

TENDER NO: BALCO/COM/12022021/01

**Refractory ARC contract- Carbon**  
**Scope of work**

**Items :-**

Item	UoM	Qty FY2021-22	Qty FY2022-23	Qty FY2023-24
Remove old lining & relining of Furnace	no.	96	96	96
Remove old lining & relining of ladle	no.	84	84	84
Patch repair Furnace and ladle Spout	MT	25	25	25
Section maintenance & cleaning	no.	2450	2450	2450
Demolition & installation of bricks	Kg	150000	150000	150000
Repairing by castable	Kg	600000	600000	600000
Head wall demolition & rebuilding	no.	4	4	4
Head wall top repairing	no.	240	240	240
Side wall top repairing	no.	120	120	120
Crossover maintenance	no.	24	24	24
Peep hole cover assemble	no.	18000	18000	18000
Degassing gap cleaning of flue wall	no.	1120	1120	1120
Straightening of flue wall	no.	2400	2400	2400
FTP hopper cleaning	no	8	8	8
FTP slanting duct cleaning	no	8	8	8
Furnace and underground cleaning	no	8	8	8

End headwall repairing	no.	48	48	48
Burner stand repairing	no.	600	600	600
Manual fluewall cleaning	no.	600	600	600
Repairing of Thermocouple, ZPR, TPR drum	no.	600	600	600

**SCOPE OF WORK:-**

**Bake Oven Refractory maintenance:**

1. Section maintenance job includes the followings,
  - A. Vertical wedge brick expansion gap to be filled with ceramic fiber at both ends.
  - B. Cleaning of lumps in pit bottom to be done by jackhammer or chisel, hammer.
  - C. Bottom tiles joint to be filled with ceramic fiber & cracked tiles to be replaced at pit bottom
  - D. Coke cleaning to be done from expansion gap between flue wall & head wall and fiber to be replaced.
  - E. U plate maintenance
  - F. fluewall coke cleaning to be done
  - G. Head wall and flue wall castable block cracks and their expansion joints to be repaired.
  - H. Patching to be done with mortar/castable.
  - I. Flue wall top peep hole ring outer and inner to be filled with mortar/ castable.
  - J. Flue wall top cleaning.
  - K. Fluewall and top castable block joint patching and blanket filling to be done.
  - L. Wider degassing gap filling with castable, mortar, blanket.
  - M. Cleaning of coke from X3,X4 bricks at pit bottom.(Cleaning coke from gulley).
  - N. Removal of blockages from fluewall cavity.
2. Peephole covers, thermocouple drum, ZPR drum, TPR drum to be repaired completely.
3. Flue wall straightening to be done by the straightening machine & Cleaning by cleaning machine
4. Pit dimensions to be measured
5. Any other repairing job required for process/improvement

6. Cross over checking and maintenance to be done as per the schedule
7. Following shutdown activities to be performed as per the schedule,
  - A. Cleaning of FTP slanting duct and other duct, furnace duct & FTP hopper.
8. Degassing gap cleaning, free of coke
9. Casting of top block with the help of mixer. Channel under party's scope
10. Burner stand repairing, including casting, anchor welding, parts fixing, welding job, only spare will be provided by BALCO.
11. Manual cleaning of sticky hard coke throughout (Top, middle, bottom) the fluewall.
12. Other activities like Side wall top repairing & Head wall top repairing, headwall top casting end headwall repairing.
13. Repairing of Peephole cover ,TPR, ZPR, thermocouple drum ,fixing of insulation, SS plate ,bolt, nut and modification. Spare parts under party's scope.

The following job should be executed outside plant

1. Casting of castable top block including channel.
2. Peephole cover assemble .
3. Repairing of peephole cover ,thermocouple, ZPR, TPR drum
4. Repairing of Burner
5. Repairing of Headwall top crown

5S, AO, VSAP, safety standard, SAP, Quality Circle to be maintained as per the Balco standards/guidelines.

All the spares & waste materials have to be kept at the designated place & cleaned the work area after the job.

Dispose all the scrap in the plant scrap yard twice in week.

Disposal of scrap brick on daily basis.

Handover the section to operation within the time limit.

All section maintenance should be done from bottom completely. Cooling of section under party's scope.

**Rodding furnace maintenance:**

1. Refractory Maintenance of Rodding
2. Furnace breaking & Relining work.

3. Ladle Breaking & Relining work.
4. Daily 4 Manpower Required for Rodding refractory maintenance activity.
5. Coil coating breaking and relining of furnace.
6. If any property damage during maintenance of furnace or ladle then penalty to imposed to contractor.
7. Any maintenance platform or Aluminium ladder under the contractor scope

For Rodding shop

Jack hammer required for breaking of ladle which is under the contractor scope.

All tools and tackles like rope, tagari, karni, breaking and relining tools of furnace is the under the contractor scope

All tools and tackles should be standard.

Rodding furnace replacement to be completed within 3 working shift (including breaking & lining) and also 3 manpower required per shift during relining of furnace. Lining cost of one furnace will be penalized if not completed within 3 working shift.

Ladle relining to be completed within 2 working shift (including breaking & lining). Lining cost of one ladle will be penalized if not completed within 3 working shift.

Balaclava, apron, leggard, face shield etc. all PPE'S the under the contractor scope.

All manpower will be for maintenance of all Bake oven & Rodding plant. There would not be any define manpower w.r.t location & Job.

**Following Specific clauses to be added:-**

1. For any safety or misconduct / administrative failure, action will be taken as per Consequence management / balco guidelines.
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2. Contractor has to ensure EOM distribution every month to 1 contractor employee. EOM Function to be organized before 10th of every month. Noncompliance would had to penalty.
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3. Any particular job need to handover within the time line, any noncompliance leads to penalty.
4. Any damage of any tools, tackles, machinery due mishandling leads to penalty.
5. Any non-compliance w.r.t quality of maintenance and repairing leads to penalty.

Maintenance of cleaning machine, straightening machine, Refractory maintenance platform, Light assembly, Welding, cutting machine, mixer machine, cooling fan under party's scope.

Supervisors should be skilled to operate Auxiliary hoist of WMI and FTA crane, Fluewall cleaning by cleaning machine.

All the tools, tackles, Safety equipment's, lights and machinery should be in party's scope.

Any fabrication job for improvement and demand of job should be in Party's scope.

Job will be as per schedule given by engineer in charge.

Job will be done as per the SOP, HIRADEC, Risk Assessment and check sheet.

**PPE MATRIX for Bake Oven & Rodding:-**

Safety Items/ PPEs	Frequency
Safety Helmet	1 year
Helmet (Inner Head Band)	Half yearly
Gloves	Weekly
Ear Plugs	Weekly
Goggles	Monthly
Heat resistance Safety Shoes	Half yearly
Dust Mask	Half yearly
Uniform	Yearly

Note – PPE distribution frequency mention is a change compulsion. In case, if it gets damage early, it is to be replaced immediately.

-PME of all workers to be done in every 6 months and form 21 to be submitted.

-PPE Brand for

Shoes - Udyogi, Midas, Bata or Favorite.

Helmet – HDPE material (Udyogi, Karam, kamal)

Dust Msk – Vinus, honey well

Goggles - (Udyog, Karam , saviour)

Gloves – Midas/Atlas/ solesafe

Other PPE brand would as per the IR recommendation

**Manpower Details(Should include the following):-**

Category	Current Numbers	Reduction/Addition Planned	Proposed Number
Unskilled	13	0	13
Semi-Skilled	9	0	9
Skilled	5	0	5
Highly Skilled	No	Nil	Nil
Engineer	No	Nil	Nil
Supervisors	3	0	3
Site In charge	0	0	0

All manpower will be for maintenance of all Bake oven. There would not be any define manpower w.r.t location & Job.

All deployment will be 8 hrs shifts in all jobs.

**Consumable Details:-**

S1 No.	Name of Consumable	Brand	Specification	Availability of Tools	UOM
1	Ladder	NA	6m height, 4m height	24	No
2	Sling	NA	5m length & 2MT	6	No
3	Shovel	NA	NA	12	No
4	Hand wire brush	NA	NA	12	No
5	Broom	NA	NA	20	No
6	Plastic Pan	NA	NA	10	No
7	Electric Bulb	NA	24 V	20	No
8	Hacksaw	NA	NA	4	No
9	Rope	NA	25 mm PP rope	80	M
10	Crowbar	NA	NA	10	No
11	Steel bucket	NA	NA	10	No
12	Hammer	NA	NA	10	No
13	Shim cutter	NA	NA	2	No
14	Chisel with handle	NA	NA	8	No
15	Measuring tape	NA	10m	2	No
16	Trowel	NA	NA	40	No
17	Measuring tape	NA	5M	2	No

18	Rope	NA	14mm Kara mental	100	M
19	Nail	NA	2 inch	0	KG
20	File	NA	NA	2	No
21	Carpenter Hammer	NA	NA	8	No
22	Water level, Spirit Level	NA	NA	2	No
23	Fall Arrester	NA	NA	20	No
24	Vibrator Needle	NA	NA	4	No
25	D-Cycle	NA	1t,5t	50	No
26	Web Sling	NA	6t 6mtr	8	No
27	Web Sling	NA	4t 4mtr	6	No
28	Chain Sling	NA	12T, 5T	20	No
29	Indication rotating light	NA	230V AC	12	No
30	Portable Rechargeable flood light LED Halogen	NA	230V AC, 100WATT	10	No
31	Cable	NA	3 core ,1.5 mm <sup>2</sup>	As per requirement	Mtr
32	Cable	NA	4 core, 4mm <sup>2</sup>	As per requirement	Mtr
33	Socket	NA	63 AMP	As per requirement	No
34	Socket	NA	32 AMP	As per requirement	No

**Machinery:-**

S.No.	Name of machine	Specification and Quantity
1	Pan Mixer Casting Machine	1T capacity
2	Hand Mixer	100 kg Capacity , 3 machine
3	Vibrator Machine	Needle Size: Dia60mm Flexible Shaft: 6m length Vibrations; 1200/min
4	Welding machine	Power: 2 H.P. Single Ph Motor 2 portable machine
5	Cutting set	1 including LPG and Gas cylinder
6	Grinding Machine	2
7	Pit cooling assembly	4
8	Hand Drill Machine	2 portable