	Enquiry No. 4421297E dated 10.02.2023
---	--

Annexure- A

Sl No.	Item Description	QUALITY PLAN	Thickness of material (MM)	QTY (MT)	Unit Covered
1	Aluminum Sheet (In coil form) as per Technical Specification No: TEP:BAP:AL:SHEET:Rev00 dated 08.05.2018	SQP:ESP:292 Rev 02 dt 11.05.2020	0.711	253	BAP Ranipet & HPBP Trichy
2			0.914	157	
3			1.00	120	
4			1.20	210	
5			1.60	32	
GRAND TOTAL				772 MT	


1. ASTM E1251-2017 for chemical composition analysis is also acceptable for Clause 2.01.03 of BAP Specification TEP: BAP:AL: SHEET Rev 00.
2. Clause No. 2.2 & 3.5 of BAP SQP: ESP:292: Rev:02 is not mandatory.
3. Clause No. 4.1,4.2 & 4.3 of BAP SQP: ESP:292: Rev:02 and Clause 6.01.00 & 6.03.00 of BAP Specification TEP: BAP:AL: SHEET Rev 00 are indicative. However, Bidder to confirm the following minimum requirement.
 - a. Marking: Grade/Alloy, Thickness, Width, Length, Temper, Batch No. or Lot No.
 - b. Packing: Packing ensuring no damage to material in transit and handling.

QUALITY REQUIREMENTS:

4.1	QAP	QAP mentioned in annexure-A shall be followed by Supplier
4.2	INSPECTION BEFORE DESPATCH	To be done at vendor's Works before Dispatch by BHEL / BHEL's Authorized Inspection Agency AIA / BHEL's customer / Customer appointed Inspection Agency
4.3	TEST CERTIFICATE	Required for Mechanical and Chemical properties.
4.4	TEST REPORT / INSPECTION REPORT	Shall be submitted along with BHEL Inspection reports in triplicate to BHEL

We hereby confirm supply shall be in line with above technical and quality requirement.

Supplier's Seal and sign

	TITLE STANDARD TECHNICAL SPECIFICATION FOR ALUMINIUM CLADDING SHEETS	SPECIFICATION No: TEP:BAP:AL:SHEET VOLUME SECTION REV. NO. 00 DATE: 08.05.2018 SHEET 1 OF 2
---	--	---

1.00.00 GENERAL

This specification covers the requirements for supply of Aluminium sheet for using it as cladding or protective covering over Thermal insulation.

2.00.00 CODES & STANDARDS

- 2.01.01 Manufacturing, physical & chemical properties, inspection and testing of Aluminium sheets to be supplied under this specification shall conform to the latest edition of the following codes and standards.
- 2.01.02 **IS:737 (latest revision)** Specification for wrought aluminium and aluminium alloy sheet and strip for general engineering purposes / **ASTM B209 (latest revision)** Standard Specification for Aluminium and Aluminium-Alloy Sheet and Plate.
- 2.01.03 **IS:504 (latest revision)** Methods of chemical analysis of aluminium and its alloys / **ASTM E34 (latest revision)**.
- 2.01.04 **IS:1608 (latest revision)** Metallic materials - Tensile testing at ambient temperature / **ASTM-B209 (latest revision) Table 2**.
- 2.01.05 **IS:2676 (latest revision)** Dimensions for wrought aluminium and aluminium alloys, sheet and strip/**ANSI H 35.2 (latest revision)**.
- 2.01.06 **IS:5052 (latest revision)** Aluminium and its alloys - Temper designations. / **ANSI H35.1 (latest revision)**.

3.00.00 MATERIAL REQUIREMENTS:

3.01.00 FORM

The aluminium sheets to be supplied shall be in coil form and with **Mill Finish**.

3.02.00 FREEDOM FROM DEFECTS

The material shall be sound and free from harmful defects for the intended application.

3.03.00 DESIGNATION AND CONDITION

The designation and the condition of the material shall be in line with **IS:737 Gr. 19000 H2 (AA1200H14/AA1100H14) (latest revision)** or **ASTM B209 – 1060 Temper H-14(latest revision)**.

3.04.00 CHEMICAL COMPOSITION

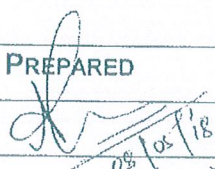
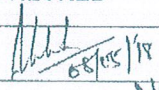
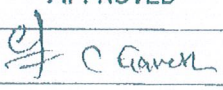
The material when analyzed as per **IS 504 (latest revision)** or any other instrumental/chemical method shall conform to the requirements as given in **Table 1 of IS:737 (latest revision) / Table 1 of ASTM B209 (latest revision)**.


3.05.00 MECHANICAL PROPERTIES

3.05.01 TENSILE TEST

The material when tested in accordance with **IS:1608 (latest revision)/ ASTM B209 (latest revision)** shall conform to the values given in **Table 2 of IS:737 (latest revision) / Table 2 of ASTM B209 (latest revision)**.

I.D.B. RAJU 22/05/18
 Dy. Manager / Engineering
 BHEL / Piping Centre,
 T. Nagar, Chennai-600 017.

PREPARED	CHECKED	APPROVED
 08/05/18 (A. V. Venkatesh)	 08/05/18 (M. K. Nataraj)	

	TITLE		SPECIFICATION No: TEP:BAP:AL:SHEET	
	STANDARD TECHNICAL SPECIFICATION FOR ALUMINIUM CLADDING SHEETS		VOLUME	
			SECTION	
			REV. NO. 00	DATE: 08.05.2018
			SHEET 2	OF 2

3.05.02 BEND TEST

When tested in accordance with the method prescribed in **IS:737 (latest revision)/ ASTM B209 (latest revision)**, the outer surface of the bend shall not show any visible crack.

4.00.00 DIMENSION AND TOLERANCES

4.01.00 The width of the aluminium sheet shall be **900 to 1500 mm.** (uniform for the entire lot of supply). BHEL will confirm the same in the Purchase Orders.

4.02.00 Standard thicknesses of the aluminium sheet will be **0.415, 0.56, 0.71, 0.91, 1.00, 1.22, 1.6 mm.** (The exact requirement of thickness and the quantity (weight in MT) will be indicated specifically in the Purchase Orders).

4.03.00 Tolerances on width & sheet thickness shall be as per **IS:2676 (latest revision) / ASTM B209 (latest revision)**.

5.00.00 INSPECTION AND TESTING

5.01.00 The material sampling shall be done as given in **IS:737 (latest revision)/ ASTM B209 (latest revision)**.

5.02.00 The material to be supplied under this specification shall be of tested quality. Inspection and testing of Aluminium sheets shall be carried out as per the requirements of **IS:737 (latest revision) / ASTM B209 (latest revision)**. Manufacturer's test certificate indicating all the chemical composition and mechanical properties shall be furnished.

5.03.00 All test certificates shall be submitted in ORIGINAL for BHEL / CUSTOMER review and based on the satisfactory test results, Material Despatch Clearance Certificate (MDCC) will be issued.


6.00.00 PACKING AND MARKING

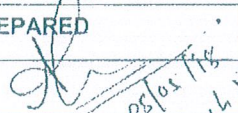
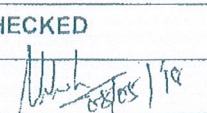
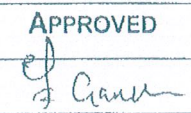
6.01.00 The material will have to be packed in polythene-lined hessian and covered with metallic sheets. Wooden saddle supports for each coil to be provided and finally the coils needs to be strapped with metallic bands suitably. Material shall be packed in such a manner so as to prevent damage in ordinary handling & transport. ***The edges of the coils (Both ID and OD) to be reinforced with metallic circular rings to avoid damage while handling. For First time supplies – packing drawing to be approved by BHEL prior to manufacture.***

6.02.00 Each package shall contain only one size of material.


6.03.00 Each package / coil shall be suitably marked with a tag for identification as given below: (legibly written - preferably at two locations for easy identification).

- | | |
|---|-----------------|
| a) BHEL's Purchase order number | b) Project Name |
| c) Name of the manufacturer & Country of Origin | |
| d) Material grade & condition | |
| e) Sheet thickness | |
| f) Weight of the contents | |

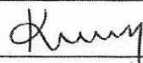

I.D.B. RAJU 22/05/18
 Dy. Manager / Engineering
 BHEL / Piping Centre,
 T. Nagar. Chennai-600 017.


PREPARED	CHECKED	APPROVED
 22/05/18 (A. K. Mahapatra)	 22/05/18 (A. K. Mahapatra)	

BAP-PURC0SESP/30/2021-BAP-9750_ELEC

	BHEL – Ranipet - 632 406, India.	DOC No: SQP:ESP:292 Rev:02
	Quality Assurance Department	Effective Date: 11/05/2020
	QWI Type: Standard Quality Plan	Page: 1 of 2
	Title: Plain Aluminum Cladding Sheet	

Applicability: Tick (✓) suitable below listed product(s) to which this QWI is applicable.											
APH/GGH	CHM	DES	ECI	ESP	FAN	FGD	FIL	G & D	WEG	GEN	
				✓						✓	

Prepared By Quality Assurance	GOPAKUMAR KS	 11/05/20
----------------------------------	--------------	---

Reviewed by	Signature
Engineering	 11/05/2020 (Mahendra Kumar)
MM / Material Planning (S. DHAKSHNAMOORTHY)	S. Dhakshnamoorthy 11/05/20
Quality Control / Procurement (K. KOVARTHANAN)	K. Kovarthanan 11/5/20

Rev No	Date	Approved by	Signature
02	11/05/2020	VENKANNA RUPANI DM/QA	R. Venkanna 11/05/2020

Record of Revisions


Rev No	Date	Clause No(s)	Details of Revision
02	11/05/2020	1.1	BHEL PO & Technical Specification included.
		2.1, 2.2	BHEL PO, strain hardening & HT included.
		3.1, 3.2, 3.3, 3.4, 3.5	BHEL PO & Technical Specification, Chemical testing, strain hardening & HT included along with changes in quantum of check and format of records.
		4.1, 4.2, 4.3	Quantum of check and format of records included.

Legends:

APH: Air Preheater; GGH: Gas to Gas Heater; CHM: Chimney; DES: Desalination;
ECI: Electrical, C & I, ESP: Electrostatic Precipitator; FAN: Fans;
FGD: Flue Gas Desulphurization; FIL: Bag Filter; G & D: Gates & Dampers;
WEG: Wind Electric Generator; GEN: General.

Proprietary Data - For Internal Use Only

88337592002230 BAP-9750 ELEC

 MANUFACTURER'S NAME & ADDRESS: BHEL: RANIPET & APPROVED SUPPLIERS		STANDARD QUALITY PLAN						DOC NO: SQP:ESP:292 REV NO:02				
		PRODUCT: Plain Aluminum Cladding Sheet						DATE: 11/05/2020				
		SUB-SYSTEM : ESP						PAGE: 2 OF 2				
SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M C/N				M	C	N	
1	2	3	4	5	M C/N	7	8	9 D	**	10		11

1.0 RAW MATERIALS:													
1.1	Rolling Ingot	Chemical Properties	B	TC Review	1 / Cast or Heat	IS: 737 / ASTM B209	IS: 737 / ASTM B209, BHEL PO & Tech Spec*	MTC/ ALC	√	P	V	-	* BHEL Tech Spec:TEP:BAP:AL:SHEET
2.0 INPROCESS CONTROLS													
2.1	Hot Rolling / Cold Rolling / Slitting	Thickness	A	Measurement	1 / Coil	IS: 2676, IS: 737 / ASTM B209 & BHEL PO	Log / IR	-	P	-	-		
		Length / Width	A	Measurement	1 / Coil			-	P	-	-		
		Surface	B	Visual	1 / Coil			IS: 737 / ASTM B209 & BHEL PO	-	P	-	-	
2.2	Condition	Strain Hardening & Heat Treatment	A	Visual	100%	IS: 737 / ASTM B209 & BHEL PO	HT Chart	-	P	-	-		
3.0 FINAL INSPECTION													
3.1	Finished Coils	Thickness, Length / Width	A	Measurement	100 %	1 / Coil	IS: 2676, IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	IR	√	P	W #	-	# 10% Random witness for BHEL QC/BHEL Appointed AIA
3.2		Surface condition and verification of completeness	B	Visual	100 %	1 / Coil	IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	IR	√	P	W #	-	
3.3		Chemical Properties	A	Testing	1 / Cast or Heat	IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	MTC / ALC	√	P	W #	-		
3.4		Tensile Properties – UTS, %Elong, Bend	A	Testing	1 / Coil	IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	ALC	√	P	W #	-		
3.5		Condition - Strain Hardening & Heat Treatment	A	Review	100%	IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	HT Chart	√	P	V	-		
4.0 MARKING, PACKING AND PRESERVATION													
4.1	Marking	Identification along with batch number	B	Visual	100 %	10% Random	IS: 737 / ASTM B209, BHEL PO & BHEL Tech Specification	IR	√	P	V	-	
4.2	Packing	Use of polythene hessasin & covered with metallic sheets	B	Visual	100 %		BHEL PO, Tech Specification & BHEL approved drawing (for first time supplies)	IR	√	P	V	-	
4.3		Reinforcement of edges of coil with metallic rings	B	Visual	100 %		BHEL PO, Tech Specification & BHEL approved drawing (for first time supplies)	IR	√	P	V	-	

Note: 1. Latest editions/versions of the indicated standards & specification shall be used by the suppliers.

LEGEND: * RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
 ** M: MANUFACTURER, C: BHEL QC/BHEL AIA, N: CUSTOMER; P: PERFORM. W: WITNESS, V: VERIFICATION; CLASS: A - CRITICAL; B - MAJOR; C - MINOR;
 MTC- Manufacturer's Test Certificate; IR- Inspection/Test Report; COC: Certificate of Compliance; (R): Routine test; (T)/(Ts): Type test; ALC: NABL Accredited Laboratory Test Certificate