

उत्पाद मानक

STEAM TURBINE ENGINEERING PRODUCT STANDARD

ST38013 पुष्ट 10 का 1 Page 1

of

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SCPERSEDES ENVENTORY NO

सामन्नी सूची सन्द्या जी ाने कमित करता है

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इस प्रजेष में दी नहें सुबन्ध भारत हेती इजिपिट्टिन्डास की सम्पोद्ध है इसका प्रवक्त एव अप्रत्यक्ष रूप सं किसी मी सरस प्रयाग जो कि क्षंप्रती के हितम झामेकारक हो भ किया स्वत्वाधिकार एवं गोपनीय

S HIN & DATE 12/2/0 ारताहर एव 20 INVENTORY NO सामग्री सूची संस्था

TECHNICAL DELIVERY CONDITIONS AND GENERAL FEATURES FOR PUMP INCLUDING SPECIFIC REQUIREMENT OF QUALITY

DESIGN AND CONTRUCTION OF PUMP 1.0

- 1.1 All materials used in the construction of the pump shall be selected from the range of material most appropriately suitable for the purpose & service conditions. The bidder shall furnish along with bid, the material specification for all the components to BHEL for review and acceptance by BHEL / owner. BHEL / owner reserve the right to ask for change in material. The size shall be standardized so as to ensure interchangeability.
- 1.2 The mater and construction of the pumps shall be such as to resist corrosion and erosion & shall give a long trouble free service.
- 1.3 The supplier shall also furnish the method and frequency of lubrication of the bearings and quantity & type of lubricant required for normal operation but lubrication of bearings with the oil being handled is preferred.
- 1.4 The design shall be such as to keep the friction loss and wear caused by end thrust, wear in mechanical seals and bearings & cavitation to the minimum. It should ensure long and trouble free service. The rotor of the pump should be balanced dynamically so that the vibration is minimum. The sound pressure level of pump motor set should not be more than 85 dba when measured at a distance 1.5 m above floor and 1.0m horizontally from equipment base plate.
- 1.5 Seals must comply with the following properties:
 - (a) Ready access and amenability for maintenance work.
 - (b) No contamination of the medium from material abraded from the seals.
 - (c) No seepage of lubricants into the flow medium.
 - (d) Minimum leakage losses with their positive removal.
- 1.6 At suitable points on the components crection eyes or lifting hooks shall be fitted for transport and erection. Their locations must be shown on the dimensional drawings.
- Pump bearings shall be designed so as to ensure 30,000 hrs. continuous service.
- The mechanical design shall allow easy access to parts for maintenance work to be carried out. 1.8 Screw and nuts must be locked to prevent loosening.

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U	सहमत विभाग AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्ववेक्षणकर्ता SUPERVISED BY	S.C.AGRAWAL	Surfacelle
1				स्रीकृति : APPROVED : APPROVED :	(A.K.JAIN) AGM	CLAS AG GRNG
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दिनांक एवं हस्ताक्षर SIGN & DATE	मी एवं ड एवं	STEAM TURBINE ENGINEERING PRODUCT STANDARD	पृष्ठ Page	10 2	का of	2 10							
SUPERSEDES INVENTORY NO.	1.9	The discharge branch of the pump shall be taken out above the base pl	late by the	e suppl	ier.								
SUP	1.10	The pumps shall be provided with drainage and venting devices.											
सामग्री सूची संख्या को अधिकमित करता है	1.11	All pump parts conveying oil shall be of oil tight construction. Comprare not permissible.	ession ty _l	pe fittii	ngs								
<u> </u>	4	Pump running at subscritical speeds, it shall be ensured that the critical speed lies above the maximum speed attainable during operation with a minimum margin of 15% of rated speed. For pump running at supercritical speeds, it shall be ensured that there is a difference of sufficient magnitude. The margin between the bordering critical speeds and pump rated speed shall be at least 20% of the rated speed. The type of coupling between pump & drive											
AND CONFIDENTIAL ents is the property of Bharat Heavy city or indirectly in any way detriment of the company	1.13	unit is to be taken into account while calculating the critical speeds for bending forces. Seals are to be designed such that they can be removed and reinstalled several times with out effecting the sealing quality.											
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bhazat Heavy Electrical Limited It must not be used directly or indirectly in any way detrimental to the interest of the company		COUPLING Coupling shall be preferably pin bush or jaw type. Suitable coupling with guards shall be provided for coupling pump with motor and shall be designed to facilitate easy alignment. One set of coupling pins/ bolts shall be supplied in spare. Coupling shall be preferably outside the pump base plate (towards motor side).											
_ _ &	,	FOUNDATION The pumps shall be mounted in the oil tank and hung from base plate a the tank. For further details please refer the drawing No. attached here 001). All the seating machined surfaces of the base plate to be maintainflatness.	with (ST)	E-ÎL-	to								
स्वत्याधिकार एवं गोपनीय हिना सरत हेवी इसेक्ट्रिकल्स की सम्यत्ति है इसका तरह प्रयोग, जो कि कपनी के हेत में हानिकारक हो		SPECIAL TOOL & TACKLES One set of tools required for erection, operation and maintenance of the pumping sets shall be supplied together with each pump. List of these tools shall be submitted along with the offer.											
स्वत्याचिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इसिक्टिकल्स की सम्पत्ति है इसका प्रत्यप्त एव अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हेत में हानिकारक हो न किया जा	2.1	<u>OUALITY ASSURANCE, INSPECTION AND TESTING</u> The manufacturer shall conduct all tests required to ensure all the component parts of the pump offered conform to the requirements of the specification and is in compliance with the requirements of applicable codes and standards.											
SIGN & DATE FOR STATE STATE	2.2 T	The bidder shall submit alongwith his offer quality plan in the enclosed with clause 2.0	format a	nd in li	ine								
शामग्री सूची संख्या INVENTORY NO S SS39	REV. NO. 6 7	निर्माणकर्ता H.GUPT WORKED BY	A WY	m H	1								
WII Q		जांचकर्ता CHECKED BY ANUJ JA	TIM M	سَّج[S]»	1								

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SUPERSEDES INVENTORY	S	The particulars of the proposed shop submitted to BHEL / its customer for	approval along with	quality plan.								
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited.If must not be used directly or indirectly in any way detrimental to the interest of the company	2.4 The equipment shall be dispatched only after inspection and clearance of material by BHEL/its customer and approval of test certificates by BHEL/its customer. 2.5 The minimum tests/ checks to be carried out on the pump as envisaged by BHEL are given below. This is however not intended to form a comprehensive testing programme as it is suppliers responsibility to prepare the detailed quality plan, which should also include tests, checks carried out by supplier as a part of their normal practice. This quality plan is subject to the approval of BHEL/its customer. BHEL/its customer reserves the right to ask for any more checks at the time of quality plan finalisation. 2.5.1 Testing of Materials The material of each component shall be tested as per relevant specification for its chemical composition and mechanical properties viz. YS, Impact, %age elongation % RA etc. Suitable NDT to ensure freedom from surface and subsurface defects shall be carried out.											
हरतामर एवं दिनांक एसटेन्यायिकार एवं गीपनीय CO SIGN & DATE हस प्रतेष में भी गई सूचना भारत हेबी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं Eleani अप्रत्यक्ष क्षण संक्रियों भी सरह क्यांग जो कि कंपनी के हित में हानिकारक हो न किया जार ।		Check for dimensions of all the co and radial run out of shaft etc. Non destructive examination DPT of discharge pipe, ultrasonic test of Dynamic balancing of the rotor as equivalent. Pump casing and discharge pipe sh times the working pressure or 1.5.7 Pump impeller shall be subjected to surface defect examination. The pressure test shall be carried of shall be 30 minutes. The testing the presence of BHEL's / custon Performance test shall be carried of tested with its motor only. Howeve carried out with test bed motor. Per characteristics e.g. discharge Vs prinoise level etc.	mponent parts includ MPI on machined so n shaft (≥50mm) to b per ISO 1940 (Gr, 2.5) nall be subjected to hy times the pump shut- to suitable NDT metho but with original bolts should be carried out her representative. ut with respective uni r, in case of D.C. mot formance test shall in	ing surface finish, arfaces of casing a be carried out. To or VDI 2060 or a draulic pressure to off head whicheve od like MPI/ DPT. Duration of hydrat manufacturer's to motor i.e. each particulate verification of clude verification.	axial and weld est at 2 or higher for aulic test works in bump sha the test m. of pump	t n ill be ay be						
HIPTI RESIL INVENTORY NO.	REV. NO. 07		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	H.GUPTA ANUJ JAIN	Jan.	3/2 S/2						

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ब्न SJ											DARD			Page	4	of	10
सामग्री पूनी संख्या SUPERSEDES को आध्वतमित करता INVENTORY NO.			BHE	EL/custo) Strip	omer.1	The ch	naracto ninatio	teristics on to c	s have	to be	4 class III of certified by dition of be	BHEL/cı	usto	mer repr	esentati	ive.	
सामग्र को आहे			(g	;) Chec	k the o	condit	tion of	of the o	il seal	s and a	ıny seepage	of oil thr	oug	gh the sea	als.		
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited It must not be used directly on indirectly in any way definitenial to the	mpany	2.5.3	and c a suit comp shoul	conserv table pr ponents	red. Al riming s of pur ufficier	ll meta coat a mp as ntly st	allic s and the one u	surface hen two unit an to safe	es exce o coat: nd pack eguard	pt brig s of ap c in wa	rnals shall be tht parts experoved pair atter and dus st any dama	oosed to vots. Ensur t proof pa	weat e as acka	ther shall ssembly o age. The	be give of all the package	e es	
COPYRIGHT AND CC matton on this documents is the pro	interest of the cor	2.5.4 2.5.5 2.5.6	hydra Blue O&l	aulic te e match M Man	st, per ling redual.	forma quirer	ince te ment l	est, stri betwee	rip dow en tank	vn exai c top ai	terial testing mination etcount of the mination etco	shall be se plate s	fui hall	rnished.			
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इसका प्रत्यक्ष पृव	रक हो न किया जाए	3.2		culation uiremen		neces	ssary (drawin	ngs (To	orque /	speed char	acteristic	s et	c.) power	r		
पनीय शिसम्पति है	त में हानिका	3.3	All	weldin	g shall	l be ca	arried	by qua	alified	welde	er as per AS	ME sec.I	X.				
स्वत्त्वाधिकार एवं गोपनीय इस प्रतेख में दी गई सूचना भरत हैवी इलीहरूकता की सन्यति है इपका प्रत्यक्ष एव	लप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जा। 1	3.4	mar doc	nufactu	ring ar shall	nd his form	subce	ontract	tors, o	f their	BHEL sha responsibil To changes	ities. The	app	oroval	t		į
हरता अर इस प्रलेख में दी गई ए	क्रिअप्रव्यक्ष रूप से किसी मी। 51 भा।	3.5	Qual docu	lity plan uments	n, deta standa	uiling o ards, a	out va	arious s ance le	stages evels, i	of mai	nufacturer a	along with ent raised	n re	levant			
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दिनांक एवं हरताक्षर SIGN & DATE	BH		STEAM TURBINE ENGINEERING			का	5
		PRODUCT	STANDARD	Page	5	of	10
SUPERSEDES INVENTORY NO.	4.0	DOCUMENTS TO BE SUPPLIED AF	TER THE PLACEM	ENT OF ORD	<u>ER</u>		
SUPER	4.1	These shall be supplied in 10 copies each Contractual drawings	or two copies and a s : 8 weeks	et of reproducib	le.		
सामग्री सूची संख्या को अधिकमित करता	4.2	Overhaul and spare parts lists	: 8 weeks				
सामग्री विकासिक	4.3	Equipment description					
ncal o the	4.4	O & M manual (10 hard copy + 2CD)	:12 weeks				
LAL eavy Elect trimental t	4.5	Record of test on noise levels before disp	oatch				
DENT] fBharat H iny way de	4.6	Record of test to DIN 1944-III or equiva	lent : Before disp	oatch or equivale	ent.		
CONFIDENTIA) property of Bharat Heavy directly in any way detrin company	4.7	List of tools and tackles	: 8 weeks				
HT AND (cuments is the 1 directly or ind interest of the	4.8	The static/ dynamic loading details on support/ foundation should be furnished	: 8 weeks				
COPYRIGHT maxion on this docum must not be used dire inter	5.0	NAME PLATE IDENTIFICATION M	IARKING SHOULD	BE AS FOLLO)WS		
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bhara Heavy Electrical Limited It must not be used directly or indirectly in any way detrimental to the interest of the company		The rating plate is to be made of X12 or Hindi and English both.	Ni188 and plates shou	ld be provided i	n		
	5.1	Type/ Designation.					
स्त्यक्ष एवं क्रियाः जाए	5.2	Manufacturer.					
त हैं इसका प्र कारक हो न	5.3	Manufacturer's works No.					
गोपनीय स की सम्पति हिंदि में हानि	5.4	Year of manufacturing.					
जार एवं । इलेक्ट्रिकल कि कंपनी के	5.5	Purchaser's order No.					
गत्ताधिर ना भारत हेर्व इ प्रयोग, जो	5.6	Volumetric flow (1/m)					
स्वत्याधिकार एवं गोपनीय क्षी गई सूचना मारत होधे इलेक्ट्रिकल्स की सम्बित केसी मी तरह प्रयोग, जो कि कंपनी के हित में हारि	5.6 5.7	Volumetric flow (1/m) Discharge pressure (Bar/MWC)					
स्वत्याधिर इस प्रलेख में दी गई सूचना भारत हेर्ब यक्ष रूप से किसी मी तरह प्रयोग, जो							
इस प्रलेख में दी गई फू अप्रत्यक्ष रूप से किसी मी त	5.7	Discharge pressure (Bar/MWC)					
स्वत्याधिय SIGN & इस प्रलेख में दी गई सूचना भारत होर्द डाउना, जो	5.7 5.8 5.9	Discharge pressure (Bar/MWC) Operating temp (In degree C)					
दिनांक & 	5.7 5.8 5.9	Discharge pressure (Bar/MWC) Operating temp (In degree C) Flow medium. Speed.	निर्माणकर्ता WORKED BY	H.GUPTA	ight?	131	7111

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दिनांक एवं हस्ताक्षर SIGN & DATE	HHH	STEAM TURBINE ENGI	NEERING		पृष्ठ	10	का	6
ि Si		PRODUCT STAND	Page	attings. The ified and to d precise protection, ill not be tected for life torage of andling and d be a list convert manual. In do not effect early spelt out, we same along and information ipment for a of 18 months per the tested sentative ed the ewithin a depute his natative shall guarantee	10			
सामग्री सूत्री संख्या SUPERSEDES को आधिकृतित करता INVENTORY NO.	The protect previous detains which easi	EANING & PAINTING, CONSERVATION e surface shall be thoroughly cleaned of all mill tective coating should be oil resistant to prever went the deterioration of the coating itself. The ails about the measures envisaged by him for it ch shall be checked & approved by BHEL/Overly accessible after the shop assembly shall be the equipment.	I scales, oxide at contamination supplier shall atternal and exioner. All surfatore hand be treated as a scale of the surfatore hand be treated as a scale of the	and other on of oil sp give exact ternal surfances, which eated and p	pecified and prescriptor and protected will no protected	and to ecise ection, t be d for li		
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited It must not be used directly or indirectly in any way detrimental to the interest of the company	pack Constor 6.1 In tomer 6.2 O& 6.3 A conto a 6.4 Loo 7.0 GEN The the Sup with call	ructions should be issued regarding reconserval kage. attractor shall be responsible for all loss or dam age due to improper packing. the packing list, dispatchable unit, BHEL P.O.n attioned. EM manual should be mentioned in the packing check list should be prepared with a column for an erection/commissioning reports. This check ck washers shall be supply with all fasteners NERAL tenderer can make suitable offers even if there efficient functioning of the equipment. Howev plier shall also fill in the blank data sheet as per the offer. The offer may not be considered if ed for in the specifications are not submitted a UARANTEE	age during transumber, Project glist. If tick marking list should be placed are minor dependent of the deviation of the technical ong with the contract of the deviation of the technical ong with the contract of the deviation of the technical o	nsportation et name sho , so that ch part of O& viations whom smust be and submit al particular	n, handli buld be neck list &M man hich do e clearly t the san ars and	convenual. not efformer alor inform	rt Fect out. ng nation	
सिक्षर एवं गीपनीय विनांक इस प्रलेख में वी गई सुम्मा भारत होये इसीव्युक्त्य की सम्पत्ति है इसका प्रत्यक्ष एवं अग्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जार ।	7.2 The char from 7.3 If displayed to slight t	e supplier shall guarantee trouble free and satistic riod of 12 months after the installation and comment the day the equipment leaves the supplier's esupplier shall guarantee the capacity, head an acteristics with oil. uring erection at site any deficiency in a part is shall prepare the assessment report and a copy of plier. The supplier shall replace/ rectify the corest time after receipt of assessment report. The sesentatives to site at his own cost otherwise the inal and binding on the supplier of pumping set as supplier shall repair/replace the defective part od. ARES supplier shall quote item wise price of recommentation respectively.	nmissioning of works. d efficiency of a detected, BH of the same shacerned items supplier if he see findings of Fet.	f the pump EL site repall be forw free of chase desire, no BHEL repressed during	as per the presentation as the sentation as the guar	he test tive ne nin a ute his ve shal	hs ed	
सामग्री सूथी संख्या INVENTORY	REV. NO. 07		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	H.GUPTA	· We	Jan Jan	5\2	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

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साम्यो कुमे राज्यः - SEPTASTDES अ ्काञ्चासा जनसः - INVENTORY NO		ANNEXUI DATA TO BE FURN ALONG WITH BI	ISHED BY BII D FOR OIL PU				
선배도와 	1.0	EQUIPMENT AND SERVICE OFFI					
	$\frac{1}{i}$	specified in the	data sh	eet			
A.I. avy Edeem mneural to	1.1	Pump as per specification	Yes/ No				
Hateur H	1.2	Motor / Make	Ycs/ No				
COPYRIGHT AND CONTIDENTIAL. The information on this documents is the preperty of Bland Heavy Electrical camiled It must not be used directly or indirectly in any way, dominated to the united It must not be used directly or indirectly in any way, dominated to the united It must not be used as a present of the company.	1.3	Necessary instruments. Test connections	Ycs/ No				
HT AN ocuments addinactly unterest	1.4	Base plate as per drg.	Yes/ No			4	
PYRIC morthis d	1.5	Companion flanges	Yes/ No				
CO information	1.6	Spare parts	Yes/ No				
	1.7	Maintenance and special erection tools	Yes/ No				
प्रश्नेक्षास्य	1.8	Commissioning of the set	Yes/ No				
न विग्नेहें इसका नेवारकावे	2.0	DESIGN AND PERFORMANCE					
गोपनीय ना १ समा ाध्यम् सा	2.1	Rated capacity of each pump.	M³/hr				
स्वत्याप्तिकार एट सम्मानकोऽत्राक्षः १३,४४० चार व्यक्त	2.2	Discharge head at rated capacity.					
स्वत्वाधि सम्बद्धाः सम्बद्धाः	2.3	Maximum discharge.					
स्टब्स्विकार् एटं न्येपनीय इसप्रमधने से 18 सुनम्मताको इसम्यन्त नार्थ सम्पत्ति हेडसम्बद्धारात्रात् इप्रमधन्ते से 18सी मोस्स्यात्रात्ति कार्यन सामेनासक विमाज्या वाए।	2.4	Minimum discharge pressure corresponding to maximum flow.					
School of the sc							
INVENTORY - STS 3	REV. NO. 07		निर्माणकर्ता WORKED BY	D.PAL	Dlal	121	06/06
HANIL S. S. A.			आधकर्ता CHECKED BY	A. JAIN	Djavi	121	16/06

SIGN &		उत्पाद मान			S	Т38	013	
বেশাল ঘ্য সংধায়ক Sic DATE	ElffE	STEAM TURBINE ENG PRODUCT STAN	INEERIN	G	पृष्ठ Page	10 8	का of	8
वास्ती मुद्री वंज्या SCPEKSFTES का अपेलमच करवा NVENTORA NO	2.5 2.6 2.6 2.7	Shut off head Performance guarantee when installed as per given arrangement. Pump B.H.P./KW at rated capacity. Maximum allowable suction lift	Y	es/No				
COPYRIGHT AND CONFIDENTIAL The uncomainer on this documents is the property of Bharat Heavy Flortical Lumbed It must not be used directly or indirectly in any way definitional to the interest of the company	2.9 3.0 3.1 3.2 3.3 3.4 3.5	(for minimum NPSH REQUIRED). Efficiency. MATERIAL OF CONSTRUCTION Casing. Impeller. Base plate. Wearing rings Shaft						
स्वत्त्वाधिकार एवं गीपनीय इस प्रजन्म काह मुजनामस्य हेवा हुआकृतस्य जेतासम्भारत हैइसके प्रजन्म का प्रजन्म का कि कामकोत्र इमस्य १५ केवी में वास प्रयोग का कि कामी का कितास मोजन है। नाजमा जार व	3.6 3.7 3.8 4.0 4.1 4.2 5.0 5.1	Stuffing box. Packing. Mechanical seal. CONNECTION Suction size. Discharge size. DRAWINGS General arrangement and sectional drawings enclosed with offer.	Yes/No					
619-31 Accepted to 18-13 Accepted to 18-13	REV. NO. O.7		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	D.PAL A. JAIN	Gp	Quel.	1	ob\oL 106

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अं अधिकृषित दुन्या INVENTORY NO	6.0 6.1 6.2 6.3	WEIGHT SCHEDULE Weight of pump. Weight of motor. Weight of pump with motor and base frame					
CCOT TRUCTOR AMALL CCUNT ILLEN LIAD. The information on this decimients is the property of Blurat Heavy Electrical Lamited It must not be used disactly or indirectly in any way deminented to the innerest of the company.	7.0 7.1 7.2 7.3 8.0 9.0 10.0	CHARACTERISTIC CURVES Power consumption / discharge flow. Discharge quantity / Pressure. Discharge / efficiency. Any deviation taken against specification Deviation taken as mentioned here. CONSTRUCTION FEATURES Type of pumps.	s Yes/I	No			•
रकापानकार एक पास्ता मारा होते इलेक्ट्रिक्त को सम्प्रता है इस प्राप्त आप । इस प्रत्य का से किसी मी तरह प्रयोग ना कि काची है होते में शामित कर तो न किसा आए। अस्तिकार का से किसी मी तरह प्रयोग ना कि काची होते में शामित स्थान कर तो न किसा आए।	10.2 10.3 10.4 10.5 10.6 10.7	No. of stages. Type of impeller Type of stuffing box sealing offerred. Type of coupling offered. Type of bearing and lubriction. Impeller diameter. Cross referred Standards: Nil					
ST-39 Halio	REV. NO. 07		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	D.PAL A. JAIN	Afan.		16 0

