

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.: BHEL / NPCIL / 30599 /ALLOY STEEL & SS FASTENERS/ CDE-19-3436					
TITLE: TPS FOR ALLOY STEEL & SS FASTENERS AS PER SA 194 Gr. 7 & 2H, SA 193 Gr. B7, AISI 304L, SA 320 L 43, SA 479 Gr 304 L					

☒ अनुमोदित / APPROVED *with minor comment*
☐ दिखानी के अनुसार अनुमोदित / APPROVED AS NOTED
☐ संशोधन को आगे बढ़ाएं / रोकें /
 PROCEED WITH/HOLD FABRICATION
☐ अंतिम ट्रांसपैरेन्सी एवं प्रिंट्स भेजें /
 SEND FINAL TRANSPARENCIES & PRINTS
☐ संशोधन करें एवं अनुमोदन के लिए पुनः प्रस्तुत करें
 REVISE & RESUBMIT FOR APPROVAL

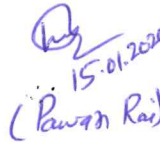
जाँचकर्ता / CHECKED BY	समीक्षाकर्ता / REVIEWED BY	अनुमोदन कर्ता / APPROVED BY
 7-2-2020	 21/2/2020	 7/2/2020

किए जानेवाले कार्य का अनुमोदन आपूर्तिकर्ता संविदाकार को विनिर्देशनों 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.

02	15.01.2020	2+3=5	 15-01-2020	 15/1/2020	 15/1/2020
01	23.07.2019	2+2=4	-Sd-/Pawan Rai	-Sd-/ N.Singh	-Sd-/ A.K.Mahor
00	18.06.2019	2+1 = 3	-Sd-/Debesh Audh	-Sd-/ N.Singh	-Sd-/ A.K.Mahor
REV NO.	DATE	PAGES	PREPARED BY	CHECKED BY	APPROVED BY

	CONDENSER & HEAT EXCHANGER ENGG. DIVISION BHEL BHOPAL	Document No.
		BHEL / NPCIL / 30599 / ALLOY STEEL & SS FASTENERS / CDE-19-3436
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REVISION CONTROL SHEET

BHEL					
REV. No Date	PAGES	Description of Revision	Prepared By	Checked By	Approved By
00, 18.06.2019	2+1=3	Original submission.	-Sd- Debesh Audh	-Sd- N.Singh	-Sd- A.K.Mahor
01, 23.07.2019	2+2=4	Revised based on NPCIL comments dtd 27.06.2019	-Sd- Pawan Rai	-Sd- N.Singh	-Sd- A.K.Mahor
02 15.01.2020	2+3=5	Revised based on NPCIL comments dtd 06.08.19. Material Gr. SA194 Gr 8, SA193 Gr B7 deleted. Testing matrix added.	 15.01.2020 (Pawan Rai)	 15/01/2020 (N. Singh)	 15/01/2020 (ASHOK MAHOR)

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TPS FOR ALLOY STEEL & SS FASTENERS AS PER SA 194 Gr. 7 & 2H, SA193 Gr. B7, AISI 304L, SA 320 L 43, SA 479 Gr 304 L		

1. Material Specification:

Studs/Bolts/Dowel Pin: SA-193 Gr. B7, SA-193 Gr. B8, SA-320 L 43

Nuts: SA-194 Gr. 7, SA-194 Gr. 8, SA-194 Gr. 2H, AISI 304L, SA 479 Gr. 304L

Material Specification shall be as per the specification mentioned above & shall confirm to common requirements for fasteners (SA962/SA962M) of ASME Section II Part-A; ED 2017

2. Quantity / Size :

As per Drawing / Purchase Order.

3. Condition:

The material shall be supplied in hot rolled or hot forged condition.

4. Dimensions and Tolerances:

- Dimensional Tolerances shall be as per respective material specification.

5. Chemical Composition:

- Chemical composition shall be as per respective material specification.

6. Heat Treatment:

- All fasteners shall be in heat treated as per respective material specification.

7. Hardness Requirement:

- Hardness shall be as per respective Material Specification.

8. Impact Test Requirement:

- Material shall be Charpy V-Notched Impact tested at 18°C as per ASME SEC.III, DIV.1 ED 2017; SUB SEC. – ND-2321.
- Location and Orientation of Impact test specimens shall be as per ASME SEC.III, DIV.1 ED 2017; SUB SEC. ND-2322.
- No. of test shall be carried out as per ASME SEC.III, DIV.1 ED 2017, SUB SEC. ND-2340.

9. Making:

Product marking shall be as per respective material specification and shall co-relate with test certificate provided.

10. Test Report Required:

- MTR shall comply with the material specification.

11. Additional Requirements:

- Studs shall be threaded as per approved drg & Nuts shall be of heavy series. Other requirement shall be carried out as per material specification.
- The areas of threads, shanks, heads of final machined parts shall be visually examined. Harmful discontinuities such as laps, seams or cracks that would be detrimental to the intended service shall be unacceptable.
- All fasteners shall be examined as per ASME SEC. III, DIV.1; ED 2017- SUB SEC. –ND-2580.
- Product Analysis shall be carried out & shall comply with the material specification.

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12. Inspection at source:

- a) Vendor has to submit fasteners manufacturing QAP for Approval.
- b) Material shall be inspected by NPCIL /BHEL as per Approved QAP.

13. Testing Matrix

01

PRODUCT FORM	MATERIAL GRADES	SUPPLY CONDITION	TESTING AS PER SECTION II-A														ADDITIONAL TESTING AS PER SECTION-III NB/ NPCIL'S SPEC (*)				SIMULATI ON
			CHEMICAL (HEAT & PRODUCT)	TENSILE	HARDNESS	GRAIN SIZE	IGC	IMAPCT	BEND TEST	PROOF LOAD & CONE PROOF LOADS	REVERSE BEND TEST	FLATTENING TEST	REVERSE FLATTENING TEST	FLARING TEST	FLANGE TEST	HYDRO TEST (OR NDE L.E. UT,ET OR FLE)	FRACTURE TOUGHNESS (RTNDT)	UT	MT PT	OR	
FASTENERS	SA194 GR.7	AS PER CL.6.4	AS PER TABLE-1	-	AS PER TABLE-2	-	-	-	-	AS PER CL. 8.2 & 8.3	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-
	SA194 GR.2H	AS PER CL.6.4	AS PER TABLE-1	-	AS PER TABLE-2	-	-	-	-	AS PER CL. 8.2 & 8.3	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-
	SA193 GR.B7	AS PER CL . 5	AS PER TABLE-1	AS PER TABLE-2	AS PER TABLE-2	-	-	-	-	-	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-
	SA 320 L 43	As per cl 4	As per table 3	AS PER TABLE-1	AS PER TABLE-1	-	-	AS PER CL. 6.2	-	-	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-
	SA 479 Gr. 304L	AS PER cl 4	AS PER TABLE-1	AS PER TABLE-2	-	-	As per ASTM-A- 262	-	-	-	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-
	AISI 304 L / SA 276 Gr 304L	AS PER cl 4	AS PER TABLE-1	AS PER TABLE-2	-	-	As per ASTM-A- 262	-	-	-	-	-	-	-	-	-	FOR DIA>25MM- AS PER NB 2300 (RTNDTs- 15°C)	FOR DIA >50MM AS PER NB 2585	FOR DIA >25MM AS PER NB 2583	FOR DIA >25MM AS PER NB 2584	-

(*): applicable for fasteners of RGCL only.