

SCHEDULE OF PRICES - MISC PUMPS HORIZONTAL						
2x660 MW DVC RAGHUNATHPUR TPP PH II (STG)						
	DESCRIPTION OF WORKS OR EQUIPMENT(S)		UOM	QUANTITY	UNIT EX-WORKS PRICE INCLUDING PACKING (INR)	TOTAL EX-WORKS PRICE INCLUDING PACKING (INR)
	Total Price for design, manufacture, assembly, inspection and testing at manufacturer's and/or his sub-contractors works, painting, proper packing to avoid damage of items during transportation & storage at site of Miscellaneous Pumps (along with Motors & mandatory spares as applicable), transportation to site, complete with all other accessories as per the requirements specified in the specification, site services including installation checks of pump motor set & supervision of replacement of gland packing with Mechanical Seal arrangement (as applicable) at site, PG Test at site and any other services, etc. as per specification PE-TS-390/527-100-W001, REV-00 for Misc. Pumps Horizontal of 2x660 MW DVC RAGHUNATHPUR TPP PH II (STG)					
1.0	Pumps and Motors (Horizontal Pumps):					
	(i)	DMCW TG PUMPS				
		Pump price:	Nos.	6		
		Motor price:	Nos.	BHEL Scope		
		Suction Strainer:	Nos.	6		
		Mandatory Spares (as per Annexure -A)	Lot	1		
	(ii)	ACW TG PUMPS				
		Pump price:	Nos.	6		
		Motor price:	Nos.	BHEL Scope		
		Mandatory Spares (as per Annexure -A)	Lot	1		
2.0	SITE SERVICES:					
2.1	Installation Check (For all Pumps) & Supervision for replacement of Gland packing with Mechanical Seal (for DMCW TG Pumps) at Site as per Specification					
2.1.1	Site Visit Charges		Nos. of Visits	6		
2.1.2	Manday Charges at Site		Nos. of Mandays	24		
2.2	Lumpsum cost for PG Test of pumps at site as per Specification		Lot	1		
	TOTAL (1.0+ 2.0)					
NOTES:						
a)	Service charges at Sl.no 2.1.1. shall include to/fro travel expenses, medical and insurance.					
b)	Service Charges at Sl.no 2.1.2. shall include boarding/lodging, local conveyance or any other applicable charge for completion of site services. No. of mandays at site defined at Sl.no. 2.1.2 above shall be calculated on the basis of presence at site (travelling time/days is excluded).					
c)	Payment for Sl. No. 2.1 shall be done based on actual consumed site visits and mandays.					
d)	Price of commissioning & erection spares, special Tools & tackle and other accessories not listed above shall be included in the price of pump & shall be supplied with the pump.					
e)	For items stated as not applicable by bidder, shall have to be supplied without any cost implication to BHEL in the event they are found to be applicable during detail engineering stage.					
f)	Please refer technical specification for detail.					
g)	Mandatory Spare Note: 1. One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the 'set' would include all components/hardware required to replace the item. 2. In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design (except for those items for which "if applicable" is specified) with quantities as specified in the Technical specification/NIT.					
Bidder shall furnish this price Schedule indicating "Quoted" against each item along with his technical offer and actual prices in his price offer.						

SCHEDULE OF PRICES -ANNEXURE-A MANDATORY SPARES OF MISC. PUMPS (HORIZONTAL)						
2x660 MW DVC RAGHUNATHPUR TPP PH II (STG)						
S. NO.	ITEM DESCRIPTION		MANDATORY SPARE LIST	QUANTITY	UNIT EX-WORKS PRICE INCLUDING PACKING (INR)	TOTAL EX-WORKS PRICE INCLUDING PACKING (INR)
1.0	MANDATORY SPARES PRICES-MISC PUMPS (HORIZONTAL)					
1.1	DMCW TG PUMPS	1.1.1	Set of Impeller for each type of pump	1 set		
		1.1.2	Pump Shaft for each type of pump	1 set		
		1.1.3	Shaft Sleeve	1 set		
		1.1.4	Casing wearing rings	2 sets		
		1.1.5	Impeller wearing rings	2 sets		
		1.1.6	Bearing for the Pump	2 sets		
		1.1.7	Thrust Bearing	2 sets		
		1.1.8	Sleeve nuts & "O" rings	1 set		
		1.1.9	Gland Packing	2 sets		
		1.1.10	Complete Coupling (Pump & Motor)	1 set		
		1.1.11	Mechanical Seal - (Both DE & NDE)	1 set		
		1.1.12	Fasteners	1 set		
1.2	ACW TG PUMPS	1.2.1	Set of Impeller for each type of pump	1 set		
		1.2.2	Pump Shaft for each type of pump	1 set		
		1.2.3	Shaft Sleeve	1 set		
		1.2.4	Casing wearing rings	2 sets		
		1.2.5	Impeller wearing rings	2 sets		
		1.2.6	Bearing for the Pump	2 sets		
		1.2.7	Thrust Bearing	2 sets		
		1.2.8	Sleeve nuts & "O" rings	1 set		
		1.2.9	Gland Packing	2 sets		
		1.2.10	Complete Coupling (Pump & Motor)	1 set		
		1.2.11	Mechanical Seal - (Both DE & NDE)	1 set		
		1.2.12	Fasteners	1 set		

SCHEDULE OF PRICES - MISC PUMPS HORIZONTAL							
2x660 MW DVC RAGHUNATHPUR TPP PH II (SG)							
	DESCRIPTION OF WORKS OR EQUIPMENT(S)			UOM	QUANTITY	UNIT EX-WORKS PRICE INCLUDING PACKING (INR)	TOTAL EX-WORKS PRICE INCLUDING PACKING (INR)
	Total Price for design, manufacture, assembly, inspection and testing at manufacturer's and/or his sub-contractors works, painting, proper packing to avoid damage of items during transportation & storage at site of Miscellaneous Pumps (along with Motors & mandatory spares as applicable), transportation to site, complete with all other accessories as per the requirements specified in the specification, site services including installation checks of pump motor set & supervision of replacement of gland packing with Mechanical Seal arrangement (as applicable) at site, PG Test at site and any other services, etc. as per specification PE-TS-390/527-100-W001, REV-00 for Misc. Pumps Horizontal of 2x660 MW DVC RAGHUNATHPUR TPP PH II (SG)						
1.0	Pumps and Motors (Horizontal Pumps):						
	(i)	DMCW SG PUMPS					
			Pump price:	Nos.	4		
			Motor price:	Nos.	BHEL Scope		
			Suction Strainer:	Nos.	4		
			Mandatory Spares (as per Annexure -A)	Lot	1		
	(ii)	DMCW STATION PUMPS					
			Pump price:	Nos.	3		
			Motor price:	Nos.	BHEL Scope		
			Suction Strainer:	Nos.	3		
			Mandatory Spares (as per Annexure -A)	Lot	1		
	(iii)	ACW STATION PUMPS					
			Pump price:	Nos.	3		
			Motor price:	Nos.	BHEL Scope		
2.0	SITE SERVICES:						
2.1	Installation Check (For all Pumps) & Supervision for replacement of Gland packing with Mechanical Seal (for DMCW SG & DMCW STATION Pumps) at Site as per Specification						
2.1.1	Site Visit Charges			Nos. of Visits	6		
2.1.2	Manday Charges at Site			Nos. of Mandays	24		
2.2	Lumpsum cost for PG Test of pumps at site as per Specification			Lot	1		
	TOTAL (1.0+ 2.0)						
NOTES:							
a)	Service charges at Sl.no 2.1.1. shall include to/fro travel expenses, medical and insurance.						
b)	Service Charges at Sl.no 2.1.2. shall include boarding/lodging, local conveyance or any other applicable charge for completion of site services. No. of mandays at site defined at Sl.no. 2.1.2 above shall be calculated on the basis of presence at site (travelling time/days is excluded).						
c)	Payment for Sl. No. 2.1 shall be done based on actual consumed site visits and mandays.						
d)	Price of commissioning & erection spares, special Tools & tackle and other accessories not listed above shall be included in the price of pump & shall be supplied with the pump.						
e)	For items stated as not applicable by bidder, shall have to be supplied without any cost implication to BHEL in the event they are found to be applicable during detail engineering stage.						
f)	Please refer technical specification for detail.						
g)	Mandatory Spare Note: 1. One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the 'set' would include all components/hardware required to replace the item. 2. In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design (except for those items for which "if applicable" is specified) with quantities as specified in the Technical specification/NIT.						
Bidder shall furnish this price Schedule indicating "Quoted" against each item along with his technical offer and actual prices in his price offer.							

SCHEDULE OF PRICES -ANNEXURE-A MANDATORY SPARES OF MISC. PUMPS (HORIZONTAL)						
2x660 MW DVC RAGHUNATHPUR TPP PH II (SG)						
S. NO.	ITEM DESCRIPTION		MANDATORY SPARE LIST	QUANTITY	UNIT EX-WORKS PRICE INCLUDING PACKING (INR)	TOTAL EX-WORKS PRICE INCLUDING PACKING (INR)
1.0	MANDATORY SPARES PRICES-MISC PUMPS (HORIZONTAL)					
1.1	DMCW SG PUMPS	1.1.1	Shaft Sleeve (DE & NDE)	2 sets		
		1.1.2	Shaft(s) with fasteners as applicable	1 set		
		1.1.3	Impeller with fasteners as applicable	1 set		
		1.1.4	Casing & impeller Wearing Ring as applicable	2 sets		
		1.1.5	Bearings for Pumps	2 sets		
		1.1.6	Thrust Bearings & thrust bearing collar (if applicable)	1 set		
		1.1.7	Sleeve nuts and O-rings (if applicable)	1 set		
		1.1.8	Gland Packing / Mechanical Seal (DE & NDE) as applicable	2 sets		
		1.1.9	Pump & Drive Coupling assembly with all fasteners & coupling Guard	1 set		
		1.1.10	Stuffing box / Gland assembly (if applicable)	1 set		
1.2	DMCW STATION PUMPS	1.2.1	Shaft Sleeve (DE & NDE)	2 sets		
		1.2.2	Shaft(s) with fasteners as applicable	1 set		
		1.2.3	Impeller with fasteners as applicable	1 set		
		1.2.4	Casing & impeller Wearing Ring as applicable	2 sets		
		1.2.5	Bearings for Pumps	2 sets		
		1.2.6	Thrust Bearings & thrust bearing collar (if applicable)	1 set		
		1.2.7	Sleeve nuts and O-rings (if applicable)	1 set		
		1.2.8	Gland Packing / Mechanical Seal (DE & NDE) as applicable	2 sets		
		1.2.9	Pump & Drive Coupling assembly with all fasteners & coupling Guard	1 set		
		1.2.10	Stuffing box / Gland assembly (if applicable)	1 set		

**2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)
2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)**

**TECHNICAL SPECIFICATION
FOR
MISC. PUMPS (HORIZONTAL)**

SPECIFICATION No. PE-TS-390/528-100-W001

REV NO. 00



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA**



TECHNICAL SPECIFICATION
MISC. PUMPS (HORIZONTAL)
2X660 MW DVC RAGHUNATHPUR TPP PH II
(STG) & 2X660 MW DVC RAGHUNATHPUR TPP
PH II(SG)

PE-TS-390/528-100-
W001

Rev. No. 00

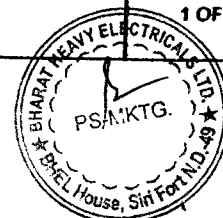
Date : 25.09.2026

INDEX

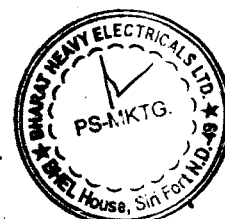
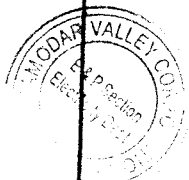
SL NO.	DESCRIPTION	
1	Project Information	
2	General Technical Requirement	
3	Specific Technical Requirement	
a)	Technical Datasheet - Part - A	
b)	Technical Datasheet - Part - B (Supplier Data to be submitted after of contract)	
c)	Compliance Drawings	
4	Performance Guarantees to be demonstrated at Site & Shop	
5	Quality Plan	
6	Painting Requirement	
7	Packing Requirement	
8	Bill Of Quantity (BOQ)	
a)	Supply	
b)	Spares	
c)	Services	
9	Documentation Requirement	
a)	Documents Required Along With Bid By Bidders	
b)	Documents to be submitted by Successful Bidder after award of contract along with submission schedule	
c)	Documents To Be Submitted As Final/As-Built	
10	Pre-Qualification Requirement (Technical)	
11	Compliance Certificate	

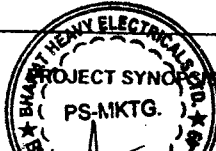
	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
PROJECT INFORMATION		

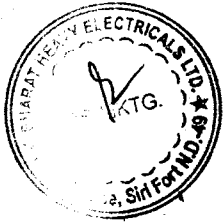
CLAUSE NO.	PROJECT SYNOPSIS																																
1.00.00	BACKGROUND Details of proposed Stage / Units Project name : RAGHUNATHPUR Thermal Power Project Stage-II No. of existing Units x Stage-I 2 X 600 MW under Erection capacity : No. of Proposed Units x Stage-II 2x660 MW capacity : Project setting up by : Damodar Valley Corporation																																
1.01.00	Location and Approach <table border="1"> <tbody> <tr> <td>Location</td> <td>:</td> <td>Raghunathpur sub-division of Purulia District, West Bengal.</td> </tr> <tr> <td>Latitude and longitude</td> <td>:</td> <td>23° 37' 20" N, 86° 39' 50" E</td> </tr> <tr> <td>Nearest Town</td> <td>:</td> <td>Raghunathpur – 7 Km</td> </tr> <tr> <td>District Head Quarters</td> <td>:</td> <td>Purulia – 38 Km</td> </tr> <tr> <td>Approach Road</td> <td>:</td> <td>Neamatpur-Purulia State Highway– 7 Km</td> </tr> <tr> <td>Nearest Railhead</td> <td>:</td> <td>Sanka R.S. on Adra-Bhajudih Broad Gauge line of S.E. Railway – 11 Km.</td> </tr> <tr> <td>Perennial Source of Cooling and Consumptive Water</td> <td>:</td> <td>Damodar River – 2 Km crow flight distance form the proposed plot.</td> </tr> <tr> <td>Source of Coal</td> <td>:</td> <td>Mine blocks in Jharkhand and Ranigunge coalfields of ECL.</td> </tr> <tr> <td>Route Distance</td> <td>:</td> <td>60 Km from the site.</td> </tr> <tr> <td>Distance of receiving S/S from TPS</td> <td>:</td> <td>Maithon Right Bank 400 kV sub-station – 36 Km and Ranchi 400 kV sub-station – 165 Km.</td> </tr> </tbody> </table>			Location	:	Raghunathpur sub-division of Purulia District, West Bengal.	Latitude and longitude	:	23° 37' 20" N, 86° 39' 50" E	Nearest Town	:	Raghunathpur – 7 Km	District Head Quarters	:	Purulia – 38 Km	Approach Road	:	Neamatpur-Purulia State Highway– 7 Km	Nearest Railhead	:	Sanka R.S. on Adra-Bhajudih Broad Gauge line of S.E. Railway – 11 Km.	Perennial Source of Cooling and Consumptive Water	:	Damodar River – 2 Km crow flight distance form the proposed plot.	Source of Coal	:	Mine blocks in Jharkhand and Ranigunge coalfields of ECL.	Route Distance	:	60 Km from the site.	Distance of receiving S/S from TPS	:	Maithon Right Bank 400 kV sub-station – 36 Km and Ranchi 400 kV sub-station – 165 Km.
Location	:	Raghunathpur sub-division of Purulia District, West Bengal.																															
Latitude and longitude	:	23° 37' 20" N, 86° 39' 50" E																															
Nearest Town	:	Raghunathpur – 7 Km																															
District Head Quarters	:	Purulia – 38 Km																															
Approach Road	:	Neamatpur-Purulia State Highway– 7 Km																															
Nearest Railhead	:	Sanka R.S. on Adra-Bhajudih Broad Gauge line of S.E. Railway – 11 Km.																															
Perennial Source of Cooling and Consumptive Water	:	Damodar River – 2 Km crow flight distance form the proposed plot.																															
Source of Coal	:	Mine blocks in Jharkhand and Ranigunge coalfields of ECL.																															
Route Distance	:	60 Km from the site.																															
Distance of receiving S/S from TPS	:	Maithon Right Bank 400 kV sub-station – 36 Km and Ranchi 400 kV sub-station – 165 Km.																															
RAGHUNATHPUR THERMAL POWER PROJECT PHASE-II (2X660MW)		TECHNICAL SPECIFICATION SECTION-VI PART-A	PROJECT SYNOPSIS PAGE 1 OF 10																														



CLAUSE NO.	PROJECT SYNOPSIS																				
	<table border="1"> <thead> <tr> <th colspan="2">NATURE OF LAND</th> <th></th> </tr> </thead> <tbody> <tr> <td>Level</td> <td>:</td> <td>Within 20 m contour variation. This plot is above highest flood level of the area.</td> </tr> <tr> <td>Soil</td> <td>:</td> <td>Fallow, moorum covered plot with alluvial soil underneath followed by rocky sub-strata.</td> </tr> <tr> <td>Land Use</td> <td>:</td> <td>Fallow, unused.</td> </tr> <tr> <td>Crops</td> <td>:</td> <td>Rainfed single-crop cultivation only on 10-15% of the area.</td> </tr> <tr> <td>Irrigation</td> <td>:</td> <td>None.</td> </tr> </tbody> </table>			NATURE OF LAND			Level	:	Within 20 m contour variation. This plot is above highest flood level of the area.	Soil	:	Fallow, moorum covered plot with alluvial soil underneath followed by rocky sub-strata.	Land Use	:	Fallow, unused.	Crops	:	Rainfed single-crop cultivation only on 10-15% of the area.	Irrigation	:	None.
NATURE OF LAND																					
Level	:	Within 20 m contour variation. This plot is above highest flood level of the area.																			
Soil	:	Fallow, moorum covered plot with alluvial soil underneath followed by rocky sub-strata.																			
Land Use	:	Fallow, unused.																			
Crops	:	Rainfed single-crop cultivation only on 10-15% of the area.																			
Irrigation	:	None.																			
	Vicinity Plan of the project is placed at Exhibit No.-1.																				
1.02.00	Land																				
1.03.00	Water																				
	Water Requirement - 6500 M³ / Hr. (without ash water recovery) - 4938 M³/Hr (with ash water recovery) Water allocation of 112.28 Cusecs from DVC is available Requirement / Availability Stage-I (2X600 MW): 48.41 Cusecs (with ash water recovery) Stage-II (2X660MW): 112.28-48.41 = 63.87 Cusecs																				
1.04.00	Railway Siding																				
	Rail link to the site for transportation of equipment during construction shall not be available. Bidder has to make alternate arrangement for transportation of equipment in their scope.																				
1.05.00	Metrological Data																				
	Data of RAGHUNATHPUR is enclosed as Annexure Annexure-I.																				
RAGHUNATHPUR THERMAL POWER PROJECT PHASE-II (2X660MW)		TECHNICAL SPECIFICATION SECTION-VI PART-A	PROJECT SYNOPSIS PAGE 2 OF 10																		



CLAUSE NO.	PROJECT SYNOPSIS			
1.06.00	Plant Water Scheme The Plant water scheme is elaborated in the tender Drg. No. 0000-102-POM-A-041 enclosed as part of this tender.			
1.06.01	Condenser Cooling (CW) Water System It is proposed to provide recirculating type CW system with cooling towers. For the recirculating type CW system it is proposed to supply clarified water as make up. Raw water from the make-up water pump house shall be pumped to a Water Pretreatment Plant. The treated clarified water shall be led to the cold water channel of CW system. CW system shall be operated at a C.O.C of about 4 . The expected circulating water analysis is given in this sub-section. For carrying circulating water from CW pump house to TG-area and from TG area to cooling tower, steel lined concrete encased duct would be provided. For interconnecting CW duct with CW pump, condenser and cooling towers, steel pipes would be used. Cooled water from cooling tower will be led to CW pump house through the cold water channel by gravity.			
1.06.02	Equipment Cooling Water (ECW) System (Unit Auxiliaries) The plant auxiliaries of Steam Generator and Turbine Generator shall be cooled by Demineralized (DM) water in a closed circuit. The primary circuit DM water shall be cooled through plate type heat exchangers by Circulating Water tapped from CW system in a closed secondary circuit. The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system. It is proposed to provide independent primary cooling water circuit for Steam Generator & auxiliaries and TG & its auxiliaries.			
1.06.03	Station Auxiliaries Cooling Water System The station auxiliaries such as Air compressors, Compressors of ash handling plant, Cooling water circuit of Air Conditioning system, compressor of mill reject system etc. shall be cooled by separate cooling water System using separate set of pumps and cooling towers.			
1.06.04	Ash Water System Necessary LP & HP water pumps, flushing water pumps & seal water pumps for slurry disposal pump gland sealing are provided			
1.06.05	Other Miscellaneous Water Systems a) CW system blow down water shall be used for the plant service water requirement, dust suppression system of coal handling plant, makeup to the			
RAGHUNATHPUR THERMAL POWER PROJECT PHASE-II (2X660MW)		TECHNICAL SPECIFICATION SECTION-VI PART-A		PAGE 3 OF 10

CLAUSE NO.	PROJECT SYNOPSIS			
	Ventilation system, ash slurry pumps sealing, sealing of Vacuum pumps (if applicable) of Ash Handling plant, make-up to fire water storage tanks and cooling water requirement of hydrogen generation plant. The service (wash water) water collected from various areas shall be treated using oil water separators, tube settlers, coal settling pits etc. as per requirement and treated water from liquid effluent treatment plant shall be recycled back to the service water system for re-use. The excess service water shall be led to central monitoring basin for disposal. b) Separate water Pre-treatment plants are proposed for Circulating Water (PT-CW) system, Demineralization Plant (PT-DM) plant and potable (PT-Pot) water systems. c) The drinking water requirement of the plant and colony shall be provided from the above mentioned Water (PT-Pot) pretreatment plant. d) Steam Cycle make-up water, makeup to the primary circuit of ECW (used auxiliaries) system, boiler fill water and makeup to the hydrogen generation plant shall be provided from Dematerializing plant. e) The quality of cooling water & DM water is given in this sub-section.			
1.07.00	Criteria for Earthquake Resistant Design of Structures and Equipment All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed as per the criteria specified in sub-section-D1 of Section-VI (Part-A).			
1.08.00	Criteria for Wind Resistant Design of Structures and Equipment All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed as per the criteria specified in sub-section-D1 of Section-VI (Part-A). 			
RAGHUNATHPUR THERMAL POWER PROJECT PHASE-II (2X660MW)		TECHNICAL SPECIFICATION SECTION-VI PART-A	PROJECT SYNOPSIS	PAGE 4 OF 10

729

	TECHNICAL SPECIFICATION	PE-TS-390/528-100-W001
	MISC. PUMPS (HORIZONTAL)	Rev. No. 00
	2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	Date : 25.09.2026
	GENERAL TECHNICAL REQUIREMENT	
1	The design, manufacture and testing of the Pumps complete with all accessories, shall generally conform to the latest editions of the appropriate standards.	
2	The bidder to choose a standard proven model from the range of pumps manufactured.	
3	The equipment shall comply with all applicable safety codes and statutory regulations of India where the equipment is to be installed.	
4	Latest codes and standards shall be applicable as on date of bid submission.	
5	In the event of any conflict between the requirements of two clauses of this specification, documents or requirements of different codes and standards specified, stringent requirement as per the interpretation of the BHEL/owner shall apply.	
6	Drawing / documents to be submitted by bidder shall be as per "Documentation Requirement" given in this specification.	
7	Bidder to note that drawing/document submission shall be through web based Document Management System. Bidder shall be provided access to the DMS for drg/doc approval and adequate training for the same. Bidder to ensure proper net connectivity at their end.	
8	The first revision drawings/ documents submitted by vendor shall be complete in all respects. Incomplete drawing submitted shall be treated as non- submission with delays attributable to vendor's account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL / Customer's place as per the requirement for across the table submissions/ discussions/ finalizations of drawings.	
9	The details of the Pumps with the quantity, design parameters, accessories etc. to be supplied shall be as per Data Sheet enclosed in this specification.	
10	Any accessory/component which is not specifically mentioned but required for proper performance and safe operation of pumps and drives to be provided without any cost implication to BHEL.	
11	The pumps shall be capable of running over the entire range of NPSH conditions required without any noise, vibration or cavitations.	
12	Pump(s) shall preferably be designed to have the best efficiency at flow within $\pm 10\%$ of the specified duty point flow. The pumps shall be suitable for continuous operation at any point within the "Range of Operation" as stipulted in TECHNICAL DATASHEET - PART - A (MISC. PUMPS - HORIZONTAL).	
13	The pumps shall be capable of starting with discharge valve fully open and close condition.	
14	Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. The head vs. capacity, the BHP vs. capacity characteristics etc. shall be identical to ensure equal load sharing and trouble-free operation of any pump when the other pump(s) working in parallel with it trip.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
15	Components of identical pumps shall be interchangeable.	
16	The materials of construction for various components specified are the minimum requirements. Equivalent or Superior materials suitable for fluid handled is also acceptable subject to Customer/BHEL approval. Materials of construction for other components not specified shall be similarly selected by the bidder for the intended duty and subject to Customer/BHEL approval.	
17	Wherever Stainless (SS) material is coming in contact with non SS material, suitable isolation (rubber etc.) shall be provided to avoid galvanic corrosion.	
	CASING	
18	Pump Casing shall be provided with a connection for suction and discharge pressure Gauge as standard feature.	
19	Pump Suction/Discharge nozzles are capable of withstanding external reactions not less than those specified in API-610.	
20	In case where an expansion joint is located at pump discharge, the pump assembly will be subjected to an additional thrust which will be transmitted to the foundation. This additional thrust shall be taken into the consideration of pump design.	
	IMPELLER	
21	The Impeller assembly shall be dynamically balanced and designed with critical speed substantially above the operating speed.	
	WEARING RING	
22	Replaceable type wearing rings (as applicable) shall be furnished to prevent damage to impeller and casing.	
	SHAFT	
23	Shaft size selected must take into consideration the critical speed as specified in API-610. The critical speed shall be at least 30% higher than the rated speed. Shaft size shall be selected on the basis of maximum torque to be applied on the pump shaft with sufficient margin as per vendor's proven practice.	
	SHAFT SLEEVE	
24	Renewable type fine finished shaft sleeves shall be provided at the stuffing boxes/mechanical seals.	
25	Length of the shaft sleeves shall be extended beyond the outer faces of gland packing or seal end plate so as to distinguish between the leakage past Shaft and shaft sleeve and that past the seals/glands.	
26	Shaft sleeves to be properly fastened to the shaft to prevent any leakage or loosening. Shaft sleeve assembly should ensure concentric rotation.	
27	In case, shaft sleeve is threaded, a water slinger to be provided on the Pump Shaft to avoid ingress of leaked water (if any due to failure of sealing arrangement for shaft sleeve) to Bearing.	
	BEARING	
28	Bearings to be easily accessible without disturbing the pump assembly.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
29	In case of axial split casing Multistage pumps, minimum factor of safety of '2' times shall be considered for bearing capacity selection and pump design.	
30	Heavy-duty ball/roller bearing to be provided to take care of the radial loads.	
31	Adequate Hydraulic pressure balancing device or Thrust Bearing to be provided to take care of the axial loads.	
32	A drain to be provided at the bottom of each bearing housing.	
33	Provision on Bearing for mounting temperature measuring instruments to be provided.	
	STUFFING BOX	
34	Stuffing box to be designed for replacement of packing without removing any part other than the gland.	
	MECHANICAL SEAL	
35	For applicable pumps, only Cartridge Type Mechanical seals shall be provided and should be suitable for the given water quality.	
36	If water handled (based upon the water quality given with Specification) by pump is dirty/ not suitable for lubrication/ cooling of Bearing/Stuffing Box/Seal, the bidder shall provide requisite strainer/ filters, tanks, motorized valves, etc. after the tap off for the required service, the arrangement provided shall be subject to BHEL/Customer approval.	
	COUPLING	
37	The pump and motor shafts shall be connected with adequately sized flexible coupling of proven design (pin-bush or spacer type) to facilitate dismantling of the pump without disturbing the motor. Necessary coupling guard shall be provided.	
38	No. of coupling holes for joining coupling hubs shall be even in number and preferably in multiples of four.	
	SUCTION STRAINER	
39	Suction Strainer to be provided along with Pump as specified in TECHNICAL DATASHEET - PART - A (MISC. PUMPS - HORIZONTAL). Counter Flanges, Gaskets And Fasteners also be provided along with each Strainer.	
40	Instructions for HT/LT Motors supplied by BHEL as free issue (with scope mentioned in TECHNICAL DATA - PART - A):	
40.1	All HT /LT motors which are not in bidder's scope of supply: only bare motors, shall be supplied as free issue by BHEL, based on ratings and TS (Torque - Speed) curve selected and furnished by the bidders along with their un-priced bid. The responsibility for satisfactory operation for combined performance of pumps & motors shall rest with the bidder only as if, the drive motors also have been supplied by the bidder.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
40.2	Couplings, base plate, foundation bolts, any other fittings, etc. as required shall be supplied by the bidders only. BHEL shall supply one number of each type of drive motors (where drive motor is not in bidder's scope of supply) for shop testing of pumps with job motors to Bidder's Works/Shop. Bidder shall dispatch this Job Motor to Project Site along with the Pumps at their cost. All other motors shall be dispatched by BHEL directly to project sites.	
41	SITE SERVICES:	
41.2	Pumps with Mechanical seal shall be supplied with gland packing arrangement initially to site and gland packing arrangement shall be replaced by vendor with mechanical seal arrangement at site after commissioning of the pumps with gland packing. Loose Mechanical seal shall be dispatched along with main supply. Shaft sleeve and any other item required for replacement of gland packing with Mechanical seal and for satisfactory operation of Mechanical seal after replacement at site shall be provided by the pump supplier without any cost implication to BHEL.	
41.2	The pumps erected by BHEL/Customer shall be checked by the bidder for correctness of their installation, alignment, etc. at site prior to their commissioning. Signed Checklist for installation after completion of the activity to be submitted as per format given with specification.	
41.3	Performance test of Pumps at Site shall be applicable for Pumps as mentioned in TECHNICAL DATASHEET PART-A and ANNEXURE FOR PERFORMANCE GUARANTEE AND TESTING.	
42	Instructions for Mandatory Spare:	
42.1	One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the 'set' would include all components/hardware required to replace the item.	
42.2	Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the total population of the item in the station (project), unless specified otherwise and the fraction will be rounded off to the next higher whole number.	
42.3	Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc. these shall cover all the items supplied and installed and the break up for these shall be furnished in the bid.	
42.4	Bidder shall not indicate "Not Applicable" against any of the spare (except for those items for which "if applicable" is specified). In case of not applicability, functionally equivalent spare to be mentioned with price in the relevant price schedules. Bidder shall not mention any remark other than price value in relevant price schedule.	
42.5	Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
43	The reputed makes of various bought out items of bidder (i.e. motor, bearings, mechanical seal etc.) shall be subject to BHEL/Customer approval in the event of order.	
44	Instrument air/ service air is not envisaged by BHEL/customer for this package, vendor to design equipment/instrument accordingly without requirement of instrument air/ service air.	
45	Quality Assurance	
45.1	Typical quality plan is enclosed in specification for guidance. The bidder shall comply with these minimum requirements and shall furnish his own quality plan for approval. The quality plan shall be subjected to customer's / purchaser's approval in the event of order without any cost implication.	
45.2	Manufacturer shall conduct all tests and stage inspections as per the approved quality plan to ensure that the Pumps shall conform to the requirements of this specification and of the applicable codes/ standards.	
45.3	All materials used for manufacture/ fabrication of the Pump components shall be of tested quality.	
45.4	Qualification of welding procedures and welders shall be as per ASME B&PV Code, Section-IX/applicable code.	
45.5	During detailed engineering, the various shop test procedures for DP test, Hydro test, Performance test, NPSH Test etc. as per Approved QAP shall be submitted by bidder along with the quality plan for BHEL/customer approval.	
45.6	Hydraulic tested equipment shall not be packed till the inside surface becomes dry.	
45.7	The pump casing shall be hydrostatically tested at maximum of the following: a. Pump Suction Pressure indicated in TECHNICAL DATASHEET PART-A (MISC. PUMPS - HORIZONTAL) (+) 2 times the TDH (Total Dynamic Head) at rated capacity (or) b. Pump Suction Pressure indicated in TECHNICAL DATASHEET PART-A (MISC. PUMPS - HORIZONTAL) (+) 1.5 times the shut-off pressure (or) c. System Design pressure indicated in TECHNICAL DATASHEET PART-A (MISC. PUMPS - HORIZONTAL).	
45.8	BHEL's / Customer's representative shall be given full access to the shop in which the equipment are being manufactured or tested and all test records shall be made available to him.	
45.9	Inspection of Mandatory spares shall be in line with approved QP for main supply.	
46	Packing	
46.1	Vacuum packing using Aluminium Barrier bags/ foil with multiple layers of polyester Nylon/ polythene to be provided by Pump Vendor for protection of pumps during long storage at site.	



**TECHNICAL SPECIFICATION
MISC. PUMPS (HORIZONTAL)
2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) &
2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)**

PE-TS-390/528-100-W001

Rev. No. 00

Date : 25.09.2026

CHECKLIST FOR INSTALLATION CHECK OF THE HORIZONTAL PUMP AT SITE

Note:

- To be filled in by BHEL Site Engineer and Pump Vendor Service Engineer
- Strike off which is not applicable

Project Name / PO No.:		Date of Check:	
Pump Name:		Pump Serial No:	
S. No.	ACTIVITY DESCRIPTION	OBSERVATION	REMARKS (IF ANY)
1	Relevant Engineering data like General Arrangement Drawing & Cross Sectional Drawing is available with site engineer for reference	Yes/No	
2	All components are available as per packing list or Approved Documents	Yes/No	
3	Condition of Pump components	OK/Not OK	
4	Pump foundation dimensions as per GA drawing (List out deviations if any)	OK/Not OK	
5	Suction & discharge piping as per GA drawing and pump is free from piping strains.	Yes/No	
6	Leveling & Center line matching of base plate	OK/Not OK	
7	Grouting of base plate- Tightness of foundation bolts to be checked	OK/Not OK	
8	Is there any need of inserting shims under motor, if yes then total thickness of shims provided	Yes/No mm	
9	Is the pump shaft free to rotate	Yes/No	
10	Bearings are properly Lubricated (Re-greasing of Bearings to be checked)	Yes/No	
11	Cooling/Flushing Connections provided for Packing Box/Mech. Seal Assembly	Yes/No	
12	Radial run out between pump & motor shafts at coupling	mm	
13	Tightness of bolts between pump-base plate and motor-base plate	OK/Not OK	
14	No load test of motor performed (As per Pump/Motor Manufacturer Recommendation)	Yes/No	
	If yes then Vibration levels at Drive end of Motor	A- V- H-	

15	Fitment of coupling halves on pump & motor shafts with respective hardwares & key	Ok/Not OK	
16	Key Slot / Notch for VMS available as per GA Drawing	Yes/No	
17	Any abnormal observation at this stage. If yes, then specify, trace out the cause & correct it.	Yes/No	
18	Any abnormal observation during initial trial run of the pumping set, If yes, then specify, trace out the cause & correct it	Yes/No	
19	Vibration level at Drive end of pump	A- V- H-	
20	Vibration Level at Non Drive End of pump	A- V- H-	
21	Temperature of bearings after initial trial run of one hour (a). At drive end (b). At Non drive end	°C °C	
22	Max Stabilized temperature of bearings (a). At drive end (b). At non drive end (c). Ambient temp	°C °C °C	
23	Observed Noise Level at 1meter distance from the Pump	dbA	
24	Amount of leakage through Gland packing	Permissible/Not Permissible	
25	Mechanical Seal available at Site (for applicable Pumps only)	Yes/No	
ADDITIONAL REMARKS/OBSERVATION (IF ANY)			
1.			
2.			
3.			
Pump Vendor Service Engineer Name Designation Sign & Date		BHEL Site Engineer Name Designation Sign & Date	End Customer (If Required) Name Designation Sign & Date

		TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)					PE-TS-390/528-100-W001
							Rev. No. 00
							Date : 25.09.2026
TECHNICAL DATASHEET - PART - A							
	PROJECT		2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)		2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)		
SL.NO	DESCRIPTION	UOM	DETAIL -TYPE 1	DETAIL -TYPE 2	DETAIL -TYPE 3	DETAIL -TYPE 4	DETAIL -TYPE 5
	Designation/Name of the Pump		DMCW TG PUMPS	ACW TG PUMPS	DMCW SG PUMPS	DMCW STATION PUMPS	ACW STATION PUMPS
1.0	Scope of Supply & Services						
	The scope covers the design, manufacture, assembly, inspection and testing at manufacturer's and/or his sub-contractors works, proper packing for delivery and installation checks & supervision of replacement of gland packing with Mechanical Seal arrangement (if applicable) at site for Miscellaneous Pumps along with mandatory spares complete with all accessories as per the requirements specified in this specification, PG Test at site and any other services, etc. if called for in the succeeding sections of the specification.						
1.1	Scope of supply of Pump Accessories and Spares:						
1.1.1	LT Electric motor with cable glands and lugs at motor end.		No (HT Motor is free issue by BHEL)	No (HT Motor is free issue by BHEL)	No (HT Motor is free issue by BHEL)	No (HT Motor is free issue by BHEL)	No (HT Motor is free issue by BHEL)
1.1.2	Strainer at Pump Suction with Flanges/Counter Flanges and Drain/Vent Valves		Yes, Conical Type	No	Yes, Conical Type	Yes, Conical Type	No
1.1.3	Pump motor coupling (Heavy duty) along with coupling guard		Yes	Yes	Yes	Yes	Yes
1.1.4	Common base plate for pumps and motor		Yes	Yes	Yes	Yes	Yes
1.1.5	Self contained lubrication system along with all internal piping, valves, fittings, specialties etc. as required		Yes	Yes	Yes	Yes	Yes
1.1.6	Counter flanges for suction/ discharge nozzles along with fixing nuts, bolts and gaskets		Yes	Yes	Yes	Yes	Yes
1.1.7	Anchor bolts, nuts, seating steel works, shims etc. as necessary for mounting the pump-motor unit on civil foundations		Yes	Yes	Yes	Yes	Yes
1.1.8	Vent with piping, valves and Priming Connection on Pump Casing		Yes	Yes	Yes	Yes	Yes
1.1.9	Drain connections in Casing and Base Plate with piping & isolating valves/plugs		Yes	Yes	Yes	Yes	Yes
1.1.10	Lifting/ handling attachments/lugs for the pump and motor		Yes	Yes	Yes	Yes	Yes
1.1.11	First fill of lubricants with topping requirements for one year of operation after commissioning and handing over of equipment		Yes	Yes	Yes	Yes	Yes
1.1.12	Set of "Special" Tools & Tackles for Pumps and motors, if any		Yes	Yes	Yes	Yes	Yes
1.1.13	Erection and commissioning spares, "on as required" basis		Yes	Yes	Yes	Yes	Yes
1.1.14	RTD for each Pump Bearing		No	No	No	No	No
1.1.15	1 No. Reverse Rotation Indicating Switch for each Pump		No	No	No	No	No
1.1.16	Mandatory Spares		Yes	Yes	Yes	Yes	No
1.2	Scope of Services:						
1.2.1	Installation Check of Pumps at site prior to their commissioning		Yes	Yes	Yes	Yes	Yes
1.2.2	Replacement of Gland Packing with Mechanical Seal at Site after commissioning		Yes	NO	Yes	Yes	NO
1.2.3	Performance Guarantee Testing at Site		Yes	Yes	Yes	Yes	Yes
2.0	DESIGN CODES & STANDARDS						
2.1	Design Standard		IS-6595/IS-5120/IS-5659/HIS				
2.2	Performance Standard		IS-9137/IS-5120/HIS/ASME PTC 8.2				
2.3	Strainer Housing/Body excluding Flange		ASME Sec VIII, DIV I				
2.4	Flange/Counter Flange		AWWA class - C-207				
2.5	Structural steel		IS 2062				
2.6	Cast Iron		IS 210				
2.7	Threaded Steel Fasteners		IS 1367				
2.8	Alloy-Steel and Stainless Steel Bolting		ASTM A193				
2.9	Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts		ASTM A194				
2.10	Carbon Steel Castings		ASTM A216				
2.11	Carbon Steel Forgings		ASTM A105				
2.12	Stainless Steel Castings		ASTM A351				
2.13	Stainless Steel Forgings		ASTM A276				
2.14	Duplex Stainless Steel Castings		ASTM A890 / ASTM A995				
2.15	Corrosion Resistance Alloy Steel Castings		ASTM A743				

		TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)						PE-TS-390/528-100-W001
								Rev. No. 00
								Date : 25.09.2026
TECHNICAL DATASHEET - PART - A								
	PROJECT		2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)		2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)			
SL.NO	DESCRIPTION	UOM	DETAIL -TYPE 1	DETAIL -TYPE 2	DETAIL -TYPE 3	DETAIL -TYPE 4	DETAIL -TYPE 5	
	Designation/Name of the Pump		DMCW TG PUMPS	ACW TG PUMPS	DMCW SG PUMPS	DMCW STATION PUMPS	ACW STATION PUMPS	
3.0	DESIGN /SYSTEM PARAMETERS							
3.1	KKS Number (TAG NO.)/Description		-	-	-	-	-	
3.2	Total No. of pumps (Nos.)		6 (six) nos. for station (3 nos per unit)	6 (six) nos. for station (3 nos per unit)	4 (four) nos. for station (2 nos per unit)	3 (three) nos. for station	3 (three) nos. for station	
3.3	No. of working & standby pumps		2 X (2 Working + 1 Standby)	2 X (2 Working + 1 Standby)	2 X (1 Working + 1 Standby)	2 Working + 1 Standby	2 Working + 1 Standby	
3.4	Location		Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	
3.5	Pump suitable for parallel operation		Yes	Yes	Not Applicable	Yes	Yes	
3.6	Pump Duty		Continuous	Continuous	Continuous	Continuous	Continuous	
3.7	Rated capacity (No negative tolerance permitted)	cu.m/hr	1200	1630	460	1005	1150	
3.8	Total Dynamic Head (TDH) at rated capacity (No negative tolerance permitted)	MWC	40	20	55	50	30	
3.9	Max. limit on shut off head Corresponding to pump TDH (MWC) at 51.5 Hz	MWC	115-130% of the rated head					
3.10	Required Range of Operation of the Pump (% of Rated Capacity)		30% to 130% of the rated flow					
3.11	The pumps offered have continuously rising head capacity curves from the duty point towards shut off point.		Yes					
3.12	The pumps offered have stable rising H-Q curves within the "Range of Operation"		Yes					
3.13	Pump characteristics		Non Overloading type & stable					
3.14	Maximum permissible speed of pump	RPM	1500					
3.15	Suction Pressure (Available)	MWC	33	15	33	33	15	
3.16	System Design Pressure	kg/cm2 (g)	10	7	12	12	8	
3.17	Design Temperature	Deg. C	60	60	60	60	60	
3.18	Specific Gravity of fluid to be handled		1	1	1	1	1	
3.19	Quality of Water Handled		Passivated DM Water	Clarified Water	Passivated DM Water	Passivated DM Water	Clarified Water	
3.20	Torque speed curve of the pump & drive motor furnished for pumps with drive motor rating of 100 KW and above.		Yes	Yes	Yes	Yes	Yes	
4.0	CONSTRUCTION FEATURES							
4.1	Type of Pump to be offered		Horizontal centrifugal type Between Bearing Pump					
4.2	Type of pump casing to be offered		Axially split type					
4.3	Type of Impeller to be offered		Closed					
4.4	Type of Pump Lubrication allowed		Self Liquid/Grease					
4.5	Sealing Arrangement		Gland packing initially & Mechanical seal finally after commissioning	Gland Packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing initially & Mechanical seal finally after commissioning	Gland Packing	
4.6	Pump is designed so that pump internals can be attended without disturbing suction and discharge piping.		Yes					
4.7	Motor rating selection criteria		Continuous motor rating (at 50 deg C ambient) for all pumps shall be at least ten per cent (10%) above the maximum load demand of the driven equipment in the complete operating range (including run out condition) to take care of the system frequency/voltage variation and in no case less than the maximum power requirement at any condition of the entire characteristic curve of the pump.					
4.8	Type of coupling between pump & motor		Flexible Spacer Type					
4.9	Material of Construction							
4.9.1	Casing		ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	
4.9.2	Impeller		ASTM-A-351 CF 8M	Bronze to IS 318 Gr. I/II or ASTM-A-351 CF8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. I/II or ASTM-A-351 CF8M	
4.9.3	Shaft		SS 316	SS 316	SS 316	SS 316	SS 316	
4.9.4	Shaft sleeves		SS 410	SS 410	SS 410	SS 410	SS 410	
4.9.5	Impeller Wear ring (as applicable)		SS 316	High Leaded Bronze to IS -318 GR. V / SSASTM-A-351 CF 8M/SS-316 in case of SS impeller	SS 316	SS 316	High Leaded Bronze to IS -318 GR. V / SSASTM-A-351 CF 8M/SS-316 in case of SS impeller	

		TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)					PE-TS-390/528-100-W001
							Rev. No. 00
							Date : 25.09.2026
TECHNICAL DATASHEET - PART - A							
	PROJECT		2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)		2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)		
SL.NO	DESCRIPTION	UOM	DETAIL -TYPE 1	DETAIL -TYPE 2	DETAIL -TYPE 3	DETAIL -TYPE 4	DETAIL -TYPE 5
	Designation/Name of the Pump		DMCW TG PUMPS	ACW TG PUMPS	DMCW SG PUMPS	DMCW STATION PUMPS	ACW STATION PUMPS
4.9.6	Casing Wear ring (as applicable)		SS 316	SS 316	SS 316	SS 316	SS 316
4.9.7	Fasteners (Wetted)		SS-304	SS-304	SS-304	SS-304	SS-304
4.9.8	Fasteners (Non-Wetted)		SS-304	SS-304	SS-304	SS-304	SS-304
4.9.9	Coupling		CI	CI	CI	CI	CI
4.9.10	Gland		SS 316	2.5% Ni CI to IS 210 GR FG-260	SS 316	SS 316	2.5% Ni CI to IS 210 GR FG-260
4.9.11	Stuffing Box		ASTM-A-351 CF 8M	2.5% Ni CI to IS 210 GR FG-260	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	2.5% Ni CI to IS 210 GR FG-260
4.9.12	Lantern ring		SS-316	Bronze	SS-316	SS-316	Bronze
4.9.13	Mechanical seals (faces)		As per Manufacturer standard	Not applicable	As per Manufacturer standard	As per Manufacturer standard	Not applicable
4.9.14	Gland packing		Teflon Impregnated (Non-Asbestos type)				
4.9.15	Water seal tube		SS tube				
4.9.16	Base plate		MS fabricated IS-2062 IS2062 E250 (min. thickness 12 mm), Epoxy Coated				
4.9.17	Counter Flange		Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
4.9.18	Suction Strainer Housing/Body		CS as per IS :2062	NA	CS as per IS :2062	CS as per IS :2062	NA
4.9.19	Suction Strainer Element / Basket including Basket Stiffeners and Handle		SS316	NA	SS316	SS316	NA
4.9.20	Suction Strainer Gasket		Nitrile Rubber / EPDM (Min. 3 mm thick)	NA	Nitrile Rubber / EPDM (Min. 3 mm thick)	Nitrile Rubber / EPDM (Min. 3 mm thick)	NA
4.10	Design Life of Bearing	Hrs	20000				
4.11	Sealing/Cooling of Stuffing Box		By Self Water				
4.12	Type of Mechanical Seal (If applicable)		Cartridge Type	NA	Cartridge Type	Cartridge Type	NA
4.13	Cooling/Lubrication Arrangement to be provided for Mechanical Seal		By Self Water				
4.14	The bidder shall make provisions for mounting following on the pump/ pump shaft: a. Purchaser's probes in both DE/NDE bearings of pumps b. Flat surface with dimensions 60 MM x60 MM on bearing Housing for mounting vibration measuring block c. Key slots of dimensions 30MM (L) X 15 MM (W) X 3 MM (D) on each pump shaft or some other suitable location		Yes	Yes	Yes	Yes	Yes
4.15	Construction Features of Suction Strainer						
4.15.1	Type of Strainer		Conical type	NA	Conical type	Conical type	NA
4.15.2	Type of Strainer Element		Wire Mesh supported with Perforated Plate	NA	Wire Mesh supported with Perforated Plate	Wire Mesh supported with Perforated Plate	NA
4.15.3	Perforation/Mesh size		10 Mesh (2 mm)	NA	10 Mesh (2 mm)	10 Mesh (2 mm)	NA
4.15.4	Maximum Permissible Pressure Drop under Clean condition	MWC	by Bidder	NA	by Bidder	by Bidder	NA
4.15.5	Strainer Inlet/ outlet Nozzle Size		500	NA	300	450	NA
4.15.6	Length of strainer (including counterflanges)	mm	750	NA	450	650	NA
4.15.7	Ratio of Screen Clear Flow Area vis-à-vis Pipe Inlet Area		-	NA	-	-	NA
4.15.8	Orientation of Inlet/Outlet Connecting Pipe		Horizontal and Co-axial	NA	Horizontal and Co-axial	Horizontal and Co-axial	NA
4.15.9	Type of Welding allowed for fabrication of Strainer Basket/Element		Only TIG Welding	NA	Only TIG Welding	Only TIG Welding	NA
4.15.10	End Connection		Flanged	NA	Flanged	Flanged	NA
5.0	PERFORMANCE PARAMETERS						
5.1	Performance Guarantee Tests at Shop/Works		Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer
5.2	Performance Guarantee Tests at Site		Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer
5.3	Benchmark Pump efficiency (P) for Bid evaluation	%	85	85	84	84	85
5.4	Benchmark Motor efficiency(M) for Bid evaluation	%	95	95	95	95	95

			TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)					PE-TS-390/528-100-W001 Rev. No. 00 Date : 25.09.2026
TECHNICAL DATASHEET - PART - A								
	PROJECT		2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)		2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)			
SL.NO	DESCRIPTION	UOM	DETAIL -TYPE 1	DETAIL -TYPE 2	DETAIL -TYPE 3	DETAIL -TYPE 4	DETAIL -TYPE 5	
	Designation/Name of the Pump		DMCW TG PUMPS	ACW TG PUMPS	DMCW SG PUMPS	DMCW STATION PUMPS	ACW STATION PUMPS	
5.5	Bid Evaluation Rate (The bid evaluation shall be done at the rate as specified in Data Sheet A per one (1) KW Power consumption, per working pump (and not standby)).	Rs./kW	1.9 lacs	1.9 lacs	6.25 lacs	6.25 lacs	6.25 lacs	
5.6	Guaranteed vibration at manufacturer's works on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4	Vrms	4.8	4.8	4.8	4.8	4.8	
5.7	Guaranteed vibration at site on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4	Vrms	3.8	3.8	3.8	3.8	3.8	
5.8	Max. noise Level (Guaranteed at site)	dB	85 dB at 1 M distance	85 dB at 1 M distance	85 dB at 1 M distance	85 dB at 1 M distance	85 dB at 1 M distance	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100- W001
			Rev. No. 00
			Date : 25.09.2026
TECHNICAL DATASHEET - PART - B FOR PUMP (SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)			
SL.NO	DESCRIPTION	UOM	DETAIL
1.0	GENERAL		
1.1	Designation of the Pump		
1.2	Manufacturer		
1.3	Model No.		
1.4	No. of pumps		
1.5	System Design Pressure	Nos.	
1.6	Specific Gravity of fluid to be handled	Kg/cm ²	
2.0	PERFORMANCE PARAMETERS	-	
2.1	Performance standard		
2.2	Rated capacity. (No negative tolerance)	M ³ /hr	
2.3	Total Dynamic Head (TDH) at rated capacity (No negative tolerance)	MWC	
2.4	Shut off head	MWC	
2.5	Range of Operation of the Pump		
	a) Min.Flow	M ³ /hr	
	b) Max.Flow	M ³ /hr	
2.6	The pumps offered have continuously rising head capacity curves from the duty point towards shut off point.		
2.7	The pumps offered have stable rising H-Q curves within the "Range of Operation"		
2.8	Pump rated speed	RPM	
2.9	Vibration measurements (2.9.2 is applicable in addition to 2.9.1 for Pumps with speed less than 600 RPM)		
2.9.1	Max.value of vibration on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4 for speed > 600 RPM		
	a) Guaranteed at manufacturer's works	mm/s	
	b) Guaranteed at site	mm/s	
2.9.2	Max.value of vibration on any pump /motor bearing w.r.t. peak to peak amplitude as per ANSI/ HIS 9.6.4 for speed <= 600 RPM		
	a) Guaranteed at manufacturer's works	microns	
	b) Guaranteed at site	microns	
2.10	Max. noise Level (Guaranteed at site)	dB	
2.11	Guaranteed Pump efficiency at rated head & rated capacity without -ve tolerance	%	
2.12	Power consumption		
	a) Guaranteed pump input power at duty point	KW	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100-W001
			Rev. No. 00
			Date : 25.09.2026
	Guaranteed max. Pump input power within range	KW	
	b) of operation.		
	c) Max. pump input power at shut off	KW	
	d) Guranteed power at motor input	KW	
2.13	NPSH required at rated capacity	MWC	
3.0	DESIGN & CONSTRUCTION FEATURES		
3.1	Type of pump casing		
3.2	Pump duty		
3.3	Type of Impeller		
3.4	Location		
3.5	Pump suitable for parallel operation		
3.6	Torque speed curve of the pump & drive motor furnished for pumps with drive motor rating of 100 KW		
3.7	Pump number of stages		
3.8	Specific speed $N = \frac{\text{RPM} \times (\text{Flow in USGPM})^{1/2}}{(\text{Head in Ft.})^{3/4}}$		
3.9	Minimum suction head required in MLC for pump operation at maximum discharge point within the 'Range of Operation' specified (NPSHR at max. flow).		
3.10	Whether pump is suitable/designed so that pump internals can be attended without disturbing suction and discharge piping.		
3.11	Type of coupling between pump & motor		
3.12	Bearing (DE & NDE)		
	a) Type and manufacturer		
	b) Bearing no.		
	c) Type of lubrication		
	d) Design life (Hrs.)		
3.13	Shaft Sealing arrangement		
	a) Type and Make/Model details		
	b) Sealing liquid		
	c) Requirement of external water if any		
	i) Quality		
	ii) Quantity/ Pump	M ³ /hr	
3.14	In case separate oil/grease/water pump or any such equipment required for bearing lubrication/stuffing box gland sealing, furnish full technical details of these equipment and their drive.		
3.15	Critical Speed of Pump Rotating Assembly	RPM	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100-W001
			Rev. No. 00
			Date : 25.09.2026
4.0	MATERIAL OF CONSTRUCTION (Indicate applicable code/ standard)		
4.1	Casing		
4.2	Impeller		
4.3	Shaft		
4.4	Shaft sleeves		
4.5	Wear ring		
4.6	fasteners		
4.7	Gland		
4.8	Lantern ring		
4.9	Mechanical seals (faces)/		
	Gland packing		
4.10	Base plate		
5.0	CONNECTIONS AND OTHER DIMENSIONAL DETAILS		
5.1	Impeller diameter	mm	
6.0	DRIVE DATA		
6.1	Drive unit output at 50°C ambient condition	KW/ P	
7.0	INSPECTION & TESTING		
7.1	Material test		
7.2	Hydrostatic test pressure	Kg/cm ²	
7.3	Hydrostatic test duration	Min.	
7.4	Performance test on pump at shop		
7.5	Dyanamic balance test		
8.0	WEIGHT AND LOADING DATA		
8.1	Weight of the pump & drive assembly	Kg	
8.2	Weight of the heaviest piece to be handled	Kg	
8.3	Size of base plate (length x width)	mm	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
COMPLIANCE DRAWING 1 WATER ANALYSIS		

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100- W001 Rev. No. 00 Date : 25.09.2026
A. Passivated DM WATER ANALYSIS:		
Conductivity:	Less than 0.1 microS/cm	
Total silica:	Less than 0.02 ppm	
pH:	8.5 to 9.5	



CLAUSE NO.

PROJECT INFORMATION

ANNEXURE-III B

CLARIFIED WATER ANALYSIS

CONSTITUTUENTS	As	CONTENTS
Calcium	CaCO ₃	95.0 ppm
Magnesium	CaCO ₃	58.0 ppm
Sodium & Potassium	CaCO ₃	68.0 ppm
TOTAL CATIONS	CaCO ₃	221.0 ppm
(except iron in solution)		
Bicarbonate	CaCO ₃	115.0 ppm
Carbonate	CaCO ₃	-- ppm
Sulphate	CaCO ₃	80.0 ppm
Chloride	CaCO ₃	26.0 ppm
Nitrate	CaCO ₃	-- ppm
Phosphate	CaCO ₃	-- ppm
TOTAL ANIONS	CaCO ₃	221.0 ppm
Silica	SiO ₂	13.5 ppm
pH value at 25°C		8.1
Residual Chlorine	Cl ₂	0.5 ppm

	TECHNICAL SPECIFICATION	PE-TS-390/528-100-W001
	MISC. PUMPS (HORIZONTAL)	Rev. No. 00
	2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	Date : 25.09.2026
PERFORMANCE GUARANTEES TO BE DEMOSTRATED AT SHOP & SITE		

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026

ANNEXURE FOR PERFORMANCE GUARANTEE AND TESTING

A. GENERAL

1	Performance Guarantees for pumps shall stand valid till the satisfactory completion of performance testing by BHEL and its acceptance by BHEL / customer.
---	---

B. PG Testing at Shop

1	Capacity, head, and power consumption of all the pumps at the rated duty point (to be demonstrated and proved at shop with the respective job motors) and to operate in accordance with the approved pump characteristic curves. During the shop test no negative tolerance in the guaranteed capacity, head and efficiency of the pump shall be allowed. Applicability of Test for each type of Pump shall be as per TECHNICAL DATASHEET - PART - A.
2	The efficiencies for pumps and motors for arriving at benchmark power consumption for Bid Evaluation shall be as indicated in TECHNICAL DATASHEET - PART - A for various pumps. No advantage shall be given to the bidder for quoting Power consumption (kW) at motor inlet lower than the benchmark kW value calculated with benchmark efficiencies given in Datasheet. However, in such case, quoted power consumption (kW) at motor inlet by the bidder shall be replaced with Benchmark Power consumption for both evaluation as well as LD purposes.
3	For the purpose of Bid Evaluation, Efficiencies for HT motors and LT motors which are not in bidder's scope shall be taken based on the maximum value as furnished in TECHNICAL DATASHEET - PART - A. During contract stage, for Pumps driven by BHEL supplied drives (HT/LT), Revised guarantee power consumption shall be calculated for M = motor efficiency as per approved datasheet of the supplied HT/LT motor. All other parameters shall remain same.
4	The bid evaluation applicable at the rate as specified below to be calculated per working pump (and not standby) as follows: Power consumption at inlet to the motors: $KW = \frac{Q \times H \times S}{P \times M \times 367.2}$ Where, Q = Rated capacity M^3/hr H = Rated TDH, MWC P = Pump Efficiency M = Motor Efficiency. S = Specific Gravity of fluid handled
5	LIQUIDATED DAMAGES: The liquated damages @ twice the bid evaluation rate per KW per working pump shall be levied in the event of failure of bidder to demonstrate the power consumption as per guaranteed values.



TECHNICAL SPECIFICATION
MISC. PUMPS (HORIZONTAL)
2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC
RAGHUNATHPUR TPP PH II(SG)

PE-TS-390/528-100-W001

Rev. No. 00

Date : 25.09.2026

C. PG Testing at Site

1	Current, Voltage, Motor input Power, Frequency, Speed, Bearing/ Motor winding Temperature, Vibration and noise level of pumps and drives and parallel operation (as applicable) without hunting & abnormal noise and with load sharing within 10% of each other at the rated duty point of pumps shall be demonstrated at site as a part of Performance & Guarantee test.
2	After commissioning of pumps at site, performance test shall be conducted by pump vendor at project site to ensure that the pumps meet the specified requirements. PG Test shall be conducted as per approved PG Test Procedure. Applicability of Performance Test for each type of Pump shall be as per TECHNICAL DATA - PART - A.
3	Vendor to replace / take corrective action for any deficiency in performance parameters at site. If the site performance is found not meeting the requirements in any respect as specified, then the equipment shall be rectified or replaced by the vendor, without any price implication.
4	All instruments required for PG testing of Noise, vibration and parallel running of pumps are to be provided by Bidder and taken back after the Test. All instruments used for PG Test shall be duly calibrated.

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)							PE-TS-390/528-100-W001		
								Rev. No. 00		
SCHEDULE OF PERFORMANCE GUARANTEES							Date : 25.09.2026			
Following parameters are guaranteed for following pumps A. 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG)										
Sl. No.	Pump Description	Guaranteed Capacity	Guaranteed TDH	Guaranteed Pump Eff.	Guaranteed Motor Eff.	Guaranteed Power consumption at inlet to motor terminals	Motor Rating	Motor GD ² Value for HT motor only	Pump RPM	T/S Curve attached for HT motor
		(M3/Hr)	(MWC)	%	%	(KW)	(KW)			
	Horizontal pumps									
1	#DMCW TG PUMPS	1200	40		95					YES
2	#ACW TG PUMPS	1630	20		95					YES
Bid evaluation and LD is applicable for pumps marked with (#) only as per TECHNICAL DATASHEET - PART - A.										
We the undersigned hereby undertake to meet the performance guarantees as listed in the table above on the conditions as elsewhere specified. Any variation of the specified conditions during official tests will be taken in account by BHEL as per specification.										
PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE										
NAME		DESIGNATION		SIGNATURE		DATE		COMPANY SEAL		

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)							PE-TS-390/528-100-W001		
								Rev. No. 00		
SCHEDULE OF PERFORMANCE GUARANTEES							Date : 25.09.2026			
Following parameters are guaranteed for following pumps B. 2X660 MW DVC RAGHUNATHPUR TPP PH II (SG)										
Sl. No.	Pump Description	Guaranteed Capacity	Guaranteed TDH	Guaranteed Pump Eff.	Guaranteed Motor Eff.	Guaranteed Power consumption at inlet to motor terminals	Motor Rating	Motor GD ² Value for HT motor only	Pump RPM	T/S Curve attached for HT motor
		(M3/Hr)	(MWC)	%	%	(KW)	(KW)			
	Horizontal pumps									
1	#DMCW SG PUMPS	460	55		95					YES
2	#DMCW STATION PUMPS	1005	50		95					YES
3	#ACW STATION PUMPS	1150	30		95					YES
Bid evaluation and LD is applicable for pumps marked with (#) only as per TECHNICAL DATASHEET - PART - A.										
We the undersigned hereby undertake to meet the performance guarantees as listed in the table above on the conditions as elsewhere specified. Any variation of the specified conditions during official tests will be taken in account by BHEL as per specification.										
PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE										
NAME		DESIGNATION		SIGNATURE		DATE		COMPANY SEAL		



CLAUSE NO.

TECHNICAL REQUIREMENTS

B. DEMONSTRATION TEST PROCEDURE FOR HORIZONTAL PUMPS**1.0****Introduction**

In accordance with the condition of contract / letter of award; on successful completion of system, trial operation at site and liquidation of all defects; the system/individual equipment shall be subjected to performance test at site.

This Test procedure shall cover demonstration test at site for following Pumps:

- UNIT ACW PUMPS
- UNIT SG ECW PUMPS
- STATION AUXILIARIES ECW PUMPS

2.0**Scope & Objective**

As per technical specifications, following shall be demonstrated at site for all the pumps mentioned above:

- a. Noise level
- b. Vibration level
- c. Parallel operation
- d. Trouble free mechanical running of individual pumps

The capacity, head & power consumption at the rated duty point demonstrated at shop will be accepted.

3.0**Condition of Test****a. Conductance of test:**

The responsibility for conducting the test rests with the contractor. The Demonstration test at site shall be conducted by the representatives of the contractor and in presence of NTPC representative. The contractor shall be given permission to inspect the entire system in advance and make it ready for test. The contractor representative will record the test data jointly with NTPC representative.

b. Test Instruments:

I. All instruments other than online instruments required to conduct the Test will be provided by the Contractor.

II. All instruments shall be calibrated in govt. approved labs/ NABL accredited Labs/ NTPC approved labs well in advance before the test is carried out, but not prior to six month of test period. The copies of test certificates of calibrated instruments shall be furnished for NTPC records.

c. Prerequisites to the test:

1. The contractor should ensure that the work covered in the contract has been completed for the system for which the test is to be carried out.
2. Proper lubrication and oil level for pump bearing is to be ensured.
3. All NTPC approved data sheets for the pumps for which the test is to be carried out shall be made available during PG test.
4. Technical Parameters: The technical parameters of the pumps are as per approved Data Sheets.

4.0**Test Methodology:**

RAGHUNATHPUR THERMAL POWER STATION PHASE-II
(2X660MW)
EPC PACKAGE (EXCLUDING STG PKG.)

TECHNICAL SPECIFICATIONS
SECTION- VI, PART - B
BID DOC. NO. CS-9586-001A-2

SUB SECTION- G-04
STANDARD PG TEST
PROCEDURE

Page 45 of 107



CLAUSE NO.

TECHNICAL REQUIREMENTS

The pump set will be tested in accordance with technical specifications/approve data sheet/HIS at site.

a. Noise Level:

Noise level measurement shall be done as per HIS. Sound level will be measured all around the pump and motor set at a distance of 1 M from the nearest surface of the machine and at a height of 1.5 M from the floor level. Noise level should be less than 85 dBA.

The tests shall be carried out with the machine operating at the rated speed and throughout the operation range. A minimum of six points should be covered for measurement. Correction for background noise and correction on account of test environment shall be considered in line with HIS.

b. Vibration level:

Vibration check shall be done as per HIS. Vibration shall be measured in horizontal, radial and vertical directions at pump thrust bearing locations and Motor DE & NDE bearing location. Guaranteed value peak to peak is 75 microns (displacement).

c. Parallel operation of Pump:

Checks on parallel operation of the pumps shall be carried out in the following manner. When operating in parallel, equal load sharing by the pumps connected in parallel shall be measured by checking amperage of each pump set. The parameter/values of pumps operating in parallel should be within 10%. There should be equal load sharing between the pumps running in parallel with no abnormal vibration, sound or hunting of head and flow.

The readings shall be recorded as per log sheet for Pumps in parallel as per Annexure-1.

LIST OF ATTACHED ANNEXURES

Annexure-1 (Sample log sheet)

Annexure-2 (Attachment – 8 of contract specifying functional guarantees / Demonstration parameters)

Annexure-3 (Relevant pages of Functional Guarantee & LD pages of contract/specification.)

Annexure-4 (Parallel operation curve of pumps)

RAGHUNATHPUR THERMAL POWER STATION PHASE-II
(2X660MW)
EPC PACKAGE (EXCLUDING STG PKG.)

TECHNICAL SPECIFICATIONS
SECTION- VI, PART – B
BID DOC. NO. CS-9586-001A-2

SUB SECTION- G-04
STANDARD PG TEST
PROCEDURE

Page 46 of 107



CLAUSE NO.

TECHNICAL REQUIREMENTS

Annexure-1 (to Demonstration Test procedure of Horizontal Pumps)

Log sheets demonstration test for horizontal pumps listed in this document:

1. Noise Level (in dBA)

Pump SN	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Remarks

2. Vibration Level

Pump SN	Driving End					
	Displacement in microns			Velocity in mm/sec		
	Horizontal Plan	Vertical Plan	Radial Plan	Horizontal Plan	Vertical Plan	Radial Plan
Pump SN	Non- Driving End					
	Displacement in microns			Velocity in mm/sec		
	Horizontal Plan	Vertical Plan	Radial Plan	Horizontal Plan	Vertical Plan	Radial Plan

3. Running in Parallel

SN	Particulars/Parameters	Discharge Pressure in Kg/cm ²	Flow in m ³ /hr	Current in amps	Remarks

RAGHUNATHPUR THERMAL POWER STATION PHASE-II
(2X660MW)
EPC PACKAGE (EXCLUDING STG PKG.)

TECHNICAL SPECIFICATIONS
SECTION- VI, PART - B
BID DOC. NO. CS-9586-001A-2

SUB SECTION- G-04
STANDARD PG TEST
PROCEDURE

Page 47 of 107

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100- W/001
		Rev. No. 00
		Date : 25.09.2026
QUALITY PLAN		

QUALITY ASSURANCE



EQUIPMENT COOLING WATER SYSTEM

	TEST / CHECKS	Material Test	WPS/PQR/Welder Qualification	DPT/MPI	Assembly Fit Up	Visual & Dimensional Check	UT	RT	Hydraulic / Water Fill	Balancing	Type Test	Performance Test	Other Test
	ITEM / COMPONENTS												
A	PLATE TYPE HEAT EXCHANGER		Y	Y ³	Y	Y			Y				
A.1	Heat Transfer Plates	Y ¹		Y ²		Y							Y ⁷
A.2	Gaskets	Y				Y							
A.3	Cover Plates (Front & Rear)	Y ¹				Y	Y ⁵						
A.4	Tie Rods	Y ¹		Y ⁴			Y ⁶						
B	HORIZONTAL CENTRIFUGAL PUMP				Y	Y						Y ¹⁰	
B.1	Casing	Y ¹		Y ⁴		Y			Y ⁸				
B.2	Impeller	Y ¹		Y ⁴		Y				Y ⁹			
B.3	Shaft	Y ¹		Y		Y	Y ⁶			Y ⁹			

NOTES

1	One per heat / HT batch
2	DP Test shall be conducted for 10% of the lot of HT plates. However, in case of any defect, entire lot shall be tested and only defect free plates shall be accepted.
3	100% DP Test shall be conducted on butt welds and 10% DPT on fillet weld after final run.
4	100% DPT shall be carried out on machined surfaces.
5	UT shall be done on plates with thickness ≥ 40 mm and for pressure parts plates 25 mm or above.
6	UT shall be done on shaft / tie rod with diameter 40 mm or above.
7	After pressing each HT plate shall be subjected to either of the following tests, as per Manufacturer Practice
	a) Light Box Test b) Vacuum Test c) Air Chamber Test
8	All pressure retaining parts shall be hydrostatically tested at 200% of pump rated head or 150% of shut – off head, whichever is higher, for at least 30 minutes. No leakage is allowed.
9	Static and Dynamic Balancing shall be carried out on complete rotor assembly.
10	All pumps shall be tested at rated speed, for head, flow capacity, efficiency and power consumption for the entire operating range i.e. from shut off head to maximum flow. A minimum of 7 readings shall be taken to plot the curve, with one reading at design flow. Testing standard shall be HIS (Hydraulic Institute Standard) of USA. Performance test shall be carried out with contract motor, wherever Liquidated Damages are to be ascertained based on performance test at shop.
11.	For pipes, fittings, valves & RE joints refer QA chapters of LP Piping.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS			QUALITY PLAN				SPEC NO.:PE-TS-999-100-W001					
				CUSTOMER:				QP NO.: PE-QP-999-100-W001 R01		DATE	24.09.2024		
				PROJECT :				PO NO.:		DATE			
				ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)		SYSTEM: CW/ACW/DMCW/PLANT/ COMMON		SECTION:		SHEET 1 OF 4			
S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY **			REMARKS
									* D	M	B	C	
1	2	3	4	5	6	7	8	9		10			11
1	RAW MATERIALS												
1.1	CASINGS (INCLUDING BOWLS,DIFFUSERS, STAGE BODIES, DISCH HEAD (IF CAST)), ETC. - (AS APPLICABLE) AND IMPELLER	MECHANICAL AND CHEMICAL PROPS	CR	MECHANICAL AND CHEM. ANALYSIS	ONE/HEAT/BATCH	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	LAB REPORT/ MTC	√	P	V	V	REFER NOTE 1.
1.2	STUFFING BOX, SUCTION BELL, WEARING RINGS,NECK RINGS, SHAFT SLEEVES	MECHANICAL AND CHEMICAL PROPS	MA	MECHANICAL AND CHEM. ANALYSIS	ONE/HEAT/BATCH	APPROVED CS	RELEVANT MATERIAL SPECN.	LAB REPORT/ MTC	√	P	V	V	
		HARDNESS DIFFERENCE BETWEEN CASING / IMPELLER AND WEARING RING	MA	LAB. TEST	100%	APPROVED CS DRAWING/ DATA SHEET	50 BHN MIN.	LAB. REPORT	√	P	V	V	
1.3	BARS/FORGINGS FOR SHAFTS, LINE SHAFTS	PHYSICAL & CHEMICAL PROPS	CR	MECHANICAL & CHEMICAL ANALYSIS.	1/CAST OR 1/BARS	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	MILL T.C. OR LAB.REPORT	√	P	V	V	CORRELATION REQUIRED. IDENTIFICATION AS PER TC
		INTERNAL DEFECTS FOR 40MM & ABOVE DIA SHAFTS.	CR	ULTRA SONIC TEST	100%	ASTMA388 BACK WALL ECHO 100%	DEFECT ECHO MAX 20% OF B.W.E. LOSS OF BACK WALL ECHO 20% MAX	NDT CERTIFICATE	√	P	V	V	
1.4	STRESS RELIEVING/ HEAT TREATMENT OF CASTING OF ALL ABOVE (IF APPLICABLE) / SOLUTION ANNEALING OF SS CASTING	1. VERIFICATION OF HT CHART	MA	VERIFICATION OF SR/HT CHART	ALL BATCHES	RELEVANT MATERIAL SPECN.	RELEVANT MATERIAL SPECN.	CORRELATED SR/HT.CHARTS	√	P	V	V	
		2. IGC TEST FOR SS CASTING	MA	LAB. TEST	ONE SAMPLE/ HT BATCH	ASTM A 262	ASTM A 262 Gr A	LAB. REPORT	√	P	V	V	
1.5	SHAFT ENCLOSING TUBES, COLUMN PIPES & DISCHARGE ELBOW	1. MECHANICAL & CHEMICAL PROPS. 2. DIMENSIONS. 3. SURFACE FINISH	MA	1. MECH & CHEM TEST 2. MEASUREMENT 3. VISUAL EXAM	1/BATCH 100% 100%	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./MAFG./ APPROVED DOCS	MFR T.C OR LAB. REPORT	√	P	V	V	
1.6	PLATE FLANGE, C/FLANGE	1. MECHANICAL & CHEMICAL PROS. 2. DIMENSIONS. 3. SURFACE FINISH	MA	1. MECH & CHEM TEST 2. MEASUREMENT 3. VISUAL EXAM	1/CAST 100% 100%	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./ MFR. DRG./ APPROVED DOC	MILL TC/ LAB REPORT	√	P	V	V	CORRELATION REQ. FOR MAT. OTHER THAN IS 2062
1.7	SUCTION STRAINER (IF APPLICABLE)	MECHANICAL & CHEMICAL PROS.	MI	MECH. & CHEMICAL TEST	1/HEAT	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./ MFR. DRG./ APPROVED DOC	MILL TC/ LAB REPORT	√	P	V	V	
1.8	PUMP CASING, IMPELLER, DIFFUSER, SHAFT	PMI (MATERIAL GRADE IDENTIFICATION)	CR	RECORD	100%	MANUFACTURER'S TEST PROCEDURE	MANUFACTURER'S TEST PROCEDURE	REPORT	√	P	V	V	
1.9	a. MECHANICAL SEAL b. PUMP BEARINGS	TYPE, SIZE, MFRS, NO., MAKE	MA	VISUAL EXAM	100%	APPROVED DATASHEET / GA	APPROVED DATASHEET		√	P	V	V	COMPLIANCE TC FOR APPROVED MAKE
BHEL					BIDDER/ SUPPLIER			FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING		QUALITY			Sign & Date		Doc No:						
	Sign & Date	Name		Sign & Date				Name		Sign & Date	Name	Seal	
Prepared by:	Prashant Agarwal	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	35 Seal	Reviewed by:						
Reviewed & Approved by:	Vishal Kumar	VISHAL K. YADAV	Reviewed by:	HARISH KUMAR	HARISH KUMAR		Approved by:						

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				QUALITY PLAN				SPEC NO.:PE-TS-999-100-W001		DATE			
					CUSTOMER:				QP NO.: PE-QP-999-100-W001 R01		DATE		24.09.2024	
					PROJECT :				PO NO.:		DATE			
					ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)		SYSTEM: CW/ACW/DMCW/PLANT/ COMMON		SECTION:		SHEET 2 OF 4			
S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY **			REMARKS
											M	B	C	
1	2	3	4	5	6		7	8	9	* D	10			11
					M B/C									
2.0 IN PROCESS CONTROL														
2.1	IMPELLER	DYNAMIC BALANCING	CR	DYNAMIC BALANCING	100%		ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	√	P	W	V	WITNESSING ONLY FOR SIZE GREATER THAN 10KW
2.2	IMPELLER-ALL ACCESSIBLE SURFACES, DIFFUSERS, SHAFT	DP TEST	MA	DP TEST ON M/CED AREA	100%		ASTM E 165	NO RELEVANT INDICATION ALLOWED	NDT CERTIFICATE	√	P	W	V	
2.3	WEARING RING, SHAFT SLEEVES, CASING	DP TEST	MA	DP TEST ON M/CED AREA	100%		ASTM E 165	NO RELEVANT INDICATION ALLOWED	NDT CERTIFICATE	√	P	V	V	
2.5	CASINGS/ BOWLS, STAGE BODIES, DISCHARGE HEAD (IF CAST), SUCTION HOUSING, COLUMN PIPE DISCHARGE PIPE ETC	LEAK TIGHTNESS	CR	HYDRO TEST	100%		APPROVED TECHNICAL DATA SHEET	NO LEAKAGE FOR TEST DURATION OF 30 MIN.	HT CERTIFICATE	√	P	W	V	1. HAMMERING OF CASTINGS WITH WOODEN/ RUBBER MALLET BEFORE HYDRO TEST 2. NO WELD REPAIRS PERMITTED ON CI CASTING
2.6	FABRICATED COMPONENTS													
2.6.1	a. WELDING PROCEDURE SPECIFICATION b. WELDING PROCEDURE QUALIFICATION RECORD c. WELDER PERFORMANCE QUALIFICATION	CORRECTNESS	MA	VERIFICATION	100%		ASME SEC.IX	ASME SEC.IX	ASME SEC.IX	√	P	V	V	WELDING PROCEDURE APPROVAL BY BHEL ALT. 3RD PARTY (LLYODS,BVQI OR EQ.) IS ACCEPTABLE.
2.6.2	WELD & ASSEMBLY FIT UPS	DIMENSION & ALIGNMENT	MA	MEASUREMENT, VISUAL EXAMINATION	100%		WPS/MFG DRG	WPS/MFG DRG	IR/LOG BOOK	√	P	V	V	
2.6.3	WELDMENTS	SURFACE DEFECTS	MA	PENETRANT TEST	100%	10%	ASTM E 165	ASME-VIII,DIV I	INSPN REPORT	√	P	W	V	10%WITNESS BY BHEL & VERIFICATION BY CUSTOMER
2.6.4	BUTT WELDS	INTERNAL DEFECT	MA	UT/RT	100%		ASME SEC. V	ASME-VIII,DIV I	IR	√	P	W	V	WITNESSING OF U.T
BHEL					BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING			QUALITY			Sign & Date		Doc No:		Sign & Date		Name		Seal
Sign & Date		Name	Sign & Date		Name				Sign & Date		Name		Seal	
Prepared by:	Prashant Agarwal	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG				Reviewed by:					
Reviewed & Approved by:	Vishal Kumar Yadav	VISHAL KR. YADAV	Reviewed by:	HARISH KUMAR	HARISH KUMAR		Seal 36		Approved by:					

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				QUALITY PLAN				SPEC NO.:PE-TS-999-100-W001		DATE			
					CUSTOMER:				QP NO.: PE-QP-999-100-W001 R01		DATE		24.09.2024	
					PROJECT :				PO NO.:		DATE			
					ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)		SYSTEM: CW/ACW/DMCW/PLANT/ COMMON		SECTION:		SHEET 3 OF 4			
S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY**			REMARKS	
									* D	M	B	C		
1	2	3	4	5	6	7	8	9		10			11	
					M B/C									
3.0	SUB-ASSEMBLY CONTROL													
3.1	ROTOR ASSEMBLY	ECCENTRICITY	MA	MEASUREMENT	100%	APPROVED GA DRG/ MFR.DRAWING	APPROVED GA DRG/ MFR.DRAWING	IR/LOG BOOK	√	P	V	V		
3.2	ROTOR ASSEMBLY RESJDUAL UNBALACE	STATIC & DYNAMIC	CR	STATIC & DYNAMIC BALANCING	100%	ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	√	P	W	V	WTNESSING ONLY FOR SIZE GREATER THAN 10KW	
3.3	COMPLETE PUMP ASSEMBLY	COMPLETENESS, CORRECTNESS, CLEANLNESS, CLEARANCES, FREENESS, ALIGNMENT	MA	VISUAL EXAM, MEASUREMENT	100%	APPROVED DRG & MFG STANDARDS	APPROVED DRG & MFG STANDARDS	I.R. & CHECK LISTS	√	P	V	V	KEY SLOT IN SHAFT/COUPLING & VMS PAD AS PER APPROVED GA/CS DRAWING TO BE SPECIFICALLY CHECKED (AS APPLICABLE)	
4	FINAL INSPECTION, TESTS & PACKING DESPATCH CONTROL													
4.1	PUMP WITH JOB/SHOP MOTOR ASSEMBLED ON INDIVIDUAL BASE FRAME	1. Q V/S HEAD, 2. Q V/S POWER, 3. Q V/S PUMP EFF. 4. VIBRATION 5. NOISE 6. BEARING TEMP. 7. LEAKAGES	CR	PERFORMANCE TEST (MIN. 2 HRS OF CONTINUOUS PUMP RUN IS REQUIRED DURING PERFORMANCE TEST)	100%	APPD. PERFORMANCE TEST PROCEDURE/ APPD. DATA SHEET/APPD. CURVES FOR VIBRATIONS - AS PER ANSI/HIS 9.6.4- 2009 (VALUES AS PER APPROVED DATA SHEET) FOR BEARING TEMP - BEARING HOUSING SHOULD NOT BE UNTOUCHABLY HOT. FOR LEACKAGE - MINOR LEKAGE (DROP BY DROP) IN CASE OF GLAND PACKING ARRANGEMENT.	I.R., PERF. TEST RECORD, PLOTED CURVES	√	P	W	W	* MINIMUM 7 POINTS FROM SHUT-OFF TO MAX. OPERATING FLOW COVERING ENTIRE OPERATION RANGE OF PUMP SHALL BE TAKEN. * CUSTOMER HOLD POINT		
		NPSH REQUIRED	CR	NPSH TEST	1/MODEL	APPD. PERFORMANCE TEST PROCEDURE/ APPD. DATA SHEET/APPD. CURVES	IR. NPSH TEST RECORD, PLOTED CURVES	√	P	W	W			
BHEL					BIDDER/ SUPPLIER			FOR CUSTOMER REVIEW & APPROVAL						
ENGINEERING		QUALITY			Sign & Date		Doc No:							
	Sign & Date	Name		Sign & Date				Name	Sign & Date	Name	Seal			
Prepared by:	Prashant Agarwal	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	Seal	Reviewed by:							
Reviewed & Approved by:	Vishal Kumar Yadav	VISHAL KR. YADAV	Reviewed by:	HARISH KUMAR	HARISH KUMAR		Approved by:							

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				QUALITY PLAN			SPEC NO.:PE-TS-999-100-W001		DATE			
					CUSTOMER:			QP NO.: PE-QP-999-100-W001 R01		DATE	24.09.2024		
					PROJECT :			PO NO.:		DATE			
					ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)		SYSTEM: CW/ACW/DMCW/PLANT/ COMMON	SECTION:		SHEET 4 OF 4			
S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY**			REMARKS
										M	B	C	
1	2	3	4	5	6	7	8	9	* D	10			11
					M B/C								
4.2	STRIP DOWN AFTER PERFORMANCE TEST	UNDUE WEAR TEAR AND RUBBING	MA	VISUAL EXAM AFTER STRIPPING	1/MODEL	NO UNDUE WEAR TEAR & RUBBING ON IMPELLER & WEAR RING		INSP. REPORT	√	P	W	W	WITNESS REQUIRED ONLY WHEN ABNORMAL SOUND OBSERVED DURING PERFORMING TEST.
4.3	COMPLETE PUMP WITH UNIT MOTOR BASE FRAME, COUNTER FLANGES ETC. INCLUDING ALL ACCESSORIES AS PER SECTION C OF SPECN.	COMPLETENESS, CLEANLINESS, OVERALL DIMENSIONS ORIENTATION, WORKMANSHIP AND FINISH	MA	VISUAL EXAM MEASURMENT	100%	APPD. G.A DRAWING	APPD. G.A DRAWING	INSP. REPORT	√	P	W	V	REFER NOTE 2 & 3.
4.4	PAINING	SURFACE FINISH, DFT, MARKINGS ETC.	MA	VISUAL EXAM, MEASURMENT, AESTHETIC	100%	APPD.DRG.	APPD.DOCS	IR.	√	P	V	V	
4.5	PACKING, MARKING	SOUNDNESS OF PACKING	MI	VISUAL, AESTHETIC	100%	TECHNICAL SPECIFICATION/ MFG. STANDARD	TECHNICAL SPECIFICATION/ MFG. STANDARD	PHOTOGRAPHS	√	P	V	-	
NOTES: 1.AS CAST HEAT MARKS SHALL BE PROVIDED ON CI CASTING LIKE TOP & BOTTOM CASING FOR CORRELATION. 2. PUMPS WITH MECHANICAL SEAL ARRANGEMENT TO BE TESTED AND SUPPLIED WITH GLAND PACKING ARRANGEMENT. HOWEVER MANUFACTURER TO ENSURE DIMENTIONAL MATCHING OF MECHANICAL SEAL WITH PUMP GA DRAWING. 3. KEY NOTCH FOR VMS TO BE ENSURED FOR APPLICABLE PUMPS.													
LEGEND : - * RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, ** M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, B: BHEL/ THIRD PARTY INSPECTION AGENCY, C: CUSTOMER P- PERFORM, W- WITNESS, V- VERIFICATION, AS APPROPRIATE MA: MAJOR, MI: MINOR, CR: CRITICAL, MTC -Mill Test Certificate, TC-Test Certificate, IGC- Inter Granular Corrosion. GA -GENERAL ARRANGEMENT DRAWING, CS-CROSS-SECTIONAL DRAWING													
BHEL					BIDDER/ SUPPLIER			FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING			QUALITY			Sign & Date		Doc No:					
	Sign & Date	Name		Sign & Date	Name				Sign & Date	Name	Seal		
Prepared by:	 Prashant Agarwal	PRASHANT AGARWAL	Checked by:	 Gaurav Garg	GAURAV GARG			Reviewed by:					
Reviewed & Approved by:	 Vishal Kumar Yadav	VISHAL KR. YADAV	Reviewed by:	 HARISH KUMAR	HARISH KUMAR			Approved by:					

QUALITY ASSURANCE

**LOW PRESSURE PIPING OR STATION PIPING**

**PIPES, FITTINGS, BENDS, VALVES, COATING-WRAPPING, STRAINERS EXPANSION,
JOINTS, TANKS, FASTENERS, LINING ETC.**

	Tests/Check Items / Components	Material Test	DPT/MPI / RT	Ultrasonic Test	WPS/ WQS/PQR	Hydraulic / Water Fill Test	Pneumatic Test	Assembly Fit up	Dimensions	Functional/operation Test	Other Tests	All Tests as per relevant Std	REMARKS
1	Pipes & Pipe Fittings	Y ^a	Y ^b			Y ¹			Y			Y	
2	Diaphragm Valves	Y ^a				Y ⁵			Y		Y ⁶		
3A	Cast Butterfly Valves (Low Pressure)					Y		Y	Y	Y	Y ⁷		
	Body	Y ^a	Y ^b										
	Disc	Y ^a	Y ^b										
	Shaft	Y ^a	Y	Y ^c									
3B	Fabricated Butterfly Valves	REFER NOTE 14											
4	Gate/ Globe/Swing Check / Ball Valves	Y ^a	Y ^b	Y ^c		Y ⁵	Y	Y	Y	Y	Y ⁸		
5	Dual Plate Check Valves	Y ^a	Y ^b	Y ^c		Y	Y	Y	Y	Y	Y ⁴		
6	Rolled & Welded Pipes and Mitre Bends	Y ^a	Y ³		Y	Y ³			Y		Y ^{3&15}	Y	
7	Coating & Wrapping of Pipes	Y ²									Y ²		
8	Tanks & Vessels	Y ^a	Y ^b		Y	Y			Y		Y ¹⁶		
9	Strainers	Y ^a	Y ^b		Y #	Y					Y ¹¹		#For Fabricated Strainer
10	Rubber Expansion Joints	Y ^a				Y ¹²		Y	Y		Y ¹³		
11	Internal Lining of Pipes	Y ^a							Y		Y ⁹		
12	Site Welding		Y ¹⁰		Y	Y							

NOTES (MEANING OF SUPERSCRIPTS)

- a One per heat/heat treatment batch/lot.
- b On machined surfaces only for castings and on butt welds.
- c For shaft/spindles > or = 40 mm
- 1 100% Hydraulic test shall be carried out. Weld joints not subjected to hydraulic test due to some unavoidable reasons, shall be subjected to 100% RT/PAUT.
- 2 Spark Test, Adhesion Test and Material Test for primer and enameled & Coal Tar Tapes as per AWWA-C-203-91/ IS-10221 & IS 15337 as applicable.
- 3 Followings are the testing requirements for fabrication of pipes at site

TESTS**QUANTUM OF CHECKS**

WPS, PQR, Welder Qualification Test

100% Welders and WPS shall be qualified as per ASME- section IX

DPT on root run

100% for pipes up to 1200 mm diameter

DPT after back gauging

100% for pipes above 1200 mm diameter

RT / UT by (TOFD/PAUT) Technique

5% (100% of T Joints)

RAGHUNATHPUR THERMAL POWER STATION
PHASE- II (2X660 MW)
STEAM GENERATOR ISLAND PACKAGE

TECHNICAL SPECIFICATIONS
SECTION-VI, PART – B
BID DOGNO-

SUB SECTION: E-05
LOW PRESSURE PIPING OR
STATION PIPING

Page 1 of 2

QUALITY ASSURANCE



	DPT on finished butt weld joints	10%
	Hydraulic Test	100%, 1.5 times the design pressure or 2 times the working-pressure whichever is higher.
4	Dry Cycle Test on Dual Plate Check valve spring for one lakh Cycles shall be carried out as a type test. If Dry Cycle test carried out earlier for same material & diameter, Test report shall be reviewed.	
5	Seat Leakage Test for Actuator Operated Valves, shall be done with by closing the valves with actuator.	
6	Tests on rubber parts shall be conducted per batch of rubber mix for tensile, Elongation, hardness, adhesion, spark test, bleed resistance test. In addition, type test for 50,000 cycles of each type of diaphragm shall also be conducted.	
7	Hydraulic Test of Body, Seat and disc-strength shall be carried out in accordance with governing design standard in presence of owner / owner's representatives. Actuator operated valves shall be checked for Seat Leakage by closing the valves with actuator. For Proof of Design Test refer respective chapters of engineering portion in the technical specification.	
8	Blue matching, wear travel for gates, valves, pneumatic seat leakage, and reduced pressure test for check valves shall be done as per relevant standard. Maximum allowable vacuum loss is 0.5 mm of Hg abs. for valves to be tested for vacuum operation for internal pressure 25 mm of Hg abs. for a period of 15 minutes. Fire safe test for ball valve shall be done wherever specified. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives. Valves shall be offered for hydro test in unpainted condition.	
9	Tensile, Elongation, Hardness, Specific Gravity, Lining Thickness, Humidity Check, Pipe temperature check, Adhesion Test and Holiday Detection Test etc as per applicable standard shall be done for all lining material and application.	
10	10% of welds (Root and finished welds) shall be subjected to DPT. (100% DPT for compressed air line and boiler & deaerator fill line.). RT/PAUT - Random 5% for weld joints for which hydro test is possible.	
11	Pressure drop across the strainer for each type and size as a special test shall be carried out. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives.	
12	During hydraulic and vacuum tests at 25mm Hg abs in 3 positions, the change in the circumference of arch should not be more than 1.5%. 24 hrs after the test permanent set in dimension should not exceed 0.5%.	
13	Tests on rubber for tensile, elongation, hardness, hydraulic stability check as per ASTM D 471, ozone resistance test as per ASTM D 1149/IS 3400 Part 20 aging test and adhesion strength of rubber to fabric, rubber to metal adhesion shall be carried out.	
14	In addition of all tests as indicated for Cast Butterfly valve being applicable for fabricated butterfly valves, following test shall be done for Fabricated Butterfly Valve: - UT as per ASTM A-435/IS 11630 & IS 4225 on plate material for body and disc shall be carried out for plate thickness 25mm and above. 100% RT and DPT as per ASTM, Section-VIII, Division-I, on butt joins of body and disc. 10% DPT on other welds shall be done. - Post weld heat treatment as per ASME, Section-VIII, Division-I on butt joints of body and disc. - Welders and WPS shall be qualified as per ASME- section IX	
15	Maximum number of segments in segmental flanges shall be four (04) only. All butt weld joints in the segmental flanges shall be examined by RT/UT. Segmental flanges exceeding 37.5 mm thickness shall be stress relieved as per norms of ASME Section VIII after welding.	
16	For pressure vessel welds RT shall be done as per design code requirements.	

All Valves shall be offered for inspection in unpainted condition.

No repair welding is permitted on Cast Iron / Alloy Cast Iron Castings.

	TECHNICAL SPECIFICATION		PE-TS-390/528-100-W001
	MISC. PUMPS (HORIZONTAL)		
	2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		Rev. No. 00
			Date : 25.09.2026
PAINTING REQUIREMENT 1 The surface of SS, Gun metal, brass, bronze and non-metallic component shall not be applied with any painting. 2 The Steel surface to be applied with painting shall be thoroughly cleaned before applying painting by brushing, shop blasting etc. as per the agreed procedure.			
Package	Condition		
1	Indoor/ Outdoor	A coat of chlorinated rubber-based zinc phosphate primer of minimum thickness DFT of 50 microns followed up with undercoat of chlorinated rubber paint of minimum DFT of 50 microns shall be applied. Then, intermediate coat consisting of one coat of chlorinated rubber based paint pigmented with Titanium di-oxide with minimum DFT of 50 microns and topcoat consisting of two coats of chlorinated rubber paint of approved shade and color with glossy finish and DFT of 100 microns shall be provided. Total DFT of paint system shall not be less than 250 microns.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001 Rev. No. 00 Date : 25.09.2026
PACKING REQUIREMENT		
Sl.no	DESCRIPTION	
1	Type of Packing:	
1.1	Vacuum packing using Aluminium Barrier bags/ foil with multiple layers of polyester Nylon/ polythene to be provided by Pump Vendor for protection of pumps during long storage at site.	
1.2	Item shall be fully covered with multi layered cross laminated colourless polyethylene sheet of at least 100 GSM and shall be packed inside wooden box or crate or fixed on wooden pallet depending upon the size.	
1.3	Item shall be firmly fixed to the bottom of the packing box/crate/pallet with the help of supports/blocks to arrest the movement from all sides. Internal threads shall be protected with metal plug sealed with Teflon tape (if applicable). External thread shall be protected with PVC sleeve. Flanged opening if any shall be covered with blank flanges sealed with blank gasket of natural rubber or equivalent.	
1.4	Loose material, primary and secondary shall be packed in corrugated box and plastic bags with proper tagging.	
2	Quality of wood:	
2.1	Quality of wood: Wood used for packing box shall be Pinewood, Rubber wood, Mango wood, Fir wood, Silver Oak wood or other as per availability with moisture content not exceeding 30%.	
3	Moisture protection:	
3.1	External machined C.S. Surfaces shall be protected against corrosion with corrosion resisting coating or grease/ shall be coated with rust preventive primer. Equipment shall be covered with HDPE sheet/ polythene sheet inside the box to prevent from moisture ingress.	
4	Packing slip & holder:	
4.1	Packing slip kept in polyethylene bag shall be placed inside the wooden box at appropriate place.	
4.2	One copy of packing slip wrapped in polyethylene bag covered in galvanized iron tin sheet/ aluminium packing slip holder shall be fixed on the external surface the packing box.	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
BILL OF QUANTITY		



TECHNICAL SPECIFICATION
MISC. PUMPS (HORIZONTAL)
2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660
MW DVC RAGHUNATHPUR TPP PH II(SG)

PE-TS-390/528-100-W001

Rev. No. 00

BOQ SCHEDULE

Date : 25.09.2026

A. 2x660 MW DVC RAGHUNATHPUR TPP PH II (STG)

1.0	Supply of Pumps and Motors:	UOM	QUANTITY
1.1	DMCW TG PUMPS		
1.1.1	Pump	Nos.	6
1.1.2	Motor	Nos.	by BHEL
1.1.3	Suction Strainer	Nos.	6
1.1.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1
1.2	ACW TG PUMPS		
1.2.1	Pump	Nos.	6
1.2.2	Motor	Nos.	by BHEL
1.2.3	Mandatory Spares (as per S.No. 3.0 below)	Lot	1

NOTE: Commissioning & Erection spares, special Tools & tackle and other accessories applicable as per Specification but not listed above shall be included in the price of pump & shall be supplied with the pump.

2.0	SITE SERVICES:	UOM	QUANTITY
2.1	Installation Check (For all Pumps) & Supervision for replacement of Gland packing with Mechanical Seal (for DMCW TG Pumps) at Site as per Specification		
2.1.1	Site Visit Charges	Nos. of Visits	6
2.1.2	Manday Charges at Site	Nos. of Mandays	24
2.2	PG Test of pumps at site as per Specification	Lot	1

NOTE:

1	Service charges at Sl.no 2.1.1 shall include to/fro travel expenses, medical and insurance.
2	Service Charges at Sl.no 2.1.2 shall include boarding/lodging, local conveyance or any other applicable charge for completion of site services. No. of mandays at site defined at Sl.no. 2.1.2 above shall be calculated on the basis of presence at site (travelling time/days is excluded).
3	Payment for Sl. No. 2.1 shall be done based on actual consumed site visits and mandays.

3.0	Mandatory Spares for	UOM	QUANTITY
3.1	DMCW TG PUMPS		
3.1.1	Set of Impeller for each type of pump	1.00	SET
3.1.2	Pump Shaft for each type of pump	1.00	SET
3.1.3	Shaft Sleeve	1.00	SET
3.1.4	Casing wearing rings	2.00	SET
3.1.5	Impeller wearing rings	2.00	SET
3.1.6	Bearing for the Pump	2.00	SET
3.1.7	Thrust Bearing	2.00	SET
3.1.8	Sleeve nuts & "O" rings	1.00	SET
3.1.9	Gland Packing	2.00	SET
3.1.10	Complete Coupling (Pump & Motor)	1.00	SET



TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100-W001	
		Rev. No. 00	
		Date : 25.09.2026	
BOQ SCHEDULE			
3.1.11	Mechanical Seal - (Both DE & NDE)	1.00	SET
3.1.12	Fasteners	1.00	SET
3.2	ACW TG PUMPS		
3.2.1	Set of Impeller for each type of pump	1.00	SET
3.2.2	Pump Shaft for each type of pump	1.00	SET
3.2.3	Shaft Sleeve	1.00	SET
3.2.4	Casing wearing rings	2.00	SET
3.2.5	Impeller wearing rings	2.00	SET
3.2.6	Bearing for the Pump	2.00	SET
3.2.7	Thrust Bearing	2.00	SET
3.2.8	Sleeve nuts & "O" rings	1.00	SET
3.2.9	Gland & Gland Packing	2.00	SET
3.2.10	Complete Coupling (Pump & Motor)	1.00	SET
3.2.11	Mechanical Seal - (Both DE & NDE)	1.00	SET
3.2.12	Fasteners	1.00	SET
NOTE:			
1	One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the 'set' would include all components/hardware required to replace the item.		
2	In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design (except for those items for which "if applicable" is specified) with quantities as specified in the Technical specification/NIT.		



	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
	BOQ SCHEDULE	Date : 25.09.2026

B. 2x660 MW DVC RAGHUNATHPUR TPP PH II (SG)

1.0	Supply of Pumps and Motors:	UOM	QUANTITY
1.1	DMCW SG PUMPS		
1.1.1	Pump	Nos.	4
1.1.2	Motor	Nos.	by BHEL
1.1.3	Suction Strainer	Nos.	4
1.1.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1
1.2	DMCW STATION PUMPS		
1.2.1	Pump	Nos.	3
1.2.2	Motor	Nos.	by BHEL
1.2.3	Suction Strainer	Nos.	3
1.2.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1
1.3	ACW STATION PUMPS		
1.3.1	Pump	Nos.	3
1.3.2	Motor	Nos.	by BHEL

NOTE: Commissioning & Erection spares, special Tools & tackle and other accessories applicable as per Specification but not listed above shall be included in the price of pump & shall be supplied with the pump.

2.0	SITE SERVICES:	UOM	QUANTITY
2.1	Installation Check (For all Pumps) & Supervision for replacement of Gland packing with Mechanical Seal (for DMCW SG & DMCW STATION Pumps) at Site as per Specification		
2.1.1	Site Visit Charges	Nos. of Visits	6
2.1.2	Manday Charges at Site	Nos. of Mandays	24
2.2	PG Test of pumps at site as per Specification	Lot	1

NOTE:

1	Service charges at Sl.no 2.1.1 shall include to/fro travel expenses, medical and insurance.
2	Service Charges at Sl.no 2.1.2 shall include boarding/lodging, local conveyance or any other applicable charge for completion of site services. No. of mandays at site defined at Sl.no. 2.1.2 above shall be calculated on the basis of presence at site (travelling time/days is excluded).
3	Payment for Sl. No. 2.1 shall be done based on actual consumed site visits and mandays.

3.0	Mandatory Spares for	UOM	QUANTITY
3.1	DMCW SG PUMPS		
3.1.1	Shaft Sleeve (DE & NDE)	2.00	SET
3.1.2	Shaft(s) with fasteners as applicable	1.00	SET
3.1.3	Impeller with fasteners as applicable	1.00	SET
3.1.4	Casing & impeller Wearing Ring as applicable	2.00	SET
3.1.5	Bearings for Pumps	2.00	SET
3.1.6	Thrust Bearings & thrust bearing collar (if applicable)	1.00	SET



TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100-W001	
		Rev. No. 00	
BOQ SCHEDULE		Date : 25.09.2026	
3.1.7	Sleeve nuts and O-rings (if applicable)	1.00	SET
3.1.8	Gland Packing / Mechanical Seal (DE & NDE) as applicable	2.00	SET
3.1.9	Pump & Drive Coupling assembly with all fasteners & coupling Guard	1.00	SET
3.1.10	Stuffing box / Gland assembly (if applicable)	1.00	SET
3.2	DMCW STATION PUMPS		
3.2.1	Shaft Sleeve (DE & NDE)	2.00	SET
3.2.2	Shaft(s) with fasteners as applicable	1.00	SET
3.2.3	Impeller with fasteners as applicable	1.00	SET
3.2.4	Casing & impeller Wearing Ring as applicable	2.00	SET
3.2.5	Bearings for Pumps	2.00	SET
3.2.6	Thrust Bearings & thrust bearing collar (if applicable)	1.00	SET
3.2.7	Sleeve nuts and O-rings (if applicable)	1.00	SET
3.2.8	Gland Packing / Mechanical Seal (DE & NDE) as applicable	2.00	SET
3.2.9	Pump & Drive Coupling assembly with all fasteners & coupling Guard	1.00	SET
3.2.10	Stuffing box / Gland assembly (if applicable)	1.00	SET
NOTE:			
1	One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the 'set' would include all components/hardware required to replace the item.		
2	In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design (except for those items for which "if applicable" is specified) with quantities as specified in the Technical specification/NIT.		

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
DOCUMENTATION REQUIREMENT		
DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID		
Sl. No.	DOCUMENT TITLE	
1	PQR CREDENTIALS (APPLICABLE AS PER NIT)	
2	COMPLIANCE CERTIFICATE (Duly Signed and Stamped)	
3	GA DRAWINGS OF PUMP & MOTOR SET INDICATING PUMP OUTLINE DIMENSIONS AND CIVIL LOAD DETAILS (Only for Reference and not for Comment/Approval)	
4	Data for Drive Motor which is not in bidder's scope of supply: Load torque speed curves of the pumps, selected motor rating, rpm, GD2 of driven equipment.	
5	SCHEDULE OF PERFORMANCE GUARANTEES (Duly Signed & Stamped and as per the format provided with Specification)	
DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE		
Sl. No.	DOCUMENT TITLE	SUBMISSION SCHEDULE
1	TDS, PERFORMACE CURVES, GENERAL ARRANGEMENT AND CROSS SECTIONAL - MISC. PUMPS (H)	Rev-00 to be submitted within 25 days of LOI/PO date.
2	QP-MISC PUMPS (H)	
3	O & M MANUAL - MISC PUMPS (H)	Rev-00 to be submitted within 15 days of approval of above documents.
4	PG TEST PROCEDURE - MISC PUMPS (H) - If Applicable	
BHEL/Customer comments/approval and Vendor Re-submission schedule		
BHEL comments on First Submission		Within 10 days of Vendor submission.
BHEL/Customer comments/approval on Revised Submission		Within 18 days of Vendor submission.
Vendor Re-submission		Within 7 days of BHEL / Customer comments.

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)		PE-TS-390/528-100-W001
			Rev. No. 00
			Date : 25.09.2026
Important Instructions for Drawings & Documents to be submitted after award of Contract			
1	Fully dimensioned outline general arrangement drawings of the pump and motor assembly (including strainer drawing) should include foundation base plate/sole plate details as applicable, civil foundation, anchor bolt details, loading data (Static and Dynamic), points of connections of external piping, cables and mounting of devices furnished by the supplier and details for Gap between Coupling Shafts, Float & details for axial/radial tolerance allowed etc. which are required for erecting agency during erection of pump.		
2	Characteristic curves of pumps showing the following to be submitted: a) Flow Vs Head b) Flow Vs Power c) Flow Vs Efficiency d) Flow Vs NPSHR/ minimum submergence		

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT	
Sl. No.	DOCUMENT TITLE
1	APPROVED DOCUMENTS
2	O&M MANUAL
3	ALL TEST CERTIFICATES / REPORTS
4	DRAWINGS OF COMPONENTS AND DETAILS AS DEEMED NECESSARY.
5	STORAGE INSTRUCTIONS

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X660 MW DVC RAGHUNATHPUR TPP PH II (STG) & 2X660 MW DVC RAGHUNATHPUR TPP PH II(SG)	PE-TS-390/528-100-W001
		Rev. No. 00
		Date : 25.09.2026
PRE QUALIFICATION REQUIREMENT (TECHNICAL)		

	PRE-QUALIFYING REQUIREMENTS (TECHNICAL) – MISC. PUMPS (HORIZONTAL)	TECHNICAL SPECIFICATION NO- PE-TS-390/528-100-W001, Rev-0 TECHNICAL PQR NO. PE-PQ-508-100-W111 REV NO.: 00 DATED- 24.09.2026
		STANDARD PQR NO: PE-PQ-STD-100-N111 REVISION NO: 05 DATE: 24.09.2026
		SHEET: 1 of 2
		FORM NO. PEM 6100-0
ENQUIRY NO.:		
PROJECT: 2X660 MW DVC RAGHUNATHPUR TPP PH II- STG & SG PACKAGE		
PACKAGE: MISC. PUMPS (HORIZONTAL)		
	1. The bidder should have designed, manufactured, tested, inspected & supplied the Horizontal Centrifugal pumps with minimum rated flow of 1450 m3/hr, which have been successfully in use for at least 1 year in thermal power plants or similar industry/ application and bidder is in business of Horizontal centrifugal pumps on continuous basis.	
	2. The Bidders shall furnish following support documents for assessment of Bidder w.r.t. PQR as indicated at Sl. No. 1 above: A. Bidder's Experience list of Horizontal centrifugal pumps for last 5 years (as on the Enquiry/NIT date) for assessment of bidder for supplying the Horizontal centrifugal pumps on regular basis for establishing business continuity in the enclosed format-Annexure-1. Bidder shall furnish the PO copy of at least two (2) executed Contracts as indicated in the experience list. B. Bidder shall furnish any one from below in support of successful performance of Horizontal centrifugal pumps for one year: i. Satisfactory Performance feedback certificates from End Customer (Owner) (in English) for at least Two successfully executed contracts (from End customers (Owners) which have been in use for atleast one year indicating salient features like year of commissioning of Horizontal centrifugal pumps, rating of project, flow of Horizontal centrifugal pumps, project name etc., date of issue of certificate and name/ designation of the certificate issuer for power plant/similar application industry. The time duration of satisfactory performance completion should be before the date of subject enquiry/NIT. OR	
	ii. The bidder has been awarded two repeat contracts for Horizontal centrifugal pumps from End Customer (Owner) / Purchaser for power plant/similar application industry. Repeat contract shall be considered when the second contract is given by the same purchaser/ owner after lapse of minimum 1 year from execution (viz. supply) of first contract. Supporting documents for execution of the first contract like dispatch ^{N2} details or commissioning report or PG test report along with the PO Copy to be furnished, if bidder intends to submit the documents for Repeat Contracts. The date of repeat contract order should not be later than the date of subject Enquiry/NIT. OR	
	iii. Satisfactory Performance feedback certificates from End Customer (Owner) (in English) for one successfully executed contract which have been successfully in use for atleast one year indicating salient features like year of commissioning of Horizontal centrifugal pumps, rating of project, flow of Horizontal centrifugal pumps, project name	

	PRE-QUALIFYING REQUIREMENTS (TECHNICAL) – MISC. PUMPS (HORIZONTAL)	TECHNICAL SPECIFICATION NO- PE-TS-390/528-100-W001, Rev-0 TECHNICAL PQR NO. PE-PQ-508-100-W111 REV NO.: 00 DATED- 24.09.2026
		STANDARD PQR NO: PE-PQ-STD-100-N111 REVISION NO: 05 DATE: 24.09.2026
		SHEET: 2 of 2

	etc., date of issue of certificate and name/ designation of the certificate issuer for power plant/similar application industry. The time duration of Satisfactory performance completion should be before the date of subject Enquiry/NIT. AND The bidder has been awarded repeat contracts for Horizontal centrifugal pumps (other than the one for which the bidder has furnished the performance feedback above) from minimum one End customer (owner)/Purchaser for power plant/similar application industry. Repeat contract shall be considered when the second contract is given by the same purchaser/ owner after lapse of minimum 1 year from execution of first contract (viz. supply). Supporting documents for execution of the first contract like dispatch ^{N2} details or commissioning report or PG test report along with the PO Copy to be furnished, if bidder intends to submit the documents for Repeat Contracts. The date of repeat contract order should be before the date of subject Enquiry/NIT. Notes:- N1 - Purchase order copy, supporting drgs/technical data sheets etc. are to be submitted along with the bid for which the bidder intends to furnish the performance feedbacks / repeat contracts for reference purpose only. N2 - Dispatch details shall include any one of the following documents: 1. E-way bill. 2. Site receipt/Receipted LR. 3. Customer's material dispatch clearance certificate. N3 – Purchase order for spare items shall not be considered as repeat order qualifying criteria. Any additional document required in support of above documents to establish the co-relation between the above documents and the supplied item shall be provided by the bidder.
	3. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
	4. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
	5. After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.
	6. Consideration of offer shall be subject to customer's approval of bidders, if applicable.

EXPERIENCE LIST

PROJECT NAME	CUSTOMER	PUMP PARAMETERS			PUMP MODEL	NO. OF PUMPS	TYPE OF FLUID	YEAR OF CONTRACT EXECUTION/ SUPPLY	TYPE OF PUMP	PERFORMANE FEEDBACK CERTIFICATE ENCLOSED (Y/N)
		FLOW	TDH	(MWC)						



TECHNICAL SPECIFICATION
MISC. PUMPS (HORIZONTAL)
2X660 MW DVC RAGHUNATHPUR TPP PH II
(STG) & 2X660 MW DVC RAGHUNATHPUR
TPP PH II(SG)

PE-TS-390/528-100-W001

Rev. No. 00

Date : 25.09.2026

COMPLIANCE CERTIFICATE

1	It is hereby confirm that the complete technical specification has been read, understood. We confirm compliance to the tender specification including any pre-bid clarifications and amendments, without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked for in NIT shall be considered withdrawn.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date