB3)	1794-TB3	ALLEN BRADLEY	**5**	
122	PLC	5A DC POWER SUPPLY, INPUT 85-264VAC, 50/60HZ, OUTPUT 24VDC, 5A SINGLE PHASE	1606-XL120D	ALLEN BRADLEY	**1**	
123	PLC	INDUSTRIAL	6181P-	ALLEN	**1**	

		TOUCH SCREEN COMPUTER FOR RSLOGIX5000	15TPXPH	BRADLEY		
124	PLC	RS LOGIX 5000 PROGRAM SOFTWARE RSNETWORX BUNDLE	9324-RLD300NXENE	ALLEN BRADLEY	**0**	
125	PLC	8 PORT ETHERNET SWITCH		D-Link	**1**	
126	PLC	40A, AC LINE FILTER	MF-420-40	EMI SOLUTIONS	**1**	
127	PLC	20A, AC LINE FILTER	MF-420-20	EMI SOLUTIONS	**1**	
128	PLC	30A, AC LINE FILTER	MF-420-30	EMI SOLUTIONS	**1**	
129	PLC	16A, AC LINE FILTER	MF-420-16	EMI SOLUTIONS	**1**	
130	PLC	15A, AC LINE FILTER	MF-420-15	EMI SOLUTIONS	**1**	
131	PLC	HMI WITH TINIUS OLSEN SOFTWARE		DELL	**1**	
132	RELAY	Siemens Relay 4NO, 120V, 50Hz	3RH1140-1AK60	SIEMENS	**5**	
133	RELAY	Siemens Relay 3NO-1NC 120V, 50Hz	3RH1131-1AK60	SIEMENS	**2**	
134	RELAY	Siemens Relay 2NO-2NC 120V, 50Hz	3RH1122-1AK60	SIEMENS	**2**	
135	RELAY	Siemens Interlock 4 NO (TOP MTD.)	3RH1921-1FAY0	SIEMENS	**2**	
136	RELAY	Siemens Interlock 3 NO-1NC (TOP MTD.)	3RH1911-1GA31	SIEMENS	**2**	
137	RELAY	Siemens Interlock 2 NO-2NC (TOP MTD.)	3RH1911-1GA22	SIEMENS	**2**	
138	RELAY	MCR RELAY, AUXILARY 1NO CONTACTS	3TX4 010-2A (2Nos)+3TX4 010-4A(02nOS.)	Siemens	**2**	
139	RELAY	MCR, 120V AC, 50Hz with 2NO+2NC CONTACTS	3TF32 00-0AFO	Siemens	**1**	
140	RELAY	MCR RELAY,	3TX4 010-2A	Siemens	**1**	

		AUXILIARY 2NO+2NC CONTACTS	(2Nos)			
141	RELAY	8 CHANNEL RELAY MODULE WITH 1 C/O, 5A CONTACT, FUSE OUTPUT WITH OMRON RELAY OF 12VAC COIL, 50HZ, PHONIX MAKE TERMINALS AT INPUT &OUTPUT	NARM-AC81FBH	NANDI	**8**	
142	RELAY	16 CHANNEL RELAY MODULE WITH 1 C/O, 5A CONTACT, FUSE OUTPUT WITH OMRON RELAY OF 120V AC COIL, 50HZ, PHOENIX MAKE TERMINALS AT INPUNPUT & OUTPUT SIDE	NARM-61FBHAC110 /G2R1	Nandi	**8**	
143	SWITCH	ROTARY DRIVE KIT FOR MCCB	3VT-9100-3HE20+3HG 10+3HA20+3 HJ10	SIEMENS	**2**	
144	SWITCH	5A, POWER SOCKET		ANCHOR	**2**	
145	SWITCH	10A, POWER SOCKET		ANCHOR	**2**	
146	SWITCH	15A, POWER SOCKET		ANCHOR	**2**	
147	SWITCH	2 POS MAINTAINED SELECTOR SWITCH WITH 1NO+1NC	3SB12 01 2AB01	Siemens	**4**	
148	SWITCH	3 POS. MOMENTARY SELECTOR SWITCH WITH TWO 1NO+1NC	3SB12 08 2EB01	Siemens	**120**	
149	SWITCH	3 POS. MAINTAINED SELECTOR Switch with TWO 1NO+1NC	3SB12 08 2DB01	Siemens	**15**	
150	TIMER	Siemens On	3RP2005-	SIEMENS	**10**	

		delay timing Relay 1 Form C Timing Contact and 1 form C Instant Contact 24-240V,50Hz AC/DC	1BW30			
151	TIMER	Siemens Off Delay Timing Relay 2 Form C Contact 100 to 127V, 50Hz, AC/DC	3RP1540-1BJ30	SIEMENS	**4**	
152	TIMER	Eagle Cycle-Flex Timer 120V, 50 Hz,	HP52A5	**	**4**	
153	TRANSFORMER	100VA, lighting control Transformer.		**	**1**	
154	TRANSFORMER	Siemens Transformer 1KVA/415V, 3-PH, 50Hz, PRI 120V, SEC		SIEMENS	**1**	
155	TRANSFORMER	Crompton Current Transformer, Ratio 150.5 CAT. #814-943U-PZLS	S-870999	Crompton	**1**	
156	TRANSFORMER	CONTROL TRANSFORMER PRIMARY 2-PHASE, 415V 50 HZ, SEC: 1-PHASE, 110V, 50HZ, 4.0KVA & 230V, 50HZ, 1.5KVA		GLASTRONIX	**1**	