
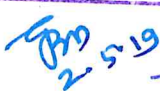


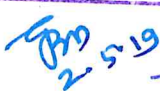


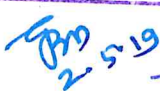



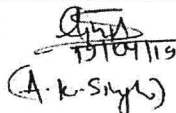
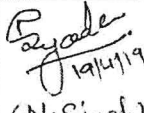
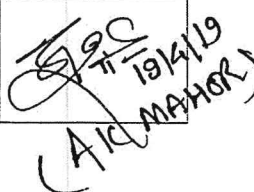


MAIN SUPPLIER'S NAME: BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL (A GOVERNMENT OF INDIA UNDERTAKING)											
NAME OF SUB-VENDOR: N/A											
NPCIL PO NO.: CMM/FTP/10-33-1-1149/e-PO/30599, DTD: 25.01.19											
QA REF. NOS.: MAIN VENDOR: 2190190 SUB VENDOR: N/A											
CUSTOMER: NUCLEAR POWER CORPORATION OF INDIA LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)											
PROJECT: 2x700MW GORAKHPUR HARYANA ANU VIDYUT PARIYOJANA (UNIT 1&2)											
EQUIPMENT: D2O HEAT EXCHANGERS											
DOCUMENT NO.:BH/EL/NPCIL/30599/SS DISHED END/CDE-19-3415											
TITLE: TECHNICAL SPECIFICATION FOR SS DISHED END											
<div style="border: 1px solid black; padding: 5px;">  न्यूक्लियर पावर कॉर्पोरेशन ऑफ इंडिया लिमिटेड Nuclear Power Corporation of India Limited </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <input checked="" type="checkbox"/> अनुमोदित / APPROVED <input type="checkbox"/> सिफ़रों के अनुसार अनुमोदित / APPROVED AS NOTED <input type="checkbox"/> संशोधन को आगे बढ़ाएं / रोके / PROCEED WITH/HOLD FABRICATION <input type="checkbox"/> अंतिम ट्रांसपेरेंसी एवं प्रिंट भेजें / SEND FINAL TRANSPARENCIES & PRINTS <input type="checkbox"/> संशोधन करें एवं अनुमोदन के लिए पुनः प्रस्तुत करें REVISE & RESUBMIT FOR APPROVAL </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">जांचकर्ता / CHECKED BY</th> <th style="width: 33%;">समीक्षाकर्ता/ REVIEWED BY</th> <th style="width: 33%;">अनुमोदन कर्ता / APPROVED BY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">  25/19 </td> <td style="text-align: center;">  25/19 </td> <td style="text-align: center;">  25/19 </td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;"> किए जानेवाले कार्य का अनुमोदन आपूर्तिकर्ता संविदाकार को निर्दिष्टताओं के अनुसार आपूर्ति करने के उत्तरदायित्व से मुक्त नहीं करता है। This approval of the work to be done does not relieve the supplier of the responsibility of supply according to specifications. </p>						जांचकर्ता / CHECKED BY	समीक्षाकर्ता/ REVIEWED BY	अनुमोदन कर्ता / APPROVED BY	 25/19	 25/19	 25/19
जांचकर्ता / CHECKED BY	समीक्षाकर्ता/ REVIEWED BY	अनुमोदन कर्ता / APPROVED BY									
 25/19	 25/19	 25/19									


	CONDENSER & HEAT EXCHANGER ENGG. DIVISION BHEL BHOPAL	Document No.
		BHEL/NPCIL/30599/SS DISHED END/CDE-19-3415
TECHNICAL SPECIFICATION FOR SS DISHED END		

REVISION CONTROL SHEET

BHEL				
REV. No Date	Description of Revision	Prepared By	Checked By	Approved By
00, 08.03.2019	Original submission	-Sd- (ARUN KUMAR)	-Sd- (N.SINGH)	-Sd- (A.K.MAHOR)
01, 19.04.2019	Document revised in line with NPCIL comments dated 26.03.2019	 (A.K. Singh)	 (N. Singh)	 (A.K. MAHOR)

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TECHNICAL SPECIFICATION FOR SS DISHED END		

1.0 Description

Dished end shall be formed by cold forming process from the single piece plate blanks, edge prepared pickled & passivated as per the requirements indicated in the dished end drawing attached with enquiry/purchase order.

2.0 Shape - 2:1 Ellipsoidal as per drawing.

3.0 Size - As per drawing.

4.0 Code of Construction

As per ASME Sec. III ND latest.

5.0 Material of Construction

Plates: Stainless Steel plates to SA-240 Gr.304L (as specified on the dished end drawing) with co-related mill test certificates shall be supplied by BHEL.

6.0 Heat Treatment

Dished ends shall be solution annealed after forming along with the test coupon as per approved heat treatment procedure. Test coupons shall be cut from the same plate which is used for forming of dished ends.

7.0 Tolerance

As per clause ND-4222 of ASME Sec III-ND unless otherwise specified.

8.0 Forming Process Qualification


Procedure qualification test shall be conducted on test coupons same as portion of component. These coupons shall be subjected to same forming process (maximum forming or bending, strain and heat treatment). The applicable tests shall be conducted to determine the tensile properties as per material specification. The forming procedure and material sampling & testing plan shall be submitted for NPCIL approval prior to forming / bend qualification. IGC testing as per practice E shall be carried out after heat treatment.

9.0 Edge Preparation

As per details given in item drawing.

10.0 Minimum Thickness after Forming

Minimum thickness resulting from the forming (after forming) process shall be in compliance to the requirements indicated in the item drawing.

	CONDENSER & HEAT EXCHANGER ENGG. DIVISION BHEL BHOPAL	Document No.
		BHEL/NPCIL/30599/SS DISHED END/CDE-19- 3415
TECHNICAL SPECIFICATION FOR SS DISHED END		

11.0 Non-Destructive Examination & Testing

- 11.1 **Liquid penetration Examination:** Entire outside surface of formed Dished Ends (both crown & knuckle portion) & the edge prepared ends shall be checked by dye penetration examination as per Article 6 of ASME Sec V & respective ASTM standard; latest edition.
- 11.2 Only NPCIL approved penetrant & developer agent shall be used.
- 11.3 Application of penetrant and developer from aerosol type spray cans is preferred.
- 11.4 The temperature of the area to be examined shall be between 16°C and 52°C.
- 11.5 All traces of penetrants and of developer shall be removed from the work immediately after the completion of examination.

12.0 Cleaning & Protection

After completing the manufacturing activities, cleanliness of both inside & outside surface of the dished ends shall be ensured by sand/shot blasting. Cleaned dished ends shall be Pickled and passivated of as per approved procedure from NPCIL.

13.0 Identification

Identification numbers shall be punched on each dish-end (DE) for proper identification & correlation with test certificates. Identification numbers to be punched respectively on each dished end, are indicated in the drawing / Purchase order.


Each Dished End to have at-least following identifications duly punched on the dished end surface, at the location marked in the drawing & shall have same marking in the Test Certificates also for correlation of TC with the respective dished ends;

- a. BHEL Purchase Order No.
- b. Drawing No. with rev.no. & Item no.
- c. Identification mark, DE no.
- d. Inspecting Officer's Seal.

14.0 Inspection

Vendor to submit Quality Plan for approval.

Dished ends shall be inspected by NPCIL-QS, as per approved QA Plan.

	CONDENSER & HEAT EXCHANGER ENGG. DIVISION BHEL BHOPAL	Document No. BHEL/NPCIL/30599/SS DISHED END/CDE-19- 3415
TECHNICAL SPECIFICATION FOR SS DISHED END		

15.0 Test Certificates

Six (6) copies of following Test Certificates duly signed by inspection authority shall be furnished.

- a. Test Certificates for Testing of Test Coupons as per clause 8.0*
- b. Final Dimensional Measurement Report.*
- c. Heat Treatment Chart, if applicable.*
- d. Non-Destructive Examination Reports.*
- e. Dispatch Clearance from NPCIL-QS.*

16.0 Quality Plan

Vendor to furnish quality plan indicating manufacturing sequence, identifying the testing involved & inspection stages for the offered dished ends. Manufacturing shall be carried out as per NPCIL approved Q.A. Plan.