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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

HE 57075

पृष्ट 13 का 1 Page 1 of 13

TURBINE OIL COOLER (Plate Type Heat Exchanger)

1.0 Objective:

This standard is prepared to purchase turbine oil cooler (Plate Type Heat exchanger)

The nozzle location of same fluid shall be parallel i.e. the inlet and outlet of turbine oil shall be on the same vertical line. (refer sketch 01 & 02).

2.0 Scope of supply:

- 2.1 Plate Type Heat Exchanger complete with following accessories and auxiliaries.
 - (i) Suitable drain and vent connections on both stream side (Turbine oil) and secondary (DM water) with isolation valves.
 - (ii) Supporting arrangement complete with foundation plate channels, anchor bolts, nuts, sleeves, inserts etc.
 - (iii) Lifting arrangement complete with lifting lugs, eye bolts etc.
- (iv) Other accessories as required to make PHE's complete in all respects.
- (v) 1 set of gasket as deemed fit with commissioning spares, if any.
- (vi) Matching piece (reducer/expander) with coatings (as required) to match the PHE nozzle connection with connecting pipe size as indicated in data sheet.
- (vii) Mandatory spares as applicable for each projects.
- 2.2 Finish paints in sealed containers for touch up of equipment after erection at Site
- 2.3 Equipment GA drawings, datasheets, test reports/certificates, instruction manuals for erection operation and maintenance etc.

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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

HE 57075

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3.0 Designation

3.1 The Turbine oil cooler shall be designated as below

3.1.1 ON DRAWINGS AND INDENTS

Material specification column: HE 57075

Description column : Turbine Oil Cooler (PHE)

3.1.2 ON ENQUIRIES AND PURCHASE ORDER

In addition to incorporating the above detail a copy of this product standard shall be enclosed along with enquiry.

4.0 Codes and Standards:

This standard is not based on any standard. Details have been taken from supplier's approved design.

Technical Requirements 5.0

- 5.1 The construction shall be as per figure (sketch 1 & 2).
- 5.2 Construction of heat exchanger

Heat transfer plates shall be packed in a frame consisting of fixed frame plate and movable pressure plate and aligned at top and bottom of carrying bars. Design shall be such that cleaning is possible without dismantling the piping Heat transfer plates shall be sealed at their outer edges and around the ports and gaskets in order to prevent leakage and inter-mixing of fluids.

Double sealing arrangement shall be provided at outer edge and around ports. The inter space between the seals shall be vented to atmosphere in order to avoid inter-mixing of liquids in case of gasket failure.

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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

HE 57075

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The gasket arrangement shall be such that it receives continuous support to ensure a long gasket life. The gasket should be able to retain its properties and shape over a life period of 10 years.

Heat transfer plates shall be provided with sufficient thickness in order to impart sufficient rigidity to the plates particularly from handling considerations. Plates shall have contact points in order to provide inter plates support. The recesses on the plates are suitably strengthened by a reinforcement plate.

Plate thickness shall be adequate to withstand all operating conditions as specified in data sheet furnished after placement of order enquiry. Thickness of pressure and frame plates shall be as per ASME Sect VIII div.1. Extra capacity of 30% over and above required margin for additional plates shall be provided in frame.

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The information on this document is the property of Bharat Heavy
Electricals Limited. It must not be used directly or indirectly in any war Each plate shall be numbered in sequence. The number shall be marked by indelible ink on the plate to permit easy reassembly. The plates shall be pressed from one piece. They shall be pressed in single/ progressive manner. प्रत्यक्ष The corrugation shall be smooth, uniform, and identical for every plate. भारत हेवी एलेक्ट्रिक्स निमिटेड की सम्पत्ति है इपका तरह प्रयोग जो कि कम्पत्ती के हित में हानिकारक हो न जाय। The PHE bottom frame plate and support should have fixing jigs and cleats to keep provision for enabling to fit through with outlet nozzle fitted underneath to collect and drain water in the event of leakages. स्वत्वाधिकार एवं गोपनीय ई मूचना किसी भ त प्रलेख में ही गई E DATE े एवं हस्ताबर & DAT हिनाक । SIGN निर्माणकर्ता Tramender **JHAMENDER** WORKED BY 20-12-21 सामग्री सूची संख्या INVENTORY NO KUMAR REV. NO: .00 जांचकर्ता DK YADAV CHECKED BY hoon 20.12.21

HE 57075 मी एम ई एम PRODUCT STANDARD दिनाक एवं हानावार SIGN & DATE HEAT EXCHANGER ENGINEERING पष्ट 13 का 4 Page 4 of 13 SUPERSEDES INVENTORY NO. Frame for each of heat exchanger shall have extra capacity to accommodate the additional plates. मामग्री मूची मंद्रता को अधिक्रमित करता है The upper carrying bar and lower guide bar shall be rigid in construction without any risk of sagging or buckling and shall facilitate easy guiding of the plates. The nozzle sizes of primary/secondary streams of PHE's shall be of adequate COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of Bharat Heavy
Electricals Limited It must not be used directly or indirectly in any widelimental to the interest of the company size within acceptable range of velocity. The size selection shall be subject to approval in the event of order If necessary, relief valves shall be provided on both the streams. 5.3 Technical Data : ASTM A240TYPE as per enquiry Material plates and connection : Neoprene, Non-glued Material gasket Data Sheet AS PER PROJECT SPECIFIC DESIGN INPUT न होंगी एनेन्ट्रिकनम निमिद्ध की सम्मनि है इसका प्रत्यक्ष प्रयोग जो कि कमानी के द्वित में हानिकारक हो न किया जाय। स्वत्वाधिकार एवं गोपनीय मारत तरह प्र 計画 H

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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

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6.0 Quality Assurance, Inspection and Testing

- 6.1 The Manufacturer shall conduct all tests required to ensure that all the major component of the cooler offered confirm to the requirements of the specification and is in compliance with requirements of applicable codes and standards.
- 6.2 The bidder shall submit quality plan along with his offer.
- 6.3 The particular of proposed shop tests and procedures for the test shall be Submitted to BHEL/owner for approval along with quality plan.
- 6.4 The minimum tests /checks to be carried out on the cooler as envisaged by BHEL are given below. This is however not intended to form a comprehensive testing program, as it is supplier responsibility to prepare the detailed quality plan, which also include tests/checks carried out by supplier as a part of his normal practice. This quality plan is subject to the approval of BHEL /owner and BHEL/owner reserve to right to ask for any more checks at the time of quality plan finalization.
 - 6.4.1 Testing of material: The material of major component shall be tested as per relevant specification for its chemical composition and mechanical properties viz. Y.S, UTS, Impact, % age elongation. Suitable NDT to ensure freedom from surface and subsurface defect shall be carried out.

Plate material used for pressing shall be furnished with mill test report showing chemical and physical properties and heat treatment records.

The following tests shall be carried out during various stages of manufacturing at Manufacturer's works.

6.4.1.1 All the component parts of the cooler including assembly shall be subjected to dimensional and visual inspection. After pressing visual and dimensional checks on the plates shall be made in the presence of BHEL's inspector, on sampling basis.

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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

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Bidder to note that heat transfer area measured by white light scanning during contract stage should not have negative tolerance more than 3% w.r.t to the heat transfer area indicated by bidder against the offered mode of PHE. However, in the case of negative tolerance (limited to maximum 3%). Bidder has to provide additional plates proportionately, as free issue assembled into all the applicable PHE'S before the final inspection and as built certificate shall be issued by the bidder accordingly. Bidder to note that negative tolerance beyond three percent shall not be accepted.

- 6.6 The heat transfer plates from each lot of the plates shall be tested by liquid/dye penetrant test in order to check for cracks and other surface defects in presence BHEL/BHEL nominated third party If any defect is detected in any of these plates, the whole lot shall be tested and plates without defects only shall be accepted. Plate cleaning agent, liquid penetrant and developer shall not contain any halogen.
- 6.7 The heat transfer plates shall be tested by light box in order to check for cracks and other surface defects in presence of BHEL/BHEL nominated Third party. The plates without defects only shall be accepted.

Gaskets:

Certificate on chemical composition of the gasket material shall be furnished to prove the quality sample testing in presence of BHEL's inspector, if desired. Shore hardness test shall be conducted on the gasket and certificate shall be furnished.

Visual and dimensional check on a sampling basis shall be done. Plates and gaskets assembled together will be inspected for proper assembly.

Frame assembly:

All materials for various components of frame assembly viz. frame plate, pressure plate, carrying bar, guide bar, tightening/clamping bolts and nuts etc. shall be tested quality and test certificates for chemical composition and physical properties shall be furnished

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PRODUCT STANDARD HEAT EXCHANGER ENGINEERING

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9.0 SUPPLY OF TECHNICAL DOCUMENTATION

- 9.1 The following documents shall be submitted along with quotation for technical scrutiny in 2 copies each
 - a) Catalogue and detailed literature including cross-sectional and assembly drawing of the cooler stating all necessary dimensions, design and test Pressure details, material details of all component parts etc.
 - b) Calculation for cooler sizing. Technical data like element capacity, total number of plates, heat exchanger area, cooling water flow rate, cooling water pressure drop, cooling water outlet temperature, oil pressure drop etc shall be furnished.
 - c) O & M manual of the cooler giving complete description installation, operation, maintenance feature including trouble shooting.
 - d) List of recommended spares along with item wise price.

The tenderer shall submit during contract stage a curve showing expected Turbine Oil (primary side) temperature at heat exchanger outlet for each one-degree centigrade variation in DM water (secondary stage) temperature, all other parameters remaining unchanged.

Similar curve for expected Oil temperature outlet temperature for variation of DM water flow rate with DM water inlet temperature remaining unaltered shall also be furnished. The bidder shall also furnish various curves to enable apply corrections during site PG testing in the event of any data variation from the stipulated design parameters

Bidder shall also furnish thermal design calculations at contract stage to justify the no. of plates offered.

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- 11.3 A tag bearing the material code of BHEL shall be attached to each cooler.
- 11.4 Marking of the packing case
 - a) Manufacturer's name or trade mark
 - b) B.H.E.L order No.
 - c) BHEL product standard No.

PACKING

Each cooler shall be drained, cleaned and packed in such a way as to avoid the possibility of damage to inside and outside parts during storage and transit. Opening should be covered to exclude dirt and other foreign material. Threaded and mechanical surfaces shall be well covered with an approved rust preventive material

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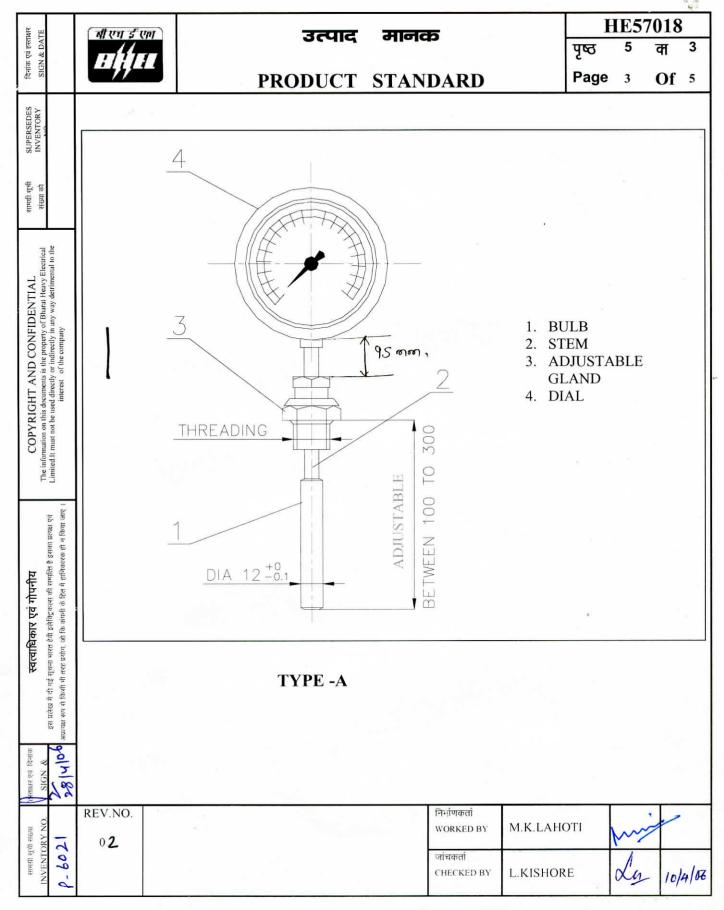
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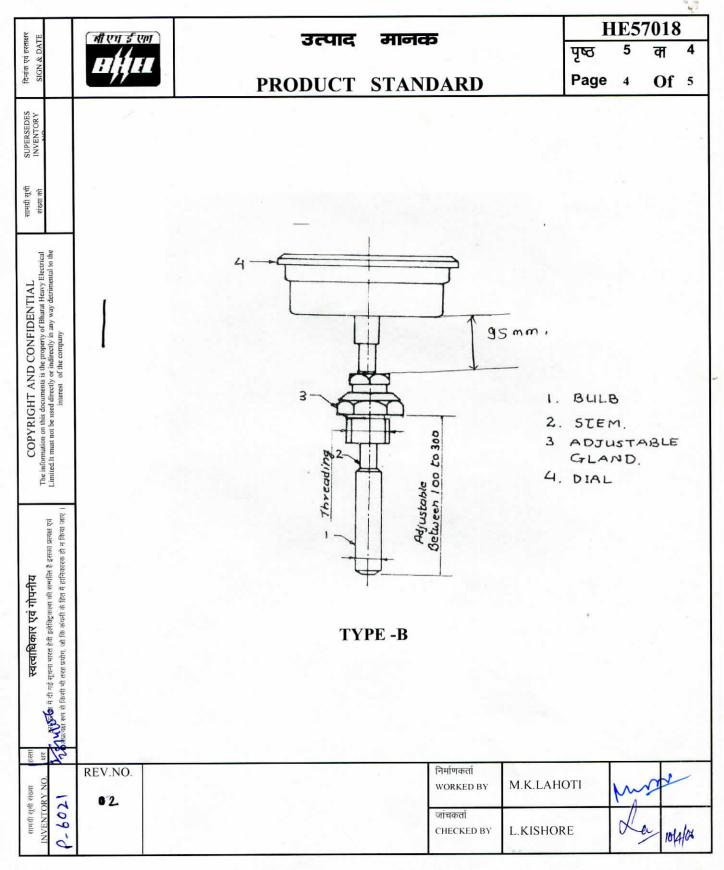
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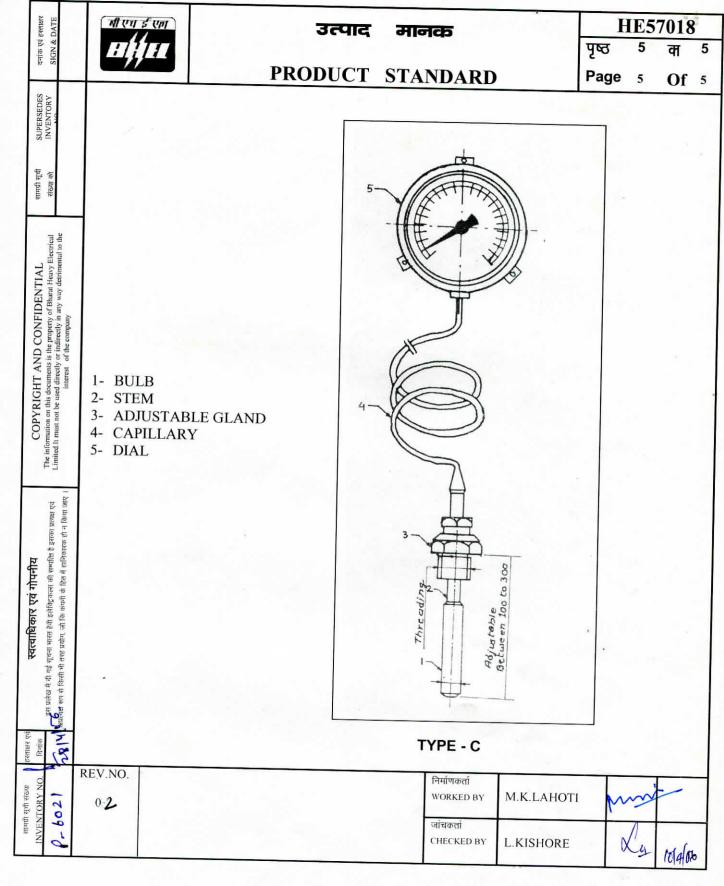
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The information on this document is the property of Bharat Heavy
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विवरण के लिए देखें मानक संख्या HW0425199, (FOR DETAILS REFFER PLANT STANDARD HW0425199)

19)	जिमार्णकर्ता WORKED BY	CODES FOR REASON	HE 57018		ROUTE (7a)	अभिकल्प द्स्तावेज सं DESIGNATION (DRAWING No.etc) (7)		सीरवर्ड एत	डॉक्युमेंट सरवर पर मोचित्र कर दी गई हैं। DOCUMENT RELEASED FROM SERVER/ CTA	
Bushouls Scelaric Kurmar	NAME	N OF CHANGE	1		REVISED SHEET. NOs. (8)	संशोधित पृष्ठ	コンプンメア	संशोद CHAN	पर मोचित्र व EASED FROM	
THE THE	हस्ताक्षर SIGN	S:- 01- ENGINI TS, 05- TO ME	\$		(9)	संशोधन संख्या REV. NO.		न संशोधन सूचना संख्या CHANGE ADVICE NO.	र दी गई है। SERVER/C	
Businale (July). 28.06.21 (Scelan AMM). 28.06.21	दिनांक DATE	ERING ERROR	, W		OF CHANGE	संशोधन का कारण क्ट्	20	ख्या NO.	ΓA -	
	आिशयांत्रिकी ENGG.	INCLUDING D.				5.		4.5		
	प्रौद्योगिकी TECHNOLO- GY	O. ERRORS, 02- DE ATIONS, 06- TO SL		1	PS.		HXE	जारीव ISSU	हस्ता SIG	
	क्वालिटी QUALITY	SIGN UPGRADITION			जैसा है AS IT EXISTS			जारीकर्ता विभाग ISSUING DEPTT.	हस्ताक्षर दिनांक SIGN & DATE	
	AGREED सहमति जिग एवं दूल वेल. विभाग था	N (INCLUDING ADDIT			(11)	संशोधन का विवरण DETAILS OF REVISION		(2)		
	सहमति वेल. प्रांधोगिकी WELDING TECHNOLOGY	STATUTORY REQUIRE		Stemdard real		Hoey mone has	- Inert Ga		डॉक्युमेंट सरवर पर DOCUMENT DEPO	7.0
	केन्द्रीय संयंत्र प्रयोग CPL	DESIGN REVIEW INC		Shundard reaftirmed without	जैसा होना चाहिए AS IT SHOULD BE	ekar	Inert Gas actuated	उत्पाद का प्रकार TYPE OF PRODUCT	क्युमेंट सरवर पर जमा कर दी गई है DOCUMENT DEPOSITED IN SERVER	
	(20) अन्य विभाग отнек рертт.	CE DAMAGED/ TURN	,	without	(12)	9	dia	(3)	दी गई है। I SERVER	
(CTA) (22) प्राप्त कर्ता RECEIVED BY STANDARDS (23) प्राप्त कर्ता RECEIVED BY (CTA) (24) पुरुष्ठ सं SHEET NO (25)	निस्तारणकर्ता RELEASED BY STANDARDS (21) जारी कर्ता ISSUED BY	DE TO CHANGE ADVIC		2	(13)	प्रभार्य मद संख्या CHARGEABLE HEAD NO.		जीएमएस/जीआ रएसपी/सीबोम सं GMS / GRSP /CBOM No. (4)	हस्ताक्ष SIGN	Σ
	NAME NAME	CODES FOR REASON OF CHANGES:- 01- ENGINEERING ERROR INCLUDING D.O. ERRORS, 02- DESIGN UPGRADITION (INCLUDING ADDITION OF VARIANT),03- DESIGN REVIEW INCLUDING CHANGES DUE TO CHANGE ADVICE IN OTHER DOCUMENTS, 04- TO MEET MANUFACTURING REQUIREMENTS, 08- TO MEET TECHNOLOGICAL MODIFICATIONS, 06- TO SUIT CUSTOMER DEMANDS, 07 TO SUIT STATUTORY REQUIREMENTS, 08 TO REPLACE DAMAGED/ TURN OUT ORIGINALS BY A FRESH ORIGINALS, 09- ANY OTHER			CB S	-\$1 - 3ykGk सीबोम/जीव्यंष्ट्रींस, जीआरएसपी की प्रकारांतर सं	भी मा प्रमुखं	मुद्रण वितरण दिनांक PRINT DELIVERY DATE		प्रपत्र डीजी ४१(डी)
多大艺	SIGN SIGN	NTS, 04- TO MEET - ANY OTHER			OTHER CBOM /GMS NOS./ GRSP NOS./ CBOM NOS. WHERE APPLICABLITY (15)		A I	1	संशे CHANGE) FORM DG
27/(1)(2) 29/10/2024	OK DATE OK DATE				(16)	अन्य साबाम Heal Exchanger Engg.) Alurett स SAMICKHER, HASEBOWAR SMINICKHER, HASEBOWARKS सिबोम सं जहां	हीर एक्सवेजा अभियात्रि	tellefilation proved BY	प्रपत्र VICE FORM	3 41(D) 3.