03.00 BRIEF SYSTEM DESCRIPTION

03.01 DESCRIPTION OF EXISTING COAL HANDLING PLANT

03.01.01 Coal Preparation Plant No.1

i) Rotary wagon tippler unloads incoming coal from WT#1 and 2 each having capacity of 800 tph and receives in two conveyor stream Y9-68 & Y9-69. Both the wagon tipplers are provided with electric pusher car on the inhaul side. The empty wagons are released over a gradient.

ii) Coal from both the streams is fed, through a series of belt conveyors to the CPP-1 coal yard. One stream has toothed roller crusher while other stream has no crusher. Each of the streams has a capacity of 800 tph.

iii) CPP-1 storage yard No. 1 has a storage capacity of 180,000 t.

iv) Out of the three Nos. of gantry cranes in coal storage yard No.1 (i.e. CPP-1) only two nos. are existing at present which are planned to be phased out in future.

v) Reclaimed coal from the storage yard is fed to storage cum blending bunker (15nos) in two rows via. Conveyor series of Y5-Y6. Coal is withdrawn from silos and conveyed to coal tower No. 1, 2 and 4 via junction house J3, J4, J5 and J6. (Presently battery no 5&6 are under rebuilding. After replacement of coal gallery Y6-38, CHP will feed coal to CT-3 also).

vi) CHP has 4 nos. of hammer crusher of capacity 250 tph and two nos. of 200 tph.

03.01.02 Coal Preparation Plant No.2

i) Incoming coal is unloaded by rotary wagon tippler No. WT# 3 on conveyor no. Y9-87, Y9-88, Y9-90, Y9-91(and finally stacked through stacker-cum-reclaimer I & II through yard conveyors Y9-94 & 95). Wagon tippler is provided with Electric Pusher Car on the inhaul side. The empty wagons are released over a gradient. Under rail hoppers are provided for manual unloading of coal from sick wagon.

ii) Coal from the conveyor stream like Y9-87, Y9-88, Y9-90, Y9-91 etc. are fed to the series of belt conveyor by passing the preliminary crusher to the coal storage yard No.2 (CPP-2). The single line conveyor capacity is 800 tph upto the storage yard.
iii) Coal storage yard No.2 (CPP-2 existing) have storage capacity of 120,000 t.

iv) Provision of direct despatch of coal to the storage cum blending bunkers by passing the storage yard has been kept. The conveyor stream capacity from the storage yard to the top of the storage cum blending bunkers is 800 tph.

v) Coal is withdrawn from 14 nos silos in two rows- 7 nos in each row according to predetermined blend ratio in two streams and fed to the final crushing station No.2.

vi) Four reversible hammer crushers of 300T/h have been provided for final crushing in crushing station No.2.

vii) From final crushing station No.2, crushed coal blend is despatched to junction No. 3F and finally to coal towers No. 5 and 6 and coal tower no 4 in case of constraint in coal supply of CHP.

viii) Also new conveyors Y9-99A and Y9-99B have been commissioned in the year 2002 to have the provision for taking coal from CPP-2 coal yard to conveyor Y9-80 and Y9-81, so that coal can be fed to silos of batteries 1 to 8.

ix) Blending is done through 14 nos of Belt weigh feeders/ Automatic Proportioning Device (APDs).

03.02 DESCRIPTION OF PROPOSED COAL HANDLING PLANT FOR COAL TOWER NO.- 7 OF COB#11 COMPLEX

1. General

In order to meet the enhanced required of coal for coke making, following additions, augmentation & modification to the existing coal handling plant is proposed:

- Addition of 5 nos. of RCC mixing bins (Silos), each of 500t storage in 3rd row of silos parallel to existing two rows of silos.

- Installation of 2 nos. additional reversible hammer mills (designated as hammer mill 7&8), each of capacity 300t/h in existing row of hammer mills after extending the existing final crushing station suitably.

- Replacement of existing hammer mills no. 5 & 6 by new hammer mills of 300 t/h capacity each, along with 630 KW slip ring reversible electric motors. Room for resistance banks & control panels for hammer mill no.
5, 6, 7 & 8 shall be provided in the new portion of the final crushing station.

- Upgrading & modification of existing collecting conveyors Y7-12 & Y7-13 to 1000 t/hr. rated capacity in the existing location with minimum shutdown.

- Connecting conveyor stream, connecting new coal tower no.-7 with existing coal handling plant.

- Connecting conveyor for new silos & new crushers to the existing Coal Handling Plant.

- 4 nos. split gates for coal handling plant on conveyors Y7-36, Y11-130, Y7-13 and Y11-134.

Flow diagram drawing no. MEC/S/9101/11/17/55/01/064.12/R0 (Sheet 1 of 2 & Sheet 2 of 2) and layout drawing no. MEC/S/9101/11/17/55/01/064.13/R0 showing the tentative location of proposed unit are enclosed for reference.

New conveyor Y11-125 will take feed from existing conveyor Y7-49 in the existing junction house 2C and feed conveyor Y11-126 with a traveling tripper to feed the individual silos (5 nos. new). Each silo will be of 500 tonne effective storage capacity. The vertical portion at a height of 1m and conical portion (slope 60°) shall be lined with 409M 8mm thick SS liner plate.

Each silo will be provided with identical Belt Weigh Feeder with PLC being provided in existing SILOS.

Silos shall be provided with pneumatic blow down facility. Bunker discharge mouth level shall be +10.2m and shall have floor at +6.2m level for laying conveyor Y11-127.

Belt weigh feeders will feed the coal to proposed conveyor Y11-127 and through conveyor Y11-128, the coal will be fed to existing conveyor Y7-35, which also carries coal from existing 2nd row of similar bunkers. The rated capacity of conveyor Y7-35 shall be 600t/hr. Conveyor Y7-35 will feed to modified conveyor Y7-36. The modification & strengthening of these conveyors are in the scope of contractor. Apart from replacing existing one way chute with split gate, conveyor Y7-36 shall be modified for accommodating split gate and upgraded to 600 tph.

Modified conveyor Y7-36 will feed the coal to existing conveyor Y7-51 & new conveyor Y11-129 through a bifurcated chute & split gate. Coal
from conveyor Y11-129 will be fed to the new hammer mill nos. 7 & 8 through conveyors Y11-130 & bifurcated chute with split gate.

The existing final crushing building shall be extended suitably to accommodate new hammer mills (No. 7 & 8) and related items & electrics. The building shall be of RCC upto top floor with structural roofing. Each hammer mill shall have independent foundation.

In order to collect crushed product from the new hammer mills, the existing conveyor Y7-12 will be extended at the tail end adequately & it’s capacity shall be upgraded to 1000 t/h rated capacity. The existing conveyor Y7-13 will also be upgraded to 1000 t/h rated capacity and will be provided with a bifurcated chute with split gate to enable feeding of existing conveyors Y14 & Y18. These two conveyors shall have stand-by drives. The upgraded conveyor shall be provided with new drive (1W+1S), belt, 35 degree carrying and 10 degree return idlers. The drives of upgraded conveyor Y7-12 and Y7-13 shall be of 1 step higher rating. The belting shall be 1400mm wide and N/N grade of 1250 kN/m rating minimum.

The proposed stream connecting the new Coal Tower no.-7, comprises of new belt conveyor nos. Y11-131, Y11-132, Y11-133, Y11-134 & reversible shuttle conveyors Y11-135 & Y11-136. the existing chute feeding to the existing conveyor no. Y-15 will be replaced by a bifurcated chute fitted with a 2 position motorised diverter gate to feed the new conveyor no. Y11-131. The coal will be conveyed to the new coal tower no.-7 via new conveyors Y11-131, Y11-132 & Y11-133 through new junction house no. 11A & 11B. The stream rated capacity shall be 600 t/h.

Reversible shuttle conveyors Y11-135 & 136 shall be provided at the top of the coal tower no.-7. These shuttle conveyors shall be fed by conveyor Y11-134 through a split diverter gate. Each of the shuttle conveyors will be of 400 t/h capacity and shall be mounted on parallel tracks and can be placed on different compartments of the coal tower to uniformly distribute the coal charge in the coal tower. For this purpose suitable nos. of limit switches shall be provided.

Additionally, the coal tower shall be provided with 18 nos. of level monitors for giving continuous measurement of level of coal in the coal tower.

A belt weigh scale shall be provided on the new conveyor no. Y11-132 to indicate the flow rate & total quantity of coal fed to the coal tower.
The new equipment & conveyors shall be interlocked & controlled with the existing coal handling plant from the existing control room.

The existing system of LSTB shall be extended to all the new units up to the top of new Coal Tower no.-7 for communication.

Facilities for dust suppression, fire fighting facilities and proper illumination of galleries and junction house is included in the scope of work.

The conveyor drives of 30 KW and above shall be provided with fluid coupling. All coupling bolts shall be replaceable without shifting of drive components. Chutes shall be lined with 8mm thick 409M SS liners. Each discharge legs of the chutes shall be provided with chute jam indicators.

Flap/ Diverter gates shall be lined with 8mm thick SS 409M liner plates.

Each junction house shall be provided with Electric hoist. The Capacities of EOT Cranes / Electric Hoists for maintenance shall be at least 1.2 times the heaviest load – or – the Capacity & approximate height of some Junction houses are indicated as below:

<table>
<thead>
<tr>
<th>Silo top</th>
<th>3t capacity</th>
<th>37m lift</th>
<th>1no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jn. House 11E</td>
<td>2t capacity</td>
<td>24m lift</td>
<td>1 no.</td>
</tr>
<tr>
<td>Final crushing station</td>
<td>10t capacity</td>
<td>10m lift</td>
<td>2 nos.</td>
</tr>
<tr>
<td>New junction house no.11A-2t capacity</td>
<td>30m lift</td>
<td>1no.</td>
<td></td>
</tr>
<tr>
<td>New junction house no.11B -3t capacity</td>
<td>45m lift</td>
<td>1no.</td>
<td></td>
</tr>
<tr>
<td>Top of coal tower no.7- 3t capacity</td>
<td>50m lift</td>
<td>1no.</td>
<td></td>
</tr>
</tbody>
</table>

03.03 DESCRIPTION OF PROPOSED COKE SORTING PLANT FOR COB#11

(i) Design Limits

Following design limits are to be considered for the proposed Coke Sorting Plant (CSP-4)

a) From & including surge hopper in the junction house no.1. Junction house no.1 is included in the scope of the contractor.
b) Upto & including junction house no. Z17 and upto & including discharge chutes of conveyors K11-21 & K11-22.
c) Including upgradation of existing conveyor no. KD-1, modification of gallery of KD-1 is included in the scope of the Contractor.
d) For coke breeze from the proposed conveyor KA-3 to the coke breeze bunkers & C3A-C2 with two way Diverter gate at Junction house JH-C3A. Nut coke from CSP coke breeze bunkers shall be disposed off by
wagons and conveyor C3A-C2, for any exigency 100% disposal facilities by wagon will be provided.

e) The discharge chute with pneumatically operated sector gate for coke car track from surge hopper in JH – 1 is in the scope of contractor.
f) 3 nos. bin vibrators shall be considered for each bunker; hence, total no. of vibrators for coke sorting plant shall be 6.

(ii) **Brief Description**

A coke sorting plant of 300t/h capacity has been envisaged for the plant. The coke sorting plant will sort out the coke into three fractions i.e. 30-60 mm, 60-80mm & (-) 30mm. The coke will pass through a series of screens and coke cutters for this purpose. Flow diagram, layout, sections etc. are shown in drgs. MEC/S/9101/11/55/01/064.01 to 064.08.

The (-) 30mm fraction will be sent and stored in the 150t capacity RCC bunkers, after screening at 15mm. The other coke fractions will be sent through conveyors to Blast furnace stock house. In addition to the above, an open mechanized emergency coke storage yard of about 2500t capacity will be provided. Required conveyor streams, traveling strippers will be provided for storage of coke. Coke will be reclaimed by an underground reclaiming conveyor as shown in the drawings.

Additionally a 1400mm wide 200 t/h conveyor streams shall be provided to carry BF coke from existing CSP-1 and feed to two numbers of 100t capacity RCC surge hoppers provided over conveyors K11-13 & K11-14. Each surge hopper shall be provided with level meters & belt weigh feeders to properly proportion the coke coming from CSP-1 & the new CDCP plant.

To take tapping from existing conveyor KD-1 a fixed tripper with a bifurcated gate shall be provided. One leg of the chute will feed coke to the new conveyor KA-1 of 1400mm wide & the other leg will feed the conveyor KD-1. A split gate shall be provided to enable feeding of coke to both the conveyors simultaneously. The walkway of conveyor KD-1 shall be suitably modified in the vicinity of the fixed tripper to facilitate movement of plant personnel.

All the buildings, junction houses, conveyor galleries will have adequate facilities like ventilation, illumination, hoisting and handling equipment, dust suppression facilities, etc. wherever necessary. All buildings shall be provided with LSTB system for communication.

Further, a dust extraction system shall be provided in the proposed Coke Dedusting Unit (CDU). A brief description of the same is given below:
(iii) **Dust Extraction System with Air Blasting Unit**

a) **Brief Description**

A dust extraction system with an air-blasting unit is to be provided in the coke-dedusting unit (CDU).

The system shall comprise dust extraction unit and air blasting unit. The dust extraction unit shall comprise suction hoods on the coke dedusting chute, ducting network, electrically operated dampers, bag filter unit, centrifugal fans, stack, electrics & control.

Bag filter unit shall consist of distribution chamber, filtering chamber with filter bags & fitting for the bags, outlet chamber, dust collection hopper with rotary air lock valves & screw conveyor, dust storage cum disposal hopper with rack & pinion gate and disposal chute, structural stair case and platform, timers etc. and one multicleone and one spark arrestor in the ducting network at the inlet side of distribution chamber of bag filter unit. (these two equipment are required to collect the hot/ glowing coke particles thereby preventing them to enter into bag filter). Two suction ducts of the ducting network shall be provided with electrically operated dampers & flanges for connecting them with the coke deducting unit (CDU) chambers (2 nos.) separately.

The air blasting unit shall consist of air intake louver, transition piece, centrifugal blasting fan, main duct and two numbers of branch ducts with electrically operated dampers & flanges.

b) **Arrangements and the Components:**

The air intake louver of air blasting unit shall be installed in the opening of wall exposed to ambient. This shall be connected to suction side of blasting fan through transition piece. The delivery side of this fan shall be connected to ducting network. The branch ducts (2 nos.) shall be connected to both the coke deducting unit (CDU) chambers through the flanges separately. There shall be two air stream/ paths, one working & one standby, from air blasting unit to dust extraction unit, through CDU chamber. The material flow in the CDU chambers conceptually shall be perpendicular to the airflow of air stream from blasting unit to dust extraction unit. Electrically operated dampers provided in the air stream at the both sides of CDU chamber shall be interlocked with the operation of CDU chambers; this is required to isolate the stand by CDU from air stream and to take the working CDU into air stream of our above system.
c) **Functional Description**

While running the CDU, air blasting unit fan shall suck ambient air through air intake louver & transition piece and blast/supply the air into the CDU through the ducting network.

The working of the dust extraction unit shall suck the air dust laden air including blasting air shall be sucked from CDU and hot/unburnt glowing coke particles shall be collected in multiclone and spark arrestor placed in the ducting network at the suction side of bag filter. The dust disposal from bag filter, multiclone & spark arrestor shall be through discharge into a central pneumatic system (through dust storage hopper). However, central pneumatic system shall not be in the scope of Contractor.

(iv) **Major Facilities**

The major scope of work of Coke Sorting Plant comprising of Coke crushing station, coke screening station, coke breeze bunkers, emergency coke storage yard, coke dedusting units, junction houses, traveling tripper bridge, galleries and associated mechanical, civil, structural, electrical works of COBP # 11 is given below:

1) 2 nos. grizzly screens (80mm), capacity 300 t/h.
2) Grizzly shall be of Manganese steel casting DISC and the underpass chute liners should be cast Basalt 110mm thick.
3) 2 nos. coke cutters (+80mm) capacity 180 tph.
4) 2 nos. vibrating screens, (30 mm) capacity 300 t/h. Screen wires should be 5 mm dia SS.
5) 2 nos. grizzly screens (60 mm), capacity 200 t/h. Grizzley specifications and chute liners shall be same as mentioned above.
6) Conveyor stream capacity 300/150 t/h.
7) 2 nos. variable speed belt weigh feeders 20t/h to 100 t/h.
8) Chain samplers – 2 nos., one each for different BF coke fractions.
9) Belt conveyors as per conveyor data sheets.

10) Belt weighers shall be provided on Coke Conveyors K11-11, K11-12, K11-15, K11-16 & conveyor K11-18.

11) Capacity up gradation of existing conveyor KD-1 to 400tph from 300tph.

12) Capacity of conveyor staying from conveyor KD-1 to the CSP-4 shall be 300t/h.

13) All chutes should be box design to avoid direct fall of Coke on Chute liners.

14) Only Cast Basalt/ Ceramic liners of 110 mm thk are to be used in Coke Transfer Chutes.

15) DE system shall be provided for dust extraction at all transfer points.

16) Control room & maintenance room shall be provided in coke screening station.

17) Automation & control facilities shall be interfaced with coke oven battery operation.

18) The extension of existing conveyor stream comprising conveyors KA-2/KA-3 to the new breeze bunkers of CSP-4 for onward conveyance to SP-3.

19) Wagon loading shall be provided for BF coke in the coke screening station of CSP-4.

20) Shift in-charge & supervisor room shall be air condition.

21) Maintenance post with Air Conditioned Supervisors room along with shift in changes room and toilet block is to be provided in the Coke Screening Station.

22) Handling & Hoisting facilities: All Junction houses shall be equipped with suitable handling & hoisting facilities. Junction houses below 6m height shall have suitable capacity (2t min.) manual hoist and more than 6m height shall have electric hoists. Under slung & EOT cranes as required in CS and other handling facilities as specified in system description shall be provided.

23) 1 no. mobile belt coiler / decoiler type belt changing device and 2 nos. hot vulcanizing unit suitable for 1600 mm belt width. Contractor shall also to provide guide rollers at required locations for coiling / decoiling of belt near each junction house / take up unit.
(v) **Other Features**

In addition to the above, following is to be provided in this package by the Contractor.

1) The capacity of the belt weighers shall be 1.2 times the rated capacity of the respective conveyors.

2) The two way diverter gates shall be of robust design and of wear resistant material for longer life.

3) Flap/ Diverter gate drives shall be of adequate rating to take care of dirty conditions of the chute’s interior.

4) Flap/ Diverter/ split gate, surge hoppers etc shall be lined with 10 mm thick ‘Hardox 500’ material with CSK bolting.

5) RCC bunkers/ under-ground hoppers shall be lined with 8mm thick SS-409M Stainless Steel.

6) Scraper/ breeze chutes should have a minimum inclination of 70 degree and should be made up 409M SS.

7) In case of bifurcated chutes, where steep angle scraper chute is not possible, the scraper shall be provided in the main chute with proper design to ensure easy accessibility for removal of scraper for maintenance purpose.

8) Suitable windows shall be provided in chutes & scraper chutes to enable proper cleaning of the chute’s interior.

9) The yard surface slope shall be such that drainage is outward.

10) Side sheeting & roofing shall be of suitable material and shall be properly fixed to ensure longer life in corrosive atmosphere.

11) Fiber glass roofing & sheeting shall be provided at suitable intervals for proper illumination in the galleries.

12) Each underground hopper in the stockyard shall be provided with manually operated sector gates.

13) Yard reclaim conveyor K11-10D shall be 1600mm wide with 35° troughing angle and without skirt board.

14) Discharge chutes shall be lined with 110mm thk. liners/ cast basalt liners.
15) Anti-corrosion painting shall be provided on all structures.

16) Silos shall be lined with 8mm thick SS-409M with SS steel coping at 1m high in vertical & complete in slope portion.

17) DE system shall be provided for dust extraction at all transfer points.

18) Grizzly screens discs shall be of high manganese cast steel.

19) All types of gear boxes shall be supplied with input shaft with matching gear wheel assly.

20) Control room & maintenance room shall be provided in coke screening station.

21) Automation & control facilities shall be interfaced with coke oven battery operation.

22) The control room shall be provided with package type AC.

23) Existing conveyor KD-1 shall be renovated with following features.
   a) Capacity : 400t/h
   b) Belt width : 1400m
   c) Troughing Angle : 35°
   d) To be provided with fixed tripper
   e) Drive to be changed accordingly.

   i) For disposal of coke breeze from CSP-1, the existing conveyor stream comprising conveyors KA-2/KA-3 shall be extended to the new breeze bunkers of CSP-4 for onward conveyance to SP-3. Nut coke from CSP coke breeze bunkers shall be disposed off by wagons and conveyor C3A-C2. For any exigency 100% disposal facility by wagon will be provided.

   ii) Nut coke from CSP-1 shall disposed off by wagons as per present practice.

   iii) Nut coke from CSP-4 bunkers shall also be disposed off by wagons/ road. Facility for the same shall be provided.

24) Wagon loading shall be provided for BF coke in the coke screening station of CSP-4.
25) Maintenance post with Air Conditioned Supervisors room along with shift in changes room and toilet block is to be provided in the Coke Screening Station.

Conveyor belt width, troughing angle and belt width will be properly selected to prevent coke spillage. Conveyor galleries, buildings will follow IPSS norms and will be provided with adequate maintenance facilities and space.

Coke crushing station, coke screening station, coke bunkers and junction house no. 1 & coke dedusting unit shall be of civil construction upto the top floor, above which it shall be of steel structure.

Other Junction Houses & travelling Tripper Bridge shall be of steel structure with RCC flooring.

Electric hoists/ manual hoist of suitable capacity & lift shall be provided in each junction house & buildings to cater to the maintenance needs. Electric hoists shall be provided wherever height of lift is more than 6 meters.
03.04 Brief System Description of Augmentation in Flux - Fuel Preparation and Plant return fines handling for SP III

The turnkey package of this CS also comprises of the following sub-systems:

- Up gradation / Addition of coke crushing and screening and grinding facilities
- Up gradation/ addition of Flux crushing & screening facilities in an integrated manner.
- Transportation of Fines from Blast Furnace nos.1 to 7 & BF # 8 to Existing Junction house JH-127
- Transportation of Coke Breeze from CSP#4 to Conveyor C102 in an integrated manner.

Brief descriptions of the various sub-systems are given below and are also reflected in the drawings enclosed. However the Contractor shall consider the contract drawings only as indicative and any changes for completeness and improvement shall be finalized during submission of basic engineering document for approval by the Contractor.

01 RECEIPT OF RAW MATERIAL

Presently iron ore fines and fluxes are being conveyed to SP-III from existing Ore Handling Plant (OHP) through two series of belt conveyors and coke from existing Coke Sorting Plant (CSP) by dump-cars unloaded in an underground hopper & through a series of belt conveyors. All the three conveyors pass through JH-111A. This system is adequate to feed both strands (existing & proposed) of Sinter Plant-III.

Sieve analysis of raw material input to fuel & flux crushing & Screening circuit
1. Lime Stone (received from Koteswar)

<table>
<thead>
<tr>
<th>Max</th>
<th>Min</th>
<th>-</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 75 mm</td>
<td></td>
<td></td>
<td>2.0%</td>
</tr>
<tr>
<td>- 75 mm to</td>
<td>+ 60 mm</td>
<td></td>
<td>15.0%</td>
</tr>
<tr>
<td>- 60 mm to</td>
<td>+ 50 mm</td>
<td></td>
<td>16.6%</td>
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<tr>
<td>- 50 mm to</td>
<td>+ 30 mm</td>
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<td>40.2%</td>
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<tr>
<td>- 30 mm to</td>
<td>+ 25 mm</td>
<td></td>
<td>9.2%</td>
</tr>
<tr>
<td>- 25 mm</td>
<td></td>
<td></td>
<td>17.0%</td>
</tr>
</tbody>
</table>

Moisture- 15%

2. Raw Dolomite

<table>
<thead>
<tr>
<th>Max</th>
<th>Min</th>
<th>-</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 60 mm</td>
<td></td>
<td></td>
<td>1.3%</td>
</tr>
<tr>
<td>- 60 mm to</td>
<td>+ 50 mm</td>
<td></td>
<td>7.3%</td>
</tr>
<tr>
<td>- 50 mm to</td>
<td>+ 20 mm</td>
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<td>44.9%</td>
</tr>
<tr>
<td>- 20 mm to</td>
<td>+ 10 mm</td>
<td></td>
<td>16.7%</td>
</tr>
<tr>
<td>- 10 mm to</td>
<td>+ 6 mm</td>
<td></td>
<td>14.3%</td>
</tr>
<tr>
<td>- 6 mm</td>
<td></td>
<td></td>
<td>15.5%</td>
</tr>
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</table>

Moisture- 15%

3. Coke Breeze

<table>
<thead>
<tr>
<th>Max</th>
<th>Min</th>
<th>-</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>+ 25 mm</td>
<td></td>
<td></td>
<td>4.3%</td>
</tr>
<tr>
<td>- 25 mm to</td>
<td>+ 15 mm</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>- 15 mm to</td>
<td>+ 10 mm</td>
<td></td>
<td>11.5%</td>
</tr>
<tr>
<td>- 10 mm to</td>
<td>+ 5 mm</td>
<td></td>
<td>15.3%</td>
</tr>
<tr>
<td>- 5 mm to</td>
<td>+ 3 mm</td>
<td></td>
<td>16.5%</td>
</tr>
<tr>
<td>- 3 mm</td>
<td></td>
<td></td>
<td>40.4%</td>
</tr>
</tbody>
</table>

Moisture- 10% (normally), 15% (in rainy season)

Tentative size distributions of raw material (sizes as required in this CS) are shown in Table: 05.01 below. Further, the product/output of crushed fuel & flux shall be in accordance with the sizes is also given below:

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Material</th>
<th>Size Distribution (mm)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Iron ore fines</td>
<td>- 8 mm</td>
<td>+8mm (5% max.)</td>
</tr>
<tr>
<td>2</td>
<td>Lime stone/Dolomite (Crush)</td>
<td>- 5mm</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3 mm</td>
<td>95% (Minimum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1 mm</td>
<td>70% (Minimum)</td>
</tr>
</tbody>
</table>
### ADDITIONS/ MODIFICATIONS AND UPGRADATION IN EXISTING RAW MATERIAL PREPARATION SYSTEM

#### 02.01 EXISTING FUEL crushing and screening facility

There is a provision of covered storage for coke breeze received from blast furnace adjacent to coke crushing and screening building. The coke breeze is reclaimed by front end loaders and conveyed to coke crushing and screening building through series of conveyors C101, C102, C103, C104, C105 and finally C106. The coke breeze gets crushed by 2 roll crusher to -10 mm from -25mm size and subsequently screened by Mogensen sizer. +3mm output from the sizer is conveyed to coke grinding building by conveyor C111 and discharged onto reversible conveyor C112. Conveyor C112 discharges into 2 nos. surge bins from where belt feeders extracts material and feeds to rod mill (2 nos.) where it gets crushed to -3mm. (-)3 mm size from crushing and screening building is directly conveyed and discharged onto conveyor C114 through conveyors C110 and C113, which in turn discharges to conveyor C115.

#### 02.02 Existing FLUX crushing and screening facility

Limestone and dolomite required for the existing machine of Sinter Plant III is drawn from bunkers of flux proportioning building and conveyed by conveyor 105 to surge bin of existing flux crushing building. The material is discharged onto reversible shuttle conveyor L106 from where it is
discharged onto bins. The material is withdrawn by vibratory feeder and fed to primary hammer mill (3 nos.) of 250tph capacity. From the hammer mills the crushed flux is conveyed by conveyors L109, L110 and L111 onto secondary hammer mills (3 nos.) These three conveyors carry crushed flux to flux screening building and discharge into surge bins(3 nos.). Material is withdrawn from each of the two openings by traveling vibro feeder (6nos.) and fed to flux screens (6 nos.) for screening -3mm size fraction. The under size (-3 mm) from each of the six screens is fed to a common conveyor L120 which conveys the material onward to storage and proportioning bin building. The oversize (+3mm) is fed to a common conveyor L115 and recycled back to flux crushing building for further crushing.

02.03 PROPOSED Fuel and Flux Crushing and Screening Facility

In order to cater to increased requirement of fuel and flux for the new sinter machine, following three facilities have been envisaged under this package which shall form part of scope of this Contract:

- Up gradation / Addition of coke crushing and screening facilities.
- Up gradation / Addition of Coke Grinding facilities
- Up gradation/Addition of Flux crushing & screening facilities.

The existing facilities also need to be modified/ extended so as to integrate the existing with proposed facilities.

02.03.a UP gradation / Addition of coke crushing and screening and grinding facilities

A similar facility for coke breeze crushing, screening & grinding with related facilities shall be added adjacent to the existing one.

As described earlier that the coke breeze is being received from the existing track hopper via belt conveyors C101, C102, C103, C104 to the coke storage yard. It is now proposed that Coke breeze & BF return fines
shall also be received by conveyor C-102 for further transportation to coke storage yard. Belt conveyor C-104 shall be suitably modified & extended and discharge onto new reversible conveyor RC 106. RC 106 shall be able to discharge either onto existing conveyor C106 or onto new conveyor C106A in a new Junction house CK-1. Conveyor C-106A shall carry the material to feed over a hopper of capacity 200m³ (effective volume) with suitable gate at proposed New Coke crushing house CK-2. A reversible belt conveyor RC-CK2 will receive the material from bunker and feed either to the two roll crusher or bypass the crusher and feed to conveyor C107A as shown in the flow diagram. The two roll crusher shall be of capacity 50 tph and shall receive -25mm (10-15% moisture) coke breeze, crush and discharge over conveyor C-107A. Conveyor C-107A shall further transfer Crushed/ bypassed uncrushed material to Junction house CK-3 and discharge over a Mogensen Sizer of capacity 50 tph for product size of (-3) mm. The oversize (+ 3 mm) from sizer shall be discharged onto conveyor C-111A which shall convey and discharge the material onto new conveyor C-112A in new coke grinding building. Conveyor C-112A shall discharge into either of two nos. surge bins of effective capacity ~100 m³ each from where material shall be withdrawn by Belt feeder and fed to rod mill. Sized material (-3mm) from rod mill shall be discharged onto existing conveyor C-114, which shall further convey the material to existing storage and proportioning bin building through existing conveyors C115, C115A and C115B.

It may be noted that input material of size -25mm and product material of size -3mm is the basic system requirement of the integrated fuel crushing and screening system. The facilities envisaged between input stage to output stage have been given in the CS. Crushing of coke at two roll crusher, screening at coke sizer and grinding at rod mill shall be decided by the contractor in an integrated manner to given the plant output of –3mm.
Up gradation/Addition of Flux crushing & screening facilities

An additional stream similar to the existing one consists of Primary & Secondary Hammer Mill with surge bin & vibro-feeders and related facilities shall be provided by extending flux crushing building. Further screens with surge bin & vibro feeders in screen building with feeding conveyor from crushing building to screen building shall be provided.

Limestone and dolomite required for the existing machine of Sinter Plant III is drawn from bunkers of flux proportioning building and conveyed by the conveyor L105 to surge bin of existing flux crushing building. It is proposed to extend the existing conveyor L 105 by nearly 7.3 m to new proposed extension of flux crushing building.

The existing reversible shuttle conveyor L-106 shall be replaced by new one of larger length so that it can feed existing three crushing series surge bins as well as a new crushing series surge bin (200 m$^3$ effective volume each). New series having a Primary hammer Mill shall receive the material from respective surge bin through vibro-feeder and after crushing it will discharge onto a new conveyor L111A. Conveyor L111A shall further feed the crushed material to secondary Hammer Mill. After crushing in secondary crushe, the material shall be conveyed to new surge bin in the screen building (100m$^3$ Effective volume) with the help of a new belt conveyor L114A. The surge bin of this screen building shall have two discharge points so as to feed the new two nos. Screens.

The undersized material (-3mm) shall be received by the existing conveyor L120. The tail end, horizontal gravity take up arrangement, electrics, control, etc. of belt conveyors L120 shall be suitably extended backward to receive the above material from Screens.
The over sized material (+3 mm) shall be recycled through existing conveyors L115, L116 & L117 to the Crushing building. The tail end, horizontal gravity take-up arrangement, electrics, control, etc. of belt conveyors L115 shall be suitably extended backward to receive the above material from Screens. Belt conveyor L117 shall further discharge the material onto the new reversible shuttle conveyor L118. The existing reversible shuttle conveyor L118 shall be replaced by new one of larger length so that it can feed existing three surge bins as well as a new surge bin (75m³ EV). The surge bins will then discharge the material over the same (as referred above) new secondary Hammer Mill with the help of Vibro-Feeder. The material shall be further crushed and fed to the screens as described above.


02.04 RE-ROUTING OF EXISTING SINTER FINES CONVEYORS (C-LINES).

The existing series C-line conveyor is feeding BF return fines from existing Blast furnaces to the sinter return fines (IPRF) conveyor F101 of SP-III at JH-127. It is now proposed to dispatch these return fines straight to the same conveyor with strengthening & modification of gallery. The same shall be executed by dismantling & re-routing of the existing C-line conveyors so as to install new CDCP unit in place of C-line Belt conveyor no. C3, and hence the existing C3, C4, C5 & C6 belt conveyors require relocation.

Dismantling of the existing belt conveyors C3, C4, C5 & C6, related galleries & junction houses no.-3, 4, 5 & 6 is included in the scope of the contractor. Junction house - C2 shall be suitably modified to re-install the
tail end of new conveyor-C3 from perpendicular direction as shown in General layout drg. No. MEC/S/9101/11/14/0/00/00/064.03/R0.

Belt conveyor no. C3 shall be re-routed and re-installed (two conveyors C3A-C1 & C3-C1) along the existing gallery of JH124 & 123A/B adjacent to railway tracks so as to feed the fines at relocated junction house -C3. Belt Conveyor C3A-C1 shall receive BF return fines at JH-C2 and discharge onto conveyor C3-C1 as well as conveyor C3A-C2 shall receive coke breeze from CSP#4 and discharge onto conveyor C3-C2 at Junction house JH-C3A. These two belt conveyors i.e. C3-C1 & C3-C2 together carry the material through common gallery and discharge onto belt conveyor C4-C1 & C4-C2 respectively. Belt conveyor C5-C1 (Sinter/ ore fines) and C5-C2 (Coke fines) shall receive the material from BF#8 Stock house and discharge over C6-C1 and C7-C1 respectively at JH-C5. Also Conveyor C4-C1 and C4-C2 shall discharge the material over conveyor C5-C1 & C5-C2 respectively at JH-C4. Conveyor gallery C5-C1 & C5-C2 shall cross over the existing gallery of conveyors between JH-120 & Emergency Sinter Storage Building.

Belt conveyor C6-C1 shall carry the Iron bearing fines (BF return) and discharge over conveyor J127-C1 at JH-C6 and in turn to F101 existing Belt conveyor at JH-127. Junction house JH-127 shall be suitably modified so as to accommodate drive and discharge end of belt conveyor J127-C1. Existing drive and discharge of belt conveyor C6 shall be dismantled before installation of new conveyor J127-C1. Belt conveyor C7-C1 shall discharge the material over belt conveyor C102A at Junction house JH-C7 and in turn feed to existing belt conveyor C102 at pent house. As a storage capacity of 12 hrs. has been envisaged in BF#8 return coke bunker in BF#8 itself, no separate storage/ surge bin has been considered in C102A to C102 conveyor transfer points. Suitable gallery structure to place drive/ discharge end of conveyor belt C102A, de-dusting system, skirt board & impact idlers
on existing conveyor C-102 shall be provided to receive coke breeze. The pent house roof shall be locally dismantled to enable erection of transfer house and discharge onto conveyor C-102. However, after installation of new Junction house over pent house, the roof & structure of pent house may again be utilized to cover remaining part of pent house.

Two dedicated routes shall be provided to transport Iron bearing material (BF return fines) till existing belt conveyor F101 of SP-III and coke fines from coke sorting plant & BF#8 stock house till existing belt conveyor C102 of SP-III. A common gallery may be considered for all parallel conveyors.

Floors of Conveyor galleries of all return line conveyors from junction house C2 to new junction house J127 & pent house of C102 shall be of chequered plate construction (Minimum 8mm O/P) with semi circular hood over conveyor.

Rerouting of these conveyor series shall be so meticulously planned that minimum shut down is required in the existing plant. Design, supply, erection, commissioning and performance guarantee test of the Rerouted conveyors are under the scope of the Contractor. Existing equipments/ components of dismantled (by the Contractor) conveyor/gallery/ junction houses shall not be re-used.

All Proposed junction houses shall have Electric hoist. The capacity & lift may be followed as per CS. Junction houses (where these facilities are not considered) of below 6m height shall have suitable capacity (2t min.) manual hoist and more than 6m height shall have at least 5t cap. Electric hoists. Under slung & EOT cranes as specified in CS and other handling facilities as specified in system description shall be provided.
**LIST OF DRAWINGS**

List of drawings enclosed with this tender is furnished below:

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