

TD-106-1 Rev No. 5  Form No.		<b>PRODUCT STANDARD</b> <b>PULVERISERS</b> <b>HYDERABAD</b>		<b>Product</b> <b>STD no.</b>	<b>BA89055</b>
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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



# PRODUCT STANDARD

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#### 1.0 PROJECT INFORMATION

a) Owner	NTPC
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
3X200 MW + 3X500 MW Ramagundam	NTPC, Ramagundam

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### ..... 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		NTPC
2	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	10.0
	Height	Meters	8.5
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	10.0
	Height	Meters	8.7
	<b>Total height</b>	Meters	17.2
	Discharge Inside diameter of silo bottom	Meters	0.51
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/SS Liner in Silo Cone ID



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TA SHEET TO BE PROVIDED BY THE BIDDER  
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Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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<p style="text-align: center;">           COPYRIGHT AND CONFIDENTIAL            The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED,            It must not be used directly or indirectly in any way detrimental to the interest of the company.         </p>						Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)	a) automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.	
						23	Pressure Gauge	
						24	Pneumatic Piping	a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.
						25	Pneumatic panel & Accessories	All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.
						26	Drain Valve	¼ " ball valve shall be provided by supplier in the air blaster for drain
<p><i>Note: 1. Design, Manufacturing, Inspection &amp; Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.</i></p> <p><i>2. Supplier to indicate the National/International standards followed during the complete process.</i></p> <p><i>3. Deviations if any shall be submitted at enquiry stage itself.</i></p>								
<b>SIGNATURE OF VENDOR :</b> .....								
<b>NAME OF VENDOR :</b> .....								
<b>SEAL OF VENDOR :</b> .....								

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#### 7.0 WARRANTY

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

#### 8.0 START UP & COMMISSIONING SPARES

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

#### 8.1 MANDATORY SPARES

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


#### 9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

#### 10.0 INSPECTION & TESTING

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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\*\*\*\*\* **11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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<p style="text-align: center;"><b>13:2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER</b></p> <p>a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.</p> <p>b) Data sheet to be furnished for review and approval.</p> <p>c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.</p>					

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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



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ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	NTPC
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
3X500 MW+ 2X210 MW+ 2X210 MW	NTPC, Kahalgoan

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### ..... 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		NTPC
3	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
5	Material to be handled		Lime Stone
6	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
7	Limestone Silo Capacity	MT	659
8	Limestone size	mm	25
9	Moisture content in the lime stone	%	10-15%
10	<b>Limestone Silo dimensions</b>		
	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	8.8
	Height	Meters	7.6
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	8.8
	Height	Meters	7.6
	<b>Total height</b>	Meters	15.2
	Discharge Inside diameter of silo bottom	Meters	0.500
11	Reference drawing number		
12	MOC of Limestone Silo		Structural Steel/ SS Liner in ID of Cone

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			



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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		<ul style="list-style-type: none"> <li>a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters.</li> <li>b) Timer shall be mounted inside the control panel.</li> <li>c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing.</li> <li>d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.</li> </ul>	
23	Pressure Gauge			
24	Pneumatic Piping		<ul style="list-style-type: none"> <li>a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo.</li> <li>b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.</li> </ul>	
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.	
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain	

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*

*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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#### 7.0 WARRANTY

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

#### 8.0 START UP & COMMISSIONING SPARES

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

#### 8.1 MANDATORY SPARES

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


#### 9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

#### 10.0 INSPECTION & TESTING

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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\*\*\*\*\***11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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<p style="text-align: center;"><b>13:2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER</b></p> <p>a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.</p> <p>b) Data sheet to be furnished for review and approval.</p> <p>c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.</p>					

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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



# PRODUCT STANDARD

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1.0	PROJECT INFORMATION
2.0	INTENT OF SPECIFICATION
3.0	SCOPE OF SUPPLY
4.0	PRE-QUALIFICATION CRITERIA
5.0	BASIC DESIGN
6.0	DATA TO BE PROVIDED BY THE BIDDER
7.0	WARRANTY
8.0	START UP & COMMISSIONING SPARES
9.0	INSPECTION & TESTING
10.0	SUPERVISION OF ERECTION, TESTING AND COMMISSIONING
11.0	SPECIAL TOOLS & TACKLES
12.0	FIRST FILL OF CONSUMABLES
13.0	DOCUMENTATION

ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	TSGENCO
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
1X800 MW Kothagudem	TSGENCO, Kothgudem

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		
2	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
5	Limestone Silo Capacity	MT	390
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	8.1
	Height	Meters	5.4
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	8.1
	Height	Meters	7.0
	<b>Total height</b>	Meters	12.4
	Discharge Inside diameter of silo bottom	Meters	0.50
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/ SS liner in ID of Cone

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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<p align="center">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>			Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)	a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters.	b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.	Rev No.	01
			23	Pressure Gauge		Page	7 of 12
			24	Pneumatic Piping	a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.		
			25	Pneumatic panel & Accessories	All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.		
			26	Drain Valve	¼ " ball valve shall be provided by supplier in the air blaster for drain		

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 12 months from the date of supply or 18 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

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- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
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  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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**TECHNICAL SPECIFICATION**  
**OF**  
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**FOR DAY SILO APPLICATION**



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7.0	WARRANTY
8.0	START UP & COMMISSIONING SPARES
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11.0	SPECIAL TOOLS & TACKLES
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ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	TSGENCO
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
1X800 MW Kothagudem	TSGENCO, Bhadradi

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		TSGENCO
2	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
5	Limestone Silo Capacity	MT	390
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	8.1
	Height	Meters	7.0
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	8.1
	Height	Meters	7.0
	<b>Total height</b>	Meters	14.0
	Discharge Inside diameter of silo bottom	Meters	0.50
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/ SS liner in ID of Cone

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		<ul style="list-style-type: none"> <li>a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters.</li> <li>b) Timer shall be mounted inside the control panel.</li> <li>c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing.</li> <li>d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.</li> </ul>	
23	Pressure Gauge			
24	Pneumatic Piping		<ul style="list-style-type: none"> <li>a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo.</li> <li>b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.</li> </ul>	
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.	
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain	

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**8.1 MANDATORY SPARES**

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price, if provided.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.  
b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.  
b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.  
c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.  
d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.  
e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.  
f) Bidder to arrange all calibrated gauges, Instruments during inspection.  
g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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<p style="text-align: center;"><b>COPYRIGHT AND CONFIDENTIAL</b>          The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED,          It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>		<p><b>13.2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER</b></p> <ul style="list-style-type: none"> <li>a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.</li> <li>b) Data sheet to be furnished for review and approval.</li> <li>c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.</li> </ul>			





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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



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**Contents:**

1.0	PROJECT INFORMATION
2.0	INTENT OF SPECIFICATION
3.0	SCOPE OF SUPPLY
4.0	PRE-QUALIFICATION CRITERIA
5.0	BASIC DESIGN
6.0	DATA TO BE PROVIDED BY THE BIDDER
7.0	WARRANTY
8.0	START UP & COMMISSIONING SPARES
9.0	INSPECTION & TESTING
10.0	SUPERVISION OF ERECTION, TESTING AND COMMISSIONING
11.0	SPECIAL TOOLS & TACKLES
12.0	FIRST FILL OF CONSUMABLES
13.0	DOCUMENTATION

ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	TSGENCO
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
5X800 MW	TSGENCO, Yadadri

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are **three** number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		TSGENCO
2	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
5	Limestone Silo Capacity	MT	1000
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	9.5
	Height	Meters	10.1
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	9.5
	Height	Meters	8.2
	<b>Total height</b>	Meters	18.3
	Discharge Inside diameter of silo bottom	Meters	0.50
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/ SS liner in ID of Cone

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.
23	Pressure Gauge		
24	Pneumatic Piping		a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 12 months from the date of supply or 18 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.  
b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.  
b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.  
c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.  
d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.  
e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.  
f) Bidder to arrange all calibrated gauges, Instruments during inspection.  
g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



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4.0	PRE-QUALIFICATION CRITERIA
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8.0	START UP & COMMISSIONING SPARES
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13.0	DOCUMENTATION

ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	TANGEDCO
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
1X800 MW NorthChennai	TANGEDCO, Northchennai

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		TANGEDCO
2	Number of Air Blaster per Limestone Silo Cone Section	Nos	3 (Minimum)*
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
5	Limestone Silo Capacity	MT	400
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Rectangular Section</b>		
	Length/Width	Meters	9.9/5.2
	Height	Meters	2.8
	<b>Conical section /Bottom Section</b>		
	Trapezoidal Section Width	Meters	5.2
	Height	Meters	5.8
	<b>Total height</b>	Meters	8.6
	Discharge Inside diameter of silo bottom	Meters	0.50
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/ SS liner in ID of Cone

**\*Silo is rectangular in shape from top with two conical outlets. Supplier shall provide Air Blasters in such a way that the arrangement of Air blasters suffices its required purpose.**



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TA SHEET TO BE PROVIDED BY BIDDER  
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Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			



# PRODUCT STANDARD

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.	
23	Pressure Gauge			
24	Pneumatic Piping		a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.	
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.	
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain	

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start- up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**8.1 MANDATORY SPARES**

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.  
b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



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ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	NTPC
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
3X800 MW	NTPC, Patratu

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		NTPC
2	Number of Silo	Nos	1
3	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
4	Material to be handled		Lime Stone
5	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
6	Limestone Silo Capacity	MT	1918
7	Limestone size	mm	25
8	Moisture content in the lime stone	%	10-15%
9	<b>Limestone Silo dimensions</b>		
10	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	12.2
	Height	Meters	10.3
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	12.2
	Height	Meters	10.6
	<b>Total height</b>	Meters	20.9
	Discharge Inside diameter of silo bottom	Meters	0.500
11	Reference drawing number		
12	MOC of Limestone Silo		Structural Steel/ SS Liner in ID of Cone



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## PULVERISERS

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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# PRODUCT STANDARD

## PULVERISERS

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.	
23	Pressure Gauge			
24	Pneumatic Piping		a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.	
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.	
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain	

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**8.1 MANDATORY SPARES**

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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\*\*\*\*\* **11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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<p style="text-align: center;"><b>COPYRIGHT AND CONFIDENTIAL</b>          The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED,          It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>		<p><b>13:2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER</b></p> <ul style="list-style-type: none"> <li>a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.</li> <li>b) Data sheet to be furnished for review and approval.</li> <li>c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.</li> </ul>			





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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



# PRODUCT STANDARD

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1.0	PROJECT INFORMATION
2.0	INTENT OF SPECIFICATION
3.0	SCOPE OF SUPPLY
4.0	PRE-QUALIFICATION CRITERIA
5.0	BASIC DESIGN
6.0	DATA TO BE PROVIDED BY THE BIDDER
7.0	WARRANTY
8.0	START UP & COMMISSIONING SPARES
9.0	INSPECTION & TESTING
10.0	SUPERVISION OF ERECTION, TESTING AND COMMISSIONING
11.0	SPECIAL TOOLS & TACKLES
12.0	FIRST FILL OF CONSUMABLES
13.0	DOCUMENTATION

ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	NSPCL
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
2X250 MW BHILAI	NSPCL,BHILAI,CHHATISGARH

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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### 3.0 SCOPE OF SUPPLY

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

### 4.0. PRE-QUALIFICATION CRITERIA

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		NSPCL
2	Number of Silo	Nos	1
3	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
5	Material to be handled		Lime Stone
6	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
7	Limestone Silo Capacity	MT	230
8	Limestone size	mm	25
9	Moisture content in the lime stone	%	10-15%
10	<b>Limestone Silo dimensions</b>		
	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	6.2
	Height	Meters	5.3
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	6.2
	Height	Meters	5.3
	<b>Total height</b>	Meters	10.6
	Discharge Inside diameter of silo bottom	Meters	0.500
11	Reference drawing number		
12	MOC of Limestone Silo		Structural Steel/ SS liner in ID of Cone

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			

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## PULVERISERS

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.
23	Pressure Gauge		
24	Pneumatic Piping		a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 12 months from the date of supply or 18 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**8.1 MANDATORY SPARES**

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

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The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
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- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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# **TECHNICAL SPECIFICATION** **OF** **AIR CANON/BLASTERS** **FOR DAY SILO APPLICATION**



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# PRODUCT STANDARD

## PULVERISERS

### HYDERABAD

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#### 1.0 PROJECT INFORMATION

a) Owner	NTPC
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
3X660 MW NPGCL, NABINAGAR	NPGCL, NABINAGAR, BIHAR

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to followed.

**Note: 1 set consists of "minimum Six (6) numbers of Air Blasters along with all accessories, mountings & Fasteners +2 no of Pneumatic Panel + 2 no of Control Panel +2 no of Timer + Pneumatic Tubing & Fittings" required for two Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### ..... 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		
2	Number of Silo	Nos	2
3	Number of Air Blaster per Limestone Silo	Nos	3 (Minimum)
4	Total number of Air Blaster	Nos	6 (Minimum)
5	Material to be handled		Lime Stone
6	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
7	Limestone Silo Capacity	MT	1080
8	Limestone size	mm	25
9	Moisture content in the lime stone	%	10-15%
10	<b>Limestone Silo dimensions</b>		
	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	9.3
	Height	Meters	7.95
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	9.3
	Height	Meters	8.05
	<b>Total height</b>	Meters	16.0
	Discharge Inside diameter of silo bottom	Meters	0.510
11	Reference drawing number		
12	MOC of Limestone Silo		Structural Steel/SS Liner in Silo Cone ID



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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Number of Blasts			
7	Hydrostatic Test pressure (indicate the standard also)		Air blaster vessel shall be tested	
8	Discharge Pipe (Minimum NB 150)			
9	Discharge pressure			
10	Area/Length of influence for each air blaster			
11	Location of Air blaster from bottom of the silo			
12	Piston Material			
13	Piston Diameter			
14	Piston Seat (Viton)			
15	Quick Exhaust Valve (Make and Model No)			
16	Solenoid Valve (Make and Model No)		Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage.	
17	Oil Lubricator (Make and Model No)			
18	Ball Valve (Make and Model No)			
19	Safety Valve (Make and Model No)			
20	Non-return Valve			
21	Connection Pipe			



# PRODUCT STANDARD

## PULVERISERS

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21	Electronic Timer (Make and Model No) mounted inside the control panel Control panel (Minimum IP 55)		a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters. b) Timer shall be mounted inside the control panel. c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing. d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply.	
23	Pressure Gauge			
24	Pneumatic Piping		a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo. b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.	
25	Pneumatic panel & Accessories		All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.	
26	Drain Valve		¼ " ball valve shall be provided by supplier in the air blaster for drain	

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*


*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**8.1 MANDATORY SPARES**

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.  
b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.  
b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.  
c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.  
d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.  
e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.  
f) Bidder to arrange all calibrated gauges, Instruments during inspection.  
g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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**11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

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<p style="text-align: center;">*****</p> <p><b>13.2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER</b></p> <ul style="list-style-type: none"> <li>a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.</li> <li>b) Data sheet to be furnished for review and approval.</li> <li>c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.</li> </ul>					

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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



# PRODUCT STANDARD

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2.0	INTENT OF SPECIFICATION
3.0	SCOPE OF SUPPLY
4.0	PRE-QUALIFICATION CRITERIA
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6.0	DATA TO BE PROVIDED BY THE BIDDER
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8.0	START UP & COMMISSIONING SPARES
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ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

a) Owner	BRBCL
b) Buyer	BHEL, HPEP-Hyderabad
c) Process/Application	Limestone Silo for Flue Gas Desulphurization system
<b>PROJECT NAME</b>	<b>PROJECT LOCATION</b>
4X250 MW BRBCL	BRBCL, NABINAGR, BIHAR

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. Piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision of Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.

**5.0 BASIC DESIGN**

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.



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#### 5.1 DUTY PARAMETERS

Sl. No.	Description	Units	Parameters
1	End User		BRBCL
2	Number of Air Blaster per Limestone Silo	Nos	Minimum 3 Nos
3	Material to be handled		Lime Stone
4	Pipe size for Air Blaster tank to Limestone Silo	NB	Minimum 150
5	Limestone Silo Capacity	MT	445
6	Limestone size	mm	25
7	Moisture content in the lime stone	%	10-15%
8	<b>Limestone Silo dimensions</b>		
9	<b>Top section/Cylindrical Section</b>		
	Diameter	Meters	7.7
	Height	Meters	6.6
	<b>Conical section /Bottom Section</b>		
	Diameter	Meters	7.7
	Height	Meters	6.7
	<b>Total height</b>	Meters	13.3
	Discharge Inside diameter of silo bottom	Meters	0.500
10	Reference drawing number		
11	MOC of Limestone Silo		Structural Steel/SS Liner for ID of Cone



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**6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER**


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Sl. No.	Description	Units	Parameters	Vendor Acceptance / comments /Deviations
1	Capacity of Air Blaster			
2	Model Number			
3	Quantity of Air required per hour for each blaster			
4	Material specification of Air Vessel			
5	Design/Working Pressure			
6	Hydrostatic Test pressure(indicate the standard also)			
7	Discharge Pipe (Minimum NB 150)			
8	Discharge pressure			
9	Area/Length of influence for each air blaster			
10	Location of Air blaster from bottom of the silo			
11	Piston Material			
12	Piston Diameter			
13	Piston Seat (Viton)			
14	Quick Exhaust Valve (Make and Model No)			
15	Solenoid Valve (Make and Model No)			
16	Oil Lubricator (Make and Model No)			
17	Ball Valve (Make and Model No)			
18	Safety Valve (Make and Model No)			
19	Non-return Valve			
20	Connection Pipe			
21	Electronic Timer (Make and Model No) mounted inside the control panel			
22	Control panel (Minimum IP 55)			
23	Pressure Gauge (2 Nos)			
24	Tubing (SS)			

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

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**7.0 WARRANTY**

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

**8.0 START UP & COMMISSIONING SPARES**

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start- up, and commissioning of the equipment/system. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

**9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING**

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and check List.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing and trial runs at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

**10.0 INSPECTION & TESTING**

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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#### \*\*\*\*\*11.0 SPECIAL TOOLS & TACKLES

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.

#### 12.0 FIRST FILL OF CONSUMABLES

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to COD including top up requirements at the time of issuance of PAC/declaration of COD. All lubricants proposed for the plant operation shall be suitable for all operating and environmental conditions that will be met on site consistent with good maintenance procedures as instructed in the maintenance manuals.

Detailed specifications for the lubricating oil, grease, gases, servo fluids, control fluids, chemicals including items qualities and quantities required per month of the plant operation for the BHEL/Customer approval herein shall be furnished within two months of placement of Order.

#### 13.0 DOCUMENTATION

##### 13.1 INFORMATION TO BE FURNISHED ALONG WITH THE OFFER

- a) Principle of operation of air blaster
- b) General arrangement drawing
- c) For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Mounting arrangement details
- e) List of Air blaster Accessories
- f) Overall dimension of the air blaster
- g) All connection flange dimension
- h) Details of inspection.
- i) Quality plan
- j) Details of maintenance procedure.
- k) Details of maintenance while the system is working.
- l) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- m) Total weight including individual weight of the system.
- n) Details of lifting hooks, eyes etc.

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**13.2. DOCUMENTATION TO BE FURNISHED AFTER PURCHASE ORDER**

- a) Detailed Assembly/Exploded view of all components to be furnished. List of spares to be mentioned in the GA. Manufacturing Action to be initiated after the approval from BHEL/Customer.
- b) Data sheet to be furnished for review and approval.
- c) Manufacturing Quality plan to be submitted for approval, Inspection and Testing.





|                                   |                                                                                   |                                                                   |  |                                  |                |
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**TECHNICAL SPECIFICATION**  
**OF**  
**AIR CANON/BLASTERS**  
**FOR DAY SILO APPLICATION**



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ANNEXURE I – List of Exceptions, if any.



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#### 1.0 PROJECT INFORMATION

|                                   |                                                     |
|-----------------------------------|-----------------------------------------------------|
| a) Owner                          | NTPC                                                |
| b) Buyer                          | BHEL, HPEP-Hyderabad                                |
| c) Process/Application            | Limestone Silo for Flue Gas Desulphurization system |
| <b>PROJECT NAME</b>               | <b>PROJECT LOCATION</b>                             |
| 3X200 + 3X500 +1X500<br>Korba FGD | NTPC, Korba                                         |

#### 2.0 INTENT OF SPECIFICATION

- a) Air Blasters to be used in the limestone silos of Flue Gas Desulphurization (FGD) System.
- b) There are two number of limestone silos in each project.
- c) Air Blasters will be used to dislodge limestone particles that are getting accumulated on the surface of the Limestone Silos without stressing the limestone structure.
- d) Vendor shall guarantee that after the installation of air blaster adverse effects like plugging, bridging, rat holing, funnelling and arching shall not occur in silo.
- e) Design, Manufacturing, Inspection and Testing of the Air Blaster shall comply with all the currently applicable statutes, regulation and safety codes in the locality where the equipment are to be installed. The Equipment shall also conform to the latest applicable Indian/British/American Standards. Nothing in this specification shall construe to relieve the contractor/bidder of the required statutory responsibility.
- f) Compliance to this specification shall not relieve the vendor/bidder of responsibility of furnishing the equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified requirements.
- g) A single point of instrument air approximately 5-7 kg/cm<sup>2</sup> will be terminated near the limestone silo, vendor to provide necessary arrangement to take air from this point to air blaster system. SS piping for air from plant tapping point to air blaster shall be provided by bidder for each air blaster. Tapping Point for the air will be around 20 m away from the Silo.
- h) Ball valve (Isolation valve) shall be provided by vendor for isolation of air blasters air supply at the plant tapping point.
- i) Bidder shall provide separate control panel for each silo with Automatic sequential timer for the sequential operation of air blaster.
- j) The Conical Portion of the Limestone Silos where Air blaster will be installed is clad with SS - 304, 4 mm thick liner.
- k) In case of any deviation taken by the vendor, it shall be listed in the proposal under separate section titled as " list of deviations/exceptions" from the enquiry document (Annexure I).

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.....**3.0 SCOPE OF SUPPLY**

- a) Design, manufacture, testing and supply Air Blaster for Limestone silos for the duty condition as specified in respective Technical Data Sheets.
- b) Supervision for Erection and Commissioning of the equipment at site, as per clause 1.0 shall be under bidder's scope. Cost for Supervision of Erection and Commissioning shall be included in the offer.
- c) Compressed air piping, valves, discharge pipe arrangement, base frame, all mating flanges, gaskets, bolts and fastening, Nozzles, hanging support. Accessories required for the Air Blaster shall be provided by the Bidder.
- d) Timer to be mounted inside the control panel and all the wirings from timer to solenoid valves will be done by the vendor during manufacturing.
- e) Suitable Cable gland to be provided at the bottom of the control panel for Input/output signals/power supply.
- f) Solenoid valve power supply/Voltage will be intimated after P.O.
- g) Control panels shall be IP 55.
- h) In case the vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same with suitable reasons in a separate section of the proposal and include the same in his scope of supply.
- i) Part items of the equipment shall be identified by Tag Nos and have to be packed in order to minimize the possibility of damage during storage or transit. The equipment shall be protected for storage of 18 months at site, any extra precaution to be taken by the Purchaser for storage beyond 18 months shall be explicitly indicated in the operation and maintenance manuals.
- j) Five hard copies of operation/maintenance manuals along with one soft copy containing all details of reference drawings and technical data shall be furnished by the Bidder.
- k) Customer approved painting schedule to be followed.

**Note: 1 set consists of "minimum three (3) numbers of Air Blasters along with all accessories, mountings & Fasteners +1 no of Pneumatic Panel + 1 no of Control Panel +1 no of Timer + Pneumatic Tubing & Fittings" required for one Silo.**

Note: Any component which required for making the system complete/operational will be in bidders scope.

**4.0. PRE-QUALIFICATION CRITERIA**

- a) Vendor should be a manufacturer of Air blaster.
- b) List of customer to whom air blasters of similar capacity supplied to silo/bunker application shall be furnished.
- c) Previous inspection and test report to be furnished for the similar capacity or higher capacity.



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#### 5.0 BASIC DESIGN

This section covers the Design, manufacturing and performance requirement of the Air Blaster and accessories.

#### 5.1 DUTY PARAMETERS

| Sl. No. | Description                                      | Units  | Parameters                                   |
|---------|--------------------------------------------------|--------|----------------------------------------------|
| 1       | End User                                         |        | NTPC                                         |
| 3       | Number of Air Blaster per Limestone Silo         | Nos    | 3 (Minimum)                                  |
| 5       | Material to be handled                           |        | Lime Stone                                   |
| 6       | Pipe size for Air Blaster tank to Limestone Silo | NB     | Minimum 150                                  |
| 7       | Limestone Silo Capacity                          | MT     | 1080                                         |
| 8       | Limestone size                                   | mm     | 25                                           |
| 9       | Moisture content in the lime stone               | %      | 10-15%                                       |
| 10      | <b>Limestone Silo dimensions</b>                 |        |                                              |
|         | <b>Top section/Cylindrical Section</b>           |        |                                              |
|         | Diameter                                         | Meters | 11.0                                         |
|         | Height                                           | Meters | 8.7                                          |
|         | <b>Conical section /Bottom Section</b>           |        |                                              |
|         | Diameter                                         | Meters | 11.0                                         |
|         | Height                                           | Meters | 9.50                                         |
|         | <b>Total height</b>                              | Meters | 18.2                                         |
|         | Discharge Inside diameter of silo bottom         | Meters | 0.50                                         |
| 11      | Reference drawing number                         |        |                                              |
| 12      | MOC of Limestone Silo                            |        | Structural Steel/SS Liner in<br>Silo Cone ID |

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#### 6.0 DATA SHEET TO BE PROVIDED BY THE BIDDER

| Sl. No. | Description                                            | Units | Parameters                                                                                                                                                                             | Vendor Acceptance / comments /Deviations |
|---------|--------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| 1       | Capacity of Air Blaster                                |       |                                                                                                                                                                                        |                                          |
| 2       | Model Number                                           |       |                                                                                                                                                                                        |                                          |
| 3       | Quantity of Air required per hour for each blaster     |       |                                                                                                                                                                                        |                                          |
| 4       | Material specification of Air Vessel                   |       |                                                                                                                                                                                        |                                          |
| 5       | Design/Working Pressure                                |       |                                                                                                                                                                                        |                                          |
| 6       | Number of Blasts                                       |       |                                                                                                                                                                                        |                                          |
| 7       | Hydrostatic Test pressure (indicate the standard also) |       | Air blaster vessel shall be tested                                                                                                                                                     |                                          |
| 8       | Discharge Pipe (Minimum NB 150)                        |       |                                                                                                                                                                                        |                                          |
| 9       | Discharge pressure                                     |       |                                                                                                                                                                                        |                                          |
| 10      | Area/Length of influence for each air blaster          |       |                                                                                                                                                                                        |                                          |
| 11      | Location of Air blaster from bottom of the silo        |       |                                                                                                                                                                                        |                                          |
| 12      | Piston Material                                        |       |                                                                                                                                                                                        |                                          |
| 13      | Piston Diameter                                        |       |                                                                                                                                                                                        |                                          |
| 14      | Piston Seat (Viton)                                    |       |                                                                                                                                                                                        |                                          |
| 15      | Quick Exhaust Valve (Make and Model No)                |       |                                                                                                                                                                                        |                                          |
| 16      | Solenoid Valve (Make and Model No)                     |       | Solenoid valves along with NRV & isolating ball valve shall be provided by the supplier for each air blaster pneumatic circuit. Voltage to be confirmed during drawing approval stage. |                                          |
| 17      | Oil Lubricator (Make and Model No)                     |       |                                                                                                                                                                                        |                                          |
| 18      | Ball Valve (Make and Model No)                         |       |                                                                                                                                                                                        |                                          |
| 19      | Safety Valve (Make and Model No)                       |       |                                                                                                                                                                                        |                                          |
| 20      | Non-return Valve                                       |       |                                                                                                                                                                                        |                                          |
| 21      | Connection Pipe                                        |       |                                                                                                                                                                                        |                                          |

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|    |                                                                                                        |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|----|--------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 21 | Electronic Timer (Make and Model No) mounted inside the control panel<br>Control panel (Minimum IP 55) |  | a) Separate control panel with automatic sequential timer shall be provided by supplier for each silo for sequential operation of air blasters.<br>b) Timer shall be mounted inside the control panel.<br>c) All the wirings from timer to solenoid valves shall be done by supplier during manufacturing.<br>d) Suitable cable glands shall be provided by the supplier at the bottom of control panel for input/output signals/power supply. |  |
| 23 | Pressure Gauge                                                                                         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 24 | Pneumatic Piping                                                                                       |  | a) SS piping for air from plant tapping to air blaster shall be provided by the supplier for each air blaster. Tapping point for air supply shall be around 20 meters away from the silo.<br>b) Ball valve shall be provided by the supplier for the isolation of air blaster air supply from the plant tapping point.                                                                                                                         |  |
| 25 | Pneumatic panel & Accessories                                                                          |  | All the three solenoid valves shall be accommodated in a panel box. For each silo one pneumatic panel shall be provided for three air blasters.                                                                                                                                                                                                                                                                                                |  |
| 26 | Drain Valve                                                                                            |  | ¼ " ball valve shall be provided by supplier in the air blaster for drain                                                                                                                                                                                                                                                                                                                                                                      |  |

*Note: 1. Design, Manufacturing, Inspection & Testing of the air blaster shall conform to the latest applicable Indian/British/ American Standards.*

*2. Supplier to indicate the National/International standards followed during the complete process.*

*3. Deviations if any shall be submitted at enquiry stage itself.*

**SIGNATURE OF VENDOR :** .....

**NAME OF VENDOR :** .....

**SEAL OF VENDOR :** .....

|                       |          |                                                                                   |                                                                   |  |                    |         |
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### 7.0 WARRANTY

The warranty period shall be 18 months from the date of supply or 12 months from the date of commissioning, whichever is earlier.

### 8.0 START UP & COMMISSIONING SPARES

Start-up & Commissioning Spares shall be part of the main supply of the Air blaster. Start-up & commissioning spares are those spares, which may be required during the start-up, and commissioning of the equipment/system. Bidder shall clearly spell the list of start-up / Commissioning spares in their technical offer. Bidder shall provide an adequate stock of such start up and commissioning spares to be brought by him to the site for the equipment erection and commissioning. The spares must be available at site before the equipment are energized.

### 8.1 MANDATORY SPARES

Supplier to quote for mandatory spares as indicated in Annexure-2 with breakup price.


### 9.0 SUPERVISION OF ERECTION, TESTING AND COMMISSIONING

- a) Erection of Air blaster will be done by owner as per vendor's Erection Manual and checklist.
- b) Supervision of Erection and Commissioning of the all Air blaster at Site (For Two Silos) as per clause no 1.0 project site is in bidder's scope. Bidder has to quote for 7 working days towards supervision of erection and commissioning & testing at Site as per clause no 1.0. TA/DA, boarding and lodging shall be borne by the bidder and shall be inclusive in the above clause.

### 10.0 INSPECTION & TESTING

The General inspection requirements to be considered are as below:

- a) Bidder shall furnish written copies of shop production, fabrication, quality and hydro test procedures and drawings for review by BHEL/ Customer prior to manufacture. Inspection of above mentioned tests by BHEL representative at bidder's works is envisaged.
- b) The Bidder shall furnish performance test procedure along with measurement standard. The procedure will be reviewed and approved by the BHEL/Customer.
- c) Final inspection and release by the BHEL/Customer is a mandatory requirement unless specially waived.
- d) Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
- e) BHEL/customer shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
- f) Bidder to arrange all calibrated gauges, Instruments during inspection.
- g) Bidder to arrange Instruments and all accessories for the measurement at site using Impact method.

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\*\*\*\*\***11.0 SPECIAL TOOLS & TACKLES**

Any special tools & tackles required for the entire equipment to disassemble, assemble or maintain the units, they shall be included in the quotation and furnished as part of the initial supply. List of special tools & tackles shall be decided by bidder as per his proven practice. When special tools are provided, they shall be packaged in separate, boxes with lugs and marked as "Special Tools for (tag / item number)". Each tool shall be stamped or tagged to indicate its intended usage. Levers and eye bolts for the removal of parts to be serviced shall be submitted with special tools.


**12.0 FIRST FILL OF CONSUMABLES**

Bidder's scope shall also include supply and filling of all lubricants, grease, filters and consumable items for operation up to commissioning of the system.

**13.0 DOCUMENTATION**

**13.1 INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER**

- a) Supplier to submit the duly filed, sealed & signed all pages of the specification with confirmation to each point.
- b) Relevant documents for manufacture & at least two un priced bid PO copies of previously supplied air blasters shall be submitted by the supplier as per pre-qualification criteria.
- c) GA drawing along with cross sectional view, all dimensions, & BOM with material specification (In sufficient information may lead to rejection of the offer). For bought out items vendor has to furnish the make and model number in the GA drawing.
- d) Pneumatic circuit for air blaster system shall be submitted.
- e) Principle of operation of air blaster
- f) All connection flange dimension & Mounting arrangement details
- g) Overall dimension of the air blaster
- h) Details of inspection.
- i) Details of maintenance procedure.
- j) Details of maintenance while the system is working.
- k) Requirement of compressed air.
  - Quantity, Max & Min.
  - Quality (moisture, oil content pressure etc.,)
- l) Total weight including individual weight of the system.
- m) Details of lifting hooks, eyes etc.

|                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                          |                                     |                |
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