



TENUGHAT VIDYUT NIGAM LIMITED
2x210 MW Tenughat Thermal Power Station
Jharkhand
Dry Fly Ash Collection & Disposal System



04.00 DETAILED SCOPE OF WORK

04.01 The scope of work of the bidder covers design, engineering, manufacture, supply, assembly, testing at manufacturer's works, inspection, packing, forwarding to site, unloading and storage, preservation, handling at site, insurance, complete installation including all civil works, building steel structures, technological steel structures, modifications in the existing system, Integration / interconnection with all the existing system / utilities, dismantling and reinstallation as may be required, pre-commissioning, testing, commissioning and performance guarantee testing and handing over the ash handling system with all its auxiliaries & accessories complete in all respect.

The scope of work under this section of the specification is described herein under. All the items, though not specifically mentioned but needed to make the system complete and reliable for trouble free & safe operation at guaranteed parameters, shall also be considered included, unless otherwise specifically excluded within the scope of work and services of the Tenderer.

04.02 **Fly Ash collection and conveying from Economiser, APH, ESP & stack hopper to Main Silo (Unit # I & II)**

1. Seventy eight (78) (approx.) nos. Ash Transporter vessels complete with all accessories and fittings for Pressure pneumatic conveying of fly ash for both the units (56 nos. for ESP hoppers, 8 nos. for economizer hoppers, 12 nos. for air pre heater hoppers and 2 nos. for stack hoppers. However, bidder may visit the site to find out the exact requirement of ash transporter vessels.
2. Adequate numbers of adopters including expansion joint, down comer, isolation valve, fluidising pads etc. below the fly ash hoppers as required. Supply of counter flanges for adopters shall be in the scope of bidder.
3. Entire ash piping for Pressure pneumatic ash conveying system complete with valves, fittings, specialities and supports, etc from the fly ash hoppers up to fly ash silos. Suitable interconnection with valves, supports, fittings, etc. will be provided for easy changeover of the fly ash lines.



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4. One lot of compressed air (Conveying air, Fluidizing air and Instrument air, etc) piping complete in all respect with valves, fittings, specialities, hangers and supports for both the units. The scope of supply will generally be as shown on the enclosed Flow Scheme and as necessary for satisfactory operation of the system.

Intermediate Silo System

5. Two (2) nos. intermediate silo(s) (One for each unit) of RCC constructions each of gross capacity of 120 m³. Each intermediate silo shall be complete with RCC supports, accessories and fittings such as vent air fan, bag filter, level sensing device, vacuum / pressure relief valve, fluidising pads, manhole, platforms, air operated isolation gates at silo bottom, etc.
6. Three (3) nos. (2W+1S) air blowers of rotary positive displacement type for intermediate silos. The air blowers shall be supplied with drive motors and other accessories and auxiliaries. The air blowers shall be located near the intermediate silos. Weather canopy shall be provided for the blowers.
7. Three (3) nos. (2W+1S) electric air heaters complete with all auxiliaries and accessories, to be located on the common header to supply hot fluidizing air at about 150⁰C to the intermediate silos at required pressure. The electric heaters shall also be located near intermediate silos. Hot air line shall be properly insulated.
8. Two (2) nos. transporter vessels for each intermediate silo (total 4 nos.) complete with all accessories and fitting for dense phase pneumatic conveying of fly ash from intermediate silo to main silo. Each transporter vessel shall be provided with manual isolation valve (knife gate), remote operated isolation valve, expansion joints, fluidising arrangement, etc.



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Main Silo System

9. Two (2) nos. main silo of RCC construction each of min 1500 m³ gross holding capacity of fly ash with RCC supports, accessories and fittings such as vent fans, bag filters, level sensing device, vacuum / pressure relief valves, fluidising pads, manholes, platforms, etc. to ensure dumping of dry fly ash on road trucks / dumpers without any dust nuisance. Vent fans & bag filters will be 2x100% for each silo.
10. Three (3) nos. (2W+1S) air blowers of adequate capacity rotary positive displacement type along with electric air heater (2W+1S) common for both main silos to supply hot fluidising air at about 150⁰C to main silos at required pressure. The air blowers will be supplied with drive motors and other accessories and auxiliaries. The air blowers will be located in the utility building near the main silo. The hot air pipelines will be insulated properly.

Each Main silo will consist the following

- a. One for Dry ash unloading onto closed trucks / dumpers. This outlet will be provided with isolation valve, control valve, air slide, telescopic chute etc. as required to discharge dry ash on to closed truck.
- b. One for moist ash unloading onto open trucks / dumpers. This outlet will be provided with isolation valve, control valve, air slide, ash conditioner etc. as required to discharge moist ash on open truck.
- c. One outlet with manual gate valve shall be provided so that this can be used in future for making ash slurry from silo for transporting to existing ash pond.
- d. One outlet with manual gate valve shall be provided for future use.



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Compressed Air System

11. Three (3) nos. of centrifugal air compressors (2W+1SB) of adequate capacity and pressure with electric drive motors, common for all the units to supply air for conveying fly ash from transporter vessels to main silos. The bidders, however, may also offer positive displacement air blowers in place of centrifugal compressor in case the same meet the dense phase ash conveying requirement as stipulated in the specification. These compressors shall also meet instrument air and bag filter requirement for the new dry fly ash handling system. The sets shall be complete with suction air filter cum silencer, blow off valves, intercooler, after cooler, moisture separator, base frame, coupling, controls etc. The compressors shall conform to the description given in the specification. Conveying air compressors shall be installed in a separate building.
12. Three (3) nos. (2W+1S) refrigerant type air driers of adequate capacity to supply of moisture free air (instrument air) for transportation of ash & control & instrumentation. Air driers shall be complete with all its accessories, auxiliaries and controls. The outlet dry air pressure dew point shall be as low as possible but in no case it shall be more than +3 deg.C. These driers shall be installed in the compressor house.
13. Two (2) nos. air receivers (one for each unit) of adequate capacity complete with all accessories and auxiliaries. These air receivers shall be installed near the compressed air building and shall meet the requirement of instrument air and air requirement of bag filter cleaning.
14. One (1) no. air receiver, each of adequate capacity complete with all accessories and auxiliaries for main silos and intermediate silos. One each air receiver shall be installed near the main silos and intermediate silos and shall meet the requirement of instrument air and air requirement of bag filter cleaning of main silos.
15. **Cooling water system :**

For cooling of plant and equipment, there shall be a separate



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Cooling Water Re-circulation System with pumps, cooling towers and piping network.

The cooling water system to be provided shall have the capacity to supply cooling water to all the plant & equipment (including stand-by equipment) at a time.

One no. cooling tower of adequate capacity with required numbers of cells (working & stand by), cooling water pumps (2W+1SB) with drive motors, piping, valves, instruments, etc. in line with the technical specification covers in Section – F, Vol. IIB of this Specification.

Piping

16. Connections from the existing arrangement shall be in such a way that working of the existing ash handling system shall not be disturbed. Further, care shall be taken to ensure that no ash deposition is allowed near the tapping points.
17. Entire piping for dense phase pneumatic ash conveying system complete with valves, fittings, supports, etc from the transporter vessels to intermediate silos, intermediate silos to main silos. Suitable interconnection shall be provided for easy changeover of the fly ash pipelines.
18. One lot of compressed air (Conveying air, Fluidizing air and Instrument air) piping complete in all respect with valves, fittings, specialities, hangers and supports for all the units. The scope of supply shall generally be as shown on the enclosed flow scheme and as necessary for satisfactory operation of the system.
19. One lot of water piping for cooling / sealing water to compressors, conditioning water to ash conditioners complete with valves, fittings, supports, instruments and other accessories.

04.03 Valves & Specialities, Etc.

One lot of different types of valves and specialities for instrument & service air, conveying air, fluidizing air and other piping for the



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complete systems. The scope of supply shall be generally as shown in the single line P&I diagram enclosed and as necessary for the satisfactory operation of the system.

04.04 Control & Instruments:

One lot of Control & Instruments for all the units. The scope of supply shall be generally as per the flow scheme enclosed and as necessary for the system including those required for control and interlock.

The technical requirements for the Control & Instruments have been detailed in the C & I Part (Section – A, Vol.II B).

04.05 Electrics

Complete electrics for dry fly ash handling system and all other items as required for the proper operation of the plant within the battery limits.

The technical requirements for the electrics have been detailed in the electrical part (Section – B, Vol. IIB) enclosed with this Specification.

04.06 Civil and Structural Work

1. Complete civil & structural work, fly ash RCC silos with RCC supports, piping supports, conveying air compressor house, canopies, MCC/switch gear and control room building, equipment foundation and all other items as required for the plant and equipment within battery limit. The technical requirement of the civil & structural works have been indicated separately and enclosed with the specification.
2. Working platforms (RCC / structural) on top & bottom of the fly ash silos, staircases, ladders, etc. as per the requirement.
3. Pipes trestles, supports etc for all the piping within the battery limit. All the pipelines shall be supported on overhead structural trestles / pipe racks to be supplied by the Bidder. Supporting the pipelines on ground / sleeper ways shall be



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avoided. In the areas where sleeper ways are unavoidable from the view of system design, the same can be provided subject to Purchaser / Consultant's approval.

4. Approach roads from existing road to silos and plant & equipment within the battery limits of the specification.
5. Structural supports, Platforms, walkways, ladders etc. for access to all equipment as necessary shall be provided.

For details of civil and structural works please refer Section – D and Section – E of Vol.IIA.

04.07 Handling & Hoisting Facilities

1. One no. pendent operated electric underslung crane of suitable capacity in air compressor house complete with all accessories including rails, cables etc. In case the indicated capacity of the crane is not adequate, the bidder shall select the capacity based on the weight of the heaviest part to be lifted during maintenance. The name and weight of the heaviest part shall be indicated in the bid. The cranes shall conform to the specification enclosed.
2. One no. manual hoist of suitable capacity shall be provided on the top of each for intermediate and main silo.

For details on Handling and hoisting facilities please refer Section – B of Vol.IIA.

04.08 Ventilation Facilities:

Ventilation of compressor & dryer house, MCC/switch gear & control room and utility building rooms. (For details, refer Section – C, Vol.IIA)

04.09 Fire Fighting Facilities

To combat any occurrence of fire in compressor house, switchgear room, control room & utility building, the portable fire extinguishers have been envisaged. The following quantity of portable fire extinguishers having IS approvals will be provided.



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- a) 9.0 litre Water type 2 nos. As per IS : 15683
- b) 4.5 kg CO2 type 4 nos. As per IS : 15683
- c) 5.0 kg DCP type 2 nos. As per IS : 15683

04.10 Miscellaneous

1. All anchor bolts, bed plates and foundation plates, sleeves required for foundation bolts, special pipe pieces, as may be required.
2. All materials, consumable, testing appliances, tools and tackles necessary for completing the work would be procured and supplied by the Bidder.
3. New set of special tools and tackles for erection and maintenance of the equipment supplied.
4. First charge and all changes of all types of lubricants, grease, consumable etc., and required upto final handing over of the plant.
5. Mandatory spares as per the list enclosed.
6. Any other equipment / accessories / component not specifically mentioned but necessary for the effective, efficient and smooth operation of the plant to meet the guaranteed performance.

04.11 Drinking water: Connection to be taken from the existing system. Further distribution upto user points is in Bidder's scope.

04.12 Ash Conditioner Water: Connection to be taken from the existing Ash Water system. After tap off point entire system upto user points is in Bidder's scope.