An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
Purchase / PCPS

TITLE **SELF CLEANING ROTARY VALVES – 8 Nos**	Phone: +91 431 2574104/2574072 Fax : +91 431 252 0233 / 0525 Email : james@bheltry.co.in

	Reference Number: Enquiry MM/PCPS/SCRV	**Enquiry Date: 30.08.2011**	**Due date for submission of quotation: 30.09.2011**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

BHEL/Trichy is looking for ..... Supply of **SELF CLEANING ROTARY VALVES**

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited) under enquiry reference "**MM/PCPS/SCRV**"	
Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For **Bharath Heavy Electricals Limited** Dy.Manager / Purchase/ PCPS

SPECIFICATION FOR SELF CLEANING ROTARY VALVE (SCRV)

CONTENTS:

	NAME	SIGNATURE	DATE
PREPARED	**Y.PRASANNAKUMAR**		07-05-2011
CHECKED	**V.RAGHAVENDRAN**		07/05/11
APPROVED	**M.MADHAPPAN**		07/05/11

SPECIFICATION FOR SELF CLEANING ROTARY VALVE (SCRV)

1. SCOPE:

1.1 Design, manufacture, Inspection, testing, painting, packing and supply of Self Cleaning Rotary Valve (SCRV) along with motor, couplings, gear box, base frame, and commissioning spares etc.

1.2. Supply of special tools required for operation and maintenance of *rotary* valve.

1.3. Supply of first fill of lubricants in a separate container.

1.4. The extent of scope stated herein is not necessarily exhaustive and it shall not relieve the vendor form his responsibility to provide goods and services necessary to satisfy the performance criteria and guarantee specified.

1.5. For project specific technical input data refer enclosed Annexure-A.

1.6. For technical specification data sheet to be filled and submitted by vendor along with offer, Refer enclosed Annexure-B.

1.7. For composition of fuel, refer Annexure-D.

1.8. For location, orientation and space constraints of the SCRV, enclosed Annexure-E.

2. APPLICATION:

2.1. The SCRV are intended to feed solid fuel (coal/lignite/pet coke) from drag link chain feeder continuously to the CFB combustor, which is at a pressure and temperature as specified in the project specific date sheet. Casing temperature may go up to 300 / 350 Deg C.

2.2. Acts as a seal in order to prevent flame from furnace to feeder, during operation.

3. DESIGN CONSIDERATION:

3.1. The SCRV shall be designed to operate at two different speeds. A boiler has four feeding system to feed solid fuel to the furnace(two feeding systems on the left side and two feeding systems on the right side of boiler). When all the systems are in operation, the valves shall operate at low speed and transfer solid fuel at the normal rate as specified in the project specific data sheet. Only in case of trip of one system on either left/right side of boiler, the valve, which is connected to the system in operation(on the same side), shall switch to high speed and transfer two times the normal rate to meet full load operation of the boiler.

3.2. The SCRV shall be equipped with a twin-arm scraper as shown in sheet 2 of 3 of Annexure-E to remove sticky material from the rotor compartments.

3.3. The SCRV casing shall be of fabricated. It is to be stress relieved after the welding operation.

3.4. The casing inner surface shall be lined with replaceable stainless steel sleeve to prevent corrosion.

3.5. The pocket shall be lined with Stainless Steel plate.

3.6. The SCRV diameter and number of pockets shall be optimized considering the maximum amount of material to be transported, the particle size distribution, variation in bulk density, temperature of the material and filling efficiency etc.

3.7. Radial clearance selected should consider the thermal expansion due to temperature and material size distribution.

3.8. The SCRV should be provided with zero speed switches.

3.9. Provision shall be given for reverse rotation of the SCRV.

3.10. SCRV shall be designed suitable to outdoor operation.

3.11. Suitable stuffing boxes are to be provided on either- side of the casing where the Shaft passes through the casing, to withstand design pressure as specified in Annexure-A.

3.12. For overload protection shear pin shall be provided in the drive end shaft.

3.13. Suitable weather protection cover shall be provided to the drive system.

3.14. Purging Air: The rotary valve shall have three separate purging air loops. Loop-I may lead to the annular air spaces at the shaft seals. It is to prevent ingress of breeze, which may lead to premature wear of the seals. Loop-II shall purge the sidewalls of the rotor. It is to prevent material from getting between the walls of the rotor and those of the casing in order to forestall cocking and possible freezing. Loop-III shall lead to the rotor pockets at the shaft level. It is to ensure that gases cannot get from the combustor into the conveying system upstream of the rotary valve. The purging air may be used to reduce the operating temperature of the rotary valve. The purging air system for the rotary valve shall be designed to ensure that the air rotates to the individual loops and can be optimized during start-up or normal operation.

3.15. The SCRV will be mounted on downstream duct through flanges. The air supply lines shall be provided accordingly.

3.16. The connecting faces for the associated components and the inlet and outlet flanges shall be machined. The bottom part of the casing shall have large inspection ports on both sides, which shall be tightly closed with removable lids. The inspection port size shall be at least 300mm.

3.17. The SCRV has to be designed to operate continuously at the material temperature specified in Annexure-A.

3.18. The materials of construction shall be as indicated below.

Casing – Carbon steel with liner material. The liner surface hardness shall be 50 to 55 HRC to a depth of 1mm.

Rotor – Carbon steel with SS304 liner.

Rotor sealing blades – Material with 45 to 50 HRC with adjustable arrangement.

Scarper – Carbon steel with adjustable tip. Tip hardness shall be 45 to 50 HRC.

All materials used shall be of tested quality.

3.19 The sidewalls shall be equipped with a ring groove on the side for even distribution of sealing air between rotor and side wall.

3.20 Noise level shall be limited to 85 Db (A)

4. INSPECTION & TESING:

Following points are to be included in the quality plan that will be submitted by the vendor.

4.1. Stage inspection for machining by BHEL approved inspection agencies.

4.2. Final inspection as per the BHEL approved quality plan at vendor's works.

4.3. No load test shall be conducted with dedicated drive system at vendor's work prior to dispatch.

4.4. The performance test shall be conducted at site continuously for 72 hours.

4.5. Shear pin failure test is to be conducted at vendor's works.

4.6. Leak tightness test shall be conducted at design pressure prior to dispatch.

Note: 1.The inspection and testing shall not relieve the vendor of his responsibilities of services and guarantee.

2. During commissioning, site will need the visit of SCRV supplier. Hence separate offer for supervision of erection and commissioning as per lump sum basis (including installation charges,travelling,boarding and lodging charges) is to be given in the offer.

5. SPARES: Vendor to recommend spares required for 2 years of trouble free operation.

6. DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER

6.1. Point wise confirmation to the specification.

6.2. General arrangement drawing with major dimensional details and with sufficient views (cross sectional) for clear understanding of the SCRV indicating the space requirement and bill of material of construction.

6.3. The drawing showing the supporting arrangement on downstream duct is to be submitted for purchaser's information.

6.4. Design calculation for:

a) Selection of drive system (drive motor, gearbox, coupling and rotor).

b) Capacity of the SCRV.

c) No load and full load power calculation considering the minimum and maximum operating conditions.

6.5. Approximate weight of the SCRV.

6.6. Procedure for liner plate replacement.

6.7. Typical quality Plan including material, fabrication, assembly, bought out items, no load test leak tightness test, shear pin test, etc.

6.8. Procedure for leak tightness test.

6.9. Document submission schedule.

6.10. Filled in data sheets as per Annexure-B.

6.11. Experience list of vendor relevant for the application intended and capacity of the Self Cleaning Rotary Valve supplied.

6.12. Typical erection & commissioning procedure indicating the sequence, do's and don'ts & checklist.

6.13. List of start up / commissioning spares.

6.14. List of recommended spares for 2 years trouble free operation.

6.15. Typical O & M manual.

6.16. Schedule of deviations.

6.17. Checklist in form of Annexure – C.

6.18. All documents submitted under this heading should be submitted in two sets unless otherwise noted.

7. DOCUMENTS TO BE FURNISHED AFTER AWARD OF CONTRACT:

7.1. Detailed dimensional general arrangement drawing of the total system with cross sectional details, bill of materials and weight of individual parts for purchaser's approval. (Approval does not relieve the vendor from responsibility).

7.2. Torque requirement of Self Cleaning Rotary Valve and selection of drive rating.

7.3. Speed Vs Torque characteristic curve for motor.

7.4. Overload shear pin calculation.

7.5. Specifications for bought out items.

7.6. Erection & commissioning procedures indicating the sequence, do's and don'ts and check list

7.7. Operation & Maintenance manual.

7.7.1 Number of copies required is 1 hard copy in addition to O & M in CD in English Language. The CD should contain only the soft form of O&M manual as in the hard copy. The manuals shall be submitted along with the invoice. Manuals generally should contain the following as minimum.

7.7.1.1. Data sheet.

7.7.1.2 Important instructions (do's and don'ts).

7.7.1.3. System description.

7.7.1.4 Installation and storage.

7.7.1.5. Operation.

7.7.1.6. Recommended spares for 2 years trouble-free service with unit price.

7.7.1.7. Trouble shooting methods with illustration.

7.7.1.8. Assembly drawings with part list, bill of materials, dimensional Drawings and other applicable details.

7.7.1.9. Manuals should pertain only to the types or model supplied for the Particular contract.

7.7.1.10 Recommended lubrication schedule & scheme.

7.10. Packing / shipping list as per BHEL format.

8. <u>PAINTING</u>: Refer project specific data sheet

9. <u>PACKING / SHIPPING</u>: Refer project specific data sheet

10. <u>EXCLUSION & DEVIATIONS</u>: Supplier has to indicate clearly the exclusions and deviations in the offer stage itself with specific reasons. Any deviation / exclusion will not be entertained after the award of contract.

ANNEXURE-A
(PROJECT SPECIFIC DESIGN INPUT DATA)

No	Description	Unit	DATA
1.	Material to be handled		Lignite
2.	Material composition		Refer Annexure-D
3.	Operating temperature	°C	150
4.	Explosion pressure	mmwc (g)	1000
5.	Pressure at inlet of feeder	mmwc	Atmospheric
	Pressure at outlet of feeder	mmwc	300
6.	Capacity of Self Cleaning Rotary Valve.: Minimum Normal Maximum	t/hr	 17.4 60.0 128
7.	Bulk density of particle	kg/m^3	For Volume : 700 For Weight : 900(Static bulk density)
8.	Particle size range	mm	Refer Annexure-D
9.	Feed line size (Inside)	mm	Refer Annexure-E
10.	Discharge line size (Inside)	mm	Refer Annexure-E
11.	**Method of speed control**		**Constant speed**
12.	Duty		Continuous
13.	Total Moisture	%	44
14.	Surface moisture	%	17
15.	Number of inlets	No	1 (One)
16.	Number of outlets	No	1 (One)
17.	Flameproof up to a gap width between sealing strips and casing sleeve	mm	0.6
18.	Type of mounting		On down stream duct through flanges.
19.	Position		Vertical
20.	Overall size of feeder	mm	Refer Annexure-E
21.	Painting Surface preparation&Surface profile: Primer coat: Number of coats: Total DFT:		 SSPC-SP3/Power tool cleaning. Heat resistant aluminium paint with suitable air drying time to IS 13183 Gr 2 DFT 20µm per coat: 2 40 µm(Min)

Temperature of medium at downstream of SCRV is 900DegC.

ANNEXURE-B

TECHNICAL SPECIFICATION DATA
(TO BE FILLED AND SUBMITTED BY THE VENDOR ALONG WITH THE OFFER)

1. Material to be handled :
2. Operating temperature :
3. Design pressure :
4. Impact strength :
5. Capacity of Self Cleaning Rotary Valve
   5. I. Normal :
   5.2. Maximum :
6. Bulk density of coal :
7. Coal size range :
8. Flameproof up to a gap width between sealing strips and casing sleeve (mm) :
9. Coal feed line size (inside) :
10. Coal discharge line size (inside) :
11. Type of Self-Cleaning Rotary Valve :
12. Method of speed control :
13. Duty :
14. Rotor M.O.C (Material of construction) :
15. Casing M.O.C :
16. Casing sleeve M.O.C :
17. Pocket liner material :
18. Pocket liner thickness :
19. Shaft M.O.C :
20. No of pockets :
21. Volume of each pocket :
22. Diameter of rotor :
23. Scraper diameter :
24. Overall height, inlet to outlet flange :
25. Rotor length :
26. Rotor diameter :

27. Rotor shaft speed :
28. Scraper shaft speed :
29. Maximum peripheral speed at rotor sealing strips :
30. Nominal torque on auto guard-coupling :
31. Max. Torque on Autoguard-coupling :
32. Filling factor :
33. Approximate weight of Self Cleaning Rotary Valve :
34. Radial clearance between rotor &
    Body at ambient and at working Temp :
35. Total quantity per boiler :
36. Purging air requirements
36. 1. Min. pressure :
36.2. Flow for shaft seals :
36.3. Flow for side plates :
36.4. Flow pocket purging :
37. Mounting :
38. Position :
39. Painting
39.1. Surface preparation :
39.2. Primer coat :
39.3. Finish coat :

Signature of authorized signatory with office seal.

ANNEXURE-C

(To be filled and submitted by the vendor along with the offer)

CHECKLIST:

The following document should be checked and signed by the authorized signatory. Offers not containing any of the documents will be liable for rejection without any further intimation. Vendor in his judgement may add further information, if required.

S.NO	DESCRIPTION	Submitted Yes / No
1.	Point wise confirmation of the specification(point 1to 10)	
2.	General arrangement of Self Cleaning Rotary Valve with major dimensional details	
3.	The drawing showing the supporting arrangement	
4.	Approximate weight of the Self Cleaning Rotary Valve	
5.	Design calculation as per clause 6.4 of Specification	
6.	Procedure for liner plate replacement.	
7.	Typical quality Plan as per BHEL format	
8.	Procedure for leak tightness test.	
9.	Document submission schedule.	
10.	Filled in data sheets as per Annexure-B.	
11.	Typical erection and commissioning procedure.	
12.	List of startup / commissioning spares.	
13.	List of recommended spares for 2 years trouble free Operation.	
14.	Typical O & M manual.	
15.	Schedule of deviations.	
16.	Checklist in the form of Annexure-C	
17.	Three sets of above documents	

Signature of authorized signatory with office seal.

ANNEXURE-D

FUEL ANALYSIS

SL.NO.	DESCRIPTION	UNIT	DESIGN	WORST	BEST
1.0	**Fuel**	**Lignite**			
1.1	**Proximate Analysis:**				
	Fixed Carbon	%	16.5	-	18.56
	Volatile Matter	%	22.0	-	24.75
	Moisture	%	44.0	44.0	37.0
	Ash	%	17.5	20.58	19.69
	Chlorine	%	0.1	0.13	0.11
	HHV	Kcal/Kg	2600	2125	2925
1.2	**Ultimate Analysis:**				
	Carbon	%	26.00	21.46	29.25
	Hydrogen	%	2.13	1.42	2.4
	Sulphur	%	1.90#	4.00#	2.14#
	Oxygen (by diff)	%	7.93$	7.93&	8.91@
	Nitrogen	%	0.54	0.61	0.61
	Moisture	%	44.00	44.00	37.0
	Ash	%	17.50	20.58	19.69
1.3	**Sieve Analysis:**				
	100%		<10mm		
	80%		<2 TO 3 mm		
	50%		<1 TO 1.5 mm		

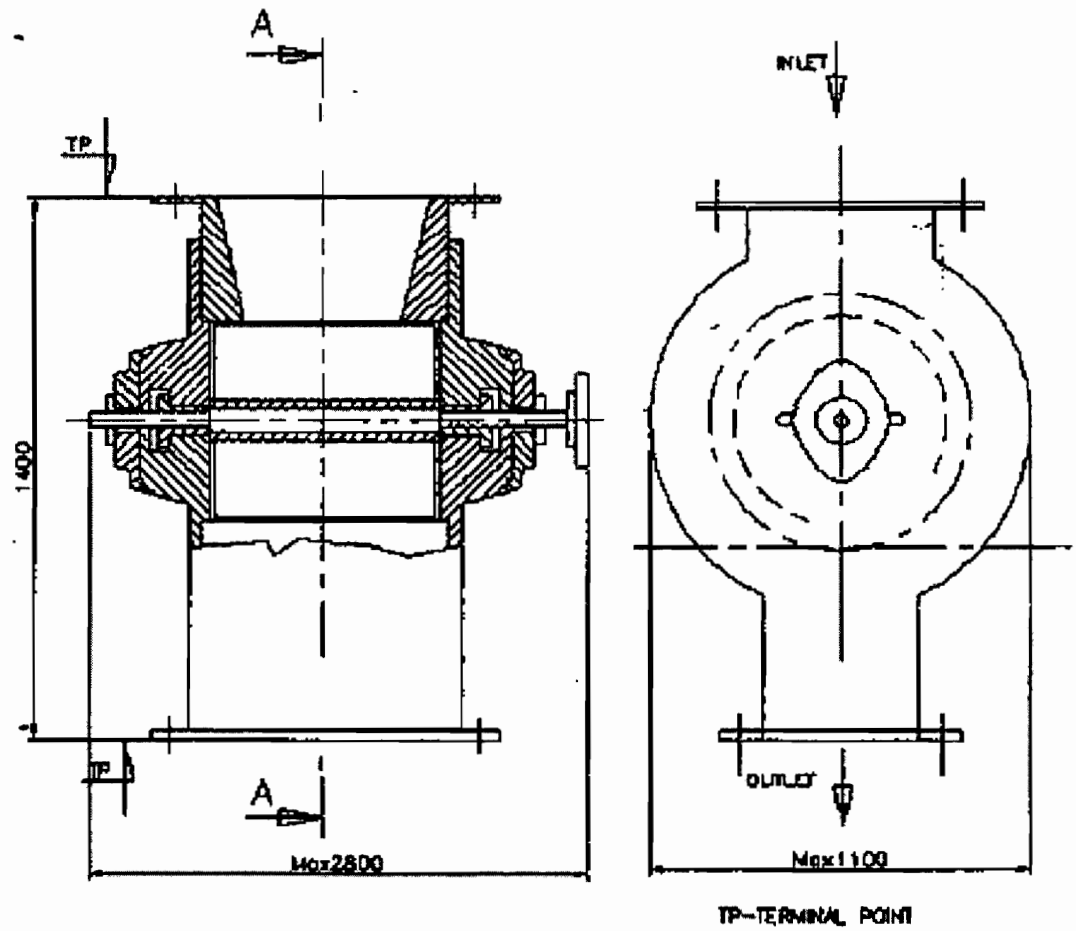
Note:
$-Includes Chlorine of 0.1%
&-Includes Chlorine of 0.13%
@-Includes Chlorine of 0.11%

# - Combustible Sulphur	1.64%	3.46%	2.14%
Ash considering above combustible Sulphur	17.76	21.12	19.69

Note:
Materials of casing,rotor,adjustable tips,fasteners,shaft,gaskets and scrapper etc,, shall be designed to suit the above fuel analysis.

ANNEXURE-E

FEEDER ARRANGEMENT

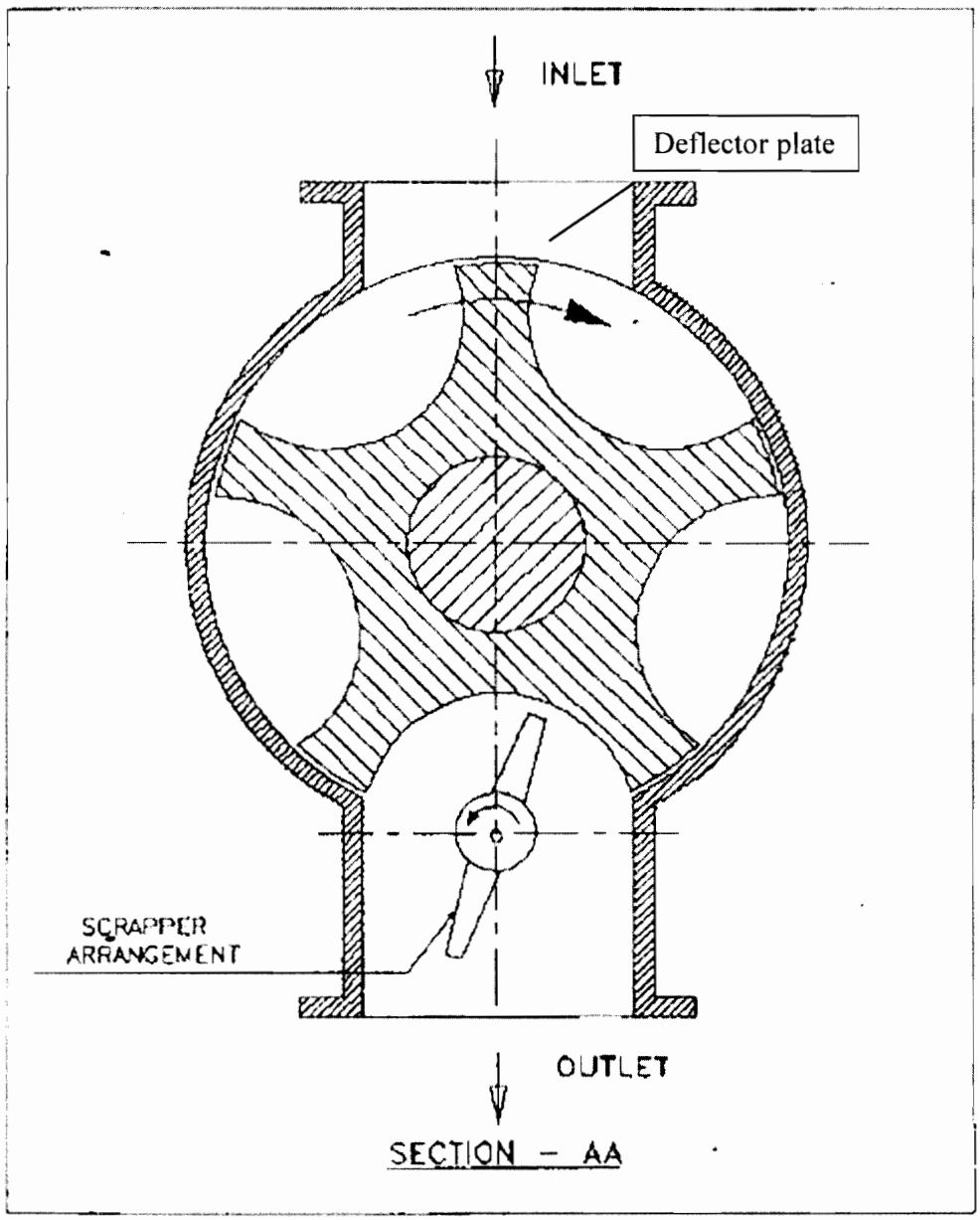


TP-TERMINAL POINT

NOTE: 01. FOR SECTION-AA, REFER SHEET 2 OF 3

ALL DIMENSIONS ARE IN MM

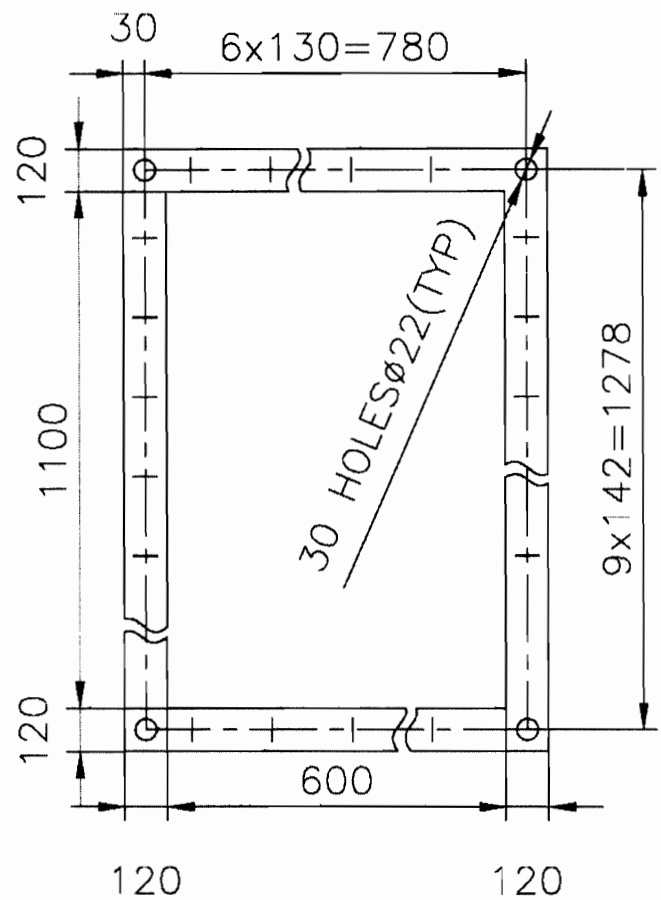
ANNEXURE-E



The dimensions in the above picture is to be read as under:

01. Opening size (inlet & outlet) of SCRV is 600x1100,600 mm is the opening width in this view.
02. Flange size, hole size, pitch shall be confirmed during GA drawing approval.

ANNEXURE–E



OUTLET COMPANION FLANGE DETAIL

ANNEXURE – ECI (SPECIFICATION FOR SELF CLEANING ROTARY VALVE FOR LIGNITE)

BHEL -TRICHY
FBC&HRSG
ELECTRICALS, CONTROLS & INSTRUMENTATION

REF: FBC&HRSG:CI:5316:SCALF
Rev:00
SH.NO 1 of 2

A. ELECTRICAL.

1. The Lignite Air Lock feeder motor STD specification are as follows.
   (a) L.T.motor specification. No. TDC:TCI:140
   (b) Quality plan no. ~~QA:CI:STD:QP:24~~ Vendor quality plan may be obtained for BHEL's approval.
   (c) Packing procedure QA:CI:STD:PR:03

2. The make of motor: shall be of ALSTOM Ltd. / CROMPTON GREAVES Ltd / BHARATH BIGILI / KIRLOSKER / SIEMENS. Motor shall be suitable for momentary reversible operation.

3. Vendor should submit the filled up data sheets (Part of Main & annexure specification) along with the offer itself.

4. **Documents after placement of order:**
   (i) Motor terminal details, Catalogue, Final motor data sheet completely filled in all columns.
   (ii) Recommended motor Power/Control circuit diagram.

B. CONTROL AND INSTRUMENTATION

1. Vendor should provide one no. Proximity type zero speed switch to detect the feeder not rotating, for process interlock purpose. The speed switch controller/ barrier shall be (2 Nos) 24V DC rating and rail mounted with 1NO+1NC potential free contact output. The controller should be housed in junction box and TB to be provided in the junction box for terminating controller and sensor. Vendor has to supply Double compression nickel plated cable glands for incoming and outgoing cables.

2. The make of the proximity switch shall be TRUCK/P&F/E&H

ANNEXURE – ECI (SPECIFICATION FOR SELF CLEANING ROTARY VALVE FOR LIGNITE)

BHEL -TRICHY
FBC&HRSG
ELECTRICALS, CONTROLS & INSTRUMENTATION

REF: FBC&HRSG:CI:5316: SCALF
Rev:00
SH.NO 2 of 2

3. All JBs shall be Galvanised. Wall/column mounted junction boxes having 32 (2x16) terminals and cable entry only at the bottom and sealed with fire proof compound; Screwed terminal type; IP 65 or equivalent degree of protection for enclosure. Separate terminal blocks shall be used for analog and digital signal and also for signals with different voltages. Removable gland plate shall be supplied. JB shall have single lockable door with gasket, able to open side ways, with common keys. Painting inside shall be glossy white & outside - IS-5 shade 631. Shield bus for screw connection shall be provided. Terminal size shall be suitable for 0.5 sq.mm to 2.5sq.mm wire. Terminal blocks shall be vertical. JB shall have provision to add 10% additional terminals. Accessories like metal tag (SS), clamps, fixtures, bolts (SS), nuts (SS), gaskets (neoprene), lock & key, fire proof compound for sealing, etc. shall be supplied. The grouping of instruments in JBs is subject to Purchaser's approval. All the field Junction boxes shall have single doors and provision for locking. The doors shall not have screwed type of locking, but turnable hinge based.

   The JBs are subject to approval prior to manufacturing All JBs shall be provided with individual canopies to avoid ingress of water.

   All the TBs used shall be 6.6polymide to withstand corrosion and the metallic portion shall be coated against rust / corrosion.

4. Vendor should submit the technical leaflet/catalogue of motor, proximity switch, Controller/Barrier & junction box with offer.

Note:-
Vendor should indicate any protection requirement to be taken care by Purchaser to protect the motor/equipment.

	Name	Signature	Date
Prepared	Balaji		30.04.2011
Checked	P.Venkataraman		30.04.2011
Approved	A.Swaminathan		30.04.2011

BHARAT HEAVY ELECTRICALS LIMITED / TIRUCHIRAPPALLI
CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN
FOR

LT MOTORS(FLAME PROOF)

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	18.04.96	--- Sd ---	--- Sd ---	--- Sd ---	Initial release.
01	16.06.97	--- Sd ---	--- Sd ---	--- Sd ---	Format revised
02	21.03.02	--- Sd ---	--- Sd ---	--- Sd ---	Department name changed, CTQ requirements added & General revision.
03	07.12.07	RM.VAIRAVAN	N.SRIDHAR	S.SOMASUNDARAM	SQP is revised for Flame proof application.

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
I	**Bought out components**									
1.0	Enameled round copper wire Class-F (Dual Coated)	a. Overall diameter	Measurement	1 sample / lot	Mfr. Standard	LGB	P	V	-	
		b. Bare conductor dia.	Measurement	-do-	-do-	-do-	P	V	-	
		c. Increase in dimension	Measurement	-do-	-do-	-do-	P	V	-	
		d. Peel test (above 1mm dia. wire)	Visual	-do-	-do-	-do-	P	V	-	
		e. Jerk test (below 1mm dia wire)	Visual	-do-	-do-	-do-	P	V	-	
		f. Mandrel winding test	Visual	-do-	-do-	-do-	P	V	-	
		g. Resistance to abrasion	Visual	-do-	-do-	-do-	P	V	-	
		h. BDV	Measurement	-do-	-do-	-do-	P	V	-	
		I) at room temp.					P	V		
		ii) at elevated temp.						V		
		i. Electrical Resistance (upto 1.0 mm dia)	Measurement	-do-	-do-	-do-	P	V	-	Above 1 mm dia, only diameter will be checked
		j. Heat shock test	Visual	-do-	-do-	-do-	P	V	-	
		k. Elongation	Measurement	-do-	-do-	-do-	P	V	-	
		l. Cut through test	Thermal	-do-	-do-	-do-	P	V	-	
		m. Solvent test	Chemical	-do-	-do-	-do-	P	V	-	
		n. Springness	Measurement	-do-	-do-	-do-	P	V	-	
		o. Continuity of insulation covering	Measurement	-do-	IEC-317 CL 14 IS13730 pt.3	-do-	P	V	-	
		p. Tan delta bending point test	Measurement	-do-	IS13778 pt.5	Supplier TC	V	V		

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
2.0	Insulation Material (Class F)									
2.1	Isophthalate fiber glass tape. (for taping brazed joints & end connection leads)	a. Thickness & Width	Measurement	1 sample / lot	Mfr. Standard	-do-	P	V		
		b. Tensile Strength	Measurement	-do-	-do-	-do-	P	V		
		c. BDV at elevated temp in air	Measurement	-do-	-do-	-do-	P	V		
		d. Tear Resistance	Measurement	-do-	-do-	-do-	P	V		
		e. Confirmation of glass fabric	Measurement	-do-	-do-	-do-	P	V		
		f. Compatibility with impregnating varnish	Chemical	-do-	-do-	-do-	P	V		
		g. Thermal ageing test	Thermal	-do-	-do-	-do-	P	V		
2.2	Varnished Fiber glass sleevings. (over taping in brazed joints & end connection coil leads)	a. Bore diameter	Measurement	-do-		-do-	P	-		
		b. Wall thickness	Measurement	-do-	-do-	-do-	P	-		
		c. Bending before/after ageing	Visual	-do-	-do-	-do-	P	-		
		d. BDV in air at Room temp.	Measurement	-do-	-do-	-do-	P	V		
		e. Insulation Resistance	Measurement	-do-	-do-	-do-	P			
		f. Stability of coating	Visual	-do-	-do-	-do-	P	-	-	
		g. Burning test	Chemical	-do-	-do-	-do-	P	-	-	
		h. Varnish compatibility	Chemical	-do-	-do-	-do-	P	-	-	
2.3	Synthetic bonded glass fiber sheet used for slot wedge	a. Thickness & width	Measurement	-do-	-do-	Supplier TC	V	-	-	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		b. Specific gravity	Measurement	1 sample / lot	Mfr. Standard	Supplier TC	V	-	-	
		c. Water absorption	Measurement	-do-	-do-	-do-	V	-	-	
		d. BDV Test	Measurement	-do-	-do-	-do-	V	V		
		e. Insulation Resistance	Measurement	-do-	-do-	-do-	V	-	-	
		f. Comparative tracking index	Measurement	-do-	-do-	-do-	V	-	-	
		g. Tensile strength	Measurement	-do-	-do-	-do-	V	-	-	
		h. Compression strength	Measurement	-do-	-do-	-do-	V	-	-	
2.4	Slot Insulation (slot liner, packing strip, coil separator on overhangs	a. Thickness	Measurement	-do-	-do-	LGB	P	-	-	
		b. Tensile strength & elongation	Measurement	-do-	-do-	-do-	P	-	-	
		c. BDV before & after ageing	Measurement	-do-	-do-	-do-	P	V	V	
		d. Temperature stability -as received -after folding in “U” shaped slot liner.	Measurement	-do-	-do-	-do-	P	-	-	
		e. Substance (Specific gravity)	Measurement	-do-	-do-	-do-	P	-	-	
2.5	Impregnation Varnish Class – F	a. Density	Measurement	-do-	-do-	-do-	P			
		b. Viscosity	Measurement	-do-	-do-	-do-	P			
		c. Non-volatile matter	Measurement	-do-	-do-	-do-	P			
		d. Dry test	Physical	-do-	-do-		P			
		e.Compatibility with thinner % min	Chemical	-do-	-do-	-do-	P			
		f. Resoftening	Visual	-do-	-do-	-do-	P			
		g. Reaction of varnish with bare copper	Chemical	-do-	-do-	-do-	P			

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		h. Stability of varnish in an open vessel	Chemical	1 sample / lot	Mfr. Standard	-do-	P			
		i. Effect of varnish on enameled wire	Measurement	-do-	-do-	-do-	P			
		j. BDV test	Measurement	-do-	-do-	-do-	P	V		
		k. Shelf life	Visual	-do-		-do-	P	-	-	
3.0	Shaft Material	a. Dimensions	Measurement	1 sample / lot/heat	Mfr. Drg	Supplier TC	V	V	-	
		b. Chemical composition	Chemical	-do-	Mfr. Standard	-do-	V	V		
		c. Hardness	Measurement	-do-	-do-	LGB	P	V	-	
		d. Yield strength	Measurement	-do-	-do-	Supplier TC	V	V		
		e. Tensile strength	Measurement	-do-	-do-	-do-	V	V		
		f. Elongation	Measurement	-do-	-do-	-do-	V	V	-	
		g. Grain size inclusion rating	Measurement	-do-	-do-	-do-	V	V		
		h. Heat treatment cycle	Thermal	100%	-do-	Supplier TC	V	V		
		i. Ultrasonic Test	NDT	100%	-do-	-do-	P	V		
4.0	Stamping steel Sheets	a. Specific core loss before / after ageing	Measurement	1 sample / lot	-do-	-do-	V	V		
		b. Magnetisation (Permeability)	Measurement	-do-	-do-	-do-	V	V		
		c. Insulation Resistance	Measurement	-do-	-do-	-do-	V	V		
		d. Stacking factor	Measurement	-do-	-do-	-do-	V	V		
		e. Ductility	Measurement	-do-	-do-	-do-	V	V		
		f. Visual Check (waviness)	Visual	-do-	-do-	-do-	V	V		
		g. Temperature withstand capacity	Measurement	-do-	-do-	-do-	V	V		
		h. Thickness of stamping & Thickness of varnish coating	Measurement	-do-	-do-	-do-	V	V	V	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		i. Stamping Burr height	Measurement	1 sample / lot	Mfr. Standard	-do-	V	V		
5.0	Aluminium Ingots	Chemical composition	Chemical	-do-	-do-	-do-	V	-	-	
6.0	Casting: Body & End shields	a. Grade of casting (Chemical composition)	Chemical	1sample from each melt	Mfr. Drawing	-do-	V	V	-	
		b. Surface defects like blow holes/cracks	Visual	100%	No below holes & cracks	LGB	P	V		
		c. Hardness	Measurement	1 sample / lot/heat	Mfr. Standard	Supplier TC	V	V	-	
		d. Tensile strength	Measurement	-do-	-do-	-do-	V	V	-	
		e. Dimensions	Measurement	-do-	Mfr. Drawing	Inspection Record	P	-	-	
7.0	Fan (MS-Fabricated)	a. Dimensions	Measurement	1 sample / lot	-do-	Inspection Record	P	-	-	
		b. Protective paint	Visual	100%	-do-	-do-	P	-	-	
8.0	Bearings	a. Type & Make	Visual	-do-	Mfr. Standard	Supplier TC	V	-	-	
		b. Dimensions ID,OD and Width	Measurement	1 sample / lot	-do-	-do-	V	-	-	
9.0	Terminal Block DMC material	a. Dimensions	Measurement	Level-I AQL-6.5%	Mfr. Drawing	LGB	P	-	-	
		b. Tracking Index	Measurement	1 sample / lot	Mfr. Standard	LGB	V	V		
		c. Chemical composition	Chemical	-do-	Mfr. Drawing	Supplier TC	V	-	-	
10.	Gaskets	a. Hardness	Measurement	-do-	Mfr. Standard	LGB	P	-	-	
		b. Tensile strength	Measurement	-do-	-do-	Supplier TC	V	-	-	
		c. Elongation	Measurement	-do-	-do-	-do-	V	-	-	
		d. Dimensions	Measurement	Level-	Mfr.	-do-	V		-	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		e. Neoprene content	Chemical	AQL-4.0% 1sample/ lot	Drawing Mfr. Standard	Supplier TC	V	V		
11.	Space heater	a. Insulation Resistance	Measurement	-do-	-do-	LGB	P	V	-	
		b. H.V.Test	Measurement	-do-	-do-	-do-	P	V	-	
		c. Resistance	Measurement	-do-	-do-	-do-	P	V	-	
		d. Wattage	Measurement	-do-	-do-	-do-	P	V	-	
12.	Brazing Alloy	Chemical composition	Chemical	-do-	-do-	-do-	V	-	-	
13.	Paints	a. Viscosity at 32 deg.c	Measurement	1sample/ lot	-do-	LGB	P	-	-	
		b. Drying time	Visual	-do-	-do-	Supplier TC	V	-	-	
		c. Dry film properties	Visual	-do-	-do-	-do-	V	-	-	
II	**INPROCESS INSPECTION (out-sourced)**									
1	Machined Cast iron body	a. Blow holes / Cracks	Visual	100%	No blow hole / crack on machined surface	LGB	P	-	-	
		b. Surface Finish (Ra)	Measurement	100%	Mfr. Drawing	-do-	P	V		No welding on the casting is permitted for below holes and cracks.
		c. Bore ID, Perpendicularity, Concentricity & other flame path Dimensions	Measurement	100%	-do-	-do-	P	V		
2	Machined Cast iron End Shields, Terminal Box &	a. Blow holes / Cracks	Measurement	100%	No blow Holes/ cracks	-do-	P	-	-	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
	Covers	b. Dimensions	Measurement	100%	Mfr. Drawing	LGB	P	V		
3.0	Stator Core	a. Core length, Dia.	Measurement	100%	-do-	-do-	P	-	-	
		b. Core locking & skew	Visual	100%	Mfr. Standard	-do-	P	-	-	
		c. Rigidity of core	Measurement	100%	-do-	-do-	P	-	-	
		d. Deburring & Cleanliness	Visual	100%	-do-	-do-	P	-	-	
4.0	Die cast Rotor	a. Core length	Measurement	100%	-do-	-do-	P	-	-	
		b. Blow holes	Visual	100%	-do-	-do-	P	-	-	
	INPROCESS INSPECTION (In house Manufacturing)									
4.1	Coil Forming	a. Verification of copper wire size	Measurement	100%	Mfr. Standard	LGB	P	V	-	
		b. No. of turns.	Measurement	100%	-do-	-do-	P	V	-	
4.2	Wound Stator	a. Resistance	Measurement	100%	-do-	-do-	P	V	-	
		b. H.V.Test	Measurement	100%	IS:325	-do-	P	V	-	2 KV for 1 minute
		c. Insulation Resistance	Measurement	100%	IS:325	-do-	P	V	-	> 2 megaOhm
		d. Polarity	Measurement	100%	Mfr. Standard	-do-	P	V	-	
		e. Surge Test (Coil short)	Electrical	100%	-do-	-do-	P	V	-	
		f. Workmanship of Joints, slot wedge tightness, Coil end connection & Overhang Dimensions.	Visual	100%	-do-	-do-	P	-	-	
4.3	Flood Impregnation	a. Dipping & Baking Cycles	Process parameters: Temp., Time, Viscosity.	100%	-do-	LGB	P	V	-	

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		b. Polarisation index	Measurement	2 nos min.per week	Mfr. Standard	LGB	P	V	-	
4.4	Rotor & Shaft Assembly	Press fitting	Visual	100%	Mfr. Drawing	LGB	P	-	-	
4.5	Rotor Machining	a. Rotor OD, Concentricity w.r.t Brg. Seating dia	Measurement	100%	Mfr. Drawing	-do-	P	V	-	
		b. Rotor & Fan Balancing	Measurement	100%	ISO-1940 Gr-2.5	-do-	P	V		
4.6	Hydraulic pressure testing for Body, End shields, Terminal box and covers	a. Pressure withstand capacity	Measurement	100%	IS 2148 * (10 Kg/sq.mm for 1minute)	Test report	P	V		* As per CMRI test report
		b. Dimensional check for flame path	Measurement	100%	IS 2148	LGB	P	V		
III	**Final Assembly**	a. Determination of Air-Gap	Measurement	100%	Mfr. Drawing	-do-	P	V		
		b. Flange Run out (For flanged Motors only)	Measurement	100%	-do-	-do-	P	V		
		c. Proper fixing w.r.t * Gasket Fixing * Terminal Box fixing * Terminal Board fixing * Lead terminations * Provision of lugs	Visual	100%	Mfr. Standard	-do-	P	V		
IV	**FINAL INSPECTION**									
	Routine Test	a. Marking on the Name plate details, legibility, painting & Appearance, Terminal Box Location & accessories, phase sequence & Ferrule	Visual	100%	IS:325/ Spec. / Appd Drg./ Data Sheets	Test certificate	P	W		

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
		marking b. Provision of Flame proof cable glands make, type, rating	Visual	100%	Spec. / Appd Drg./ Data Sheets	LGB	P	W		
		c. Dimension – Mounting & Overall	Measurement	100%	IS:325/ Spec. / Appd Drg./ Data Sheets	-do-	P	W		
		d. Measurement of stator winding Resistance & Space heater	Measurement	100%	-do-	-do-	P	W		
		e. IR Test before/after H.V.Test on main winding & space heater	Measurement	100%	-do-	-do-	P	W		
		f. H.V.Test on Winding and space heater	Measurement	100%	-do-	-do-	P	W		
		g. Reduced voltage running in both direction	Measurement	100%	-do-	-do-	P	W		
		h. No Load run test	Measurement	100%	-do-	-do-	P	W		
		i. Locked rotor test	Measurement	100%	-do-	-do-	P	W		
		j. Vibration test at rated Voltage & speed	Measurement	100%	-do-	-do-	P	W		
		k. Over speed test	Measurement	100%	-do-	-do-	P	W		
		l. Degree of protection as routine check	Visual	I sample / lot/ frame	-do-	-do-	P	W		
	Painting	m. Paint shade	Visual	I sample / lot	-do-	-do-	P	W		
		n. Paint Thickness & adhesion	Measurement	-do-	Mfr. Standard	-do-	P	W		

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REF.DOC. & ACCEPTANCE STANDARD	FORMAT OF RECORD	AGENCY			REMARKS
							M	B	C	
	Type test	a. All tests mentioned in routine test	Electrical	1 motor in a batch	IS 325/Spec/Approved data sheet	Test certificate	P	V		
		b. Full load run & temp. rise test	Electrical	-do-	-do-	-do-	P	V		
		c. Load test at 125%, 100%, 50%, 25% load	Electrical	1 motor in a batch	IS 325/Spec/Approved data sheet	Test certificate	P	V		
		d. Momentary O/L test	-do-	-do-	-do-	-do-	P	V		
		e. Starting torque test	-do-	-do-	-do-	-do-	P	V		
		f. Starting torque test	-do-	-do-	-do-	-do-	P	V		
		g. Pull out torque test	-do-	-do-	-do-	-do-	P	V		
		h. Statutory certificates like i. BIS certificates ii. CPRI or CMRI Certificate iii. DGMS certificates iv. CCE certificates v. DGFASLI certificate	Review	100%	IS 325/IS 2148/Spec/ Approved data sheet	Statutory test certificates	P	V		

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI

CONTROLS AND INSTRUMENTATION / FB
QUALITY ASSURANCE

STANDARD PACKING PROCEDURE
FOR
ELECTRICAL ACTUATORS, POWER CYLINDERS AND ELECTRICAL EQUIPMENTS

Rev	Date	Prepared	Checked	Approved	Revision History
00	01.01.96	Sd/-	Sd/-	Sd/-	Initial History
01	28.03.02	A.J.OMPRAKASH Sd/-	R.VARADARAJAN Sd/-	G.MATHIYALAGAN Sd/-	Department name changed
02	26.02.07	RM.VAIRAVAN	N.SRIDHAR	S.SOMASUNDARAM	Revised after discussion with Shipping Dept.

1.0 SCOPE

1.1 This procedure gives minimum guidelines to be complied with for packing of Electrical actuators, Power cylinders and other Electrical equipments. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for periods more than one year.

2.0 WOOD SPECIFICATION FOR PACKING

2.1 Rubber wood as per manufacturer standard.
2.2 Silver Oak as per procedure PR:CHEM:017 or as per relevant International Standards.

3.0 PACKING

3.1 For Inland packing, rubber wood and export packing Silver Oak wood shall be used. The wood used shall be seasoned and treated.
3.2 The required wood case for the equipment to be packed shall be made out of individual planks of single length. The case should not have joints. Sufficient number of horizontal, vertical and diagonal planks (dimensions depending up on case size) shall be used for binding and strengthening runners have to be provided with metallic sling plates for handling.
3.3 Support planks are to be provided such that, no force is acting on the parts of equipment or its parts.
3.4 Power cylinders have to be packed with the piston in the closed condition.
3.5 Preservative chemicals are to be applied, wherever required.
3.6 Blank holes if any, shall be plugged.
3.7 Spring actuated equipments have to be de-energised before packing.
3.8 The equipments covered with a polythene sheet shall be kept inside the box, followed by coir, wooden bottoms, thermo coal, etc to prevent vibration effect during loading, transportation, etc.
3.9 The gap between job and the box shall be filled with suitable material like jute, coir, thermo coal, etc.
3.10 On all sides of the inner case, black polythene sheet shall be nailed.
3.11 Loose items of the equipment, if any, shall be packed separately.
3.12 Each case must have sufficient quantity of silica gel, packed in cotton cloth bags, shall be kept at different places as required.
The bags used shall have the following information marked on it.
Silica Gel activator type:
Blue: Active
Rose: Reduced active
White: No activity. To be replaced with fresh Silica gel.

4.0 MARKING

4.1 After completing the packing, Stencil marking, as per dispatch instructions and symbol marking as per Annexure – I shall be made. Please ensure the box is stenciled with “FRAGILE ITEM”, “HANDLE WITH CARE”

5.0 PACKING SLIP

5.1 A copy of the packing slip, kept in a polythene cover shall be kept inside the box. Another copy of the packing slip, kept in a polythene cover shall be kept out side the box and covered with a metallic plate to the case.

6.0 CAUTION

Do not pack any other Mechanical items with this case.

7.0 GENERAL

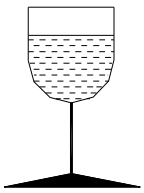
7.1 These packing procedures are the minimum requirements in addition to the standard instructions mentioned in the Purchase Order and Specification.

7.2 Deviation to meet the packing procedure requirements / non-clarity in packing approach in any quotation will be liable for rejection of offer.

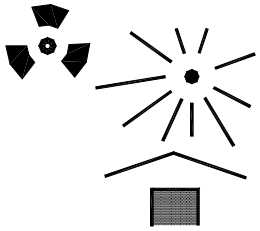
ANNEXURE – 1

TO

PROCEDURE NO:CI:QAC:PR:02/00 ; PR:03/00 ; PR:04/00



FRAGILE, HANDLE WITH CARE



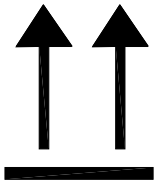
PROTECT FROM HEAT AND RADIOACTIVE SOURCES

USE NO HOOKS

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.

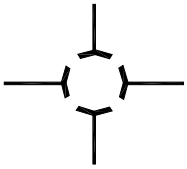
KEEP DRY

NOTE: Not all cases have waterproof internal linears: plywood used in the construction may not have a waterproof glueline.



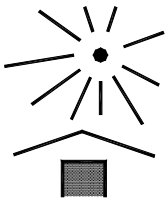
THIS WAY UP

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.

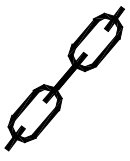


CENTRE OF GRAVITY

NOTE: This should be stancilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).

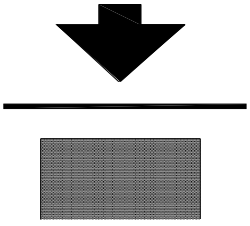


KEEP AWAY FROM HEAT



INTERNATIONAL "SLING HERE" SYMBOL

... kg max



STACKING LIMITATION

NOTE: The maximum load in kilograms should be marked above the arrow.

Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT,TIRUCHIRAPPALLI 620 014.

TECHNICAL DELIVERY CONDITIONS

FOR SUB - DELIVERY COMPONENTS OF

CONTROLS AND INSTRUMENTATION

LT MOTOR (AC) (NON FLAME PROOF)

Rev. No.	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED ENGG	APPROVED QAC
01 - 05	----	General Revisions	Sd/-	Sd/-	Sd/-	Sd/-
06	29/04/99	Revised for special improvement project	Sd/-	Sd/-	Sd/-	Sd/-
07	22/12/03	Revised after revisit	Sd/-	Sd/-	Sd/-	Sd/-
08	21/04/05	Revised as per MOM dated 06/04/05 between BHEL(T) and BAP(Ranipet) at BAP(Ranipet) and BAP(Ranipet) mail dated 09/05/05				

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
1.0	SITE CONDITIONS		
1.1	Altitude above mean sea level	550 m.	
1.2	Ambient temperature condition	50°C.	
1.3	Relative humidity	100 %	
1.4	Atmosphere	Tropical ,Dusty, salty, corrosive & highly polluted.	
2.0	GENERAL		
2.1	Reference standards	IS 325, IS 1231, IS 4722, IS 6362, IS 2253, IS 12065, IS 12075 , IS 4691.	
2.2	Application	As per Enquiry & PO.	
2.3	Duty cycle	Continuous S1	
2.4	Rated voltage, frequency & Phases	415 V AC ±10%; 50 Hz ± 5%; 10% absolute sum - 3 phase	
2.5	Minimum starting voltage	80% of the rated voltage	
2.6	Minimum voltage under which motor will run satisfactorily	75% of the rated voltage for 5 minutes	
2.7	Capacity to restart (at voltage specified in point No. 2.4)	i. One hot start from hot condition ii. Two successive starts from cold condition iii. Three equally spread start per hour	
2.8	High speed bus transfer withstand capability	Suitable to withstand 150 % of rated voltage	
2.9	Type of balancing for rotor	Dynamic balancing	
2.10	Direction of rotation	Suitable for both direction	
2.11	Direction of cooling air	Non-drive end to driving end	
2.12	Class of insulation	Class F with temperature rise limited to Class B.	
2.13	Winding treatment	The insulation shall be given tropical and fungicide treatment for successful operation of the motor in hot humid & tropical climate.	
2.14	Allowed temperature rise at continuous full load	60°C by thermometer method & 70°C by resistance method	
2.15	Starting current	Less than or equal to 600% full load current subject to tolerance as per IS.	
2.16	Starting time & locked rotor	The locked rotor withstand time at 110% rated	

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
	withstand time	voltage under hot condition shall be at least 3 sec more than the starting time (at 80% of rated voltage)	
2.17	Vibration	The peak amplitude of vibration shall be as per IS 12075	
2.18	Noise level	Within the limits specified by IS 12065. (<80 db at full load condition.	
2.19	Type of enclosure	TEFC, IP 55 as per IS 4691	
2.20	Type of mounting	Horizontal foot mounted	
2.21	Bearings & Lubrication	Bearings shall be of ball or roller type effectively sealed against ingress of dust. The bearing shall be so constructed that the loss of lubricating grease is kept to minimum.	
2.22	Shaft extension	Motors shall be provided with key slotted bare shaft extension with key at the driving end.	
2.23	Terminal box		
2.23.1	Type	Weather proof IP 55 as per IS 4691, Capable of being turned through 360° in steps of 90°.	
2.23.2	Cable gland and lugs	Double compression type nickel plated brass cable glands and insulated tinned copper crimping lugs to suit the cable size shall be supplied along with the motor. i) Size of power cables will be intimated during approval. ii) For space heater cable glands and lugs suitable for 2CX2.5 to be provided	
2.23.3	Type of terminals	Stud / screw type with plain washers, spring washers / checknuts & lugs	
2.24	Fault level	40 KA for 0.25 Sec	
2.25	Painting	Epoxy based paint (Colour shade 631 as per IS:5, unless otherwise indicated specifically in the enquiry)	
2.26	Space heaters		
2.26.1	Motors above 30 kW	Separate space heater suitable for 240V, single phase AC.	
2.26.2	Motors below 30 kW	Winding shall be suitable for heating continuously	

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
		at 24 V, single phase, AC	
2.26.3	Terminals	Separately terminated with clear identification in main terminal box	
2.26.4	RTD for winding/bearing	For motor rated 160kW and above only unless specifically called for in the enquiry.	
2.27	Lifting Device	Eye bolt or lugs to facilitate safe lifting	
3.0	INSPECTION & TESTING	As per applicable quality plan QA:CI:STD:QP:24	
4.0	DOCUMENTS a) Along with offer: b) After placement of order	3 sets of technical data sheet as per the enclosed format and Motor general arrangement drawing giving foundation details, shaft details 6 sets of the following: 1. Technical Data sheet as per the enclosed format 2. Motor general arrangement drawing giving foundation details, shaft details 3. Motor characteristic curves 4. Guarantee certificate 5. O & M manuals.	
4.0	PACKING	As per Packing Procedure QA:CI:STD:PR:03 or as per Manufacturer's Standard Practice. The packing shall meet the Transport , Environment & Storage hazards.	

NOTE:

1. Refer current valid list for revision status of Quality Plan & Packing Procedure.
2. In 'Vendor compliance' column Vendor to indicate 'YES', 'NO' or 'NOT APPLICABLE'.
3. RTDs, if applicable, are to be provided two per phase (winding and bearing). RTDs shall be duplex type and terminated in a separate terminal box . Termination arrangement of RTD of winding and bearing shall be submitted alongwith offer.

DATA SHEET

CL. NO	CHARACTERISTICS	REQUIREMENTS
1.0	Application	
1.1	Tag Numbers	
2.0	Manufacturer	
3.0	Type & frame size	
3.1	Degree of Protection	IP55
4.0	Rated output in kW	
4.1	Rated speed	
5.0	Rated voltage , frequency & phases	415 V AC ±10%; 50 Hz ± 5%; 10% absolute sum - 3 phase
6.0	Full load current	
7.0	Full load efficiency & power factor	
8.0	Duty Cycle	S1
9.0	Rated torque	
10.0	Starting current	600% of full load current
11.0	Starting torque in % of full load torque	
12.0	Pull up torque in % of full load torque	
13.0	Pull out torque in % of full load torque	
14.0	No load starting time	
15.0	Locked rotor withstand time at rated voltage	a. Hot b. Cold
16.0	Locked rotor withstand time at minimum starting voltage	a. Hot b. Cold
17.0	Locked rotor withstand time at 110% rated voltage	a. Hot b. Cold
18.0	Starting time at minimum starting voltage with mechanism coupled	
19.0	Starting time at rated voltage with mechanism coupled	
20.0	Maximum permissible starting time	
21.0	Stator thermal time constant	
22.0	Stator winding connection	
23.0	Class of insulation & temperature rise	Class F; 60°C by thermometer method / 70°C by resistance method
24.0	Type & number of terminals broughtout	
25.0	Resistance per phase (indicative) at 20ºC	

CL. NO	CHARACTERISTICS	REQUIREMENT
26.0	Quantity and power consumption of space heater	
27.0	Direction of rotation	Bi-Directional.
28.0	Bearing make & type	Drive End; Non Drive End;
29.0	Lubricant quantity , grade & recommended interval of lubrication	
30.0	Type of mounting & shaft orientation	Foot mounting; Horizontal.
31.0	Terminal Box	
31.1	Location & angle of rotation	
31.2	Gland size for stator winding	
31.3	Gland size for space heater	Suitable for 2CX2.5 sq.mm(armoured), if applicable.
31.4	Cable entry	
32.0	GD² of motor (kg-m²)	
33.0	Total weight of motor (kg).	
33.1	Weight of stator (kg)	
33.2	Weight of rotor (kg)	
34.0	Total weight of motor (in kg)	
35.0	Anticipated bearing life	
36.0	Method of connection to driven equipment	
37.0	Limiting rotor temperature for determining safe stall time	
38.0	RTD for winding/ Bearing	Applicable ☐ YES ☐ NO Details:

Ref .Specification - TDC TCI 140 / REV 08

Vendor's signature and seal.

BHEL/FBC&HRSG/Purchase

TERMS AND CONDITIONS (for ENQUIRY)

1 (a) QUOTATION: Each tender should be sent in double cover, inner cover should be sealed with tender's distinctive seal and superscribed with correct tender No. item of supply and due date of opening. The outer cover should only bear the address of this office and should not have any indication that a tender is within. Two or more quotation should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.

(b) Tenders should be free from CORRECTION AND ERASURES. Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

© Price should be net F.O.R dispatching station inclusive of risk in transit and remain valid for 60 days from due date.

(d) If any Sales Tax is payable as extra to the quoted price it should be specifically stated in quotations along with CST & TNGST No. failing which the purchaser will not be liable for payment of Sales Tax. Our T N G S T No.3560005 Dt.01-04-1995, CST No.239383 Dt.11.06.1991.

(e) No revision of prices will be entertained after tenders are opened.

(f) Manufacturer's Name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation wherever necessary.

(g) Product with I S I Certification marks will be preferred.

h) The Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.

2. SAMPLES: Wherever possible ,sample should be submitted separately whether specifically requested or not so as to reach the Purchaser on or before the due date of the enquiry. They should be clearly marked with the enquiry No and the date on the outside cover to facilitate identification.

3. PACKING AND MARKING: The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.

4 TERMS OF PAYMENT: Payment will be made within 30 days of satisfactory receipt of materials at site. Wherever required by the purchaser, the successful tenderer must send the operation & maintenance manuals, test certificate, drawings etc., for the materials ordered. These should be sent immediately after dispatch of the materials and a statement to that effect should be made in the invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods dispatched either by V P P or by the document presented through bank will not be accepted unless agreed to by the Purchaser.

The duplicate copy of the invoice meant for the transporters should accompany the material as stipulated under C.E Rules 52A and 173C (or) 57GG. A Photostat copy of the above invoice for each delivery challen should be submitted along with the original bills routed through bank or submitted directly to BHEL Finance Department.

5 SECURITY DEPOSIT: For purchases over Rs.5,000/- the successful tenderer/s may be requested to furnish a Bank Guarantee. Security Deposit for an appropriate value as may be determined by BHEL.

6 LIQUIDATED DAMAGES/PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:

If the supplier fails to deliver the raw material / equipment / components within the period in the contract the purchaser shall deduct Liquidated Damages a sum equivalent to 0.5% of the price for each week of delay up to a maximum of 15% of the price of the delayed/undelivered goods. In addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system. LD and interest on advances will be recovered on the total contract price/total advance paid.

7 RISK PURCHASE: Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has filed to delivery or dispatch within the time stipulated as aforesaid of if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in clause 6 above.

8 PREFERENTIAL DELIVERY: It should be noted if a contract is placed on a higher tender as a result of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F O R destination, including all elements of freights, sales tax, duties and other incidental in case of complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.

9 MODVAT/CREDIT: If any Excise Duty is payable, the chapter head/sub-head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for his input materials, the effect of proforma credit should be passed on to the purchaser. Tender under " MODVAT" shall be preferred.

10 GENERAL : The Purchaser reserves the right to split up the tender and place order for individual items with different tenders and also increase or decrease the quantity.

Any other conditions which might have been quoted by the Seller and are in contravention to the terms prescribed in the order and which have not been specifically accepted in by Purchaser will not be applicable to the contract.

BHARAT HEAVY ELECTRICALS LIMITED
FBC & HRSG / PURCHASE
TIRUCIRAPPALLI - 620 014 , TAMILNADU

445 – 407 (Rev.01)

INSTRUCTIONS TO TENDERERS (INDIGENOUS)

01.a Tenderers shall quote their price on **Ex-Works / FOR Despatching point** basis. Materials will be transported by road through BHEL / TRICHY approved transport carriers to respective destinations indicated in the tender.

b Split-up prices must be furnished by the tenderer for the basic Instrument / Equipment and for all accessories quoted.

02. Offer must include Spares required for:
a) Commissioning of the equipment.
b) **2** years trouble free operation.

03. If the tender specification calls for various alternatives, all such alternatives are to be quoted by the tenderers.

04. Data sheet as called for in the enquiry shall be filled by the tenderer in full and submitted along with the quotations.. **Offers with incomplete information in data sheet are liable for rejection**.

05. Offers shall be accompanied by copies of drawings, catalogues, illustrated leaflets as called for in the tender specification.

06. In case of tenders invited in two parts, vendors shall furnish **Un-priced Complete Bill Of Materials in the technical bids** for our evaluation. Technical bids alone will be opened on the tender due date.

07. Manufacturer's quality plan must be sent along with the offer. The Vendor shall submit along with the offer the list of components made in house and the list of bought out components, the source, the quality requirements for the same. A copy of the product catalogue with all the relevant information shall also accompany the offer. In case **BHEL Standard Quality plan** is applicable, vendor to confirm for their **compliance**.

08. Each and every point of BHEL specification / data sheet must be either confirmed or commented upon without fail either in typed form or in neatly hand written form bringing out clearly the deviations (if any) taken by the tenderers. However, the tenderers must make all efforts to adhere to BHEL specifications in toto. Offers received without such point to point confirmations / comments shall be considered incomplete and liable for rejection.

09. Status f tender submission shall invariably be informed to BHEL either over **E-Mail / Fax atleast two days in advance of due date**, failing which **no extention of due date is entertained.**

10. **No advance will be made along with order**. Our payment terms will be **100% within 45 days after receipt and acceptance of materials at our works / site.** Please note that finalisation of tender is not only on the price factor but also on your accepting our terms of payment.

11. The equipment shall be guaranteed for a period of **12 / 18** months from the date of putting the equipment in use or **18 / 24** months from the date of despatch whichever is earlier.

12. Vendor to confirm for providing **Bank Guarantee for 10% order value** (as per BHEL format) valid for a period mentioned in the point No.11 .

13. Please quote DGS&D rates if the equipment is covered under the current rate contract. A copy of current rate contract shall also be enclosed with the offer.

14. The purchase also reserves the right to allow to the Public Enterprises price preference facilities as admissible under Government policy.

15. The rate of excise duty prevalent on the date of quotation shall be clearly indicated in the offer itself for incorporation in the Purchase Order. It will be payable at the quoted rates subject to completion of delivery within the stipulated dates. However revision due to statutory variations will be applicable.

16. In case of an order, **3 sets of hard copies** of detailed dimensional drawings, O&M insturctions & manuals and **2 sets of soft copies in CD** will have to be furnished by the supplier **at no extra cost**.

17. If the component requires approval of the prospective supplier's drawing before manufacture, such drawings must be furnished within two weeks from the date of Letter of Intent unless contracted otherwise. Drawings to be submitted for approval must be complete in all respects without necessitating submission of revised drawings for approval.

18 **"Original Invoice for Buyer"** should be submitted along with the advance copy of documents to, The Manager / Purchase / IPP, Bldg.No.79, BHEL, Trichy-14 for each of the despatch made, for processing payment.

19. Detailed offer should reach us before the due date indicated in the tender. Telegraphic offers will normally be not accepted and will be treated as incomplete.

20. Offers must reach us latest **before 2.30 P.M.** on the date of opening of tender viz:

21. The materials are to be despatched to :

BHEL / FBC & HRSG / Purchase

TERMS & CONDITIONS *(FOR IMPORT ENQUIRY)*

I OFFER:

Offer in English Language and in Triplicate in a sealed cover super scribing the Enquiry Number and the due date shall be submitted (addressed) to:

The Manager/Purchase/FBC&HRSG
Building No.79
Bharat Heavy Electricals Limited
High Pressure Boiler Plant
TIRUCHIRAPALLI – 620 014
Tamil Nadu, India

Offer should be firm for net FOB Nearest Sea Port and C&F Chennai Port price indicating the shipping specifications and the earliest delivery in respect of offers from overseas suppliers. Offer from indigenous sources shall be firm for F.O.R TIRUCHIRAPALI.

II DOCUMENTS:

(i) offer should be accompanied by detailed technical literature, Catalogue and detailed dimensional drawing in English and In Triplicate or otherwise, the offer will not be considered.

(ii) In case Overseas suppliers route their offer through their accredited selling agents, a letter of authority should be furnished mentioning the name and address of their selling agents who are authorized to bid, negotiate and concluded a contract on their behalf.

III AGENCY COMMISSION:

(i) In respect of the offer from Overseas suppliers, agency commission, if any, payable to their agents in India, shall invariably be shown separately in the pro forma invoice and this will be paid by us IN INDIA in Indian Rupees, on satisfactory completion of the contract.

(ii) If overseas principal has any tie up with any third party in respect of Agency Commission it should be declared while submitting the offers.

(iii) Copies of current Agency Agreement / Authorization Letter in respect of Agency Commission shall be furnished along with offer, if not made available earlier.

(iv) For calculation of Rupees equivalent of Agency Commission, exchange rate as prevailing on the date of order will be taken.

IV SPARES:

The tender should quote separately for spares that are required for two years trouble free operations. The spares offer should accompany the offer of main equipment otherwise the quotation will be overlooked.

V VALIDITY:

The offers for main equipment and spares shall be kept open for acceptance for 120 days (one hundred and twenty days) from the date of opening of the tender.

VI TEST CERTIFICATES, OPERATING AND MAINTENANCE MANUALS:

The tender shall clearly mention in their offer that the Test certificate and Operating and Maintenance Manuals etc., as called for in the Technical specification in the required number of copies will be provided at no extra cost. If any amount is payable as extra, the same shall be indicated separately in the offer.

VII TERMS OF PAYMENT :

In the event of an order the Purchase will arrange for an Irrevocable Letter of Credit against presentation of documents. Under no circumstances confirmed and irrevocable letter of credit will be established by the Purchase.

VIII GENERAL:

(i) Preference will be given to suitable indigenous or ex-stock imported offers failing which imported offers from incoming consignment against the indigenous supplies " stock and sale licence" will be accepted. If stock and sale licence is not available with the indigenous suppliers, the same shall be indicated in their offer.

(ii) Bank Guarantee: The supplier in the event of an order should furnish a Bank Guarantee from an approved Bank at no extra cost in a pro forma which will be supplied to the Supplier, along with the order, for an amount equipment to 10% of the value of the contract. The Bank Guarantee should remain in full force and effect during the period that would be taken for successful completion of the contract and shall continue to be enforceable till 12 months from the date of receipt of consignment at Purchaser's site or 18 months from the date of last shipment at the Port of delivery whichever is earlier.

XI LD/PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIERY:

" If the supplier fails to deliver the equipment / components within the period specified in the contract the Purchaser shall deduct Liquidated Damages a sum equivalent to 0.5% of the price for each week of delay up to maximum 15% of the price of the delayed / undelivered goods, in addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price / total advance paid"

QUOTATION DATA SHEET

THE TENDERS SHALL FURNISH THE PARTICULARS CALLED FOR IN THE QUOTATION DATA SHEET ENCLOSED AND SUBMIT THE FILLED IN DATA SHEET ALONG WITH THE QUOTATION WITHOUT FAIL OFFERS WITH INCOMPLETE INFORMATION IN DATA SHEET ARE LIABLE FOR REJECTION. IN CASE OF DISCREPENCY, INFORMATION CONTAINED IN THIS DATA SHEET SHALL BE CONSIDERED FOR EVALUATION.

PLEASE STRIKE OUT WHICHEVER IS NOT APPLICABLE:

PROJECT: ENQ.NO & DATE :

DUE DATE :

01	VALIDITY	UPTO
02	DELIVERY PERIOD	. . . . . MONTHS / WEEKS
03	DELIVERY PLACE	
	(a) EX-WORKS PLACE	
	(b) FOR / DESPATCHING POINT	
04	EXCISE DUTY	. . . . . % / NOT APPLICABLE
05	TAX	. . . . . % / NOT APPLICABLE
	(a) C S T	. . . . . % / NOT APPLICABLE
	(b) LOCAL TAXES (SUPPLY WITHIN THE STATE)	. . . . . % / NOT APPLICABLE
06	OCTROI CHARGES	. . . . . % / NOT APPLICABLE
07	PACKING CHARGES	. . . . . % / NOT APPLICABLE
08	FORWARDING CHARGES	. . . . . % / NOT APPLICABLE
09	FREIGHT CHARGES	. . . . . % / NOT APPLICABLE
10	INSURANCE CHARGES	. . . . . % / NOT APPLICABLE
11	TESTING / IBR CHARGES (LUMPSUM)	. . . . . % / NOT APPLICABLE
12	COMMISSIONING CHARGES (LUMPSUM)	. . . . . % / NOT APPLICABLE
13	PAYMENT TERMS	
14	ACCEPTANCE FOR PROVIDING BANK GUARANTEE AS PER BHEL PROFORMA	YES / NO / APPLICABLE
15	DIMENSIONAL DRGS / DATA SHHETS	ENCLOSED / NOT APPLICABLE
16	ANY OTHER ADDITIONAL FACTORS	
17	LD CLAUSE @ 0.5% PER WEEK MAXIMUM 15% FOR THE DELAYED DESPATCHING	
18	GUARANTEE PERIOD SHALL BE 18 / 24 MONTHS	

WE CONFIRM THAT THE STATUTORY LEVIES, DUTIES, TAXES ETC FURNISHED ABOVE ARE BASED ON THE LATEST GOVT NOTIFICATION. WE ALSO CONFIRM THAT WE HAVE GONE THROUGH ALL THE CONDITIONS OF THE ENQUIRY AND OUR OFFER IS ACCORDINGLY SUBMITTED

SIGNATURE WITH SEAL

BHARAT HEAVY ELECTRICALS LIMITED
PCPS / PURCHASE

Ref: MM/PCPS/SCRV Dated 30.08.2010

SPECIAL CONDITIONS

1. This tender is for the supply as per the enclosed Enquiry and specification. The offered price shall be valid for 6 months from the date of quotation.

2. The tender is in TWO parts. One part consisting of Technical Bid with Commercial terms & conditions for supply in-line with our requirements and another Part containing Price Bid. Techno-Commercial bid and Price bids are to be submitted in separate sealed covers. Both these covers are to be put in a single cover duly super scribing the Enquiry Number. The technical bid with commercial terms & conditions will be opened on the due date and based on the acceptance of techno-commercial bid, the price bid of the qualified vendors will be opened on a suitable date with due intimation.

3. BHEL reserves the right to Negotiate with the L1 vendor.

4. BHEL reserves the right to re-float the tender opened, if L1 price is not the lowest acceptable price to them inter-alia other reasons.

5. The materials are to be dispatched to M/s. Bhavnagar Energy Company Ltd, C/o. BHEL Site office, Padva Village, Ghogha, Bhavnagar, Gujarat, **in case of indigenous** vendors on FOR/Destination basis. **in case of foreign vendors on FOB/Nearest seaport basis.** Mode of packing & delivery shall be clearly specified in your quote.

6. Desired delivery within 12 weeks from the date of order. For the delayed delivery, LD is applicable at 0.5% per week, subject to a max. of 15% on undelivered portion.

7. Offers will be evaluated on FOR / BECL Site cost basis only. Necessary loading factor for internal freight & insurance will be added from sea port to BECL site in case of foreign vendors.

8. 100% payment will be effected on receipt and acceptance of materials at site in case of indigenous vendors. 100% payment on collection basis thro' bank will be effected for foreign vendors. PBG should be submitted as per proforma attached for 10% value of the order along with dispatch / negotiation documents.

9. Applicable commercial terms & conditions shall be clearly spelt out in the offer.

10. Quotes should be submitted only by the principals. Orders will be placed only on the principals. Ordering on Indian agent will not be done. Qualified L1 vendor will be considered for ordering.

Dy. Manager/Purchase/PCPS

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 60 DAYS FROM THE DATE OF COMPLETION OF WARRANTY PERIOD)

PERFORMANCE BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its High Pressure Boiler Plant Division located at Tiruverumbur, Tiruchirapalli- 620 014 (hereinafter called 'the Company') having entered into a contract with …….hereinafter called ' the said contractor ' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the contract No……. Dt ……. Between BHEL, Trichy and as per the contract, the contractor / supplier is to furnish a performance Bank guarantee for Rs. ……. for the due performance of the equipment to be supplied under the above referred contract and for the fulfillment of all the terms and conditions of the contract, We …….(indicate the name of the bank) (herein after referred to as the bank) at the request of …….. (Contractor(s)) do here by undertake to pay the company an amount not exceeding Rs…….against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said contractor (s) of any of the terms and conditions contained in the said agreement.

2. We …….(indicate the name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

3. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We…….(indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till_____Office / Department/ Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (I) Unless a demand or claim under this guarantee is made on us in writing on or before the _____we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack.Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the bank personally.

6. We ……..(indicate the name of Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearence, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. It shall not be necessary for the company to proceed against the contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.

9. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirapalli.

10. The guarantor hereby declare that it has power to execute this guarantee and the executant has full powers to do so on its behalf under the proper authority granted to him/them by the guarantor

11. We ……(indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we……., (indicate the name of Bank) have hereunto setout Bank Seal the_____day _____month 200

LIST OF NATIONALISED BANKS

01.	**ALLAHABAD BANK**
02.	**ANDHRA BANK**
03.	**BANK OF INDIA**
04.	**BANK OF BARODA**
05.	**BANK OF MAHARASTRA**
06.	**BHARATH OVERSEAS BANK**
07.	**CANARA BANK**
08.	**CENTRAL BANK OF INDIA**
09.	**CORPORATION BANK**
10.	**DENA BANK**
11.	**INDIAN BANK**
12.	**INDIAN OVERSEAS BANK**
13.	**OREINTAL BANK OF COMERCE**
14.	**PUNJAB NATIONAL BANK**
15.	**PUNJAB AND SIND BANK**
16.	**STATE BANK OF INDIA**
17.	**STATE BANK OF TRAVANCORE**
18.	**STATE BANK OF MYSORE**
19.	**STATE BANK OF BIKANER & JAIPUR**
20.	**STATE BANK OF HYDERABAD**
21.	**STATE BANK OF PATIALA**
22.	**STATE BANK OF MAHARASTRA**
23.	**SYNDICATE BANK**
24.	**UCO BANK**
25.	**UNION BANK OF INDIA**
26.	**UNITED BANK OF INDIA**
27.	**VIJAYA BANK**

OTHER BANKS	
28	ABN AMRO BANK N.V.
29	CITI BANK N.A.
30	DEUTSCHE BANK AG
31	HDFC BANK LTD.
32	ICICI BANK LTD.
33	IDBI LTD.
34	STANDARD CHARTERED BANK
35	THE HONGKONG AND SHANGHAI BANKING CORPORATION LTD.