

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG60729															
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SUPERSEDES INVENTORY NO	OWN EXPERIENCE																		
STATOR WATER PUMP WITH AC MOTOR																			
1.0 SCOPE: This specification covers the requirements for the design, manufacture, inspection, testing, and supply of horizontal, single-stage, centrifugal pumps along with AC motor, flexible coupling, coupling guard, base plate, foundation bolts, and all associated accessories. The Pump-Motor set is to be supplied in assembled condition.																			
2.0 APPLICATION: The Pump-Motor set will be used for supplying demineralized (DM) water to the stator windings of generators of rating 500 MW and above.																			
3.0 TECHNICAL REQUIREMENTS (PUMP EXCLUDING MOTOR)																			
3.1 Technical Data																			
<table border="0"> <tr> <td>i. Type of pump</td> <td>- Centrifugal.</td> </tr> <tr> <td>ii. Liquid to be pumped</td> <td>- Demineralized water.</td> </tr> <tr> <td>iii. Max. Working temperature</td> <td>- 75°C.</td> </tr> <tr> <td>iv. Suction</td> <td>- Flooded.</td> </tr> <tr> <td>v. Discharge</td> <td>- Refer Table-1</td> </tr> <tr> <td>vi. Head</td> <td>- Refer Table-1</td> </tr> <tr> <td>vii. Dimensional Details</td> <td>- Refer Table-1</td> </tr> </table>						i. Type of pump	- Centrifugal.	ii. Liquid to be pumped	- Demineralized water.	iii. Max. Working temperature	- 75°C.	iv. Suction	- Flooded.	v. Discharge	- Refer Table-1	vi. Head	- Refer Table-1	vii. Dimensional Details	- Refer Table-1
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vii. Dimensional Details	- Refer Table-1																		
3.2 Constructional Features																			
i. The design of pump shall be such that the complete rotating assembly can be withdrawn without disturbing the pipe connections. ii. The design of pump shall be of end suction type, self-venting, volute open with integral cast feet, end suction nozzle and top discharge nozzle. iii. The impeller shall be closed radial type, statically and dynamically balanced with valves to relieve pressure on stuffing box.																			
दिनांक एवं हस्ताक्षर SIGN & DATE <i>Soden 20/7/26</i>		नाम NAME TSX PSC MEMBER QAX सहमत विभाग AGREED DEPTT नाम NAME दिनांक एवं हस्ताक्षर DATE & SIGNATURE																	
सामग्री सूची संख्या INVENTORY NO R-6449		अनुवादक TRANSLATED BY निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY पर्यवेक्षणकर्ता SUPERVISED BY स्वीकृति APPROVED: Asha Gupta (AGM/EME) निर्माण PREPARED EME-HEEP जारी ISSUED: TSX-HEEP दिनांक DATE: 09.04.2014																	
(SUPERSEDES)		REV.NO. 08 Date 27.07.2026 CHANGE ADVICE NO TGE-26-60		Gr. NO. 2.83															

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COPYRIGHT AND CONFIDENTIAL The information on this document 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.		4.0 TECHNICAL REQUIREMENTS (Motor) Each pump shall be provided with 3 Phase, 50 Hz, 415 Volts, Continuous Duty AC motor of rating as per Table-1. 4.1 Motor shall comply with the specifications as per Annexure-I. 4.2 The motor shall have the type of Enclosure IP-55 as per IEC60034-5. 4.3 The supplier shall furnish filled up motor data sheet as per Annexure- III. 5.0 COUPLING & COUPLING GUARD: Spacer type flexible coupling shall be provided so that motor need not be removed from the base plate. The coupling shall be designed to facilitate easy alignment. Coupling guard of suitable design shall also be supplied. 6.0 PERFORMANCE TESTS AND TEST CERTIFICATES: The Pump-Motor Set shall be tested in accordance with the applicable standards specified in this specification. The complete Pump-Motor Set shall be performance tested at the supplier's end using the actual motor (which will be supplied against BHEL PO), operating at the rated speed and rated duty point (capacity and head). The test results, along with the relevant test certificates, shall be submitted to BHEL for review and acceptance. Tests (as per table at page-4) shall be carried out by supplier: -					
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रयोग एवं प्रकाशन इस से किसी भी तरह प्रयोग जो कि सम्पत्ती के हित में हानिकारक		दिनांक एवं हस्ताक्षर SIGN & DATE		REV. NO. 08		निर्माणकर्ता WORKED BY	
सामग्री सूची संख्या INVENTORY NO.		20/7/26				Anubhav Jain	
P-6449						जांचकर्ता CHECKED BY	
						Ajay Kumar Gupta	
						27.7.26	
						27.7.26	

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सामग्री सूची संख्या को INVENTORY NO	SUPERSEDES INVENTORY O	8.0 FITTINGS / ACCESSORIES: Any fittings, accessories which might have not been mentioned in this specification but are usually supplied with the equipment for satisfactory functioning are to be supplied.			
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.		9.0 DOCUMENTATION: 9.1 Along with offer: i) Cross-sectional & overall dimensional GA drawing, Foundation drawing, Material of different components, special features and other important details. ii) Filled-up pump data sheet as per Annexure-II and Motor data sheet as per Annexure-III. 9.2 Along with supply: i) Operation and maintenance manual covering relevant literature, drawings of pump and motor for erection, operation and maintenance, including trouble shooting, preventive and overhaul maintenance instruction. ii) 2 copies of the test certificates of Pump & Motor as per Clause No. 6 above.			
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दिनांक एवं हस्ताक्षर SIGN & DATE	11.0 PERFORMANCE GUARANTEE The Pump-Motor set shall be guaranteed for a period of 12 months from the date of commissioning and 18 months from the date of dispatch whichever is earlier.				
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समय की सूची संख्या को अधिकृतित करती है	SUPERSEDES INVENTORY	Annexure-I				
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.		TECHNICAL SPECIFICATIONS FOR 415 V, 3-phase AC MOTORS				
		- This specification covers 3 phase, 415 V AC squirrel cage induction motors for driving the Pump - The motor shall be of reputed make i.e. CGL / ABB / SIEMENS / BHARAT BIJLEE. - Motors shall conform to the requirement of the latest edition of IEC 60034-1. - Motors shall be suitable for operation from 415 volts, 50 Hz, 3 wire solidly grounded supply. - Motors shall be suitable for supply frequency variation of $\pm 5\%$, terminal voltage variation of $\pm 10\%$ and combined voltage & frequency variation of $\pm 10\%$. - Motors shall be suitable for direct on-line starting and shall be constant speed type, designed for continuous operation. - Motors shall be capable of starting and accelerating satisfactorily at a minimum voltage of 85% of rated terminal voltage and shall also be capable of satisfactory operation at full load for 10 minutes, at a terminal voltage up to 80%. - Motors shall be capable of developing the rated torque even when the supply voltage drops to 70% of the rated voltage for 50 cycles and as such pull out torque shall not be less than 205% of full load torque. - Motors shall be so designed as to be capable of withstanding the voltage & torque stresses developed due to the vector difference between the motor residual voltage and the incoming supply voltage equal to 150% of the rated motor voltage during fast changeover of buses. The duration of changeover shall be assumed as 50 cycles. - Motors shall be capable of satisfactorily withstanding the continuous duty as stipulated by IEC: 60034-1. - Locked rotor current of motor at rated terminal voltage shall not exceed 6 times the rated full load current +20%. - Also, safe stall time of the motors at 110% voltage shall be more than the accelerating time at 80% starting voltage by more than 2.5 second. - Motor shall meet the duty requirements such as speed, current, torque, axial thrust, accelerating and stall capacities imposed by the driven equipment.				
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21. Terminal Box: Terminal box shall preferably be mounted on top. Terminal box shall be capable of satisfactorily withstanding short circuit forces corresponding to a fault level limited to 50 kA for 0.25 sec at motor terminals. Spacing between the terminals and the volume inside the terminal box should be adequately designed, so that no difficulty is experienced during the connection of cable to the motors. It shall be so constructed not to allow any intrusions of water or dust. Suitable double compression brass glands and cable plugs shall be provided to match with the Cable Entry Details as per table below Cable Entry Details <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Motor rating in KW</th> <th>Power cable size in sq. mm. (#)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>24.1-37.0</td> <td>3CX70</td> </tr> <tr> <td>2.</td> <td>37.1-55.0</td> <td>3CX120</td> </tr> <tr> <td>3.</td> <td>55.1-90.0</td> <td>3CX150</td> </tr> </tbody> </table> The terminal box shall be capable of being turned through 360° in steps of 90°.						Sl. No.	Motor rating in KW	Power cable size in sq. mm. (#)	1.	24.1-37.0	3CX70	2.	37.1-55.0	3CX120	3.	55.1-90.0	3CX150
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3.	55.1-90.0	3CX150															
22. Motor Frame: The frames and all external parts of the motor shall be rigid fabricated steel or a casting. In the latter case, the material shall be of meehanite cast iron or approved equivalent.																	
23. A plate showing direction of rotation as determined by the phase sequence on the terminal marking shall be screwed at the non-driving end on the body of the motor.																	
24. Name Plate: Each motor shall have a name plate/ name plates showing diagram of connections and particulars as per IEC 60034-1 and the following additional information: i) Temperature rise under normal conditions / abnormal conditions. ii) Type of bearings, bearing identification number and recommended lubricant. iii) Phase sequence to correspond to direction of rotation for the application. iv) Starting limitations, if any.																	
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सामग्री सूची संख्या को अपडेट करनी है	SUPERSEDES INVENTORY	Annexure-I (Contd.)			
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.		25. The motor shall be capable of withstanding the electro dynamic stresses and heating imposed if it is started at voltage 110% and 80% of the rated voltage respectively. 26. Overload Capability: The motor after having attained the temperature rise corresponding to the rated load shall be capable of withstanding momentary overload of 160% of full load torque for 15 seconds without damage (the voltage & frequency being maintained at the rated values). 27. Overspeed Capability: The motors shall be designed to withstand 120% of the rated speed for two minutes without any mechanical damage. 28. Motors shall be designed to keep torsional & rotational natural frequencies of vibrations at least 25% above or below, preferably above the motor operating speed, to avoid resonance in vibration over the operating speed range of the Pump Motor Set. 29. Vibrations: The vibrations measured at motor bearings shall be within the limits specified in IEC 60034-14. The motor shall also be capable of withstanding the vibrations produced by the driven equipment. 30. Noise Level: Noise levels shall comply with IEC 60034-9. 31. Fault level shall be limited to 50 kA (r.m.s) for 1 second. 32. Motor shall be provided with eye bolts, lugs or other means to facilitate lifting. 33. Two earthing bolts of size suitable for earthing conduction of size 25x6mm² shall be provided on either side of the motors. 34. Motors shall be suitable for two hot starts in succession under the specified conditions of load torque and inertia, with the motor initially at its normal running temperature. 35. Motors shall be cooled by a totally enclosed fan as per IC411 method of cooling. 36. Motors shall be subjected to type and routine tests as per IEC 60034. Type Test Certificates (not older than 5 years from the date of bid opening) shall be furnished. In-case of non-availability of any of the type test certificates, vendor shall carry out the type tests & provide the type test reports along with the supply without any price implication to BHEL.			
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सामग्री सूची संख्या INVENTORY NO P-6449	REV. NO. 08	निर्माणकर्ता WORKED BY Anubhav Jain	जांचकर्ता CHECKED BY Ajay Kumar Gupta	27.7.26	27.7.26

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सामग्री सूची संख्या को अधिकृतित करता है		SUPERSEDES INVENTORY				पृष्ठ 20 का 11 Page 11 of 20	
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		स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की संपत्ति है इसका प्रयोग एवं अपर्याय रूप से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक		37. Following drawings shall be submitted for approval after PO placement: i) GA Drawing showing the position of terminal boxes, earthing connection etc. ii) Arrangement drawing of Terminal Box iii) Speed Vs torque Characteristics. iv) Load Vs efficiency and power factor Characteristics v) Speed Vs current Characteristics vi) Time Vs current Characteristics vii) Thermal withstand time curve. Characteristics		Annexure-I (Contd.)	
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उत्पाद क्रय विनिर्देश (हीप : हरिद्वार)
PRODUCT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

TG60729

पृष्ठ 20 का 17

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TABLE-1

VAR.	PUMP DISCHARGE (M ³ /HR.)	PUMP HEAD (MWC)	MOTOR RATING (KW) & Efficiency Class	DIMENSIONAL DETAILS AS PER FIGURE	MATERIAL CODE	GENERATOR RATING
01	70	80	37KW -IE3	1	W90415302390	500 MW
02	150	77	75 KW -IE3	2	W90415302382	660 & 700 MW
03	120	75	45 KW -IE3	3	W90415302374	800 MW
04	135	75	45 KW -IE3	3	W90415302617	800 MW
05	150	77	75 KW -IE4	2	TG9041530010	660 & 700 MW
06	135	75	45 KW -IE4	3	TG9041530002	800 MW

TABLE- 2

Sl. No.	Material code	Description	Applicable for Variant
01	TG9741530056	SPARE KIT FOR PW PUMP MOTOR SET comprising of: ➤ Mechanical Seals, ➤ Pump bearings (DE + NDE), ➤ Motor bearings (DE+NDE), ➤ Set of Gaskets.	01
02	TG9741530048		03,04,06
03	TG9741530030		02, 05

REV. NO. 08

निर्माणकर्ता
WORKED BY

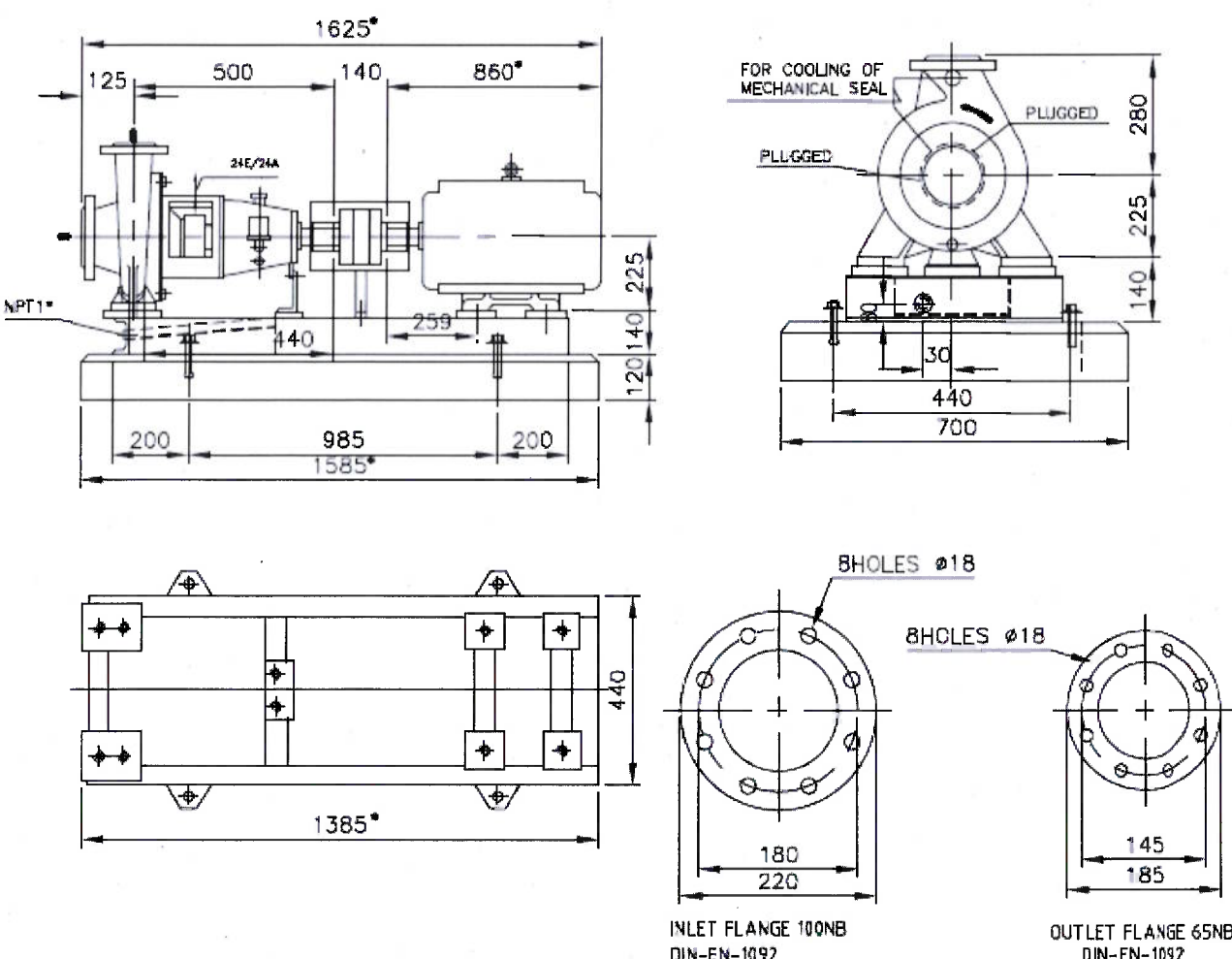
Anubhav Jain

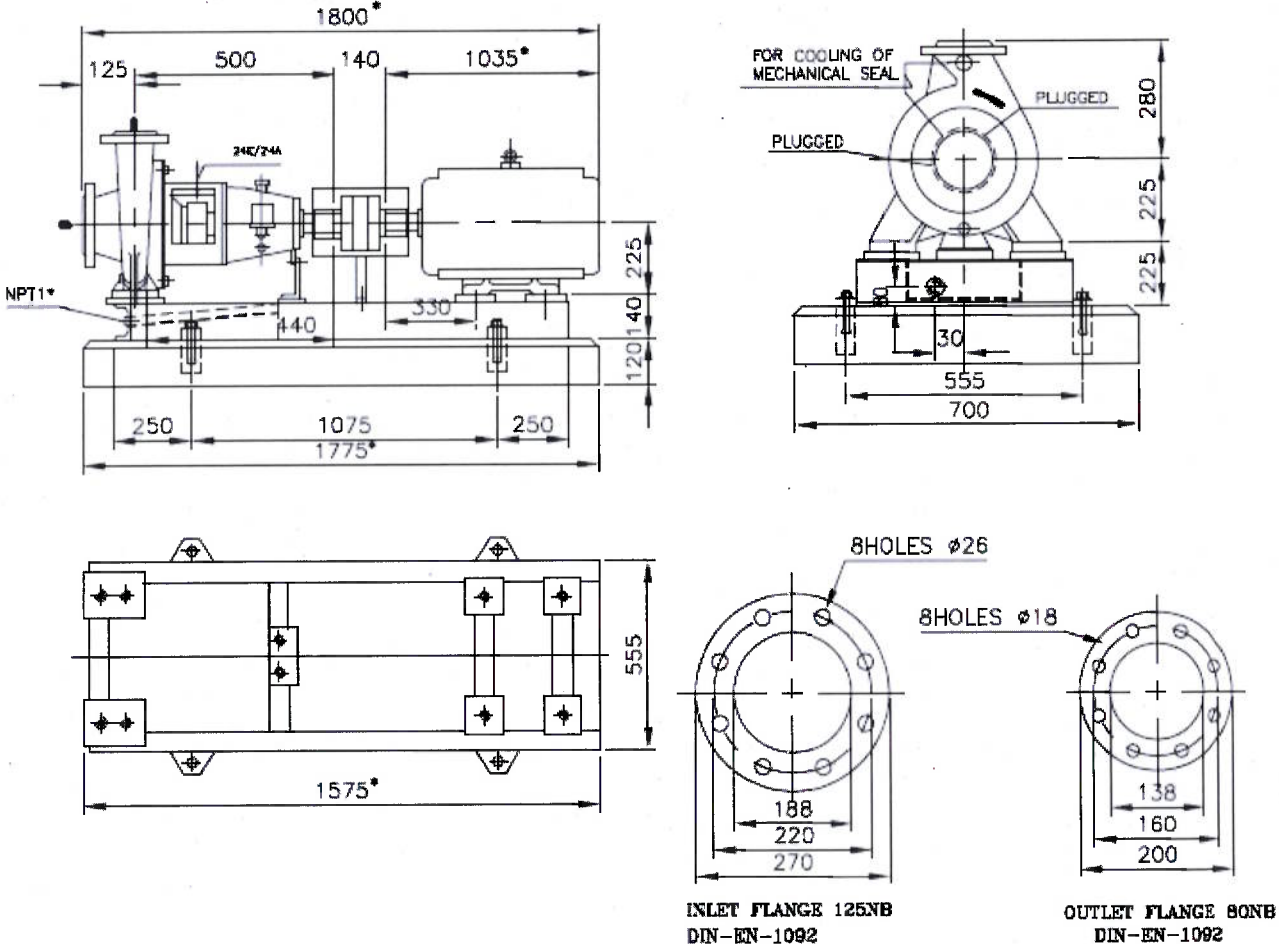
जांचकर्ता
CHECKED BY

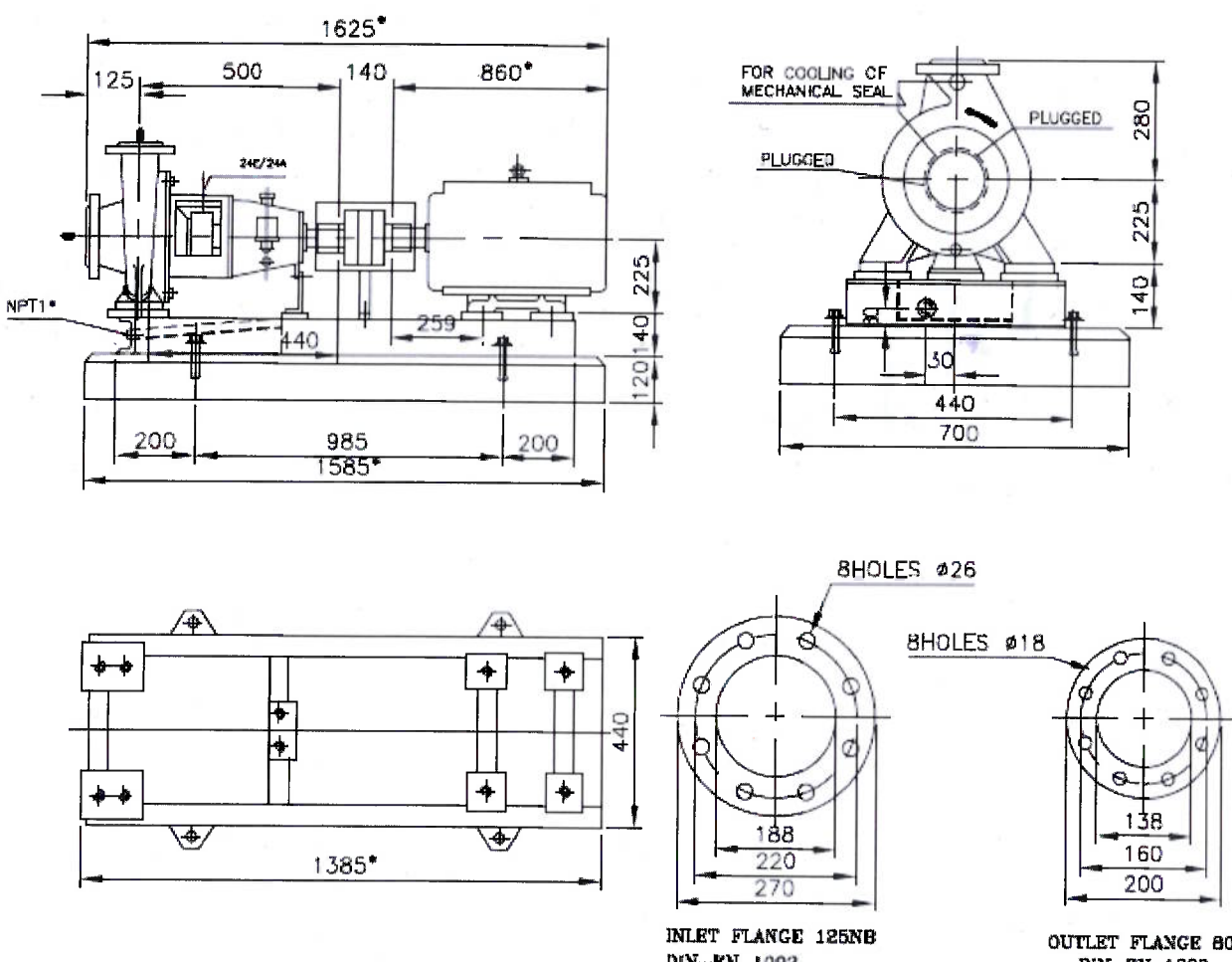
**Ajay Kumar
Gupta**

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सामग्री सूची संख्या INVENTORY NO <i>P-6449</i>	REV. NO. 08		निर्माणकर्ता WORKED BY	Anubhav Jain	<i>AJ</i>	27.7.26
			जांचकर्ता CHECKED BY	Ajay Kumar Gupta	<i>Ajay</i>	27.7.26

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG60729 पृष्ठ 20 का 19 Page 19 of 20	
सामग्री सूची संख्या को अधिकृत करता है		SUPERSEDES INVENTORY			
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स्वत्वधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसका प्रचलन एवं अप्रचलन रूप से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक					
दिनांक एवं हस्ताक्षर SIGN & DATE					
Figure-2 <u>DIMENSIONS MARKED * ARE FOR REFERENCE ONLY.</u>					
सामग्री सूची संख्या INVENTORY NO	REV. NO. 08		निर्माणकर्ता WORKED BY	Anubhav Jain	 27.7.26
सामग्री सूची संख्या INVENTORY NO			जांचकर्ता CHECKED BY	Ajay Kumar Gupta	 27.7.26

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG60729 पृष्ठ 20 का 20 Page 20 of 20	
SUPERSEDES INVENTORY	सामग्री सूची संख्या को अधिकारित करता है				
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.		स्वत्वाधिकार एवं गोपनीयता इस दस्तावेज में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तृतीय व्यक्ति को बिना लिखित अनुमति के प्रसारित करना या इसका उपयोग करना कानून के विरुद्ध है।			
दिनांक एवं हस्ताक्षर SIGN & DATE 30/7/26		Figure-3 DIMENSIONS MARKED * ARE FOR REFERENCE ONLY.			
सामग्री सूची संख्या INVENTORY NO. P-6449	REV. NO. 08	निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	Anubhav Jain Ajay Kumar Gupta	 	27.7.26 27.7.26