ST38013 भी एम डे एल उत्पाद मानक पुष्ट 10 STEAM TURBINE ENGINEERING PRODUCT STANDARD Page SUPERSEDES INVENTORY NO TECHNICAL DELIVERY CONDITIONS AND GENERAL FEATURES FOR PUMP INCLUDING SPECIFIC REQUIREMENT OF QUALITY **DESIGN AND CONTRUCTION OF PUMP** 1.0 म्मोकमित करता है सामक्री सूची सञ्ज्या 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 COPYRIGHT AND CONTIDENTIAL. The information on this describents is the property of Blinian Heavy Electron Limited It must now be used treated; an institute in any way definitential to the inferst of the company. standardized so as to ensure interchangeability. The material of construction of the pumps shall be such as to resist corrosion and erosion & 1.2 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. Seals must comply with the following properties: 1.5 इस प्रजेष में तो गई सूतमा भारत होयां इजेतिष्ट्रायत्स्त की सम्पारंत है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से विश्वी भी तरस प्रयांग, जो कि कंपनी के हित में झानेकारक हो भ किया (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. गोपनीय (d) Minimum leakage losses with their positive removal. स्वत्वाधिकार एवं 1.6 At suitable points on the components crection eyes or lifting hooks shall be fitted for transport and crection. Their locations must be shown on the dimensional drawings. 1.7 Pump bearings shall be designed so as to ensure 30,000 hrs. continuous service. 1.8 The mechanical design shall allow easy access to parts for maintenance work to be carried out. Screw and nuts must be locked to prevent loosening.

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REV.NO. 04

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SIGNATURE & DATE

21.08.06

DATE

31-08-1984

NAME

DHARAMPAL

S.C.AGRAWAL

(A.K.JAIN) AGM

TSX

ANUJ JAIN

SSUED:

TRANSLATED BY

WORKED BY

CHECKED BY

PREPARED STE (TL/TA)

पर्यवेक्षणकर्ता SUPERVISED BY

निर्माणकता

जाचकर्ता

स्वीकति

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DATE & SIGNATURE

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Rha e SIGN &		STEAM TURBINE ENGINEERING PRODUCT STANDARD Page 2 of 10											
SUPERSEDES INVENTORY NO	1.9	The discharge branch of the pump shall be taken out above the base plate by the supplier. The pumps shall be provided with drainage and venting devices.											
सामग्री सूची सन्धा का अधिकमित तहरता है	1.11	All pump parts conveying oil shall be of oil tight construction. Compression type fittings are not permissible. Pump running at subscritical speeds, it shall be ensured that the critical speed lies above											
COPYRIGHT AND CONFIDENTIAL The unformation on this documents is the property of Blanta Heavy Electronal Lumited It must not be used directly or indirectly in any way detrimental to the interest of the company	1.13	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 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. COUPLING 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.											
स्वत्ताधिकार एवं गोपनीय इस प्रकेष में दी गई सुबना भारत हेवा इनोक्ट्रिकेस का समादेत है इसका क्रायक एव स्रायक्ष रूप से किसी मी तरह प्रयोग जो कि कम्मी के हित में झांचेकारक हो न किया जाए।	1.40	The pumps shall be mounted in the oil tank and hung from base plate at the tank top into the tank. For further details please refer the drawing No. attached herewith (STE-TL-001). All the seating machined surfaces of the base plate to be maintained for 0.5 mm flatness. 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.											
अरशक्ष प्रमाधनात्र इस प्रजेशन में अर्थ क्षा के में अर्थ क्षा के में	2.0 2.1	QUALITY ASSURANCE, INSPECTION AND TESTING 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. The bidder shall submit along with his offer quality plan in the enclosed format and in line with clause 2.0											
समय्री प्रत्म गञ्जा INVENTORY NO P-55339	REV. NO. 04	निर्माणकर्ता WORKED BY OTTERPORT CHECKED BY ANUJ JAIN Jan 16/06/06											

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समग्री धूरी संन्या SUPERSEDES को आयेकमित करता INVENTORV	2.4	The particulars of the proposed shop submitted to BHEL / its customer for The equipment shall be dispatched of BHEL/ its customer and approval of the state of th	approval along with	quality plan. nd clearance of ma		
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	given less suppressed checks the appressed control of the control	The minimum tests/ checks to be car below. This is however not intended to below. This is however not intended to below. This is however not intended to be a part of the carried out by supplier as a part of the proval of BHEL/ its customer. BHEL thecks at the time of quality plan final fresting of Materials The material of each component shall themical composition and mechanical them are carried out.	to form a comprehens ailed quality plan, where normal practice. It is customer reserved lisation. be tested as per relevel properties viz. YS, I	ive testing program ich should also ince This quality plan is sethe right to ask for ant specification for impact, %age elor	nme as it clude tests subject to or any	s,
ICN & DAFE इस प्रज्ञ म की गढ़ कुरना भारत हैती इसे होने हुन मो पनी य इस प्रज्ञ म की गढ़ कुरना भारत हैती इसे होने हुन में होने होने होने होने होने होने होने होने	2.5.2 F (a) (b) (c) (d)	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 th Pump impeller shall be subjected the surface defect examination. The pressure test shall be carried of shall be 30 minutes. The testing the presence of BHEL's / custon Performance test with one of the co in case of D.C. motor the performate Performance test shall include veri	mponent parts including / MPI on machined such shaft (≥50mm) to be per ISO 1940 (Gr.6.3) all be subjected to hytimes the pump shut-oo suitable NDT method with original bolts, should be carried out their representative, ontract motor (A.C.) sance test may be carried fication of pump charmans and the should be carried out the sho	ing surface finish, a arfaces of casing ar be carried out.) or VDI 2060 or. draulic pressure tentify head whichever od like MPI/ DPT of Duration of hydra at manufacturer's whall be carried out.	axial	,
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सम्प्रमास्त्री अपन्ता SUPERSEIDES का क्रमोक्रमात करता INVENTORY NO			(f)	of BHEL represent Strip dow	/ customer ative. /n examina	The character to c	aracteristics	DIN1944 class have to be condition of be	ertified by	BHEL/ cu	stomer		
	Latined If must not be used directly or indirectly in any way deirmental to the interest. of the company	2.5.4	and give all the pack is sa Test balan furmi	r testing the conserved. In a suitable the componer tages should fe for two years the conference of th	e pump, al All metall priming c ents of pun d be suffic rears in a v indicating aulic test,	I the surface oat and to p as one iently streamy yery daming the test performa	aces and in es except be hen two co cunit and poong to safe p atmospher results of nance test, str	any scepage ternals shall be right parts ex- ats of approv- ack in water a guard against re. naterial testin rip down exam	be thorough posed to well paints. It and dust protest any dama	nly cleaned eather shal Ensure asse oof packag ge during t	l, dried l be embly o ge. The ransit a		
स्वत्ताधिकार एवं गोयनीय इस प्रतेष में वी गई सुधना मासा हेब ४ तक करणात है इसका प्रवस एव	रूप से किसी में स्वत प्रताम् आधार कराये के हिंदा में शिक्षिकार के प्रक्रियों आपूर्	3.1 3.2 3.3 3.4	Calc requ All v Examman docu	ils and crossulation with irement. volding shaping an of the properties of the prop	h necessar Il be carrie the pre-ap and his sul	drawinged by quaproval decontract	ment along gs (Torque alified weld becuments boors, of their	er as per ASI y BHEL shall responsibility No changes s	nd dynamic acteristics of ME sec.IX. I not releas ties. The ar	cal loading tc.) power te the proval			
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			PRODUCT STA	NDARD	,	Page	5	of 	10
SCPERSTORY NO	4.0	DOG	CUMENTS TO BE SUPPLIED AFTER	THE PLACEM	1ENT O	F ORDE	<u>R</u>		
सम्प्री वृत्ता संज्या का कारकामेत वस्ता	4.1		e shall be supplied in 10 copies each or tw ractual drawings	vo copies and a s	et of repr	oducible			
राप्तमधी। उस उत्तरकार	4.2	Over	haul and spare parts lists	8 weeks					
ical the	4.3	Equip	oment description	8 weeks					
AL, savy Electr trimental to	4.4	0 &	M manual (10 hard copy + 2CD)	:12 weeks					
DENTI	4.5	Reco	rd of test on noise levels before dispatch						
CONFIDENTIAL property of Blanca Heavy detrimes a company	4.6	Rece	rd of test to DIN 1944-III or equivalent	: Before disp	oatch or e	quivalen	t.		
AND (rents is the settly or ind est of the	4.7	List	of tools and tackles	: 8 weeks					
COPYRIGHT AND CONFIDENTIAL. The information, or this documents is the property of Blanci Heavy Electrical amitted It must not be used directly or indirectly in any way derimental to the information of the company.	4.3		static/ dynamic loading details on ort/ foundation should be furnished	: 8 weeks					
COF	5.0	NAM	E PLATE IDENTIFICATION MARK	ING SHOULD	BE AS F	OLLOV	VS		
The u			ating plate is to be made of X12 or Ni186 and English both.	3 and plates shou	ld be pro	vided in			
त्रीहः संस्कृति स्थान	•	5.1	Type/ Designation.						
12 5880의 및 레보다 램 리		5.2	Manufacturer.						
ोपनीय ग्रह्म सम्ब		5.3	Manufacturer's works No.						
ग्र एवं न इजित्तिहरू इजित्तिहरू		5.4	Year of manufacturing.					٠	
स्वत्वाधिकार एवं गोपनीय इसप्रमेभ में या गई शुरुन मारत हती इसमिक अधि है इसमा अ सब रूप से छिसी मी वसस्यमार जो कि कपनी के मेंसम आमेजारक हो न		5.5	Purchaser's order No.						
रूप स्थानाइ शुख क्रियो मां तर		5.6	Volumetric flow (1/m)						
स्वत्याधिकार एवं गोपनीय इस प्रकेष में या व्यापना मरत हवा इसिक्ट्रेक्स की तम्बेता हे इसका प्रत्यक्ष एव स्प्रत्यक्ष क्ष्म से फक्षी नी वस्त्र प्रयोग, जो कि कपनी के ब्रिंग म क्षाकेल्यक से नाक्सा जाए									
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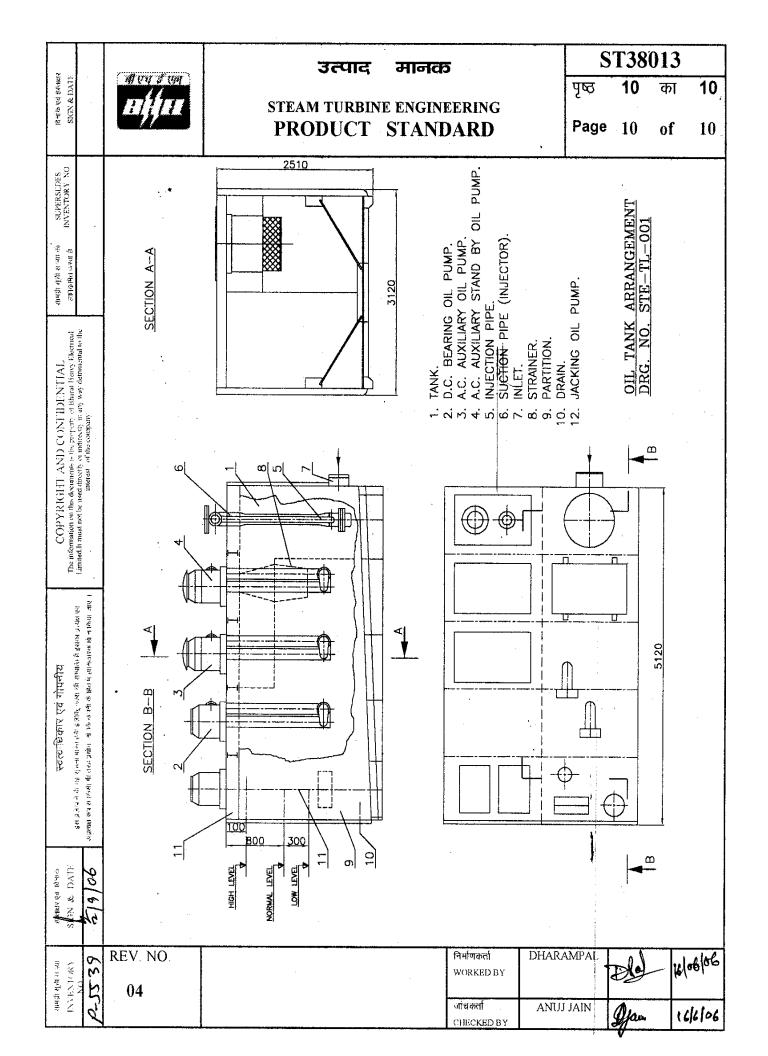
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दिनां ः एवं इस्तात्तर के Dz			PRODUCT STAN	DARD	•	Page	7	Of	10
SUPERSEDES INVENTORY NO					<u> </u>				
	·		ANNEXUR <u>DATA TO BE FURNI</u> ALONG WITH BID	SHED BY BII					
सामग्री धुशे सन्धा ज न्होक्रमेत करत		1.0	EQUIPMENT AND SERVICE OFFE	RED			٠		
	•	ı	Please state whether the following equipare offered or not.	ment service as	s specifie	d in the	data sh	eet	
[TA] Heavy Elec Jetrimental		11.1	Pump as per specification	Yes/ No					
DASNIT of Bharat L any way d		1.2	Motor / Make	Yes/ No					
COPYRIGHT AND CONFIDENTIAL The miornation on this documents is the property of Blead Heavy Electrical Limited If must not be used directly or indirectly in any way detiminant to the interest of the company.		1.3	Necessary instruments, Test connections	Yes/ No					
HHTA documents ed directly interest		1.4	Base plate as per drg.	Yes/ No					
COPYRIGHT mation on this docum must not be used dis- inter		1.5	Companion flanges	Yes/ No					
CO miornistic rted.fr.mus		1.6	Spare parts	Yes/ No					
		1.7	Maintenance and special erection tools	Yes/ No	¥				
प्रत्यक्ष एन नाक्ष्या अध्		1.8	Commissioning of the set	Yes/ No					
ति है इसका नेवारक खे		2.0	DESIGN AND PERFORMANCE						
स्वत्वाधिकार् एटं नोपनीय ११मा मननश्चा इजाक् कथा क्षा भभार ११९ मधेमा नो १६ कार्म कक्षा में हार्		2.1	Rated capacity of each pump.	M³/hr					
क्राप्ट्र १६८१क्ष्य		2.2	Discharge head at rated capacity.						
वत्वाधि ।गामास्तर्भः १८७४ः। मा		2.3	Maximum discharge.						
स्वत्वाधिकार एवं नोपनीय इस प्रकेश में याचे सुराग गरर भी इजाक्षाण के सम्मात है इसले प्रत्यात एत इप्रत्यक्ष को से कियो गरिस्ट प्रयोग जा भार ने ती उच्चेत में सिल्लाक हो गर्भग आए।		2.4	Minimum discharge pressure corresponding to maximum flow		·.		-		
इस म									
हिसाय १ एव हिसार स्ति		•			·				
INVENTORY	RĘV. NO.	04		निर्माणकर्ता WORKED BY	D.PAL	R	Alal	161	06/06
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ादमान् एवं अस्तावस्		PRODUCT STANDARD	Page 8	of 10
- F				
SCPARSI 1458 INVENTORA NO	2.5	Shut off head.		
	2.6	Performance guarantee when installed Yes/No as per given arrangement.		
सामक्री शुक्षे सन्द्रम अ नमेरवामन करता	2.6	Pump B.H.P./KW at rated capacity.		
	2.7	Maximum allowable suction lift (for minimum NPSH REQUIRED).		
A.f., avy Electi dinental te	2.9	Efficiency		
JENTIA Sharat He , way deti	3.0	MATERIAL OF CONSTRUCTION		
ONFILD openy of f	3.1	Casing.		
COPYRIGHT AND CONFIDENTIAL. The information on this documents is the property of Bharat Heavy Electrical Lantiacth In miss not be used directly or indirectly in any way definitional to the interest of the company.	3.2	Impeller		
HTFA locuments ad directly interest	. 3.3	Base plate.		
YRIC For this c not be use	3.4	Wearing rings		
CO] utennation at it musi	3.5	Shaft		
The n	3.6	Stuffing box.		
	3.7	Packing.		
त्र प्रस्त्र ए	3.8	Mechanical scal		
ट्रा गाति है इस्क	4.()	CONNECTION		
सोपनी इन्ह श्री सभ	4.1	Suction size.		
स्यस्वाधिकार एवं गोपनीय शन मारत होते इजेक्ट्रेड क्या के प्राप्त १६ प्रयोग, जो कि काली क प्रसार्व जार	4.2	Discharge size.		
यत्वाष्टि स्वास्त्रहे	5.0	DRAWINGS		
न् न दो १४ सूर हेन्द्री भी त	5.1	General arrangement and sectional Yes/No		
स्वर्ताधिकार एवं गोपनीय इस प्रतेय मधाण्ड गुलनामारतस्त्री इसेक्ट्रेक्टर्स ने सम्प्रात्ते इसन्त प्रथ्य एत स्प्रस्था रूप से किसामा तस्त्र ग्रामाः जा कि करमी क इसमें सामेन्सर हा ना नेमा जर्	,	drawings enclosed with offer		
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IGN &			•	
सम्भाभूता सन्धा	REV. NO. 04	निर्माणकर्ता WORKED BY D.PAL	blas	16/06/02
सम्भाविष्		जांचरुली CHECKEDBY A. JÄIN	aprin	16/6/06
	<u> </u>	TA. JAIN	<u> </u>	

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निमान् एवं इस्ताक्षत्	en figur	STEAM TURBINE ENGINE PRODUCT STANDA	पृष्ठ Paç			9 10	
COPYRIGHTAND CONFIDENCE of Selection of Selection (NENTORY NO Lamited It must not be used discuss of the company of Bhant Hawy Electron of Selection of the company of Bhant Hawy Electron of Selection of the company o	6. 6. 6. 7. 7. 7. 8. 9. 10.	 Weight of pump. Weight of motor. Weight of pump with motor and base frame. CHARACTERISTIC CURVES Power consumption / discharge flow. Discharge quantity / Pressure. Discharge / efficiency. Any deviation taken against specifications Deviation taken as mentioned here. CONSTRUCTION FEATURES 	Yes/N	√o.			
स्थालम् एव स्थालः इस प्रत्यम में को हो सुमानामस्य होता, ये जार में सम्प्रता है इसला प्रमास स्थालस्य का सामिक्सो में तरह प्रयोग, जा कि काली के हिस में समितिस्य हर न किया जाए।	10 10 10 10 10	 Type of impeller. Type of stuffing box sealing offerred. Type of coupling offered. Type of bearing and lubriction. Impeller diameter. 					
ANYENTORY NO P_ST_39	REV. NO. 04		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	D.PAL A. JAIN	Africa.	16/04	606



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ध्यनांक एवं हस्ताकार SIGN & DATE	मी एवं ई एम		0(4)	ч о	Holds		पृष्ठ	6	का 1	
ध्यनाक प SIGN					'ANDARD					
	, ,	(5	STEAM TUR	BINE E	NGINEERI	VG)	Page	1	of (
SUPERSEDES INVENTORY NO.			AUXILIA	RY O	PECIFICAT IL PUMP IGAL PUM	SET	R			
सामधी कूची संख्या को अधिकमित क्रता है	ASS PLA	THIS SPE SEMBLY, TE TE, LIFTIN	ECIFICATION:— CIFICATION IS ESTING AND I IG LUGS, COU Y SUPPLIER.	DELIVER	Y OF PUMP	SET COMP	PLETE	WITH	BASE	
DENTIAL rry of Bharat Heavy r indirectly in any way	STE AT A	THE PUMP AM TURBIN	ING SETS ARE NES AND SHO TEMPERATURE	ULD BE	SUITABLE F	OR CONTIN	IUOUS	OPER.	ATION	
ONFI rectly o	2.0 <u>FUN</u>	ICTION:-								
THE PUMPING SETS ARE INTENDED FOR OPERATION IN CONJUCTION W STEAM TURBINES AND SHOULD BE SUITABLE FOR CONTINUOUS OPERAT AT AN AMBIENT TEMPERATURE OF 50°C + AVERAGE HUMIDITY 90% AND MAXIN HUMIDITY 100%. 2.0 FUNCTION:— A.O.P. COMES IN OPERATION WHEN THE TURBINE IS INITIALLY STAR AND WHENEVER PRESSURE IN THE LINE IS BELOW SET POINT, GOVERN SYSTEM IS TO BE CHARGED AND LUBE OIL SUPPLY IS NEEDED FOR BEARING. THESE ARE TWO IN QUANTITY / SET. ONE PUMP IS KEPT STANDBY PUMP. 3.0 APPLICABLE CODE/STANDARD:— IS:4722, IS:325, IS:2253, IS:2254, IS:32 IS:4029.										
COF	3.0 APP	LICABLE CO	DE/STANDARD	<u>≔</u>	S:4722, IS:32	5, IS:2253,	IS:225	4. IS:	3202.	
The	4.0 OIL	SDECIFICAT	ion.		S:4029.	•			•	
ोय पत्ति है इसका प्रत्यक्ष एवं क्षानेकारक हो न किया जाए।	IOC		D BE HANDLED D TURBINOL-4							
स्वरवाधिकार एवं गोपनीय इस एतेख में भी गई पूरना भारत हेमी इलेक्ट्रिकल्स की सप्तिहें प्रपत्पम कप से किसी भी तरह प्रगाग, यो कि करनी के हिंद में हानेका	SPE FLAS OPE	ECIFIC GRA SH POINT	COSITY AT 65 VITY AT 65°c TEMPERATURE	·	:	16 cs/100 0.8488 200°c (mir 65°c -6.6°c (m	n.)			
PATE O						नाम		ľ	एवं हस्ताक्षर	
F W -2					TID A NOT	NAME		SIGNAT	URE & DATI	
SIGN SIGN	TSX A	KCHATURY		अनुवादक निर्माणकर्ता	TRANSLATED BY	-		500	1 4	
	QAX S	5Chauhan	Maul	ानमाणकतः। जांचकर्ता	WORKED BY CHECKED BY	DHARAMPA ANUJ JAIN	,	Draw	27/08/00	
1 V NO.	सहमत विमाग AGREED DEPTT.	नम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्य बेक्सणकर्ता	SUPERVISED BY	S.C.AGRAW	AL	SIAA	127/3/6	
eited) qu's eisen Inventory no 2, SS41	2004 8 41		W DIGITATURE	स्वीकृति APPROVEI	:): (A.K.JAIN) AGI	M A70 S	an	<u>ر ۱</u>		
INVE	REV.NO. 06 C	SUPERSED	ES)	निर्माण		शारी 73	'X	दिनांक	:	
(m)	Dt. 07-04-06			PREPARED	: STE	ISSUED:		DATE	: 03-08-84	

ST-39014 विनोक एवं इस्ताकार SIGN & DATE उत्पाद मानक भी एग ई एम पृष्ठ वा 2 PRODUCT STANDARD (STEAM TURBINE ENGINEERING) Page 2 Of 6 SUPERSEDES INVENTORY 5.0 PUMP SPECIFICATION:-5.1 IDENTIFICATION NO. TO BE MENTIONED ON NAME PLATE MAY22APOO1 AND MAY23APOO1. 5.2 DESIGN TEMPERATURE = 100°C OPERATING TEMPERATURE = 65°C NORMAL SUCTION PRESSURE = 0.05 Bar MINIMUM SUCTION PRESSURE = 0.025 Bar समयी सूची १ अधिकमित् NORMAL DISCHARGE CAPACITY NORMAL MAYIMIM MAYIMUM VARIANT DISCHARGE PRESSURE DISCHARGE CAPACITY DISCHARGE PRESSURE (Liter/Min) (Bar) (Liter/Min) (Bar) VAR. 1 2544 7.0 4700 COPYRIGHT AND CONFIDENTIAL Information on this documents is the property of Bharat Heavy cent Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company 6.6 VAR. 2 3248 6.1 4560 5.8 VAR. 3 2820 5.6 5355 6.2 VAR. 4 3240 7.4 5460 6.6 VAR. 5 3060 7.3 6600 7.1 VAR. 6 2544 8.0 4700 6.6 VAR. 7 2356 7.4 3204 6.9 VAR. 8 2905 8.2 5177 6.6 VAR. 9 1930 7.5 VAR. 10 2880 8.7 6016 6.3 VAR. 11 3060 7.3 6600 7.1 VAR. 12 3180 8.2 5400 6.6 VAR. 13 1852 8.0 4649 7.0 VAR. 14 2767 8.0 2392 8.3 VAR. 15 2774 8.4 5144 8.0 VAR. 16 VAR. 17 The inform Electrical 5.3 DURING INITIAL STARTUP IN WINTER OIL TEMPERATURE MAY GO AS BELOW AS 20°C. THE CAPACITY OF MOTOR SHALL BE AS INDICATED IN CLAUSE NO. 7.3 OF THIS SPECIFICATION. 5.4 PUMP WITH DROOPING CHARACTERSTIC SHALL NOT BE ACCEPTABLE. 5.5 PUMP SHALL BE SUITABLE FOR MOUNTING VERTICALLY ON THE OIL TANK & PUMP BED द्य PLATE SHALL MATCH THE COUNTER FLANGE PROVIDED ON THE TANK AS PER SKETCH इस्ए प्रतेख में वी गई सूक्षमा मारत हेवी ह्रलेशियुक्तकम की सम्परित है इसका प्रथ्यक एप्टब करा से किसी भी तरह दवीग, जो कि कंपनी के दित में शनिकारक हो न किया। ON SHEET NO. 6. PUMP SUPPLIER SHALL FURNISH THE PERMISSIBLE TIME FOR THE OPERATION OF PUMP AT 5.6 SHUT OFF LOAD. न्) पनीय 6.0 MOTOR:-A SUITABLE MOTOR CONFORMING TO THE PUMP REQUIREMENT SHALL BE SUPPLIED. THE MOTOR SHALL ALSO MEET THE FOLLOWING REQUIREMENTS BROADLY. THE MOTOR स्वत्वाधिकार एवं SHALL CONFIRM TO IS:4722, IS:325, IS:2253, IS:2254, IS:4029 & IS:3202 OR EQUIVALENT BS: SPECIFICATIONS. THE MOTOR SHALL MEET ALL INDIAN STATUTORY REQUIREMENTS. APPLICATION:-6.1 TO DRIVE OIL PUMP FOR SUPPLYING OIL TO BEARING & GOVERNING ELEMENTS. TYPE OF MOTOR:-SQUIRREL CAGE, INDUCTION MOTOR. KW RATING OF THE MOTOR SHOULD BE THE MAXIMUM OF THE FOLLOWING THREE 6.3 CONDITIONS: 6.3.1 IT SHALL HAVE ATLEAST 15% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP WHEN IT IS DISCHARGING MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 50°C TEMPERATURE. 6.3.2 IT SHALL HAVE ATLEAST 5% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP इस्सानार एवं विमांक SIGN & DATE Men WHEN IT IS DISCHARGING MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 35°C TEMPERATURE. 6.3.3 IT SHALL HAVE AT LEAST 5% RESERVE CAPACITY THAN REQUIRED TO DRIVE THE PUMP Q WHEN IT IS DISCHARGING 70% OF MAXIMUM QUANTITY AT A VISCOSITY CORRESPONDING TO 20° TEMPERATURE. FINALLY SUPPLIER SHALL FURNISH THE KW RATING AT AN AMBIENT TEMPERATURE OF 50°C. REV. NO. निर्माणकर्ता DHARAMPAL 127/08/06 सामग्री सूची संख्या INVENTORY NO. WORKED BY 06 4 V) जांचकर्ता ANUJ JAIN S Jain 27/3/06 CHECKED BY

विनांक एवं इस्ताक्षर SIGN & DATE ST-39014 उत्पाद मानक भी एम हैं एम पृष्ठ 6 वा 3 PRODUCT STANDARD (STEAM TURBINE ENGINEERING) Page 3 Of 6 KW ACTUALLY REQUIRED BY DRIVEN 6.4 : PUMP CAPACITY EQUIPMENT UNDER SPECIFIED OPRATION/ STARTUP CONDITIONS. 6.5 RATED VOTAGE : 415V समग्री सूची संख्याको अधिकमित करता है **FREQUENCY** : 50 Hz PERMISSIBLE VOLTAGE AND FREQUENCY 6.6 : ±10% VOLT. VARIATION UNDER NORMAL RUNNING ± 5% FREQUENCY CONDITIONS. COMBINED VARIATION 6.7 : 10% (SUM OF ABSOLUTE VALUES) MINIMUM VOLTAGE REQUIRED UNDER STARTING COPYRIGHT AND CONFIDENTIAL is information on this documents is the property of Bharat Heavy trical United. It must not be used directly or indirectly in any way detrimental to the interest of the company : 80% RATED CONDITION TO BRING DRIVEN EQUIPEMENT UPTO RATED SPEED. 6.9 NO. OF PHASES : 3 ø 6.10 TYPE OF DUTY : CONTINUOUS 6.11 FULL LOAD SPEED : IT SHALL BE COMMENSURATE WITH PUMP SPEED AS PER DESIGN. 6.12 FULL LOAD CURRENT : AS PER DESIGN. 6.13 STARTING CURRENT : NOT TO EXCEED 600% OF RATED CURRENT (EXCLUSIVE OF IS TOLERANCES) 6.14 STARTING TORQUE : 1.3 (MIN.) OF RATED TORQUE. 6.15 BREAK DOWN TORQUE : 2.05 TIMES (MIN.) OF RATED VALUE. 6.16 EFFICIENCY AT FULL LOAD : 90% (MIN.) 6.17 POWER FACTOR AT FULL LOAD : 0.85% MINIMUM The Electri MOTOR SHALL BE DESIGNED TO WITH STAND THE VOLTAGE AND TORQUE STRESSES 6.18 DEVELOPED DUE TO THE DIFFERENCE BETWEEN THE MOTOR RESIDUAL VOLTAGE AND INCOMING SUPPLY VOLTAGE EQUAL TO 150% OF THE RATED MOTOR VOLTAGE Ġ. DURING FAST CHANGEOVER OF BUSES. ! इसका प्रत्यक्षा । ।एक हो न किया (इस प्रलेख में बी गई सूचना भारत हेयी इलेक्ट्रिकल्स की सम्पन्ति है इसका प्रस्थत रूप से किसी भी तरह प्रयोग, जो कि कंपनी के वितर्म हानिकारक हो = 7.0 STARTING DATA: 7.1 STARTING : SUITABLE FOR DOL STARTING. गोपनीय 7.2 ACCELERATION TIME WITH FULL LOAD $: 3.5 \pm 0.5 SECS.$ CONNECTED. 7.3 LOCKED ROTOR WITHSTAND TIME UNDER HOT CONDITION AT RATED VOLTAGE स्वत्वाधिकार एवं SHALL BE AT LEAST 2.5 SEC. MORE THAN STARTING TIME. 7.4 PERMISSIBLE STARTING DUTY CYCLE : 3 STARTS EQUALLY SPREAD OVER NO. OF STARTS. HOUR AND 2 CONSECUTIVE STARTS FROM HOT CONDITION WITHOUT ANY INJURIOUS HEATING TO THE WINDING. 7.5 OVER LOAD (% OF FULL LOAD) THAT : MOTOR SHALL BE CAPABLE OF CAN BE CARRIED BY THE MOTOR WITHOUT RUNNING AT FULL LOAD AT 80% OF IMPAIRING, OVERALL PERFORMANCE AND RATED VOLTAGE FOR FIVE MINUTES PERIOD FOR WHICH THIS OVERLOAD IS AND 70% OF RATED VOLTAGE FOR APPLICABLE. इस्ताझर एवं विभाज SIGN & DATE 70/27 1 SEC. 7.6 LOCATION : INDOOR CLASS OF INSULATION 7.7 SIGN : CLASS-F, FUNGUS RESISTANT, 7 TROPICALISED AS PER IS:3202 WITH TEMP. RISE LIMITED TO THAT OF CLASS B. REV. NO. निर्माणकर्ता DHARAMPAL 27/03/06 सामधी सूची संख्या INVENTORY NO. WORKED BY 4 06 ١V 5 जांचकर्ता ANUJ JAIN CHECKED BY ffair 27/3/06

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Peries SIG		11,1,1	PRODUCT ST (STEAM TURBINE E		Page	4	Of 6		
_	ᅱ	7.0					<u> </u>		
SUPERSEDES INVENTORY		7.8 7.9	SHAFT DISPOSITION MOUNTING METHOD OF CONNECTION DRIVEN EQUIPEMENT.	: VERTICAL / FLA : FLANGE FLEXIBL					
		7.10	DIRECTION OF ROTATION AND CORRESPONDING TERMINAL DESIGNATION.	: TO SUIT PUMP					
समग्री सूबी संख्याको अधिकमित करता है		7.11	ENCLOSURE AND VENTILATION	: TOTALLY ENCLOS	SED FAN CO	DOLED			
	_	7.12	BEARING	DARD 0,000					
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	the company	7.13	GROUNDING DEVICE	: SUITABLE ARRAN PROVIDED FOR EA AT TWO SEPARAT CONNECTION POIN EARTHING CONDU- AS PER IS:4722-	ARTHING THE E AND DIST VTS. DESIGN CTOR SHALL	MOTOR NCT OF			
CON s is the pr	erest of	7.14	TERMINAL CONNECTORS FOR STATOR HEADS TYPE AND NUMBER.	: 6 NEUTRAL SHAI EXTERNALLY IN TI					
T AND documents t not be use	to the inte	7.15	TERMINAL BOX	: TERMINAL BOX S	HALL BE P	ROVIDED	s		
COPYRIGHT	detrimental			CABLE GLANDS A LUGS TO MATCH CABLES, THE SIZE INTIMATED AT THI TERMINAL BOX SI	IND COPPER OWNER'S AL OF WHICH I E TIME OF	CABLE UMINIUM WILL BE ORDERING).		
	पनी के दित में शमिकारक हो न किया जाए।			BEING ROTATED TH OF 90° AND IT SH OF PROTECTION O ALSO BE SUITABLE FAULT LEVEL OF 5	ROUGH 180 IALL HAVE A OF IP:55. IT TO WITHSTA	in steps Degree Shall ND the			
गोपनीय ऋकी क्ष्मक्ष	अस्य में आ	7.16 7.17	WHETHER PHASES SEGREGATED SPACE HEATER	: NO : TO BE PROVIDED)				
एवं न क्रिक्ल	6	7.18	RATED VOLTAGE FOR SPACE HEATE						
स्वत्वाधिकार एः सुम्मा मारत हेवी हलेक्ट्रि	£€ 15	8.0	SPECIAL REQUIREMENTS						
स्वत्वाधिकार सुमना मारत हेथी हर्	इस्	8.01 8.02	THE MOTOR SHALL BE RE—WOUND THE MOTOR SHALL HAVE ON LINE GR						
	4) 44	8.03	THE MOTOR CONSTRUCTION SHALL BE SU!		RIY AND REA	SSEMBLÝ			
म स	रूप से क़िसीभी तरह प्रयोग, आ	8.04	THE MOTOR SHALL BE SUITABLE F						
इस दलेखाने बीगई	प्रका स्थ		OIL FUMES WITHOUT ANY HAZARD.						
<u>~</u>	भप्रत्यक्ष	8.05	SEPARATE TERMINAL BOX FOR SPA	ACE HEATERS SHALL	BE PROVID	ED.			
DATE		8.06	MOTOR SHALL BE PAINTED WITH P AND ITS COLOUR SHALL BE INTIMA				I		
19	8	9.0	TESTS AT MANUFACTURE'S WORK	S:					
CSN	3		MOTOR AFTER COMPLETE ASSEMBLY TYPE AND ROUTINE TESTS AS PER	IS: 4722.		4			
-	14	(ii)	IN ADDITION THE FOLLOWING TESTS	SHALL ALSO BE CAR	RRIED OUT:				
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ानंक एवं इस्तानार SIGN & DATE	्यी एवा है एवा इस्टेडिंग	PRODUCT STANDA	ARD	पृष्ठ	6 व	5					
विनांक एवं SIGN &		(STEAM TURBINE ENGINE		Page	5	Of 6					
EDES	· •	ADDITIONAL TYPE TEST: DEGREE OF PROTECTION TEST TO CONFO	NOW TO T	UE COECIEIE	.u.						
SUPERSEDES INVENTORY	4	DEGREE OF PROTECTION.									
15 to		MEASUREMENT OF NOISE LEVEL AS PER EVEL SHALL BE LIMITED SO AS TO ACHI									
समग्री सूदी संख्या को अधिकमित करता है		OISE LEVEL AS PER CLAUSE 1.4 OF ST	38013.	•							
समधी सूची अशिक्रमित	-	ADDITIONAL ROUTINE TESTS: 20% OVERSPEED TEST FOR 2 MINUTES.		1							
way	, ,	MEASUREMENT OF VIBRATION AS PER IS:	12075.	~							
AL	_	OCUMENTS TO BE SUPPLIED WITH OFFE		•							
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VFID propert		OCUMENTS ARE NOT SUPPLIED.	1097 V/OLT	ACEC :							
CO od dire	10.1 10.1.1	CHARACTERISTICS AT 80%, 100% AND 1 STARTING CURRENT V/S TIME.	10% VULI	AGES.		:					
AND cuments of be us	10.1.2	TORQUE V/S SLIP.									
COPYRIGHT aformation on this do	10.1.3 10.2	THERMAL WITHSTAND CHARATERISTIC FOR TYPE AND FRAME SIZE.	R HOLAN	D COLD CO	NDITION.						
PYRI nation of imited.i	10.3	STARTING TIME	•								
CO]	10.3.1	WITH 100% VOLTAGE AT TERMINAL.									
t g	10.3.2 10.4	WITH 80 % VOLTAGE AT TERMINAL. SAFE STALL TIME AT 110% VOLTAGE UN	DER HOT	CONDITION.	•						
। उत्यक्त एवं न किया जाए।	10.5	10.5 POWER (Kw) RATING CALCULATION W.R.T. PUMP REQUIREMENT.									
क्सका प्रत किथी न वि	10.6 11.0	EXPECTED LIFE OF BEARING. DOCUMENTS TO BE FURNISHED WITHIN FOUR Y	VEEKS OF	PLACEMENT O	F ¹ ORDER						
ो पनीय की समस्ति है इसका उत्पक्त एवं हित में हानिकारक हो निक्या जार		(FOR BHEL OR THEIR CUSTOMER'S APPROVAL):		e e							
`F F 16	11.1	SIX HARD COPIES AND ONE SOFT COPY MOTOR DATA SHEET AND G.A. DRAWING.	(IN PDF	FORMAT) O	F						
स्वत्वाधिकार एवं युष्ता मारत हेवी ब्रह्मिट्रकर मी तरह धरोग, जो कि कंपनी	11.2	DRAWING SHOWING TERMINAL DETAIL OF AND DIMENSION OF TERMINAL BOXES.	ALL TERM	IINALS AND	LOCATION						
स्वत्वाधिकार धूषमा मारत हेशी ब्रह्मे तिरह प्रयोग, जो कि	11.3	ROTOR WEIGHT AND TOTAL MOTOR WEIG	нт.	•							
	11:4	CHARACTERISTIC CURVES OF THE MOTOR									
इस प्रलेख में थी गई स्वाम सन से किसी	12.0	SIX COPIES OF TESTS CARRIED OUT AS									
客冊 4 *45 64 64		MOTOR SHALL BE FURNISHED TO BHEL FO ON ACCEPTANCE FROM BHEL SIDE, MOTOR		•							
		FOR DISPATCH.									
PATE A	13.0	FOR TECHNICAL DELIVERY CONDITON AND PLEASE REFER ST38013.	GENERAL	FEATURES (DF PUMP						
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ST-39015 BRAILBIT उत्पाद मानक SIGN & DATE बीएस है एक 3 पष्ट वा 6 देशक एवं PRODUCT STANDARD (STEAM TURBINE ENGINEERING) Page 3 Of 6 6.6 PERMISSIBLE VOLTAGE VARIATIONS : ~15% UNDER NORMAL RUNING CONDITIONS. +10% MINIMUM VOLTAGE REQUIRED UNDER STARTING 6.7 : 80% RATED CURRENT समग्री सूची संख्या को अधिकृष्टित करता है CONDITION TO BRING DRIVEN EQUIPEMENT UPTO RATED SPEED. 6.8 TYPE OF DUTY : CONTINUOUS 6.9 FULL LOAD SPEED : IT SHALL BE COMENSURATE WITH PUMP SPEED AS PER DESIGN. 6.10 FULL LOAD CURRENT COPYRIGHT AND CONFIDENTIAL information on this documents is the property of Bharst Heavy rives! Limited it must not be used directly or indirectly in any way definited in the Interest of the company : AS PER DESIGN. 6.11 STARTING CURRENT : 3 TO 3.5 TIMES. I RATED 6.12 STARTING TORQUE : 3 TO 3.5 TIMES. TORQUE 6.13 EFFICIENCY AT FULL LOAD : 85% MINIMUM 7.0 STARTING DATA 7.1 STARTING SUITABLE FOR DIRECT ON LINE STARTING WITH A PERMANENT RESISTANCE CONNECTED IN THE ARMATURE CIRCUIT. UNDER THIS CONDITION MOTOR SHALL BE CAPABLE OF DRIVING THE PUMP AT 100% LOAD. THE MOTOR SHALL ACCELARATE TO FULL SPEED WITH FULL LOAD CONNECTED WITHIN 3±0.5 SECONDS. SUCH RESISTANCE SHALL ALSO BE INCLUDED IN THE OFFER. THE RESISTANCE SHALL BE FOR CONTINUOUS The information on Slectrical Limited.lt DUTY. THE RESISTANCE BOX ENCLOSURE TEMP, RISE OVER AMBIENT SHOULD NOT EXCEED 70°C AND IT IS OF FeCr-AI OR CUPRO-NICKLE TYPE SHOULD HAVE IP21 (MIN.) DEGREE OF PROTECTION. STARTING RESISTANCE BOX/PANEL SHALL BE IN VENDOR SCOPE OF SUPPLY. 7.2 PERMISSIBLE STARTING DUTY CYCLE/NO. OF STARTS:-प्रलेख में दी गई सूचना मारत हेनी इस्तेषिट्र करूर की सम्पत्ति है इसका प्रत्यक्ष एवं THREE STARTS SPREAD OVER AN HOUR AND TWO CONSECUTIVE STARTS FROM HOT । प्रस्यका रूप से किसी भी तरह प्रयोग, जो कि खंपनी के हित में हामिकारक हो न किया CONDITION WITHOUT ANY INJURIOUS HEATING TO THE WINDING. OVER LOAD (% OF FULL LOAD) THAT : 25% FOR 5 MINUTES. CAN BE CARRIED BY THE MOTOR WITHOUT गोपनीय IMPAIRING, OVERALL PERFORMANCE AND PERIOD FOR WHICH THIS OVERLOAD IS ā APPLICABLE. स्वत्वाधिकार 7.5 LOCATION : INDOOR 7.6 CLASS OF INSULATION : CLASS-F, FUNGUS RESISITANT. TROPICALISED AS PER IS:3202 WITH TEMP. RISE LIMITED TO THAT OF CLASS B. 7.7 SHAFT DISPOSITION/MOUNTING : VERTICAL / FLANGE MOUNTED 2 METHOD OF CONNECTION TO DRIVEN : FLANGE FLEXIBLE COUPLING. EQUIPEMENT. DIRECTION OF ROTATION AND CORRESPONDING : TO SUIT PUMP 7.9 DATE TERMINAL DESIGNATION. दिमाय 7.10 ENCLOSURE AND VENTILATION : TOTALLY ENCLOSED FAN COOLED हस्ताक्ष एवं SIGN & IP-55 REV. NO. निर्माणकर्ता DHARAMPAL ENVENTORY NO. शामग्री सूबी संख्या WORKED BY 14/6/06 04 **जांचकर्ता** ANUJ JAIN 14/6/06 CHECKED BY

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RY NO				,					
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		ADDITIONAL ROUTINE TESTS:							
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AND tents to the ectly or in rest of the	10.3.1	WITH 100% VOLTAGE AT TERMINALS.							
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दि नास्त्र इ. सामकास्य	11.2	DRAWING SHOWING TERMINAL DETAIL OF ALL TOURISHON OF TERMINAL BOXES.	ERMINALS	AND LOCATI	ON AND				
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द एव ताकाइक स्वीत्ता	11.4	CHARACTERISTIC CURVES OF THE MOTOR.	D CLAUCE	NO 00 0	N EATU				
स्वत्वाधिकार विनामसाङ्ग्रेष्ठेड स्हज्यात् अस्ट्रि	12.0	SIX COPIES OF TESTS CARRIED OUT AS PE MOTOR SHALL BE FURNISHED TO BHEL FOR				1LY			
स्वत्व सूबना मा तस्ह प्रय		ON ACCEPTANCE FROM BHEL SIDE, MOTOR	CAN BE	CONSIDERED	SUITABL	Ę.			
स्यत्याधिकार एवं गीपनीय इस प्रत्य में दी यह सूदना मानत होने इत्रोक्ष्य कर की सम्प्राण है इर ह्यायक रूप से क्रिंदी में तसर ग्यागे जा हेन्द्रीनी है क्रियम झामेलास्क	13.0	FOR DISPATCH. FOR TECHNICAL DELIVERY CONDITION AND (LPEASE REFER ST38013.	GENERAL F	EATURES O	F PUMP.				
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NTPC QUALITY PLAN

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