

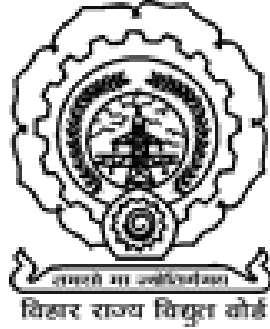


BHEL-ISG  
BANGALORE

2X250 MW TPP BSEB Barauni  
Technical Enquiry Specification for  
Slurry Duty Knife gate valves For Ash  
Handling System

DOCUMENT NUMBER

IS-1-10-2013/AHP-006



BIHAR STATE ELECTRICITY BOARD  
2X250 MW THERMAL POWER PROJECT, BARAUNI


CUSTOMER'S CONSULTANT: STEAG ENERGY SERVICES (INDIA) PVT. LTD., NOIDA

**TECHNICAL ENQUIRY SPECIFICATION**  
OF  
**SLURRY DUTY KNIFE GATE VALVES FOR ASH HANDLING SYSTEM**



BHARAT HEAVY ELECTRICALS LIMITED  
INDUSTRIAL SYSTEMS GROUP  
BANGALORE


	Prepared By	Checked by	Approved by
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 <b>BHEL-ISG</b> <b>BANGALORE</b>	2X250 MW TPP BSEB Barauni <b>Technical Enquiry Specification for</b> <b>Slurry Duty Knife gate valves For Ash</b> <b>Handling System</b>	<b>DOCUMENT NUMBER</b>  IS-1-10-2013/AHP-006
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**1.00 PROJECT INFORMATION:**

The specification has been prepared for supply of Slurry Duty knife gate valves (pneumatic as well as manual operated) for 2X250 MW TPP, Unit 8&9 for BSEB, Barauni for which Steag Energy System Pvt. Ltd., Noida is the consultant for the customer BSEB. BHEL is the principal contractor who is responsible for the establishment of the power project for unit 8 & 9.

Industrial Systems Group (ISG) of BHEL located at Bangalore will be executing the Ash Slurry Disposal System of the 2X250 MW, BSEB, Barauni Unit 8 & 9.

Project information for the 2X250 MW BSEB Barauni project is as per enclosed Annexure –I (Sheet 1)

**2.00 SCOPE OF SUPPLY:**

The scope of supply and works includes design, manufacture, supply, testing at shop, inspection at manufacturer’s work, delivery at site and supervision of erection & commissioning, PG test of knife gate valves. The bidder shall include in their offer for number of man days for supervision of erection & commissioning & PG test of knife gate valve as 6 days over 3 visits to site(2 days x 3 visits) and the visit is inclusive of expenses towards travel, accommodation etc.

The Knife Gate Valve shall be supplied with all equipments/accessories like pneumatic cylinder, limit switches, solenoid valves, companion flanges with nuts, bolts, gaskets & washers, etc. as per this Specification and Data Sheet enclosed herewith. Valve manufacturer shall make their own arrangement for testing of knife gate valves at shop floor.


Items and accessories which are not mentioned specifically but are essential for sound performance of the equipment shall be supplied by bidder without any cost implication to BHEL.

**3.00 QUALIFICATION REQUIREMENT**

The bid is open for participation to those bidders who satisfy the following Technical requirements: -

3.1 Bidder should have designed, engineered, manufactured, tested & supplied at least two (2) numbers of both the types (uni-directional and bi-directional) of Slurry Duty Knife Edge Gate Valves of similar rating & specification as given below for Ash slurry disposal pumping application for Ash Handling plant of two different thermal power stations of min. 250MW rating.

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Type	:	<ul style="list-style-type: none"> <li>• Uni-directional (Cast NI Hard 500 BHN deflection cone)</li> <li>• Bi- Directional (Body shall be of split type design)</li> </ul>
Location	:	Uni-directional at pump suction side, Bi- Directional at pump Discharge side and Bi-directional at Pipe Crossover.
Size	:	300 NB
Operation	:	Pneumatic Operated at Suction and Discharge side and Manual operated at pipe crossover.
Application	:	Ash Slurry
Working pressure	:	Minimum 120 MWC at discharge and pipe crossover side.

Bidder who has manufactured and supplied uni- directional and bi-directional slurry duty knife gate valves shall be considered.

3.2 These Slurry Duty Knife Edge Gate Valves should be in successful operation for a period of at least Two (2) years in the preceding 7 years on the date for submission of bid.


3.3 Bidder should have service facilities (incl. assembly/ testing) in India and the same shall be indicated in the offer.

3.4 Bidder shall provide documentary evidence in support of his claim for having experience in design, manufacture, testing and supply, performance of Slurry Duty Knife Edge Gate Valves meeting the requirements mentioned in sl. Nos. 3.1, 3.2 & 3.3 for Ash Handling Plants which are in operation on the date of submission of bid.

3.5 The Make of offered Slurry Duty Knife Edge Gate Valves shall be subjected to approval by Customer / Customer's consultant. The bidder whose make not approved by customer/ customer's consultant will not be considered for evaluation of their offer.

3.6 BHEL-ISG reserves the right to assess the capabilities and capacity of the Bidder / Bidder's associates to perform the contract, should the circumstances warrant such assessment in the overall interest of the Employer.


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BHEL-ISG reserves the right to reject any or all bids or cancel/withdraw the Bids without assigning any reason whatsoever and in such case no bidder / intending bidder shall have any claim arising out of such action.


#### 4.00 TECHNICAL SPECIFICATION FOR KNIFE GATE VALVE:

4.01	Type	:	Slurry Duty knife gate valves
4.02	Applicable Code/Standard	:	As per manufacturer's standard
4.03	Size & Quantity	:	300NB, 4 Nos. ( <b>Uni-directional with deflection cone, pneumatic operated valve for Suction side</b> ) 4 Nos. ( <b>Bi-directional with split body design, pneumatic operated valve for Discharge side</b> ) 12 Nos. ( <b>Bi-directional with split body design, Manual hand wheel operated for pipe crossover arrangement on discharge side</b> )
4.04	Performance Parameters	:	Slurry Duty knife gate valves
	i) Working Pressure	:	15 MWC (for Suction side valve) 120 MWC (for Discharge side valve)
	ii) Design Pressure	:	Min. 1.1 times the working pressure.
	iii) Hydro Test pressure	:	1.5 times the working pressure
	iv) Design temperature	:	Max.70 deg C.
	v) Type	:	300NB Knife gate, Uni-Directional and Bi-Directional
	vi) Duty	:	To be designed for continuous duty
	vii) Application	:	To handle abrasive ash slurry
4.05	Design Standard	:	As Per Manufacturer's Standard (Bidder to specify the design standard followed)
4.06	Site Data	:	Refer Annexure-I

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<b>4.1</b>	<b>Material of Construction</b>	:	
<b>4.1.01</b>	<b>Knife Gate Valves</b>		
i)	Body	:	Cast iron FG-260 to IS:210
ii)	Gate	:	Stainless steel (ASTM A240 Type 304), edge stellited to 1.0 mm thk. With 350-400 BHN. Min
iii)	Stem	:	EN-8
iv)	Deflection cone as Applicable	:	Cast Ni hard 500BHN
v)	Seal for Bi-directional valves as applicable	:	Nitrile seal with steel reinforcement
vi)	Bore liners for Bi-directional valves	:	Polyurethane with steel reinforced / equivalent
<b>4.1.02</b>	<b>Air/Pneumatic Cylinder</b>		
i)	Make	:	As per Reputed Make
ii)	Type	:	Double Acting both end cushioning
iii)	Barrel	:	MS Tube(Honned & Chrome Plated)/ Hard Anodised
iv)	Piston Rod	:	SS410
v)	Piston & Piston Rod Seals	:	Nitrile/Polyurathene/Neoprene rubber
vi)	End Covers	:	CI Casting/ Aluminium Die Cast
vii)	Piston	:	CI Casting/ Aluminium Die Cast
<b>4.1.03</b>	<b>Solenoid Valve</b>		
i)	Make	:	As per Annexure-II
ii)	Type	:	5/2 way
iii)	Body	:	Forges Brass/SS/ Aluminium
iv)	Seat/Seal	:	NBR
v)	Duty	:	Dustproof, Explosion-proof and waterproof

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vi)	Enclosure ratings	:	IP 65
<b>4.1.04</b>	<b>Limit Switch</b>		
i)	Make	:	As per Annexure-II
ii)	Type	:	Mechanical Lever type
iii)	Contact Type	:	2 N/O + 2 N/C
iv)	Duty	:	Oiltight, dustproof, Explosion-proof and waterproof
v)	Construction	:	Aluminium die cast
vi)	Enclosure ratings	:	IP 67
<b>4.1.05</b>	<b>Pneumatic Tubing and fittings</b>		
i)	Tubing MOC	:	PU
ii)	Fittings MOC	:	Brass/GI (No pushfit acceptable)
iii)	Size	:	¼" to ½"

<b>4.2</b>	<b>Design &amp; Construction Features:</b>
i)	The operating pressure for air/pneumatic cylinders shall be 2 to 10 bar (g) and it shall be double acting type with both end cushioned. The pneumatic cylinders shall be tested to withstand 12 bar (g) air pressure during inspection.
ii)	Body shall be designed to withstand hydro test pressure of 1.5 times the working pressure.
iii)	The seat leakage test pressure shall be 1.1 times the working pressure and the acceptable leakage norms for Metal to metal seated uni-directional valves shall be as per guidelines contained in MSS SP 81. However no leakage shall be acceptable for Bi-directional knife gate valves.
iv)	Mechanical Position Indicators refers to provision of arrow marking for open and close limits/direction.

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v)	2 nos. Limit Switches per pneumatic operated valve shall be provided for open and close signals.
vi)	Material Test Certificate shall be provided for Body, Gate, hand wheel, stem/spindle for knife gate valves, Pneumatic cylinder solenoid valve, and limit switches.
vii)	Certificate for the same shall be submitted for review during inspection. The working air pressure for the solenoid valve shall be 1 to 10 Bar(g). The valves shall be 1/4" 5/2 way internal pilot operated, poppet type and the solenoid shall be plug in type. The solenoid shall have "Push & Turn" type of manual actuator.
viii)	Painting shall be as per manufacturer standard, however the total DFT should not be less than 100DFT.

<b>4.3</b>	<b>ACCESSORIES:</b>
	<p>Each manual / pneumatic operated knife gate valve shall include the following minimum accessories as part of each knife gate valve:</p> <ul style="list-style-type: none"> <li>• Companion flanges along with nuts &amp; bolts and gaskets shall be supplied for each valve.</li> <li>• Tool kit for operation and maintenance of the slurry duty knife gate valve.</li> </ul>

**5.00 TECHNICAL DATA SHEET TO BE FILLED BY THE BIDDER**

Sl.No.	Description	
1.00.00	<b>KNIFE GATE VALVE</b>	
1.01.00	<b>General</b>	
1.01.01	Make/Manufacturer	:
1.01.02	Application	:
1.01.03	Type	:
1.01.04	Size and Quantity	:
1.01.05	Mode of Operation	:
1.01.06	Design Standard	:




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1.01.07	Design Temperature	
1.01.08	Working Pressure	
1.01.09	Design Pressure	
1.01.10	Body Hydro-Test pressure	
1.01.11	Seat Hydro Test Pressure	
1.01.12	Seat Leakage Rate	
1.01.13	Mechanical Position Indicator	
1.01.14	End Connection	
<b>1.02.01</b>	<b>Material Specification</b>	
2.1.00	Body	
2.2.00	Gate	
2.3.00	Seat	
2.4.00	Spindle/Stem	
2.5.00	Deflection Cone	
2.6.00	Gland	
2.7.00	Gland Pack	
2.8.00	Hand wheel	
<b>2.00.00</b>	<b>AIR/PNEUMATIC CYLINDER</b>	
<b>2.01.00</b>	<b>General</b>	
2.01.01	Make	
2.01.02	Cylinder Type	
2.01.03	Bore Diameter	
2.01.04	Piston Rod Diameter	
2.01.05	Stroke	
2.01.06	Operating Pressure	
2.01.07	Operating Temperature Maximum	
2.01.08	Mounting	

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2.01.09	Pneumatic test pressure		
<b>2.02.00</b>	<b>Material Specification</b>		
2.02.01	Barrel		
2.02.02	Piston Rod		
2.02.03	Seals		
2.02.04	End Covers		
2.02.05	Piston		
<b>3.00.00</b>	<b>LIMIT SWITCH</b>		
<b>3.01.00</b>	<b>General</b>		
3.01.01	Make		
3.01.02	Quantity		
3.01.03	Type		
3.01.04	Switch Configuration		
3.01.05	Switch Rating		
3.01.06	Duty		
3.01.07	Contact Type		
<b>3.02.00</b>	<b>Material Specification</b>		
3.02.01	Construction		
<b>4.00.00</b>	<b>SOLENOID VALVE</b>		
<b>4.01.00</b>	<b>General</b>		
4.01.01	Make		
4.01.02	Valve Type		
4.01.03	Solenoid Type		
4.01.04	Quantity per pneumatic operated knife gate valve		
4.01.05	Model No.		
4.01.06	Working Pressure		
4.01.07	Port Connection		
4.01.08	Manual Actuator		
4.01.09	Solenoid Voltage		

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4.01.10	Solenoid Insulation		
4.01.11	Solenoid Power		
4.01.12	Protection Class		
<b>4.02.00</b>	<b>Material Specification</b>		
4.02.01	Body		
4.02.02	Seat/Seal		
<b>5.00.00</b>	<b>Pneumatic Tubing and fittings</b>		
5.01.00	Tubing MOC		
5.02.00	Fittings MOC		
5.03.00	Size		
<b>6.00.00</b>	<b>PAINTING:</b>		
6.01.00	Please indicate type of paint used / total paint DFT / Final RAL color shade of outside surface		

#### 6.00 INSPECTIONS & TESTING:

Inspection and testing shall be carried out in presence of BHEL-ISG and customer (BSEB)/ customer's consultant (STEAG) / representatives. The vendor shall furnish inspection & testing procedure & QAP for due approval from BHEL/Customer/customer's Consultant. Vendor is responsible for getting the Inspection & Test procedures and Quality Assurance Plans approved from the main Customer. Inspection & Test procedure, QAP will be furnished by vendor along with their offer.

All Quality plans shall be submitted in soft copy (word file/excel file/ and pdf file) for BHEL/Customer/customer's Consultant approval. As per the hold points mentioned in QAP, Vendor shall submit the inspection calls by E-mail with clear notice of 10-15days followed by hard copy to be sent by courier so as to reach BHEL desk within 3-4 days from the date of E-mailing of the document. BHEL shall inform within 7-10 days of receipt of

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inspection call whether inspection shall be carried out or waived off. After completion of inspection the material will be treated as cleared for dispatch by BHEL/Customer/customer's Consultant inspector, if inspection is OK as observed by Inspection Engineers.


Vendor shall maintain strict quality norms and standards for Bought out/self manufactured items through its wide network of quality departments throughout the country who carryout stage and final inspection of the product as per quality standards agreed by engineering/quality specialists.

**7.00 TECHNICAL INPUTS TO BE FURNISHED/ CONFIRMED ALONG WITH THE OFFER:**

Following documents are to be necessarily enclosed for each type of knife gate valve by the Bidder as a part of the Offer:

- a) Manufacturer's QAP.
- b) GA drawing.
- c) Sectional assembly drawings complete with bill of material.
- d) Duly filled in Bidder's Data Sheet.
- e) Catalogues for the offered models.
- f) Minimum 2 Nos. installations of similar type/rating/duty of knife gate valves in Thermal Power Plant to be indicated by the bidder in their offer.
- g) Bidder shall submit signed copy of all the pages of enquiry specification.
- h) List of Commissioning Spares other than mentioned at Clause No. 9 of this specifications.
- i) The list of tools in the Tool Kit for operation and maintenance of the knife gate valve.
- j) Bidder to specify the design standard followed for design of Knife gate Valves and also specify the equivalent Indian Standard/MOC for foreign standards
- k) Painting Schedule.

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**8.00 List of Drawings/Documents to be furnished after placement of L.O.I.**

8.01	Sectional assembly drawings complete with bill of material and its part numbers for approval.
8.02	GA drawing for approval.
8.03	Technical Data sheet for approval
8.04	Manufacturer's QAP for approval.
8.05	Operational and maintenance manual for information
8.06	Lubrication schedule for information
8.07	Painting Schedule for approval.
8.08	Any other relevant document which may be felt necessary during execution of Contract.
8.09	Successful bidder shall submit all the above with proper title block within a week of receipt of LOI. Bidder's LD on account of delay on submission and revised submission of these documents/drawings shall not be entertained.
8.10	The approval time for Drawings/ Documents from BHEL/Customer shall be considered by bidder as three weeks for their planning of supply of equipment within time frame.

**8.1 OPERATION & MAINTENANCE MANUAL:**

O & M manual shall contain the following:


1. Principle of operation of the equipment.
2. Details of preventive / repair maintenance for equipment and accessories used.
3. Details about the general specifications, design capacities of equipment and their function.
4. Equipment Bidder's address, telephone nos., contacts person details to be furnished.
5. Required Dismantling devices, tools etc.,
6. List of DO's and DO NOT's.
7. Test certificates.
8. All drawings.
9. O& M Manual for Solenoid valves.
10. O& M Manual for air/Pneumatic Cylinders.

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<p>11. O&amp; M Manual for Limit Switches.</p> <p>12. Storage and erection instructions.</p> <p>13. Proper procedures &amp; sequence of operation.</p> <p>14. Details of consumable.</p> <p><b>Note:</b> i) All manual shall be supplied in proper bound books or in folders, preferably in A4 size.</p> <p>ii) The volume and section number shall be intimated by the Bidder.</p> <p>iii) Prospective Bidder will submit the regular progress reports for self manufacturing &amp; their bought out items equipment ordering /manufacturing status, drgs status once in fifteen days.</p> <p>iv) Bidder shall directly send O&amp;M Manuals to BHEL-ISG HQ as per distribution schedule given below in Clause – 8.2 with covering letter copy to Project Manager, BHEL-ISG, Bangalore. BHEL Project Manager shall co-ordinate and ensure submission to Customer/customer's Consultant for the equipments as per BHEL standard practice.</p> <p><b>8.2 DISTRIBUTION OF DRAWINGS/ DOCUMENTS DURING DETAIL ENGINEERING:</b></p> <p>a) <u>Distribution of drawings/ documents:</u>  <u>For Approval and Information category drgs :</u>  Initial submission –Soft copy (AutoCAD version and Pdf version)  Commented copies back to the sender- Soft copy (Pdf version)  Resubmission of revised drg – Soft copy (AutoCAD version and Pdf version).  Final approved drawings/documents – 5 nos. hard copies.</p> <p>b) BHEL / Customer / customer's Consultant shall review and furnish their comments/approval within 15 days from the date of receipt of drawings/documents. M/s BHEL/Customer/customer's Consultant will furnish Comments /approval to the Vendor after review of each drawing/document.</p> <p>c) Considering the criticality of the project requirement, all efforts shall be made to re-submit the drawings/documents as early as possible. However, the commented drawings shall be re-submitted by successful Bidder within 7 days from the date of receipt of commented drawings/ documents from BHEL/Customer/customer's Consultant.</p> <p>d) Drawings approved under Cat-B shall hold good for construction/execution subject to taking care of comments of M/s BHEL/Customer/customer's Consultant.</p>
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- e) In case, successful Bidder does not agree with any specific comments, successful Bidder shall furnish the explanation for the same to M/s BHEL/Customer/customer's Consultant within the framework of contractually agreed specification for consideration, acceptance and formal approval under Category A, as per specifications.
- f) For Category C, BHEL/Customer/customer's Consultant will send soft copies of marked up drawings for further action by successful Bidder.
- g) Final distribution of copies of all Category A approved drawings/documents shall be submitted by successful Bidder to BHEL/Customer/customer's Consultant as per distribution schedule given above.

#### **9.0 COMMISSIONING SPARES:**


The commissioning spares as mentioned below shall be included in bidder's scope:

- a) 1 set of Seal Kit for pneumatic cylinder of suction side knife gate valves. One set of seal kit refers to the requirement of seals for one pneumatic cylinder.
- b) 1 set of Seal Kit for pneumatic cylinder of discharge side knife gate valves. One set of seal kit refers to the requirement of seals for one pneumatic cylinder.
- c) 1 set of gaskets for suction side pneumatic operated knife gate valves. One set of gaskets refers to the requirement of gaskets for one valve.
- d) 1 set of gaskets for discharge side pneumatic operated knife gate valves. One set of gaskets refers to the requirement of gaskets for one valve.
- e) 2 sets of gaskets for discharge side manual hand wheel operated knife gate valves. One set of gaskets refers to the requirement of gaskets for one valve.
- f) 2 nos. of limit switches for pneumatic operated knife gate valves.
- g) 1 set Tool kit for operation and maintenance of the knife gate valve. Bidder to submit the list of tools in the Tool Kit for operation and maintenance of the knife gate valve.

#### **10.0 ESSENTIAL SPARES:**

Bidder to furnish the list of essential spares required for initial 3 years of operation of Knife Gate Valve..

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 <p><b>BHEL-ISG BANGALORE</b></p>	<p>2X250 MW TPP BSEB Barauni <b>Technical Enquiry Specification for Slurry Duty Knife gate valves For Ash Handling System</b></p>	<p><b>DOCUMENT NUMBER</b>  IS-1-10-2013/AHP-006</p>
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### 11.0 PROJECT INFORMATION

Bihar State Electricity Board (BSEB) is setting up a Coal fired Thermal Power plant at Barauni, in Begusarai (Bihar). The capacity of the proposed Thermal power project is **2 X 250 MW** configurations with sub – critical steam parameters. The proposed units is expansion to the existing Barauni TPS, Begusarai.

Owner/Purchaser (or Customer)	BIHAR STATE ELECTRICITY BOARD (BSEB)
Customer's Consultant	STEAG Energy Services (India) Pvt Ltd., Noida
Project Title	BSEB - 2 X 250 MW BARAUNI TPS, UNIT 8 & 9
Project location	BARAUNI , BIHAR
Existing station	BARAUNI TPS UNIT 1 To 7.
Longitude / latitude	86 <sup>0</sup> 01'36"E / 25 <sup>0</sup> 23'36"N
Elevation (above Sea level)	41.76 m above MSL
Transport facilities	By Rail / Road
a) Nearest Railway station /Gauge	Barauni
Ambient Air Temperature	Temperature - maximum 42.4 deg C minimum 8.4 deg C
<b>Design Ambient Temperature</b>	<b>50° C</b>
Relative humidity	73%
Design Relative humidity	100%
Maximum Wind speed	17 m/ sec
Maximum Rainfall	352.8 mm in 24 hrs

#### Plant location.

The Proposed Plant is 8 Km from Barauni town within Barauni TPS closed to Barauni-Mokama section of national highway (NH-31).

#### Access to Site.

Approach to the site by road is from Barauni- Mokama section of national highway (NH-31).

#### **Seismological Parameters**

The proposed project is located in seismic Zone IV, accordingly Seismic forces should be considered as per IS: 1893.

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BHEL-ISG  
BANGALORE

2X250 MW TPP BSEB Barauni  
**Technical Enquiry Specification for  
Slurry Duty Knife gate valves For Ash  
Handling System**

DOCUMENT NUMBER

IS-1-10-2013/AHP-006

**12.0 VENDOR LIST OF ELECTRICAL ITEMS**

Sl.No	ITEM DESCRIPTION	Sl.No	VENDORS
1	SOLENOID VALVES	1	ASCO, Chennai
		2	Rotex Manufacturers & Engineers Pvt. Ltd.,
		3	Yokogawa India Limited,
		4	UV International, Madras
2	LIMIT SWITCHES	1	KA SCHMERSAL, GERMANY
		2	JOHAN VOLLENBROICH, GERMANY
		3	IFM ELECTRONIC, GERMANY
		4	JAYASHREE ELECTRON PVT. LTD,
		5	GENERAL INSTRUMENT CONSORTIUM
		6	SIEMENS India Ltd.
		7	BCH Electric Limited
		8	PEPPERL+FUCHS(INDIA) PVT LTD
		9	JAI BALAJI & CO., CHENNAI
		10	ELECTRO MECHANICAL INDIA, KOLKATA
		11	JAYASHREE ELECTRON PVT. LTD,
		12	ELECTRICAL EQUPT. CORPN., NEW DELHI
		13	AG Systems, (AG Electronics )MUMBAI
		14	Beta Systems engineering
		15	PROTOCONTROL INSTRUMENTS (I) PVT LTD