

Ref No. : PE/PG/YE1/E-5402/2016/CORRIGENDA/02

Date: 13.01.2017

CORRIGENDA / ADDENDUM-02

SUBJECT: 1 X 370 MW KPCL YELAHANKA CCPP
TENDER ENQUIRY FOR CHEMICAL DOSING SYSTEM
OUR REF: TENDER ENQUIRY NO: PE/PG/YE1/E-5402/2016, DATED- 13.12.2016

EXTENDED DUE DATE
18.01.2017
BY 02.00PM

Replies to Bidders' pre- queries have been compiled and are hereby uploaded on BHEL websites along with Amendment no. 01 to Technical specifications.

Also, the due date of submission of offer against tender for Chemical Dosing System invited vide Enquiry No PE/PG/YE1/E-5402/2016, Dtd-13.12.2016 is extended up to 18.01.2017, 02.00 PM. All bidders are requested to visit the website **www.bhel.com** (Tender Notifications Section), **www.bhelpem.com** OR <https://bheleps.buyjunction.in>. All future corrigenda/ amendment and due date extension, if any, for this tender shall be hosted only on above websites.

Encl:-

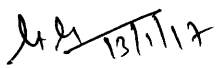
- Replies to Pre bid Queries of bidders (Annexure – I)**
- Amendment – 01 to Technical Specification**

PLEASE NOTE THAT NO FURTHER DUE DATE EXTENSION SHALL BE GRANTED.

Thanking You,

With Regards,

For & on behalf of BHEL


SUMEET SAHAY
SR ENGINEER/PG-I-2

सुमीत सहय / SUMEET SAHAY
वरिष्ठ अभियन्ता (पी.जी.-I-2)/Sr. Engineer (PG-I-2)
भारत भारी इलेक्ट्रिकल्स लिमिटेड/Bharat Heavy Electricals Ltd.
पावर सेक्टर-परियोजना प्रबंधन
Power Sector-Project Engineering Management
प्लॉट नं.-25, सेक्टर-16ए नोडा-201 301
Plot No. 25, Sector-16A Noida-201 301

Please reply to:

Sh Sumeet Sahay, Sr. Engineer
PG-I-2

Power Project Engineering Institute Building
HRD & ESI Complex Plot No. 25, Sector -16 A,
BHEL-PEM,Noida-201301 (U.P.)
Tel No.0120-4213532, 09999498202

ENQ. NO. : PE/PG/YE1/E-5402/2016 Dtd 13.12.2016
PROJECT : 1 X 370 MW KPCL Yelahanka CCPP
PACKAGE : Chemical Dosing System

ANNEXURE - 1

PREBID CLARIFICATION SCHEDULE DATED 02.01.2017: SHEET 01 OF 02

1.0 SL.NO. 17, SEC. C1-A/CLAUSE 17.0 / PAGE 24 OF 152

Sl.No. a : Not envisaged hence not provided.

BHEL Reply- Bidder to follow technical specification.

Sl.No. b : No special tools are required. However 1 coat of Finish Paint for touch-up will be provided.

BHEL Reply- Please Refer Amendment-1 Dtd.12.01.2017.

Sl.No. c : No first fill of chemicals will be provided.

BHEL Reply- Please Refer Amendment-1 Dtd.12.01.2017.

2.0 SEC : C1 – D : QUALITY ASSURANCE

Please note that we shall follow Quality Plan as given under Sec. C1-D for the Complete Dosing System.

We shall not follow separate Quality Plan for Motors, Local Control Panels & Instruments as provided elsewhere with the specification.

BHEL Reply- Bidder to follow technical specification.

3.0 SEC. C1 – F / DATA SHEET - A

Sl.No. 7.1 & 7.2 / PAGES 38, 39 of 152 :

Since the main piping is of S.S.304 the valve body / bonnet will be of S.S.304. However, the stem and other wetted parts will be of S.S.316.

BHEL Reply- Bidder to follow technical specification.

Sl.No. 8.1 & 8.2 / PAGES 41 of 152 :

Since the main piping is of S.S.304 the valve body / bonnet will be of S.S.304. However, the stem and other wetted parts will be of S.S.316.

BHEL Reply- Bidder to follow technical specification.

Sl.No.10.0 / PAGE 42 of 152

The flanges on pump discharge of IP & LP will be 300 class.

BHEL Reply- Bidder to follow technical specification.

4.0 SEC. C3 / CLAUSE 4.0/PAGES 73 OF 152

Sl.No.4.0 : Since a local starter cum control panel is provided for the system no separate Junction box for instrumentation will be provided.

BHEL Reply- Please Refer Amendment-1 Dtd.12.01.2017.

5.0 SEC. CD – D/ INSTRUMENTS DATA SHEET / PAGE 77, 79 OF 152

a) Pressure Indicators : We confirm to all details except armoured capillary of 15 m. The same shall not be provided and is not envisaged for the service as the service is neither corrosive nor for oil.

BHEL Reply- Please Refer Amendment-1 Dtd.12.01.2017.

b) Pressure Transmitter : We confirm to all details except armoured capillary of 15 m. The same shall not be provided and is not envisaged for the service as the service is neither corrosive nor for oil.

BHEL Reply- Please Refer Amendment-1 Dtd.12.01.2017.

ENQ. NO. : PE/PG/YE1/E-5402/2016 Dtd 13.12.2016
PROJECT : 1 X 370 MW KPCL Yelahanka CCPP
PACKAGE : Chemical Dosing System

PREBID CLARIFICATION SCHEDULE DATED 02.01.2017: SHEET 02 OF 02

- c) Diff. Pressure Transmitter : We confirm to all details except armoured capillary of 15 m. The same shall not be provided and is not envisaged for the service as the service is neither corrosive nor for oil.

BHEL Reply- Please Refer Amendement-1 Dtd.12.01.2017.

- d) Diff. Pressure Switch & Level (DP Type) Transmitter : We confirm to all details except armoured capillary of 15 m. The same shall not be provided and is not envisaged for the service as the service is neither corrosive nor for oil.

BHEL Reply- Please Refer Amendement-1 Dtd.12.01.2017.

- e) Level Gauge : Will be tubular type without ball check valves.

BHEL Reply- Bidder to follow technical specification.

6.0 ANNEXURE – 1, LIST OF SUB-VENDORS/ PAGE 112 TO 125 OF 152 :

a) Agitator : (Sl. No. 2.0)

This is self manufactured and will be our own make. Hence no sub-vendor is applicable. This will be of TECHNO.

b) Tubular Level Gauge : Sigma

b) Duplex Strainer : (Sl. No. 44.0)

This is self manufactured and will be our own make. Hence no sub-vendor is applicable. This will be of TECHNO.

c) Gate / Globe/ NRV Valves : (Sl. No. 46.0)

This is self manufactured and will be our own make. Hence no sub-vendor is applicable. This will be of TECHNO.

d) 3 Way Valves : (Sl. No. 48.0)

This is self manufactured and will be our own make. Hence no sub-vendor is applicable. This will be of TECHNO.

BHEL Reply (S.No. -6)- Requirement of technical specification is clear in this regard. Bidder to refer S.No. 11 (2.0)/SECTION-C1-A/VOL-IIB,Page 17 of 152 & Notes indicated in Annexure-I,Page No 126 of 152.



TITLE:
KARNATAKA POWER CORPORATION LIMITED
1x370 MW KPCL YELAHANKA CCPP
TECHNICAL SPECIFICATION FOR CHEMICAL DOSING SYSTEM

SPEC NO: PE-TS-409-154-A001. Rev.-01

AMENDMENT NO # 1

PAGE 1 of 3

DATE: 12.01.2017

The following modifications with respect to Technical Specification for CHEMICAL DOSING SYSTEM, BHEL's Technical specification no PE-TS-409-154-A001. Rev-01 shall apply. Bidder to note that existing clauses/page numbers as appearing in the specification stands deleted and clauses/page numbers as mentioned in "Modified to" column shall be applicable and complied by the bidder.

MODIFIED CLAUSES/PAGE NUMBERS.

Sl no.	Vol. No.	Section/ Description	Clause no	Page no	Existing	Modified to
1.	II-B	C1-A/SCOPE OF SUPPLY & SERVICES, EXCLUSION AND TERMINAL POINTS ETC.	17.0 (b)/ MISCELLANEOUS REQUIREMENT	24 of 152	All special tools necessary for proper maintenance or adjustment of the equipment packaged in permanent box. Finish paints for touch-up painting of equipment after erection at site in sealed container.	All tools & tackles, if any, necessary for proper maintenance or adjustment of the equipment packaged in permanent box. Finish paints for touch-up painting of equipment after erection at site in sealed container.
2.	II-B	C1-A/SCOPE OF SUPPLY & SERVICES, EXCLUSION AND TERMINAL POINTS ETC.	17.0 (c)/ MISCELLANEOUS REQUIREMENT	24 of 152	All the first fill and one Year's topping requirements or 10 % of first fill quantity, whichever is more of consumable such as greases, oil, lubricants, servo fluids/control fluids, gases and etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be furnished by the bidder. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum.	All the first fill and one Year's topping requirements or 10 % of first fill quantity, whichever is more of consumable such as greases, oil, lubricants, servo fluids/control fluids, gases and etc. excluding chemicals which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be furnished by the bidder. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum.
3.	II-B	C1-D/QUALITY ASSURANCE	-	29-32 of 152	QUALITY PLAN -CHEMICAL DOSING SYSTEM (HIGH & LOW)-REV-01	QUALITY PLAN -CHEMICAL DOSING SYSTEM (HP & LP)-REV-02
4.	II-B	C3/SPECIFIC TECHNICAL REQUIREMENT – & CONTROL INSTRUMENTATION	4.0/ Specific Technical Requirements (C&I):	73 of 152	The junction boxes/LIEs for termination of instruments are in bidder's scope	Stands Deleted.
5.	II-B	D/INSTRUMENT DATASHEET	INSTRUMENT DATASHEET	77 & 78 of 152	<u>Pressure Indicators:</u> Direct reading, pipe mounted Pressure gauges of aluminium casing with 150 mm inch phenolic dial (white dial with black numerals), 316 SS Bourdon tube, nylon movements and micrometer type adjustable pointer, accuracy of +0.5% of span including accessories like syphons for steam services, snubbers for pump discharge applications and chemical diaphragm for corrosive and oil services and name plate. Material of accessories will be SS. IP65 or equivalent degree of protection for enclosure. Over range protection will be 25% above maximum pressure. Armoured capillary of 15m shall be provided. Bourdon tube shall be drawn tube for pressure < 70bar (g) and bored tube for > 70 bar (g).	<u>Pressure Indicators:</u> Direct reading, pipe mounted Pressure gauges of aluminium casing with 150 mm inch phenolic dial (white dial with black numerals), 316 SS Bourdon tube, nylon movements and micrometer type adjustable pointer, accuracy of +0.5% of span including accessories like syphons for steam services, snubbers for pump discharge applications and chemical diaphragm for corrosive and oil services and name plate. Material of accessories will be SS. IP65 or equivalent degree of protection for enclosure. Over range protection will be 25% above maximum pressure. Bourdon tube shall be drawn tube for pressure < 70bar (g) and bored tube for > 70 bar (g).



TITLE:

KARNATAKA POWER CORPORATION LIMITED
1x370 MW KPCL YELAHANKA CCPP
TECHNICAL SPECIFICATION FOR CHEMICAL DOSING SYSTEM

SPEC NO: PE-TS-409-154-A001. Rev.-01

AMENDMENT NO # 1

PAGE 2 of 3

DATE: 12.01.2017

Pressure Transmitters:

Micro-processor based Smart Electronic Transmitters, rack mounted with accuracy of +0.1% of span, field zero and span adjustment, self diagnostics, temperature sensor for compensation. Power supply 24 V DC; output signal of 4-20 mA DC and digital signal with HART protocol. IP 65 or equivalent degree of protection. Aluminium housing with epoxy coating, 316 SS sensing element. Accessories like snubbers for pump discharge applications and chemical diaphragm with 15 m PVC covered SS armoured capillary for corrosive and oil services. Material for accessories will be SS.

Differential Pressure Indicators:

Direct reading type, pipe mounted, bellows or diaphragm operated differential pressure indicators; aluminium casing (epoxy coated) with 150 mm dial, 316 SS pressure element; accuracy of +0.5% of span including accessories like snubbers for pump discharge application, chemical diaphragm with 15 m PVC covered SS armoured capillary for each limb for corrosive and oil services and 3 way manifold. Material of accessories will be SS. IP 65 or equivalent degree of protection. Over range protection will be 50% above maximum pressure.

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Differential Pressure Switches:

Bellows or diaphragm operated non-indicating field mounted type; aluminium casing (epoxy coated); 316 SS pressure element nylon movement; accuracy of +1% of span with an adjustable contact including accessories like snubbers for pump discharge applications, chemical diaphragm with 15 m capillary for each limb for all corrosive and oil services and 3 way manifold. Material of accessories will be SS. Auto reset micro switch with tamper proof external adjustable set values with 2 SPDT contacts rated for 0.2 A at 220 V DC. IP 65 or equivalent degree of protection over range protection 50% above maximum pressure. Repeatability shall be +0.5% FSR.

Smart Electronic Transmitters for Measurement of Pressure, Differential Pressure(DP),

Flow/Level(DP Type):

Micro-processor based indicating type (LCD display), rack mounted with accuracy of +/- 0.1% of span, Repeatability :+0.05% of FSR or better, Linearity :+0.1% of FSR or better.

Pressure Transmitters:

Micro-processor based Smart Electronic Transmitters, rack mounted with accuracy of +0.1% of span, field zero and span adjustment, self diagnostics, temperature sensor for compensation. Power supply 24 V DC; output signal of 4-20 mA DC and digital signal with HART protocol. IP 65 or equivalent degree of protection. Aluminium housing with epoxy coating, 316 SS sensing element. Accessories like snubbers for pump discharge applications and chemical diaphragm. Material for accessories will be SS.

Differential Pressure Indicators:

Direct reading type, pipe mounted, bellows or diaphragm operated differential pressure indicators; aluminium casing (epoxy coated) with 150 mm dial, 316 SS pressure element; accuracy of +0.5% of span including accessories like snubbers for pump discharge application, chemical diaphragm and 3 way manifold. Material of accessories will be SS. IP 65 or equivalent degree of protection. Over range protection will be 50% above maximum pressure.

77

Differential Pressure Switches:

Bellows or diaphragm operated non-indicating field mounted type; aluminium casing (epoxy coated); 316 SS pressure element nylon movement; accuracy of +1% of span with an adjustable contact including accessories like snubbers for pump discharge applications, chemical diaphragm and 3 way manifold. Material of accessories will be SS. Auto reset micro switch with tamper proof external adjustable set values with 2 SPDT contacts rated for 0.2 A at 220 V DC. IP 65 or equivalent degree of protection over range protection 50% above maximum pressure. Repeatability shall be +0.5% FSR.

Smart Electronic Transmitters for Measurement of Pressure, Differential Pressure(DP):

Micro-processor based indicating type (LCD display), rack mounted with accuracy of +/- 0.1% of span, Repeatability :+0.05% of FSR or better, Linearity :+0.1% of FSR or better. Hysteresis: +0.1% of FSR or better external zero and span



TITLE:

**KARNATAKA POWER CORPORATION LIMITED
1x370 MW KPCL YELAHANKA CCPP
TECHNICAL SPECIFICATION FOR CHEMICAL DOSING SYSTEM**

SPEC NO: PE-TS-409-154-A001. Rev.-01

AMENDMENT NO # 1

PAGE 3 of 3

DATE: 12.01.2017

				Hysteresis: +0.1% of FSR or better external zero and span adjustment, self diagnostics, temperature sensor for compensation. Power supply 24 V DC; output signal of 4- 20 mA DC. IP 65 or equivalent degree of protection with epoxy coating, 316 SS/ haste alloy/ other suitable sensing element. Accessories like snubbers for pump discharge applications and chemical diaphragm with 15 m PVC covered SS armoured capillary for corrosive and oil services, etc. Material for accessories will be SS. HART protocol output shall be available in each transmitter. In case it becomes necessary to use a DP transmitter for pressure measurement then a 3-valve manifold should be used in place of 2-valve manifold. LVDT type is not acceptable. Wherever, the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.	adjustment, self diagnostics, temperature sensor for compensation. Power supply 24 V DC; output signal of 4- 20 mA DC. IP 65 or equivalent degree of protection with epoxy coating, 316 SS/ haste alloy/ other suitable sensing element. Accessories like snubbers for pump discharge applications and chemical diaphragm etc. Material for accessories will be SS. HART protocol output shall be available in each transmitter. In case it becomes necessary to use a DP transmitter for pressure measurement then a 3-valve manifold should be used in place of 2-valve manifold. LVDT type is not acceptable. Wherever, the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.
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		MANUFACTURER'S NAME & ADDRESS :		QUALITY PLAN				PROJECT 1X370 MW YELAHANKA COMBINED CYCLE POWER PLANT PACKAGE CONTRACT NO. CHEMICAL DOSING SYSTEM (HP & LP) MAIN SUPPLIER BHEL/PEM, NOIDA					
				ITEM: CHEMICAL DOSING SYSTEM (HP & LP)		QP.NO : PE - VE-409-154A-006						REV. : 2	
				SUB - SYSTEM :		DATE :							
				CHEMICAL DOSING SYSTEM		PAGE : 1 OF 4							
S.NO.	COMPONENTS/ OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE/ METHOD CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY**			REMARKS	
1	2	3	4	5	6	7	8	9	M	B	R	11	
1.0	WELDER'S QUALIFICATION												
1.1	WELDING PROCEDURE SPECIFICATION (WPS)	CORRECTNESS	MA	SCRUTINY	100%	ASME IX	ASME IX	QW 482	P	V	V		
1.2	WELDER PERFORMANCE & PROCEDURE QUALIFICATION RECORD	WELD SOUNDNESS & WELDING PERFORMANCE	MA	PHYSICAL TEST	ASME IX	ASME IX	ASME IX	QW 483 & QW 484	P	V	V		
2.0	TANKS												
2.1	RAW MATERIAL :												
2.1.1	PLATE	CHEMICAL & PHY. PROPERTIES	MA	CHEM & PHY TEST	1/PLATE/HT BATCH	ASTM A 240 GR.TP 304	ASTM A 240 GR.TP 304	MFG.TC/LAB REPORT	P	V	V	IDENTIFICATION BY BHEL	
		IGC TEST	MI	IGC TEST	1/PLATE/HT BATCH	ASTM A 262 PR.'E'	ASTM A 262 PR.'E'						
2.1.2	PIPE FOR NOZZLE	CHEMICAL & PHY. PROPERTIES	MA	CHEM. & PHY.TEST	1/HT BATCH/SIZE	ASTM A 312 GR.TP 304	ASTM A 312 GR.TP 304	MFG.TC/LAB REPORT	P	V	V		
		MICRO STRUCTURE	MI	GRAIN STRUCTURE	1/HT BATCH/SIZE	FOR HEAT TREATMENT	FOR HEAT TREATMENT	MFG.TC/LAB REPORT	P	V	V		
		IGC TEST	MI	IGC TEST	1/HT BATCH/SIZE	ASTM A 262 PR.'E'	ASTM A 262 PR.'E'	MFG.TC/LAB REPORT	P	V	V		
		HYDRO TEST	NA	LEAKAGE	100%	NO LEAKAGE	NO LEAKAGE	MFG. TC/IR	P	V/W	V	REFER NOTE 4	
2.1.3	FLANGES FOR TANKS	CHEMICAL & PHY PROPERTIES	MA	CHEM & PHY TEST	1/HT BATCH	ASTM A 182 GR. F 304	ASTM A 182 GR. F 304	MFG.TC/LAB REPORT	P	V	V		
2.2	IN PROCESS												
2.2.1	DISHED ENDS	DIMENSIONS	MA	MEASUREMENT WITH TEMPLATE	100%	APPD.DWG.(BY BHEL)	APPD.DWG.(BY BHEL)	MFG.TC./LAB REPORT	P	V	V		
		SURFACE DEFECTS ON WELDMENTS		DP TEST	100%	ASTM E 165	NO SURFACE DEFECTS	MFG.TC	P	V	V		
2.3	FINAL ASSEMBLY FOR TANKS:	DIMENSIONS &	MA	MEASUREMENT	100%	APPD.DWG.(BY BHEL)	APPD.DWG.(BY BHEL)	MFG.TC/INSP REPORT	P	W	W	TO BE OFFERED ALONG WITH	
		ORIENTATION	MA	VISUAL		APPD.DWG.(BY BHEL)	APPD.DWG.(BY BHEL)	MFG.TC/INSP REPORT	P	W	W	FINAL SKID ASSEMBLY INSPECTION.	
2.3.1		LEAKAGE	MA	WATER FILL FOR 2 HR	100%	N.A.	NO LEAKAGE	MFG.TC/INSP. REPORT	P	W	W		
3.0	STIRRER :												
3.1	RAW MATERIAL FOR SHAFT	CHEM.& PHY. PROPERTIES	MA	CHEM & PHY TEST	1/BAR	ASTM A 479 GR.TP 304	ASTM A 479 GR.TP 304	MFG.TC/LAB REPORT	P	V	V		
		IGC TEST	MA	IGC TEST	1/HT BATCH	ASTM A 262 PR.'E'	ASTM A 262 PR.'E'	MFG.TC/LAB REPORT					
3.2	IMPELLER	CHEMICAL PROP.	MA	CHEMICAL TEST	1/PLATE	ASTM A 240 GR.TP 316	ASTM A 240 GR.TP 316	MFG.TC/LAB REPORT	P	V	V		
3.3	COMPLETE STIRRER UNIT WITH MOTOR	PERFORMANCE IN WATER FILLED TANK											
		- VIBRATION	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V		
		- WOBBLING	MA	VISUAL	100%	NO WOBBLING	NO WOBBLING	MFG.TC	P	V	V		
		- POWER CONSUMPTION/ CURRENT DRAWN	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V		
4.0	MOTORS:	ROUTINE TEST	MA	MFG. TC	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V		
		TYPE TEST	MA	MFG. TC	1/ SIMILAR FRAME SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V		
		DEGREE OF PROTECTION	MA	MFG. TC	1/ SIMILAR FRAME SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V		
				** LEGEND : M : MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR B : BHEL/NOMINATED INSPECTION AGENCY "P" PERFORM, "W" WITNESS, AND "V" VERIFICATION									
MANUFACTURER/ SUB CONTRACTOR		MAIN SUPPLIER--BHEL		R: KPCL				SIGNATURE OF APPROVAL BY CUSTOMER					
SIGNATURE													

THIS IS A PART OF TECHNICAL SPECIFICATION PE-TS-409-154-A001,R01

		MANUFACTURER'S NAME & ADDRESS :		QUALITY PLAN				PROJECT		1X370 MW YELAHANKA COMBINED CYCLE POWER PLANT			
				ITEM: CHEMICAL DOSING SYSTEM (HP & LP)		Q.P.NO : PE - VE-409-154A-006		PACKAGE		CHEMICAL DOSING SYSTEM (HP & LP)			
				SUB - SYSTEM :		DATE :		CONTRACT NO.					
				CHEMICAL DOSING SYSTEM		PAGE : 2 OF 4		MAIN SUPPLIER		BHEL/PEM, NOIDA			
S.NO.	COMPONENTS/ OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE/ METHOD CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY**			REMARKS	
									M	B	R		
1	2	3	4	5	6	7	8	9	10			11	
5.0	METERING PUMP:												
5.1	RAW MATERIAL :												
5.1.1	WETTED PARTS	CHEM & PHY. PROPERTIES	MA	CHEM. & PHY. TEST	1/BAR	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V	SHALL BE TESTED WITH EITHER JOB MOTOR OR SHOP MOTOR OF SIMILAR FRAME SIZE	
		SURFACE TEST	MI	UT ON BAR>25 MM DIA	100%	ASTM A 388	REF. NOTE # 1	MFG.TC/LAB REPORT	P	V	V		
				DP ON M/C SURFACE	100%	ASME - E - 165	NO SURFACE DEFECTS	MFG.TC/LAB REPORT	P	V	V		
5.2	FINAL INSPECTION												
5.2.1	PUMP WITH MOTOR	LINEARITY	MA	PERFORMANCE	100%	API 675	API 675	INSPECTION REPORT	P	W	V		
		STEADY STATE ACCURACY	MA	SHOP TEST	100%	API 675	API 675	INSPECTION REPORT	P	W	V		
		REPEATABILITY	MA	SHOP TEST	100%	API 675	API 675	INSPECTION REPORT	P	W	V		
		POWER DRAWN @ 100% STROKE	MA	MEASURED AT WORK	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	INSPECTION REPORT	P	W	V		
		LEAKAGE	MA	HYDRO TEST	100%	@1.5X DESIGN PRESSURE	NO LEAKAGE	INSPECTION REPORT	P	W	V		
		DIMENSIONS	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	V		
		NOISE	MA	MEASUREMENT	100%	--	< 85 dbA AT 1 M RADIUS	INSPECTION REPORT	P	W	V		
		VIBRATION	MA	MEASUREMENT	100%	--	≤45 MICRONS (PEAK TO PEAK)	INSPECTION REPORT	P	W	V		
7.0	PRESSURE RELIEF VALVE	SET & RESET PRESSURE.	MA	PERFORMANCE	100%	BHEL APPD.DATA SHEET & API RP-520	BHEL APPD.DATA SHEET & API RP-520	MFG. TC	P	V	V		
		DIMENSIONS	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	MFG. TC	P	V	V		
		LEAKAGE DURING PERFORMANCE TEST	MA	VISUAL	100%	NO LEAKAGE	NO LEAKAGE	MFG. TC	P	V	V		
8	VALVES (GATE, GLOBE & NRV)												
8.1	RAW MATERIAL :												
8.1.1	BODY, BONNET COVER	CHEM.& PHY PROPERTIES	MA	CHEM.& PHY TEST	1/HT BATCH	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG. TC/LAB REPORT	P	V	V		
		HEAT TREATMENT	MA	HEAT TREATMENT	1/HT BATCH	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG. TC/LAB REPORT	P	V	V		
8.1.2	TRIM MATERIAL	CHEM.& PHY PROPERTIES	MA	CHEM.& PHY TEST	1/BAR/SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG. TC/LAB REPORT	P	V	V		
8.2	ASSEMBLY												
		LEAKAGE (BODY & SEAT)		HYDRO TEST	100%	BHEL APPD.DATA SHEET	NO LEAKAGE	MFG TC	P	V	V		
		LEAKAGE (SEAT)		PNEUMATIC TEST	100%	BHEL APPD.DATA SHEET	NO LEAKAGE	MFG TC	P	V	V		
		DIMENSIONS		MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	MFG TC	P	V	V		
				** LEGEND :									
MANUFACTURER/ SUB CONTRACTOR		MAIN SUPPLIER--BHEL		M : MANUFACUTRER/SUB-CONTRACTOR/SUB-VENDOR									
				B : BHEL/NOMINATED INSPECTION AGENCY				R: KPCL					
				"P" PERFORM, "W" WITNESS, AND "V" VERIFICATION									
SIGNATURE								SIGNATURE OF APPROVAL BY CUSTOMER					
THIS IS A PART OF TECHNICAL SPECIFICATION PE-TS-409-154-A001,R01													

बी एच ई एल 		MANUFACTURER'S NAME & ADDRESS :		QUALITY PLAN				PROJECT				1X370 MW YELAHANKA			
ITEM: CHEMICAL DOSING SYSTEM (HP & LP)				Q.P.NO : PE - VE-409-154A-006 REV. : 2				PACKAGE CHEMICAL DOSING SYSTEM (HP & LP)							
SUB - SYSTEM : CHEMICAL DOSING SYSTEM				DATE : PAGE : 3 OF 4				CONTRACT NO.							
								MAIN SUPPLIER BHEL/PEM, NOIDA							
S.NO	COMPONENTS/ OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE/ METHOD CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY**						
									M	B	R				
1	2	3	4	5	6	7	8	9	10			11			
9.0	FITTING/FLANGES FOR PIPING:														
9.1	RAW MATERIAL	CHEM.& PHY PRPERTIES	MA	CHEM.& PHY TEST	1/HT BATCH	ASTM A 182 GR.TP 304	ASTM A 182 GR.TP 304	MFG.TC/LAB REPORT	P	V	V				
		HEAT TREATMENT	MA	HEAT TREATMENT	100%	ASTM A 182 GR.TP 304	ASTM A 182 GR.TP 304	MFG.TC/LAB REPORT	P	V	V				
		IGC TEST	MI	IGC TEST	1/HT BATCH	ASTM A 262 PR. 'E'	ASTM A 262 PR. 'E'	MFG.TC/LAB REPORT	P	V	V				
9.2	FINAL INSPECTION	DIMENSIONS	NA	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG/ ANSI B 16.11/16.5	BHEL APPD.DATA SHEET/DWG/ ANSI B 16.11/16.5	MFG.TC	P	V	V				
10.0	STRAINERS :														
10.1	RAW MATERIAL FOR BODY	PHY. & CHEM. PROPERTIES	MA	PHY. & CHEM.TEST	1/BAR/SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TCLAB REPORT	P	V	V				
10.2	SCREEN	CHEMICAL	MA	CHEMICAL	1/SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V				
		MESH SIZE	MA	MEASUREMENT	1/SIZE	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V				
10.3	FINAL INSPECTION	DIMENSIONS	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V				
		LEAKAGE		HYDRO TEST	1	BHEL APPD.DATA SHEET	NO LEAKAGE	MFG.TC	P	V	V				
11.0	PIPE (SEAMLESS)														
11.1	MATERIAL	CHEMICAL	MA	CHEMICAL	1/HT BATCH/SIZE	ASTM A 312 GR.TP 304	ASTM A 312 GR.TP 304	MFG.TC/LAB REPORT	P	V	V	IDENTIFICATION BY BHEL. REFER NOTE 4.			
		MECHANICAL TEST	MA	MECHANICAL TEST	1/HT BATCH/SIZE	ASTM A 312 GR.TP 304	ASTM A 312 GR.TP 304	MFG.TC/LAB REPORT	P	V	V				
		MICRO STRUCTURE	MI	GRAINS STRUCTURE	1/HT BATCH/SIZE	FOR HEAT TREATMENT	FOR HEAT TREATMENT	MFG.TC/LAB REPORT	P	V	V				
		IGC TEST	MI	IGC TEST	1/HT BATCH/SIZE	ASTM A 262 PR 'E'	ASTM A 262 PR 'E'	MFG.TC/LAB REPORT	P	V	V				
		HYDRO TEST	MA	LEAKAGE	100%	NO LEAKAGE	NO LEAKAGE	MFG.TC/IR	P	V/W	V				
12.0	LEVEL GAUGE :														
12.1	RAW MATERIAL	CHEM.PROPERTIES	MA	CHEM.TEST	1/HT BATCH	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V				
12.2	FINAL INSPECTION	DIMENSION	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V				
		LEAKAGE	MA	HYDRO TEST	100%	BHEL APPD.DATA SHEET	NO LEAKAGE	MFG.TC	P	V	V				
13.0	PRESSURE & DP GAUGE														
13.1	MAT. FOR WETTED PARTS & BOU	CHEM.PROPERTIES	MA	CHEM.TEST	1/HT BATCH	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V	INSTRUMENTS AS APPLICABLE FOR THE MODULE ORDERED SHALL BE CONSIDERED.			
13.2	FINAL INSPECTION	DIMENSIONS	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	MFG.TC/LAB REPORT							
13.3	PERFORMANCE	ACCURACY & OVERLOAD PROTECTION	MA	CALIBRATION	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG. TC	P	V	V				
14.0	SWITCHES(LEVEL, PRESURE & DP) & TRANSMITTERS (LEVEL, PRESSURE & DP):														
14.1	MAT. FOR WETTED PARTS	CHEM.PROPERTIES	MA	CHEM.TEST	1/HT BATCH	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V				
14.2	PERFORMANCE	FUNCTIONAL	MA	CALIBRATION & VISUAL	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V				
		IR-HV-IR		ELECTRICAL	100%	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC	P	V	V				
		DIMENSIONS		MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	MFG.TC	P	V	V				
		DEGREE OF PROTECTION	MI	VERIFICATION OF TYPE TEST CER	TYPE TEST	BHEL APPD.DATA SHEET	BHEL APPD.DATA SHEET	MFG.TC/LAB REPORT	P	V	V				
				** LEGEND :											
MANUFACTURER/ SUB CONTRACTOR		MAIN SUPPLIER--BHEL		M : MANUFACUTRER/SUB-CONTRACTOR/SUB-VENDOR B : BHEL/NOMINATED INSPECTION AGENCY "P" PERFORM, "W" WITNESS, AND "V" VERIFICATION				R: KPCL							
SIGNATURE								SIGNATURE OF APPROVAL BY CUSTOMER							
THIS IS A PART OF TECHNICAL SPECIFICATION PE-TS-409-154-A001,R01															

		MANUFACTURER'S NAME & ADDRESS :		QUALITY PLAN				PROJECT 1X370 MW YELAHANKA COMBINED CYCLE POWER PLANT				
				ITEM: CHEMICAL DOSING SYSTEM (HP & LP)		QP.NO : PE - VE-409-154A-006		PACKAGE CONTRACT NO.		MAIN SUPPLIER BHEL/PEM, NOIDA		
				SUB - SYSTEM : CHEMICAL DOSING SYSTEM		REV. : PE - VE-409-154A-006 2						
				PAGE : 4 OF 4								
S.NO.	COMPONENTS/ OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE/ METHOD CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY** M B R			REMARKS
1	2	3	4	5	6	7	8	9	10			11
15.0	CONTROL PANEL :	DIMENSIONS	MA	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	CONTOL PANEL TEST TO BE OFFERED ALONG WITH FINAL SKID ASSEMBLY.
		CONTINUITY, IR-HV-IR	MA	ELECTRICAL	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		VERIFICATION OF MAKE	MA		100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		RATING OF COMPONENTS	MA		100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		PAINT SHADES, THICKNESS	MA		100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		ADHESION	MA		100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		DEGREE OF PROTECTION	MI	VERIFICATION OF TYPE TEST CERTIFICATE	TYPE TEST	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	MFG.TC/LAB REPORT	P	V	W	
16.0	COMPLETE SKID ASSEMBLY:	DIMENSIONS & ORIENTATION	CR	MEASUREMENT	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		LEAKAGE, CHECK ON WELDMENTS		VISUAL & HYDRO TEST	100%	DISCH.PIPING - 1.5 x DISCH PR. OF PUM	NO LEAKAGE	INSPECTION REPORT	P	W	W	
		FUNCTIONAL TEST FOR INTERLOCKS	MA	VISUAL	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
	PMI Test for SS	GRADE CONFIRMATION	MA	CHEM.TEST	100%	BHEL APPD.DATA SHEET/DWG	BHEL APPD.DATA SHEET/DWG	INSPECTION REPORT	P	W	W	
		PAINTING	MA	VISUAL & MEASUREMENT	100%	BHEL APPD PAINTING SCHEME	APPD DWG/PAINTING	INSPECTION REPORT	P	W	W	
17.0	PACKING OF SYSTEM INSPECTION ALONG WITH SPARES											
	PACKING OF SYSTEM	DIMENSION OF PACKING IN ASSEMBLED CONDITION / TRANSPORT WORTHY PACKING	MA	DIMENSION / VISUAL	100%	PACKING DRAWING / BHEL APPROVED PACKING PROCEDURE	PACKING DRAWING / BHEL APPROVED PACKING PROCEDURE	CLAEARNCE REPORT FROM BHEL + PHOTOS AFTER SYSTEM PACKING	P	W	W	
	LOOSE ITEM PACKING	SPARE PACKING WITH SPARE LIST COPY VERIFICATION	MA	CHECK SPARE WITH LIST AND PACKING	100%	SPARE LIST AS PER PO	SPARE LIST AS PER PO	REPORT OF CHECKING SPARES	P	W	W	
NOTE-1) WHEN BACK WALL ECHO IS SET TO 100% OF FSH IN SOUND AREA, DEFECT ECHO SHALL NOT EXCEED 20% OF FSH. MAX BACH WALL ECHO IS 20% OF FSH. TOTAL NO OF DEFECTS SHALL BE MAX. 5 NO IN ONE METER LENGTH. MIN DISTANCE BETWEEN TWO DEFECTS SHALL BE 3 TIMES THE DIA OF BAR.												
NOTE-2) CHEMICAL DOSING SKID VENDOR SHALL BE SELECTED FROM CUSTOMER APPROVED SOURCES. ALL THE BOUGHT OUT ITEMS OF THE CHEMICAL DOSING VENDOR SHALL BE PROCURED FROM BHEL APPROVED SOURCES.												
NOTE- 3) ALL VENDOR DRAWINGS/DATASHEETS SHALL BE APPROVED BY BHEL. ONLY MANUFACTURING QP(PREPARED IN LINE WITH THIS STANDARD QP) OF THE VENDOR SHALL BE FORWARDED FOR CUSTOMER APPROVAL. ALL THE BHEL APPROVED DOCUMENTS SHALL BE FURNISHED TO CUSTOMER FOR INFORMATION/RECORDS ALONG WITH O&M MANUAL. COPY OF THE SAME SHALL ALSO BE FURNISHED TO INSPECTION AGENCY DURING INSPECTION.												
NOTE 4) FOR PIPES PURCHASED DIRECTLY FROM MANUFACTURER'S OR AUTHORIZED DEALERS, APART FROM TC REVIEW, CHECK WILL BE AS PER CLAUSE 2.1.2 AND 10.0; HOWEVER FOR HYDRAULIC TEST, MANUFACTURER TC SHALL BE REVIEWED . IN CASE ON IMPORTED PIPES PURCHASED FROM OPEN MARKET, TEST SHALL BE PERFORMED AS PER CLAUSE 2.1.2 AND 10.0 (INCLUDING HYDRAULIC TEST).												
NOTE 5) FOR RAW MATERIAL (BARS/PIPES/CASTINGS/FORGINGS) WHERE HEAT TREATMENT ARE CARRIED OUT BY MATERIAL PRODUCERS ON BULK QUANTITIES, THEIR TEST CERTIFICATE SHALL BE REVIEWED (EXCEPT TIME TEMPERATURE CHART)												
NOTE 6) NDT REQUIREMENT ON WELDING (TANK, PIPE, BREATHER/WATER SEAL/CO2 ABSORBER) SHALL BE AS -- A) ON BUTT WELD-- 25% DP & 25% RT FOR PUMP SUCTION SIDE & 100% DP & 100% RT FOR PUMP DISCHARGE SIDE. B) ON FILLET WELD--100% DP TEST												
		** LEGEND : M : MANUFACUTRER/SUB-CONTRACTOR/SUB-VENDOR B : BHEL/NOMINATED INSPECTION AGENCY R : KPCL										
SIGNATURE		MAIN SUPPLIER--BHEL		"P" PERFORM, "W" WITNESS, AND "V" VERIFICATION								
THIS IS A PART OF TECHNICAL SPECIFICATION PE-TS-409-154-A001,R01												