



BHEL-ISG  
BANGALORE

5x800 MW YADADRI THERMAL POWER STATION  
(Stage 1&2), NALGONDA  
Technical Enquiry Specification of  
100 MT Weigh Bridge

SPECIFICATION NO.  
IS-4-ES- 699-300-M004

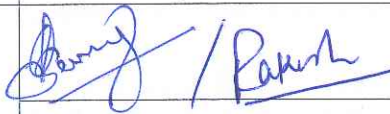
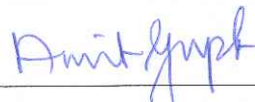
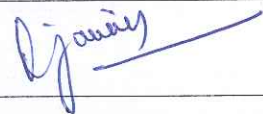


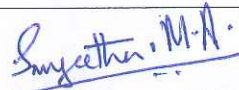


5x800 MW YADADRI THERMAL POWER STATION (Stage 1&2), NALGONDA  
(TSGENCO)

TECHNICAL ENQUIRY SPECIFICATION FOR 100 MT WEIGH BRIDGE



BHARAT HEAVY ELECTRICALS LIMITED  
INDUSTRIAL SYSTEMS GROUP  
BANGALORE

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**Note: Bidder shall submit the following documents along with the bid for technical assessment.**

- 1. Technical specification & Annexures signed and stamped.**
- 2. No deviation sheet as per the schedule.**
- 3. Compliance cum confirmation certificate signed and stamped.**
- 4. Credentials with reference to technical Pre-qualification requirement.**
- 5. Unpriced format, duly mentioned 'Quoted' against each serial no below each column signed and stamped.**



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## 1.0.0 PROJECT INFORMATION:

### 1.1.0 General

1.1.1 The specification has been prepared for scope of 100 MT Weigh Bridge (05 Nos) and accessories for 5X800 MW TSGENCO Yadadri Stage1&2 for which TCE, Bangalore is the consultant for the customer TSGENCO. BHEL is the principal contractor who is responsible for the establishment of the power project for 5 Units. Industrial Systems Group (ISG) of BHEL located at Bangalore is executing the Ash Handling System of the 5X800 MW TSGENCO Yadadri Project.  
Refer Annexure 01 for further details.

### 1.2.0 Plant description

- 1.2.1 Incoming materials shall be received in the plant by road trucks / tractor-trailers.
- 1.2.2 The trucks / trailers are weighed with material before unloading in store area in the power plant and tare weighed after unloading.
- 1.2.3 The receipt of material in the power plant will be in either of the Normal trucks or Tractor trailers.

### 1.3.0 Design requirements

- 1.3.1 The weighbridge shall be suitable for 24 hrs. of operation per day.
- 1.3.2 The weighbridge shall be suitable for operation during rainy season.
- 1.3.3 The weighbridge shall be capable of withstanding dynamic load imparted by the vehicle movement and braking.
- 1.3.4 The weighbridge shall calibrate automatically the variation due to rains and other errors.
- 1.3.5 The weighbridge equipment shall be electronic load cell with microprocessor-based type.
- 1.3.6 The weighbridges shall be pit less type. Approximately 100 weighments per day are expected to be made using the weigh bridge.
- 1.3.7 **The Load Cells** shall be of multi column compression / double-ended shear beam type, indigenously manufactured, shall operate on strain gauge principle, hermetically sealed and must be vibration resistant. The number of load cells to be used should be minimum 10 nos. with each load cells having maximum safe over load protection capacity. Suitable compensation must be built in for temperature variation. Maximum safe over load protection shall be provided upto 300% of the rated capacity and maximum load for mechanical damage must be 400% of the rate capacity. Overall system accuracy shall be  $\pm 0.25\%$  of actual weight. The system accuracy shall be repeatable. The system shall have in built accuracy Recheck capability. The fixing of the load cells must be such as to facilitate easy access for replacement in case of fault. Load cell should conform to IP 68 protection and should be tested by a National Test House for the same and have overload parameters.
- 1.3.8 **Weighing Equipment** (Digital Weight Indicator) shall be desk top type and shall be suitable for working in dusty and hot condition. Digital weight indicator shall be microprocessor based and shall be protected against all forms of Electro Magnetic and Radio frequency interference.



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## 2.0.0 SCOPE OF WORKS:

### 2.1.0 Scope of supply

- 2.1.1 Five (5) nos. of complete weighbridge platform with load cells, Junction box, digital weight indicator, totalizer and test weight for calibration along with the following accessories for each weighbridge.
- 2.1.1.1 PC and provision of interfacing with PC to be given with necessary software and user manual. PC shall have the configuration as mentioned in Data sheet of this specification.
- 2.1.1.2 Laser jet printer (colored) A4 size shall be provided.
- 2.1.1.3 UPS with 1/2-hour backup facility.
- 2.1.1.4 All necessary cables from load cells up to digital weight indicator, totalizer and PC.
- 2.1.1.5 Conduits & fixing hardware required for cabling.
- 2.1.1.6 Earth strip and wire required for earthing of bidder supplied Equipment/Instruments.
- 2.1.1.7 All other accessories and limits required to complete the weighing system.
- 2.1.1.8 One (1) no PDB (if required) for each control room.
- 2.1.2 One (1) no PC & Printer and provision of interfacing this PC with all other control room for common monitoring. This PC to be located on the office room as shown in the GA drawing. Hardware & Software required for data displaying in office room is in the scope of bidder.
- 2.1.3 Chair, table, required for the control rooms and office room
- 2.1.4 All the items shall be supplied from TSGENCO approved sources.

### 2.1.5 Notes

- 2.1.5.1 The weighbridge shall be tested for full capacity and certified to be accurate before received at the site. After erection at site vendor shall arrange for the inspection of the weighbridge by the Inspector of weights and measures and get the weighbridge stamped by him. The requisite fees for such first stamping shall be paid by the vendor. The requisite test loads for stamping shall also be arranged by the Bidder.
- 2.1.5.2 All the instruments/equipment/electrical items shall be provided & designed with maximum star rating as available in line with energy conservation policies notified by BEE, GOI
- 2.1.5.3 Painting shall be as per mentioned the specification. Final finish paint shall be applied after erection.
- 2.1.5.4 Supply and application of grouting, shims for the erection of weigh bridge are in the scope of bidder.

### 2.2.0 Civil

Civil work are not in bidder's scope of work. However, Bidder has to furnish recommended civil drawing of weigh Bridge, control room as well as foundation drawing of equipment.



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### 2.3.0 Electrical

Electrical power of 240 Volts A.C. + 10%, 50 Hz +3% or -5% will be made available in the weighbridge control room by BHEL. Further distribution of power supply and other required Voltage levels for the system shall be in the scope of bidder. Bidder shall furnish power supply requirement. Earth pit is in the scope of BHEL.

### 2.4.0 Scope of Services

- 2.4.1 Intra-site transportation of weigh bridge from storage area at site, Erection, site testing and commissioning of all items covered under scope of supply.
- 2.4.2 Submission of all interface data required for design and engineering of the system, which are included in the scope of supply, defined above.
- 2.4.3 Preparation and submission of drawings / documents/ Cable Schedules for approval / information to purchaser as per the drawings / documents submission schedule.
- 2.4.4 Quality plan, inspection and testing of equipment at works submission of test certificate.
- 2.4.5 Submission of O&M manual and As-built drawing.
- 2.4.6 Training of TSGENCO's personnel in operation and maintenance of the complete system. Certification / stamping of the weigh bridge by authorities of weights and measures.

### 2.5.0 Consumables

- 2.5.1 Specification including brand names and quantities of all consumable materials such as lubricants, flushing oil, hydraulic fluids etc. required for start-up, initial filling, commissioning are to be submitted by the Bidder.
- 2.5.2 Supply of all consumables (mentioned at S. No. 2.5.1) required for initial fill, commissioning and demonstration test is included in the scope of bidder.

### 2.6.0 Maintenance Tools and Tackles

- 2.6.1 One (1) set of special tools and tackles required for operation, maintenance, inspection and repair neatly packed in steel boxes completes with operating instructions for the equipment shall be furnished.

### 2.7.0 Mandatory Spares

- 2.7.1 Load cells - 05 nos. The bidder shall supply these items only after the intimation by BHEL.

### 2.8.0 EXCLUSIONS FROM BIDDER'S SCOPE OF WORK

- 2.8.1 Access roads and approaches to the weighbridge.
- 2.8.2 Receipt of the material at site and storage. (However, receipt of the material from BHEL storage, intra site movement, erection , commissioning, PG test and erection is in the scope of the bidder)
- 2.8.3 Civil works.



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**3.0.0 TECHNICAL DATA SHEET:**

Sl. No.	DESCRIPTION	VALUE
1	Weigh Bridge Type	Electronic Pit Less Type, Microprocessor based Road Weigh Bridge. Make: TSGENCO approved make
2	Quantity	Five (5) Nos. (Two (2) Nos. for Stage-I & Three (3) Nos. for Stage-II)
3	Codes & Standards	IS-1436, IS- 9281 & OIML for Load cell.
4	Weighing Capacity	100 Tonnes with 20000 mm X 4000 mm platform size of anti-skid steel
5	No. of Trucks / trailers for weighment	100 Trucks / tractor / trailers per day
6	Type of trucks / trailers for weighment	18 wheeler
7	Control Room Size	Refer Annex-3, GA of Weigh Bridge Control Room
8	Load Cells Type	Double-ended shear beam type hermetically sealed & vibration resistant, working on strain gauge principle and system shall have in built accuracy recheck Capability.
9	Number of load cells per weighbridge	Minimum 10 Nos. each with rating of maximum safe over load capacity. Suitable compression must be built for temperature variation.
10	Maximum Safe over load protection	300 % of rated capacity
11	Maximum load for mechanical damage	400 % of rated capacity
12	Least count of the graduation	10 kg
13	Weighing data storage capacity	Minimum 500 weighing
14	Digital weight indicator	Will be provided to display weight microprocessor base
15	UPS	½ hour backup.
16	Printer	Coloured laser jet Printer ( A4 type )
17	Accuracy Required	±0.25 % of actual weight
18	Rating of each load cells	Minimum 2 times the rated weight divided by the number of load cells.
19	Load cell protection	IP 68. Certificate from national test house and have overload parameters shall be provided.
20	Visual display unit	Based on SMT technology to be provided in weight indicator
21	Location of PC / Printer	In the control room near weigh bridge and Office room
22	Totalizer	Minimum 6 digit type to be provided in the weigh bridge



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Sl. No.	DESCRIPTION	VALUE
23		<b>MATERIAL OF CONSTRUCTION</b>
a.	Platform	As per IS2062 Grade-A and Should be anti-skid type. Thickness of Platform Plate shall not be less than 12 mm
b.	Load cell	Alloy Steel
24	Digital weight indicator	At least 20 mm high character display for backlight LCD display
25	Display modes	Weight and 16 mm for message with a) Indicate weight b)Indicate calibration-Auto zero tracking and calibration to be checked automatically every 5 minutes
26	Display of key board entered values	10 mm high characters
27	Indicator	Kg or Tonne & Resolution shall be 10 kg
28	Protection	From electromagnetic and radio interference
29	PC Configuration (Industrial Type PC)	a) Processor: Core i7 Processor, 3.2 GHz b) RAM: 4GB DDR2 RAM c) Mother Board: Intel Express Chipset d) Graphics: On board with min. 512MB Video Memory e) Hard Drive: 1TB HDD f) DVD R/W: 1 no. 52X CD RW & 16X DVD RW IDE Combo g) Ethernet Card: 2 nos. X 10/10/1000 MB h) Network Controller: 1 GbE NIC upgraded to 10 GbE i) Serial Port (RS232): 2 Nos. j) Parallel Port: 1 no. k) USB Port: 4 nos. l) Peripherals: 1no.USB Optical Mouse, 1no. USB Multimedia QWERTY Keyboard, 1no.24" Colour TFT/LCD Monitor m) OS: Windows 8 n) MS Office 10 o) Standard Weighing Software capable of providing details like net weight, tare Weight, total weight etc. <b>SOFTWARE FOR WEIGHBRIDGE MANAGEMENT:</b> Complete weighbridge management user friendly Software for processing data date wise, truck wise, challan wise, shift wise, customer wise data for generation of daily / Weekly & monthly report. Provision for connecting with other weighbridges/ server computer by LAN is provided in PC.



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30	Weighment & printouts	<ol style="list-style-type: none"><li>1. Name of contractor</li><li>2. Date and Time</li><li>3. Serial Number</li><li>4. Product Code</li><li>5. Customer Code</li><li>6. Truck Registration Number</li><li>7. First (Gross) Weight (I)</li><li>8. Second (Tare) Weight (II)</li><li>9. Net (Pay load) Weight (III)</li><li>10. LXBXH (M)</li></ol> Weigh slip after every weighment (i.e.) I & II weighments. Built in clock provide date and time to printer. Facility for totalizing the different material received.
31	Test Weight for Calibration	1 Ton Capacity to be provided by the bidder.
32	Furniture in control room and Office room (Chair and Table)	Table, Chair is to be provided by the bidder.
33	Performance at Site	Performance of weigh bridge is to be carried out by the bidder at site
34	Painting (Only for Weigh Bridge platform)	<p><b>Surface Preparation:</b> Degreasing and surface preparation to SA 2 1/2.</p> <p><b>Prime coat:</b>-One (1) coat of Epoxy based polyamide cured (2) pack HB zinc phosphate primer. Dry-film thickness 75 microns per coat.</p> <p><b>Intermediate coat:</b> One (1) layer 2 pack high build epoxy polyamide MIO, dry film thickness 100 micron.</p> <p><b>Finish coat:</b> Application of two coats of chlorinated rubber paint. Dry-film thickness 30 microns per coat.</p> <p><b>Total system:</b> Dry film thickness 235 microns. Final shade of paint shall be as per manufacturer's standard</p>
35	Totalizer / Digital Weight Indicator	<p><b>Details of Weighing Electronics:</b></p> <p>Desk top type, compact, suitable for dust, hot, humid condition without Air Condition Microprocessor base compact Abs housing with Splash proof front panel IP65, With Protection of electromagnetic &amp; radio interference. Annunciations, Overload Indication: OL (OVERLOAD) Display for over capacity.</p> <p>Auto Calibration system:-Indicator has a facility for auto calibration and also locking facility after calibration. Calibration to be Check automatically and pass ward protected.</p> <p>Digital Filtering System: - Indicator has digital filtering system in Indicator has digital filtering system in Indicator has digital filtering system in case for oscillatory loads.</p>



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		<p>Standard Function:</p> <ol style="list-style-type: none"> <li>1. High Precision A\D Conversion with Readability1\30000.</li> <li>2. Able to set-up zero-tracking range. Zero(auto\manual) range Linearity correction by auto/manual calibration.</li> <li>4. Standard RS232 communication interface with select able baud rate and Communication methods.</li> </ol> <p>Technical parameter:</p> <ol style="list-style-type: none"> <li>1. A\D conversion method: Double integral</li> <li>2. A\D conversion speed: 7- 10times/sec.</li> <li>3. Max A\DCONVERSION:700000.</li> <li>4. Input signal range: 0mV-30mV</li> <li>5. Input senility.≥ 1μv\e.</li> <li>6. Load cell excitation: DC 15V;I≤350mA</li> <li>7. Max. Connection number of load cell: 6 at 350 ohm</li> <li>8. Load cell Connection mode: 6 wire, auto compensation for long distance ≤ 50meters</li> <li>9. Vertical counts: 3000</li> <li>10. Max. Internal counts: 30000</li> </ol>
		<ol style="list-style-type: none"> <li>11. Division: 1/2/5/10/20/50/100 optional</li> <li>12. Display:-Minimum 20 mm character height for backlight LCD or LED, 6 digit indication</li> <li>13. Display range:- 99990~320000(d=10)</li> <li>14. Score board interface (standard) Serial standing signal by current looporRS232Cwith baudrate1200/2400/4800/9600 Transmission distance: Current loop≤ 2000 meters; RS232C ≤ 30meters</li> <li>15. Communication Interface (RS232C standard Serial communication interface, with selectable baud rate by continues sending method or on command method Transmission distance: RS232meters ≤30meters;</li> <li>16. Power supply: Volts AC-240V, (+10%), 50Hz+3%or-5%.</li> <li>17. Front panel control zero balance with zero key. Tare key for display weight while it is positive and indicator display net weight, gross weight Input/ enter key for input data or use for next step of calibration and setting. Weight/ escape key for go out of process</li> </ol>
36	LOAD CELL TECHNICAL DETAILS	<ol style="list-style-type: none"> <li>1. Type- Double Ended Shear Beam</li> <li>2. Construction -Alloy Steel</li> <li>3. Operating Temperature --30 to +65- degree</li> <li>4. Maximum Excitation- 15 VDC</li> <li>5. Recommended Excitation- 10 to 12 VDC</li> <li>6. Zero Balance- +/- 1.0 % FS.</li> </ol>



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7. Temperature Effect on zero- + 0.02% FS
8. Sensitivity -2 .0 + 0.002mv /v
9. Input Resistance- 725 + 25 Ohms
10. Out Put Resistance- 700 + 05 Ohms
11. Insulation Resistance- > 5000 M oh
12. Total Error- + 0.02% FS
13. Cable Dia- 6 mm
14. Creep (30 minute) - 0.02% FS
15. Protection class -IP 68
16. Cable length -Actual required as per layout (minimum Cable length 12 Mtr. to be supplied)
17. Standard –OIML

**37 Junction Box**

a.	Type of Enclosure	Dust tight & weatherproof conforming to IP 65
b.	Material	3 mm sheet steel / fiberglass reinforced polyester(UV stabilized)
c.	Paint	i) Exterior : Opaline green shade 275 of IS: 5 ii) Interior - Brilliant Glossy White.
d.	Gasket Material	Neoprene
e.	Cable Entry	3 mm (min) Bottom / side Gland plate
f.	Box Mounting	4 x external lugs, 11mm diameter holes/slots Galvanized steel support frame( if required )



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#### **4.0.0 INSPECTIONS , TESTING & DEMONSTRATION GUARANTEE**

The above described items shall be tested by manufacturer in accordance with approved QAP and relevant standards. The material inspection, testing & certificates in accordance with relevant standards shall be sent to BHEL-ISG HQ. After commissioning, load test shall be performed by the successful bidder at site.

#### **4.1.0 DEMONSTRATION TEST**

The values of demonstrate parameters that are to be guaranteed are furnished in this specification. The equipment shall be guaranteed to meet performance requirements required by this specification and rectification shall be carried out until satisfactory results are obtained. BHEL reserves the right to reject the equipment should the performance values fall short of those indicated in the Data Sheet-A. In case of such option of rejection, being exercised by BHEL, the tender shall replace the equipment, which shall meet the guaranteed values.

#### **4.2.0 GUARANTEE AND PENALTY FOR SHORTFALL IN PERFORMANCE**

4.2.1 The Bidder shall provide guaranteed performance for the entire package in the format schedule of demonstration test and the values provided therein shall be binding on the Bidder.

4.2.2 The terms under guarantee shall be as follows:

Items for which shortfall in demonstration is not acceptable and which must be corrected at no extra cost to the BHEL/TSGENCO within guarantee period. All items specified in Schedule of demonstration test shall not be accepted for any shortfall in performance.

4.2.3 For these items above, the Bidder shall carry out modifications even before commencement of trial operation to obtain the guaranteed performance. These parameters must remain stable throughout the period of trial run. All work related to correction and subsequent trial run to prove stability/reliability shall be completed within the guarantee period at no extra cost to the BHEL/TSGENCO

4.2.4 If finally, inspite of all practicable effort on the part of the Bidder, the stipulated guarantees on these parameters are not established, the BHEL/TSGENCO retains the option to reject the equipment. In case the option to reject is exercised by the BHEL/TSGENCO, the Bidder shall replace the rejected equipment within a reasonable period of time as will be indicated by the BHEL/TSGENCO and achieve the performance as guaranteed in the document.

#### **4.3.0 Test Codes**

4.3.1 The provisions outlined in the international or Indian codes shall generally be used as a guide for all above test procedure unless otherwise specified in Detailed Technical Specification.

#### **4.4.0 Taking over**

4.4.1 Upon successful completion of all the Client (TSGENCO) Acceptance Tests, the BHEL/TSGENCO shall issue to the Bidder a Taking over Certificate as a proof of the final acceptance of the equipment. Such certificate shall not relieve the Bidder of any of his obligations which otherwise survive, by the terms and conditions of the Contract after issuance of such certificate.



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4.5.0 SCHEDULE OF DEMONSTRATION TEST

Sl.no	Description	Unit	Data
1	<i>Weighing Capacity</i>	<i>Tons</i>	
2	<i>Platform Size</i>	<i>Mx M</i>	
3	<i>Accuracy</i>	<i>Kg</i>	



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**5.0.0 QUALITY ASSURANCE, TESTING, INSPECTION & HSE**

**5.1.0 Quality Assurance**

- 5.1.1 The detailed Quality Plans for manufacturing and field activities should be drawn up by the Bidder, separately in the format attached under Section Technical data sheets and schedules and will be submitted to Consultant/TSGENCO for approval. Such quality plans will be finalized before award.
- 5.1.2 These approved documents shall form a part of the contract. In these approved quality plans, Client shall identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of the Client's Engineer or his authorized representative and beyond which the work will not proceed without consent of Client/Authorized representative in writing.
- 5.1.3 No material shall be despatched from the manufacturer's works before the same is accepted subsequent to pre-despatch final inspection including verification of records of all previous tests/inspections by Client Engineer/Authorised representative, and duly authorised for despatch issuance of MDCC.
- 5.1.4 For all spares and replacement items, the quality requirements as agreed for the main equipment supply shall be applicable.
- 5.1.5 The equipment shall be guaranteed to meet performance requirements required by this specification and rectification shall be carried out until satisfactory results are obtained. The Client reserves the right to reject the equipment should the performance values fall short of those indicated in the schedule of Technical data sheets. In case of such option of rejection, being exercised by the Client the Bidder shall replace the equipment, which shall meet the guaranteed values.

**5.2.0 Inspection, Testing and Inspection Certificates**

- 5.2.1 The Bidder shall give the Client/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the Bidder's account except for the expenses of the inspector's. The Client/Inspector, unless the witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date on which the equipment is noticed as being ready for tests/inspection failing which the Bidder may proceed with test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of test reports.

**5.3.0 Client Acceptance Tests, Trial operation and Demonstration test**

- 5.3.1 After the pre-commissioning tests are satisfactorily over, the complete equipment shall be placed on initial Operation during which period the complete equipment shall be operated integral with sub-systems and supporting equipment as a complete plant.

**5.4.0 Refer Annexure -6 for HSE Manual.**



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**6.0.0 TECHNICAL INPUTS TO BE FURNISHED DURING DETAILED ENGG.**

- i) GA of 100 MT Weigh Bridge - Submission within 3 weeks from the date of LOI
- ii) Data Sheet of Weigh Bridge - Submission within 3 weeks from the date of LOI
- iii) QAP of Weigh Bridge - Submission within 3 weeks from the date of LOI
- iv) Required civil assignment drawings- As applicable.
- v) Any other drawings and datasheets -As applicable.
- vi) Erection Manual - Submission within 12 weeks from the date of LOI
- vii) O&M Manual - Submission within 12 weeks from the date of LOI

**NOTE:-**

1. All Re-submissions shall be made within 10 days of receiving comments from BHEL / customer.
2. Incomplete drawings/documents shall not be treated as submitted.



BHEL-ISG  
BANGALORE

5x800 MW YADADRI THERMAL POWER STATION  
(Stage 1&2), NALGONDA  
Technical Enquiry Specification of  
100 MT Weigh Bridge

SPECIFICATION NO.  
IS-4-ES- 699-300-M004

### 7.0.0 ELECTRICAL AND C&I VENDOR LIST

Sl. No	Name of the Item	Sl. No	Name of the vendor
1	LOAD CELL	1	ZEMIC (USA)
		2	KELI (SINGAPORE)
		3	FLINTECH
		4	SENSOTRONICS
2	Work stations, Server, PC's	1	HP
		2	IBM-LENOVO
		3	DELL
3	Printers ( Laser/Inkjet)	1	EPSON (Intjet only)
		2	HP
		3	IBM
		4	CANON
		5	XEROX
		6	LEXMARK
4	UPS (MINI)	1	HITACHI-HIREL
		2	APC
		3	DELTA
		4	EMERSON
		5	APLAB
		6	SCHNEIDER ELECTRIC
5	UPS BATTERY	1	EXIDE
		2	AMCO

Note:

1. The list furnished above is a tentative list and has been given for information. The final list of sub-vendors shall be as accepted by customer. No price implication shall be attributable to BHEL on addition or deletion of sub-vendors. For items not covered in the list but required for this package, vendor list shall be forwarded during detailed engg.