

PROJECT
TENDER NO.
SUBJECT

: STEAM GENERATION PLANT AT TALCHER, ODISHA
: PNMM/PC-150/E-4003/NCB
: REPLY TO PRE-BID QUERIES : LOT 10 Dated 20.10.2020

Sl. No.	Reference of Tender Document			Bidder's Query	PDIL/TFL's Reply	
	Section No.	Page No.	Clause No.			Subject
1.	Prebid replies uploaded on 27.05.2020	Page no 5 of 42	38	Custody flow meters of various raw materials & utilities	Custody flowmeters are not envisaged inline with pre-bid replies. Reliable flow measurement instrumentation / devices vide flow element + Flow transmitter with inaccuracy level of 0.065% are considered for export steam to main plant, HP super heated steam for reheating, DM water, Instrument air and cooling water (inlet).	Custody flowmeters are not required. Flow measurement instrumentation / devices for all raw material, utilities etc. which are coming to the SGP (as input) & going out from the Boiler(as Output) including the streams whatever is required to be measured for PGTR shall be provided. The measuring instrument shall be well proven and reliable one.
2.	Prebid replies uploaded on 27.05.2020	Page no 6 of 42	46	2W+2S BFW pumps shall be provided. Common suction and common discharge header shall be considered all pumps. Further, provision (tapping point along with valve & blind flange) for the connection of 2 nos. additional BFW pumps to be kept by LSTK Contractor for future requirement.	2W+2S BFW pumps shall be provided. Common suction and common discharge header shall be sized for 2W boilers only.	Bidder to consider BFW pumping system for online change over of Boiler without sacrificing the net export quality & quantity of HP steam at any point of time.
3.	VI-5.3.1	8 of 75	5.2.2	Steam generators and auxiliaries (with 2W+1S configuration)	All headers, steam lines, cooling water lines, equipment, electrical cabling and equipment shall be sized and designed considering 2W boilers at any point of time.	Bidder to consider the online change over of Boiler without sacrificing the net export quality & quantity of HP steam at any point of time. Accordingly complete system including all headers, steam lines, cooling water lines, equipment, electrical cabling and equipment etc. shall be designed.
4.	Prebid replies uploaded on 27.05.2020	Page no 17 of 42	124	Motorised actuators shall be integral starter type.	Actuators which are application specific shall OEM integrated make and specification.	Bidder to comply the requirement already mentioned in Sl. No. 124 of Reply to Pre-bid Query Lot 1.
5.	Prebid replies uploaded on 27.05.2020	Page no 20 of 42	150	Particle size distribution shall be provided by customer during detail engineering	Since particle size distribution/sieve analysis is not available during bidding stage, scheme and capacities of crusher and screen considered shall be as per the details furnished in technical bid by the bidder. Diverter Gates feeding to SGP conveyors at Client's crusher house shall be in Client scope.	Diverter Gates shall be in SGP Bidder's scope. GA of Screening and Crushing building has already been provided in Prebid Query Reply Lot 4, in which dotted lines shows the SGP Bidder's scope.
6.	Prebid replies uploaded on 27.05.2020	Page no 20 of 42	152	As per IS:11592 and latest CEMA.	Belt conveyor Power and tension calculation shall be done as per CEMA 5.	Belt conveyor Power and tension calculation shall be done as per latest edition of CEMA or IS:11592.
7.	Prebid replies uploaded on 27.05.2020	Page no 21 of 42	156	All pulleys shall be lagged in herring-bone pattern.	As part of our technology, we will provide Diamond lagging (both way of herringbone) and plain lagging of 10mm thk for non drivepulleys.	Noted.

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8.	Prebid replies uploaded on 27.05.2020	Page no 22 of 42	167	Flow diagram for coal handling system which is in scope of LSTK vendor.	Since particle size distribution/sieve analysis is not available during bidding stage, scheme and capacities of crusher and screen considered shall be as per the details furnished in technical bid by the bidder.	Noted.
9.	Prebid replies uploaded on 27.05.2020	Page no 25 of 42	202,203,204, 205, 206	Indicative list wherein HVAC system are required : 1. Control room(s) 2. Sub -station(s) 3. Lab Tech Building(s) 4. Field Maintenance office(s) 5. Operator cabins 6. Lift machine rooms 7. Chemical storage shed 8. Feeder panel rooms 9. Other miscellaneous building , if any.	Common chiller based centralised air conditioning system is considered for Control room, switch gear room, VFD room located in electrical building with 1no common standby unit. Pressurised vetillation system is considered for Cable cellar, BFP area, compressor room located in electrical building with 1no common standby unit. Office space, labroom, SWAS room located in Electrical Room shall be provided with Packaged AC units/Split AC units with common standby units. Fresh air to AC room is provided by supply air unit with chemical filter suitable for G3 environment. Local control room & switchgear Room are provided with Packaged AC units/Split AC units with common standby units. Toilets, Machine rooms, Battery room and cable rooms for field MCC rooms are provided with exhaust ventilation	Bidder proposition seems to be inline with Design philosophy -HVAC enclosed with the NIT. Queries are related with clubbing of various buildings and providing Common facility for the same . Bidder to kindly note that no such deviation against DESIGN PHILOSOPHY -HVAC of NIT is accepted, However, clubbing of various buildings shall be finalised during detail engg. .
10.	Prebid replies uploaded on 27.05.2020	Page no 40 of 42	357	Vendor List	Request to include thyssenkrupp in vendor list for coal handling system, Lime Handling system, Crushers, Screen and other belt conveying equipment which are manufactured by thyssenkrupp.	As per NIT. Bidder to refer Pre-bid query reply Lot-8 dated 02.09.2020 (Sl. No.33) also.

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11.	Prebid replies Lot 3	Page no 13 of 68	88	This specification covers design basis and execution requirements for fire protection system as per statutory regulations NFPA codes. The design and construction of the fire etection and protection equipment shall be of internationally accepted standards and in compliance with the regulations of the Tariff Advisory Committee (TAC) and other relevant statutory requirements for steam generation plant of TFL.	Please note Tariff Advisory Committee (TAC) is no longer existing. Hence, Fire approval complete scope, of design approval and as built approval of FFS is being done by free lance LPA inspection agents for certification. The same shall be applicable in this project as well	As per NIT. It is to be noted that as per NIT, TAC guidelines are to be followed. However Bidder understands is ok.
12.	Prebid replies Lot 3	Page no 13 of 68	89	Control room (s): Central AC system with complete auxiliaries with 100% stand-by chillers & AHUs are required with chemical filters. Chemical Filters to be selected as Compliant to Ammonia-Urea Plant environmental condition.	Compliant to Ammonia-Urea Plant environmental condition, prevalent air quality is considered as per G3 classification.	Shall be discussed & finalised during detail engg. subject to submission of relevant documentation in this regard.
13.	Prebid replies Lot 3	Page no 15 of 68	115	Hazardous Area classification	Although all field Instruments shall be Zon -1 Gr.IIC T6 with IP-65 as min. with SS canopy. Bidder wish to clarify SGP is clasified as non-hazardous safe working area	Irrespective of area classification, All field Instruments shall be Zone-2 Gr.IIC T6 with IP-65 as min. with SS canopy.
14.	Prebid replies Lot 3	Page no 27 of 68	230	Air cooled bottom ash cooler consider for bed ash cooling with required bed ash cooler outlet gate and bypass chute for the bed ash coolers. .Bed ash cooler design capacity shall be selected suitably.	Bottom ash cooler could be air/water cooled based on proven CFBC technology of the bidder to meet the cap on aux power consumption of 8 MW	Bottom ash cooler shall be air/ water cooled type. Further, Bidder to ensure that while bottom ash draining from the boiler, the heat from ash is dually recovered and is not wasted as per good engineering practice. Amendment to Section-VI-4.0 shall be issued.
15.	Prebid replies Lot 4	Page no 9 of 10	47	The rated capacity of the bed ash conveying shall be based on 150 % margin over bed ash generation rate based on worst coal at BMCR condition.	Ash handling system and equipments shall be sized considering maximum 43.5% ash content in ROM Coal as design basis for SGP. In 43.5 % ash 10% shall be considered as bed ash and 90% as fly ash	As per NIT.
16.	Prebid replies Lot 4	Page no 4 of 10	25	Bidder shall decide capacity and number of air compressor as per system design requirement by considering 100% standby compressor	Compressors sized considering maximum 43.5% ash content in ROM Coal as design basis for SGP, number of compressors shall be N+1 standby.	Bidder shall decide capacity and number of air compressor as per system design requirement, considering 100% standby compressor.
17.	Prebid replies Lot 4	Page no 3 of 10	22	Bidder to develop flow scheme for Bed Material conveying and submit with bid. B) Bed material shall be conveyed pneumatically.	For our CFBC boilers bed materiak is required only for initial filling, no make up is required, required bed height is maintained by ash generated. Hence we	Bed material shall be conveyed pneumatically.

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					do not envisage any handling system for bed material. Initial filling shall be done by conveyors/hoist arrangement.	
18.	Prebid replies Lot 8	Page no 3 of 15	13	Particle size distribution for Lime shall be provided by customer during detail engineering	Since particle size distribution/sieve analysis is not available during bidding stage, scheme and capacities of crusher and screen considered shall be as per the details furnished in technical bid by the bidder.	Noted.
19.	Prebid replies Lot 8	Page no 4 of 15	14	Coal handling Capacity : Noted. Lime Handling Capacity to be considered by Bidder : 500TPH (Rated)/ 600 TPH (Design). In case of sizing of limestone crusher (bidder's scope), bidder shall use a surge hopper to store limestone with adequate capacity in upstream of crusher for minimize the capacity of limestone crusher.	If the same conveying system upstream SGP battery limits is capable to handle 500 TPH /600 TPH for lime conveying, please reconsider capacity of coal handling system for SGP scope. 500 TPH of coal is adequate for the boilers. Also capacity of surge hopper for limestone is considered as 1hr storage	Flow of Coal (-) 30 mm at outlet of CGP crusher house is 1000TPH (Rated)/ 1200 TPH (Design). SGP Bidder shall design downstream as per CGP crusher house outlet flow. Bidder shall use a surge hopper to store limestone with adequate capacity in upstream of crusher for minimize the capacity of limestone crusher.
20.				General	Please clarify, complete area marked for SGP in plant can be utilised by the bidder for given scope. There is no need to earmark any space for future scope/additions.	SGP indicated in Plot Plan (320 M x 240 M) shall be used for this SGP Package + future provision for 2 x 45 MW STG including boiler and all associated auxiliaries.
21.			API 611 5th edition Clause 1 (Scope)	They are generally used where steam conditions will not exceed a pressure of 48 bar and a temperature of 400 Deg C or where speed will not exceed 6000 r/min	API 611 shall be applied to the offered turbine even though the inlet pressure is 62 kg/cm ² g and temperature is 480 Deg C.	Steam Turbines as driver wherever applicable shall be compliant to API 611, However, API 612 Compliant Steam turbines are also acceptable. Latest codes & standards to be followed by the vendor.
22.			API 611 5th edition Clause 6.3.8.5		Holding down bolt spot face dia shall be 2 times the size of the hole since Parting plane width to be increased to provide spotfacediameter as 3 times but it will cause leakage in parting plane & it will shave off casing surface also.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
23.			API 611 5th edition Clause 6.9		All related calculations will be submitted during detailed Engineering. Torsional analysis of the complete train is not possible	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
24.			API 611 5th edition Clause 7.2.9		Coupling hub will be keyed to rotor shaft & hub will be bolted to coupling transmmision unit	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.

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25.			API 611 5th edition Clause 8.3.3.2	No load MRT will be at site or shop with reduced steam parameters available sufficient to run the turbine at full rated speed testing. 8.3.3.2, Steam Turbine shall be checked minimum for the following condition with available steam condition 1) 110% at Maximum continuous speed for 15 min 2) Overspeed Device shall be checked +/- 2% of the nominal trip setting are attained 3) Speed Governor and any other speed regulating device shall be tested for smooth performance over operating range 4) At Maximum continuous speed Equipment shall be run for 1 hour continuously.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.	
26.			General	Hydraulic Solenoid valves	For Hydraulic Solenoid valves where the power required is more than 3 W which means that Intrinsically safe cannot be offered. In such case we can offer Explosion proof Solenoid valve only.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
27.			General	3.21 of the ANSI/ISA-RP 12.6-1995	Please note that as per paragraph 3.21 of the ANSI/ISA-RP 12.6-1995, any device which will neither generate nor store more than 1.2 volts, 0.1 amps, 25 mW or 20 µJ as termed as Simple Apparatus. ANSI/ISA clearly states that simple devices (in our case RTD and Limit Switches) do not need to be approved as intrinsically safe. When these simple apparatus are connected to an approved intrinsically safe associated apparatus (barrier located in MMS/DCS), the circuit is considered intrinsically safe.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
28.			API 613 5th edition - Special Purpose Gearbox 2.7.4.5	Provision shall be made for mounting the following: 1 one event per revolution probe at input and output 2 axial probes at each thrust bearing 1 axial probe on any shaft without a thrust bearing 2 radial probes per radial bearing 2 accelerometers—1 input and 1 output on the coupling ends	Unless specified shafts having an axial float will not be equipped with axial position probes.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.

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29.			API 613 5th edition - Special Purpose Gearbox 4.3.2.1.2	All oil pressures, viscosities, and temperatures shall be at the operating values recommended in the manufacturer's operating instructions for the specific unit being tested. The overall oil flow rate to the gear unit shall be recorded.	The test bench is equipped with an ISO VG46 oil viscosity. The oil inlet temperature is adopted to simulate the contractual oil viscosity.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
30.			API 613 5th edition - Special Purpose Gearbox 4.3.2.1.6	The mechanical running tests shall be conducted with the contract half couplings mounted and the moment simulators attached, resulting in a moment equal to one-half of the contract coupling spacer. If the coupling halves are not available, or are not compatible with the vendor's shop equipment, the moment simulator must simulate the moment equal to the contract half coupling plus one-half of the coupling spacer.	For the mechanical run test, OEM will use its own test stand couplings with moment simulators,	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
31.			API 613 5th edition - Special Purpose Gearbox 4.4.1	Equipment shall be suitably prepared for the type of shipment specified, including blocking of rotor when necessary (such as when the gear unit does not contain thrust bearings). The preparation shall make the equipment suitable for 6 months of outdoor storage from the time of shipment, with no disassembly required before operation.	The equipment will be prepared for 6 months indoor storage	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
32.			API 670 5th edition (w.r.t gearbox) 6.1.9.1.2	Bearings whose length-to-diameter ratio is greater than 0.5 shall be provided with two axially collinear temperature sensors located in the lower half of the bearing, 30° (±10°) from the vertical centerline in the normal direction of rotation.	OEM standard practice is to mount both temperature sensors at loaded zones of the bearing.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
33.			API 670 5th edition (w.r.t gearbox) 6.2.1.4	In the standard configuration, all extension cables shall be protected in conduit.	All extension cables will be protected in liquid-tight flexible metallic (LFTM) conduit from the instrument head to the junction box mounted on the gear unit casing, unless noted otherwise in applicable proposal.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
34.			API 670 5th edition (w.r.t gearbox) 6.2.4.4	The leads from all temperature sensors shall: a) be oriented to minimize bending or movement during operation and maintenance; b) be secured to prevent cable whipping and chafing resulting from windage or oil without restricting pad movement;	Embedded temperature sensor leads will extend from the bearings to the Junction box mounted on the gear unit casing Embedded temperature sensor leads (or extension cable, where applicable) will be protected by liquid-tight flexible metallic (LFTM) conduit from the exit point on the gear housing	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.

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				c) unless otherwise specified, be free from connections inside the machine; d) utilize a terminal head outside the machine for all cable connections		
35.			API 670 5th edition (w.r.t gearbox) 11.2	Unless otherwise specified, the MPS vendor shall keep the following data available in electronic format for at least 10 years for examination by the purchaser or his/her representative upon request: a) purchase specifications for all major items on bills of materials, b) test and calibration data to verify that the requirements of the specification have been met.	Calibration curves for individual pieces of vibration instrumentation can be furnished upon specific request at no additional cost; however, calibration curves for vibration instrument sets consisting of the probe, cable and Proximitor together are an extra cost option and not furnished unless specifically purchased	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
36.			API 670 5th edition (w.r.t gearbox) 5.3.3	The junction box(s) should be located for ease of access and on the same side of the machinery train as the oscillator-demodulator junction box(s). The junction box(s) should not be mounted on the machine but in a vibration-free environment.	OEM's standard practice is to mount the junction box on the lower half of the Casing.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
37.			API 670 5th edition (w.r.t gearbox) 6.1.2.1	For monitored radial bearings, two radially oriented probes shall be provided. These two probes shall be: a) coplanar, 90° (±5°) apart and perpendicular to the shaft axis (±5°); b) located 45° (±5°) from each side of the vertical center;	Due to the physical dimensions of gear units, Probe cannot be normally mount plus or minus 45 deg from vertical axis on these units. However, with current monitoring technology, this constraint is generally not an issue.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
38.			API 670 5th edition (w.r.t gearbox) 6.2.1.1	All probes (except piston rod drop probes) shall be mounted in holders that permit adjustment and are retractable or removable while the machine is running.	All vibration probes permit adjustment and are retractable or removable while the machine is running. However, axial vibration probes protrude into cavity subject to oil splash; therefore, removal during equipment operations is not recommended.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
39.	PC150/E/4003/ SecVI-5.3.3- Design philosophy - Rotating Equipments		3.2.10	Bearing Isolators of reputed & established make shall be provided for equipment & its driver motor/ turbine & gear box.	Bearing isolators are not applicable for gearbox, as we are considering labyrinth type baffles, which is proven type for similar gearboxes.	Noted.
40.	PC150/E/4003/ SecVI-5.3.3- Design philosophy -		2.8	Inspection and testing guidelines-Rotating equipment: For Gear boxes all requisite test regarding material inspection viz. Radiography, UT,	Radiography is not applicable for gear casing and same is not considered. All other tests such as UT, PT and MPI will be performed.	Noted.

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	Rotating Equipments			PT, MPI to be conducted.		
41.	PC150/E/4003/ Sec VI-5.3.3- Design philosophy - Rotating Equipments		2.9	Mechanical run test along with Full speed/ Full or part load test , Full torque/ slow roll test, Sound level test to be performed and witnessed for gear boxes.	Only no-load full speed test for gearbox as per API 613 has been considered. No other additional tests are considered.	Shall be as per NIT.
42.			API 670 5th edition (w.r.t gearbox) 6.2.1.1		Gearbox temperature instrumentation philosophy : 1)SS Ex 'e' rated- Junction box mounted in Gearbox lower casing-01 no considered. 2) Duplex embedded type RTD's-12 nos per gearbox, will be terminated at local junction box. 3) SS Cable glands, conduits and LTFM conduits terminated between gearbox and Junction box. 4) Temperature transmitters and cabling from local Junction box to Control panel is NOT in OEM's scope of supply	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
43.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		LOS Design class as per API 614 Ch.3 is: CLASS II-P0-R1-H1-BP1for 10-TR- 2801	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
44.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		Lube Oil Pump- (Triple Screw type) API 676 3rd Ed having OEM standard Mech seal & NOT API 682.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
45.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		Oil Filter, Cooler shall be design as per ASME Sec VIII Div. 1 without 'U' stamp	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
46.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		Oil Cooler -Tube OD 5/8" x 1.24mm thk, TEMA C and AEW model in line with API 614 Ch. 3	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
47.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		Temperature control valve shall be 3- way thermostatic internal mixing type	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
48.			API 614 5th edition Chapter 1 & 3 - Lube Oil System		Pressure Control valve shall be self- actuated type & not pneumatic type.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
49.			API 614 5th edition Chapter 1 & 3 - Lube		Pressure Safety Valve shall be Conventional Spring-Loaded type &	As per applicable latest API Standard / OEM's proven design based on relevant

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				Oil System	NOT Modulating type as per API 614	latest API Standard.	
50.				API 614 5th edition Chapter 1 & 3 - Lube Oil System	Transmitters – Output 4-20 mA HART type. Foundation Field bus transmitters are not considered.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.	
51.				API 614 5th edition Chapter 1 & 3 - Lube Oil System	Offered Level Transmitter (LIT): DP type and Level Gauge (LG): Reflex type	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.	
52.				API 614 5th edition Chapter 1 & 3 - Lube Oil System	Winterization like Heat tracing, thermal insulation, cladding, Personnel Protection, heating enclosure for LO items are NOT applicable	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.	
53.				API 676 3rd edition - Positive Displacement pumps 6.3.2	The purchaser shall install a pressure-limiting valve(PLV) for each positive displacement pump. The PLV accumulation pressure shall not exceed the maximum allowable working pressure(MAWP) of the pump.	OEM provides Pump with LMRV, and LMRV accumulation pressure may be exceeds 10% of the set pressure	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
54.				API 676 3rd edition - Positive Displacement pumps 6.8.1.9	Rotors for twin screw pumps shall be dynamically balanced to ISO 1940-1 Grade G2.5	Rotors for Twin Screw Pump dynamically balanced as per ISO 1940-1 Grade G6.3 (instead of G2.5).	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
55.				API 676 3rd edition - Positive Displacement pumps 6.9.13	The seal chamber shall be provided with an internal or external vent to permit complete venting of the chamber before start-up	Not applicable, since Seal Chambers are subjected to Suction pressure	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
56.				API 676 3rd edition - Positive Displacement pumps 6.11.1	Measurement on Bearing Housing: Steady state vibration at any speed withinoperating range on test or in thefield Rolling Element Bearings: Vu < 3.8 mm/s RMS (0.15 in/s RMS) Where Vu is the unfiltered velocity and RMS is the root mean squared.	Vibration limit below 3.8 mm/s is acceptable only at site with rigid supports and pipe line and proper alignment of Base frame. On test benches below is the limit: Motor < 15 kW – 4.1 mm/sec Motor > 15 kW – 7.1 mm/sec	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
57.				API 676 3rd edition - Positive Displacement pumps 6.13.2.18	The minimum quality bolting material for pressure-retaining parts shall be carbon steel(such as ASTM A307, Grade B) for cast iron casings; and hightemperature alloy steel (such as ASTM A193, Grade B7) for steel casings. Carbon steel nuts (such as ASTM A194, Grade 2H) shall be used, except that casehardened carbon steel nuts (such as ASTM A563, Grade A) shall be used where spaceis	Bolting and nut material shall be as below: For pressure retaining part(Carbon Steel) bolt material: Allen Cap Screw: IS 1367 Cl. 12.9 ; Hex Bolt: IS 1367 Cl. 10.9; IS 1367 Cl. High temperature alloy steel bolt and carbon Steel nut are provided as per API standard.	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.

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				limited. For temperature below -29 oC (-20 oF), low-temperature bolting material (such as ASTM A320) shall be used.		
58.			API 676 3rd edition - Positive Displacement pumps 8.3.3.1	Oil system components downstream of the filters shall meet the cleanliness requirements of ISO 10438-3 before any test is started.	cleanliness requirement shall be as per ISO 4406 (26/24/17)- tested on test benches	As per applicable latest API Standard / OEM's proven design based on relevant latest API Standard.
59.	PC150/E/4003/ SecVI-5.4 Technical Specification Busduct : (PC150-TS-0807)	3 of 8	5.1.1	The sheet steel enclosure for enclosing and supporting the bus-bars shall be made out of 14 SWG sheet steel, bolted on the angle iron frame work.	Enclosure material is mentioned as sheet steel. We shall provide Aluminium Alloy enclosure for SPBD as this is type tested and validated design. Steel sheet enclosure is not recommended for current more than 1600A. Steel has a much lower conductivity than Aluminum. For higher current, steel enclosure will get hot spot temperature rise. At present, required current for 3.3kV busduct is 3000A. We don't recommend steel enclosure for this high current. Moreover, steel enclosure will be heavier than AL enclosure.	Noted.
60.	PC150/E/4003/ SecVI-5.4 Technical Specification Busduct : (PC150-TS-0807)	3 of 8	5.1.2	The enclosure shall completely enclose the bus bars from all sides. It shall have degree of protection IP: 52 for indoor installation and IP: 55 with rain protection canopy for outdoor installation as per IS/IEC:60947.	Degree of Protection of busduct shall be as per Appendix-F of IS: 8084 (An Indian standard for busduct). Please Confirm.	NIT condition prevails. Refer clause Nos. 9.1.2, 9.1.3 & 9.16.4 of Section VI-5.4 : Design Philosophy - Electrical. Also refer clause No. 2.5 of Section VI-5.4 : Design Philosophy - Electrical.
61.	PC150/E/4003/ SecVI-5.4 Technical Specification Busduct : (PC150-TS-0807)	4 of 8	5.2.3	The bus-bars material shall be high conductivity Aluminium alloy conforming to grade E91E of IS: 5082/electrolytic grade copper.	Busbars material shall be Aluminium Alloy grade 63401 as per IS (91E as per BS). Please confirm.	NIT condition prevails. The bus bars and connection shall be made of electrolytic grade copper only. Refer clause No. 9.6.1 of Section VI-5.4 : Design Philosophy - Electrical. Also refer clause 2.5 of Section VI-5.4 : Design Philosophy - Electrical.