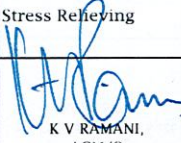
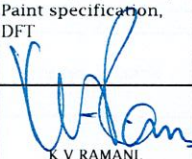


		NPCIL approved sub suppliers	RAW MATERIAL QUALITY PLAN FOR SA106 Gr B PIPES & SA671 Gr CC70 CI 32 PIPES						PROJECT: KUDANKULAM Unit 3&4 - 2x1000 Mwe CUSTOMER : NPCIL MAIN-CONTRACTOR: BHEL-PIPING CENTRE BHEL CUSTOMER Nos: 7430, 7431						
			SYSTEM : PEB (SCHEDULE NO : G.1)		QP No: 7430:QP:RM:01 Rev No: 01 Date : 23.05.2020										
S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS	
					M	C&N					M	C	N		
1	2	3	4	5	6		7	8	9	D*	10			11	
1.0	RAW MATERIAL:														
1.1	Raw material - a) Billet - SA 106 GrB b) Plate - SA 516 Gr70	Steel making process, Chemical & Mech. Properties, Impact test for plate as applicable, NDE* & Heat treatment	Major	Review of Chemical & Mechanical properties	One sample per heat		Applicable Material Specification, SA 20	MTC	✓	P	H	W(R)	* 100% UT for plates of all thickness as per SA578. Acceptance : Level B		
1.2	Welding Consumable	Chemical & Mech. Properties as per ASME Sec II C	Major	Verification	One sample per batch		As per applicable WPS/PQR	As per applicable WPS/PQR	TC	✓	P	H	W(R)		
2.0	INPROCESS CONTROLS:														
2.1	SEAMLESS PIPE:														
2.1.1	Non Destructive Examination - UT	Internal Soundness	Major	UT	100%		ASME E 213	UT report	✓	P	R	W(R)			
2.1.2	Product Analysis	Chemical Properties	Major	Chemical test	As per ASME Spec		As per S1 of ASME SA-106 Gr.B	Test Certificate	✓	P	R	R			
2.1.3	Heat treatment	Soaking time, ROH, ROC etc	Major	Heat treatment	100%		ASME SA-106 Gr.B	ASME SA-106 Gr.B	HT Chart	✓	P	R	R		
2.1.4	Mechanical Test	Tensile Test, bend test and other test as applicable	Major	Tension test	As per ASME Spec		ASME-SA-106 Gr.B	ASME-SA-106 Gr.B	Test Certificate	✓	P	R	R		
 J. NANTHINI, Dy.MGR/QA MAIN CONTRACTOR		 K V RAMANI, AGM/Q MAIN CONTRACTOR	LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER; C:BHEL/BHEL AIA ; N: CUSTOMER-NPCIL. P: PERFORM R:REVIEW OF DOCUMENTS W: WITNESS & 100% REVIEW OF DOCUMENTS H: HOLD POINT W(R): WITNESS BY REVIEW OF DOCUMENTS.					FOR BHEL USE:				FOR NPCIL USE:			
								REVIEWED & APPROVED				REVIEWED & APPROVED			
SIGNATURE															

		NPCIL approved sub suppliers	RAW MATERIAL QUALITY PLAN FOR SA106 Gr B PIPES & SA671 Gr CC70 CI 32 PIPES						PROJECT: KUDANKULAM Unit 3&4 - 2x1000 Mwe						
			SYSTEM : PEB (SCHEDULE NO : G.1)			QP No: 7430:QP:RM:01 Rev No: 01 Date : 23.05.2020			CUSTOMER : NPCIL MAIN-CONTRACTOR: BHEL-PIPING CENTRE BHEL CUSTOMER Nos: 7430, 7431						
S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS	
					M	C&N				D*	M	C	N		
1	2	3	4	5	6		7	8	9	10				11	
2.2 WELDED PIPE :															
2.2.1	Plate cutting layout for pipe rolling	Rolling Direction	Major	Dimensions & Orientation	100%		Approved drawings	Approved drawings	Inspection report	-	P	R	R		
2.2.2	Welding :Welding procedure qualification	Welding parameters, mech. & chem. Properties & soundness of weld	Major	Visual, NDE, Mech. & Chem.	100%		Approved WPS	ASME Sec IX	WPS, PQR	✓	P	W & H	W & H	WPS, PQR shall be furnished for NPCIL approval. Refer Note 1 & 2	
2.2.3	Welder's performance qualification	Position, Soundness	Major	Visual, etching, NDE, Mech. & Chem.	100%		Approved WPQ	ASME Sec IX	WPQ	✓	P	H	V		
2.2.4	Edge preparation & joint fit up	LPI	Major	NDE + Visual	100%		ASME Sec V Article 6		NDT Report	✓	P	R	R		
2.2.5	All Butt welds (LS & CS)	Weld Quality	Major	RT	100%	10%	ASME Sec V Article 2 / ASME Sec III Div.1 NC5320		NDT Report	✓	P	W(R)	W(R)	Review of RT film	
2.2.6	5% of Butt welds	Weld quality	Major	UT	100%		ASME Sec V Article 4 / ASME Sec III Div.1 NC5330		NDT Report	✓	P	V	V		
2.2.7	All butt welds	Root pass and final pass Weld quality	Major	PT	100%		ASME Sec V Article 6 / ASME Sec III Div.1 NC5350		NDT Report	✓	P	V	V		
2.2.8	Weld surface Profile and Smoothness of internal Surface	Check of Smoothness and spatter of weld surface	Major	Visual	100%		Approved procedure	Approved procedure	Inspection report		P	R	R	Refer Note 3	
2.2.9	Heat treatment (after welding)	Stress Relieving	Major	verification	100%		Approved WPS / ASME Sec.III Div.1 NC		HT charts	✓	P	R	R		
 J. NANTHINI, Dy.MGR/QA		 K V RAMANI, AGM/Q		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER; C:BHEL/BHEL AIA ; N: CUSTOMER-NPCIL. P: PERFORM V: VERIFICATION R:REVIEW OF DOCUMENTS W: 10 % WITNESS & 100% REVIEW OF DOCUMENTS H: HOLD POINT & REVIEW OF DOCUMENTS. W(R): WITNESS BY REVIEW OF DOCUMENTS. S:SURVEILLANCE				FOR BHEL USE:				FOR NPCIL USE:			
								REVIEWED & APPROVED				REVIEWED & APPROVED			
SIGNATURE		MAIN CONTRACTOR													

		NPCIL approved sub suppliers	RAW MATERIAL QUALITY PLAN FOR SA106 Gr B PIPES & SA671 Gr CC70 Cl 32 PIPES						PROJECT: KUDANKULAM Unit 3&4 - 2x1000 Mwe CUSTOMER : NPCIL MAIN-CONTRACTOR: BHEL-PIPING CENTRE BHEL CUSTOMER Nos: 7430, 7431					
			SYSTEM : PEB (SCHEDULE NO : G.1)			QP No: 7430:QP:RM:01 Rev No: 01 Date : 23.05.2020								
S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS
					M	C&N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	10			11
2.2.10	Hydro test	Pressure Resistance	Major	Visual	100%	10%	As per SA 530 , SA 999		Inspection report	✓	P	W	W	HOLD POINT
Product Testing (Sample shall be identified from attached coupon plate to pipe per heat/lot)														
2.2.11	a) Product Analysis (Parent&Weld test coupon)	Chemical Properties	Major	Chemical test	Plate : 1 sample per heat ; Weld : 1 sample per heat per 150 meter.		As per S4 of ASME SA-671		Test Certificate	✓	V	W	W	HOLD POINT
	Transverse Tensile test of weld	Tensile strength of weld	Major	Mechanical test	1 sample per heat per 60 meter.		As per ASME SA-671 & ASTM A 370		Test Certificate	✓	V	W	W	HOLD POINT
	Transverse Guided Weld Bend test	Weld ductility	Major	Mechanical test	2 sample per heat per 60 meter.		As per ASME SA-671 & ASTM A 370		Test Certificate	✓	V	W	W	HOLD POINT
	Charpy V Notch Impact test	Toughness	Major	Mechanical test	1 set per heat per 60 meter.		As per ASME SA-671, ASTM A 370 & SA-20	Test Temp: -50°C Min Avg value=15J. Min Individual value=12J.	Test Certificate	✓	V	W	W	HOLD POINT Refer Note 4
3.0 FINAL INSPECTION														
3.1	Overall dimensions, surface condition	Dimensional, visual surface condition straightness, end finish, bevel angle, root face, thickness, length, marking etc.	Major	Measurement	100%	10%	Approved drawings	Approved drawings	Inspection report	✓	P	W	W	HOLD POINT
3.2	Cleaning and Grit blasting, Painting	Surface preparation, Paint specification, DFT	Major	Visual + contamination check , Measurement	100%	10%	If Direct to Site (DTS) : External : Primer of Inorganic Zinc Silicate DFT = 70microns min. Internal : Rust preventive coating or Rust Inhibitor inside.		Inspection report	✓	P	W	V	
J.N.NTHI. Dy.MGR/QA		 K.V. RAMANI, AGM/Q		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER; C:BHEL/BHEL AIA ; N: CUSTOMER-NPCIL. P: PERFORM V: VERIFICATION R:REVIEW OF DOCUMENTS W: 10 % WITNESS & 100% REVIEW OF DOCUMENTS H: HOLD POINT & REVIEW OF DOCUMENTS. W(R): WITNESS BY REVIEW OF DOCUMENTS. S:SURVEILLANCE					FOR BHEL USE:		FOR NPCIL USE:			
MAIN CONTRACTOR		MAIN CONTRACTOR							REVIEWED & APPROVED		REVIEWED & APPROVED		APPROVAL SEAL	
SIGNATURE														

		NPCIL approved sub suppliers	RAW MATERIAL QUALITY PLAN FOR SA106 Gr B PIPES & SA671 Gr CC70 CI 32 PIPES						PROJECT: KUDANKULAM Unit 3&4 - 2x1000 Mwe					
			SYSTEM : PEB (SCHEDULE NO : G.1)			QP No: 7430:QP:RM:01 Rev No: 01 Date : 23.05.2020			CUSTOMER : NPCIL MAIN-CONTRACTOR: BHEL-PIPING CENTRE BHEL CUSTOMER Nos: 7430, 7431					
S.No	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS
					M	C&N				D*	M	C	N	
1	2	3	4	5	6	7	8	9	10	11				
	Cleaning and Grit blasting, Painting	Surface preparation, Paint specification, DFT	Major	Visual + contamination check, Measurement	100%	10%	If Despatch to BHEL Stores : External : Resin type Rust preventive coating. Internal : Rust preventive coating or Rust Inhibitor inside.	Inspection report	✓	P	W	V		
4.0 MARKING, PACKING AND SHIPPING CONTROL														
4.1	Verification of Marking	Marking	Major	Verification	100%	Approved drawings, Refer Note 7 & 8		Inspection report	✓	P	W	R		
4.2	Packing	Blanking of ends & packing	Major	Visual	100%	Approved drawings, Refer Note 9		Inspection report	✓	P	W	R		
4.3	Documentation Folder	QP Compliance	Major	Review	100%	MTCs, HT charts, NDE & Hydro reports etc		History Docket	✓	P	R	W(R)	HOLD POINT	
<u>General Notes:</u> Welded pipes : All longitudinal welded pipes shall employ only automatic welding. In one random length one welded circumferential seam of same quality as longitudinal weld is permitted. Circumferential weld seam shall be atleast 2.5m from either end. Longitudinal seams of two portions shall be staggered by 90°. Welded pipes of diameter less than 900NB shall not have more than one longitudinal seam joint. WPS/PQR/WPQR shall be reviewed by BHEL & NPCIL. Only NPCIL approved brand of Welding Consumables shall be used. (Annexure 1). Impact test qualified WPS/PQR shall be used. The Internal & External weld profile of pipes shall be ground smooth for coating application. Weld spatter, cleats, sharp corners, projections and indentations shall be removed. Internal and External Weld finish requirements shall be as per Engineering Drawing. Impact test shall be done as per any one of the below option : Option 1 : Raw material SA 516 Gr 70 plates used for fabrication of pipes shall be subjected to Charpy V-Notch Impact test as per S5 - Supplementary requirement of SA 516. Fabricated pipe SA671 Gr CC70 CI32 shall be subjected to Charpy V-Notch Impact test as per S2 - Supplementary requirement of SA 671. Option 2 : Raw material SA 516 Gr 70 plates used for fabrication of pipes is exempted from Impact test according to ASME Sec III NC 2019, Clause NC 2311(a)-8. Impact test shall be done on the weld metal and welding procedure qualification. Impact values for the SA 516 Gr 70 Plates and Pipe made from SA 516 Gr 70 plates shall meet the requirements of SA 20. Number of weld repairs in Welded pipes at the same spot shall be restricted to maximum two by NPCIL approved procedure. All repaired welds shall be re-examined and re-tested as per the requirements of original weld and shall meet the requirements of the same. Calibrated Furnaces, instruments, Gauges shall be used during inspection, examination and testing Non-Destructive examinations shall be carried out by personnel qualified to Level-II of ISNT or ASNT Marking : Paint stencilling : PO no, Maker's emblem/code, Spec, Grade, Heat no, Size (OD/IDx thickness x Length in mm) Hard Punching at 100mm from pipe end : Maker's emblem/code, Spec, Grade, Heat no, Size (OD/IDx thickness x Length in mm) , Inspector's seal. Paint or Ink for marking shall not contain any harmful metal or metallic salts such as zinc, lead or copper which cause corrosive attack on heating. Packing : End of pipes shall be secured with end caps to avoid storage & transit damages. Bevelled pipe ends shall be closed with a leak tight Steel bevel protector combined with plastic plug. Dessicant material suitable for use in combination with steel (moisture absorbent) shall be placed inside closed pipe to enable corrosion prevention for atleast 2 years.														
 J. NANTHINI, Dy.MGR/QA MAIN CONTRACTOR		 K.V. RAMANI, AGM/Q MAIN CONTRACTOR		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER; C: BHEL/BHEL AIA ; N: CUSTOMER-NPCIL. P: PERFORM V: VERIFICATION R: REVIEW OF DOCUMENTS W: 10 % WITNESS & 100% REVIEW OF DOCUMENTS H: HOLD POINT & REVIEW OF DOCUMENTS. W(R): WITNESS BY REVIEW OF DOCUMENTS.				FOR NPCIL USE:						
SIGNATURE				REVIEWED BY				APPROVED BY				APPROVAL SEAL		

Annexure -1

NUCLEAR POWER CORPORATION OF INDIA LTD.

(A Government of India Enterprise)

Directorate of Quality Assurance

Phone: 022 - 2599 5045, Fax 022 - 2556 5354

1) LIST OF APPROVED CARBON STEEL & LOW ALLOY STEEL WELDING ELECTRODES (2 pages)

As on 25-01-2018

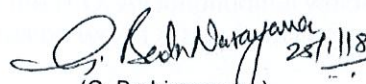
Sr. No.	Manufacturers	Brand name	AWS No.	Valid up to
1.	ADOR Welding Ltd., Silvassa	SUPABASE X PLUS	E7018	FEB2019
2.	ADOR Welding Ltd., Silvassa	MOLYTEN	E7018-A1	APR2020
3.	ADOR Welding Ltd., Silvassa	TENALLOY Z PLUS	E7018-1	JUN2022
4.	ADOR Welding Ltd., Silvassa	CHROMOTEN	E8018 B2	APR2020
5.	ADOR Welding Ltd., Silvassa	CHROMOTEN-C	E9018 B3	APR2020
6.	D&H SECHERON, Indore	MOLYTHERME	E7018-A1	JUN2022
7.	D&H SECHERON, Indore	MEDIO	E6013	JUN2020
8.	D&H SECHERON, Indore	EXOBEL	E6013	JUN2020
9.	D&H SECHERON, Indore	SUPERTHERME	E7018	JUN2020
10.	D&H SECHERON, Indore	SUPERTHERME(SPL)	E7018-1	SEP2018
11.	D&H India Ltd., Indore	SUPER -LH (SPL)	E7018-1 (DCEP Only)	FEB2021
12.	D&H India Ltd., Indore	STANDARD	E6013	FEB2021
13.	D&H India Ltd., Indore	SUPER LH	E7018 (DCEP Only)	FEB2021
14.	D&H India Ltd., Indore	SUPER -CR-1	E8018 B2	DEC2020
15.	D&H India Ltd., Indore	SUPER -CR-2	E9018 B3	DEC2020
16.	ESAB INDIA LTD, AMBATTUR, CHENNAI	ESAB 28	E6013	SEP2018
17.	ESAB INDIA LTD, AMBATTUR, CHENNAI	ESAB 36H	E7018	SEP2018
18.	ESAB INDIA LTD, AMBATTUR, CHENNAI	ESAB 36H(SPL)	E7018-1	SEP2018
19.	ESAB INDIA LTD, AMBATTUR, CHENNAI	ESAB PIPEWELD 6010R	E6010	SEP2018
20.	HONAVAR ELECTRODES, THANE	REGULAR S	E6013	JAN2020
21.	HONAVAR ELECTRODES, THANE	ULTIMATE - 18	E7018	JAN2020
22.	HONAVAR ELECTRODES, THANE	ULTIMATE - 18 SPL	E7018-1	JAN2020
23.	MAILAM INDIA LTD., PUDUCHERRY	MAILARC -13R	E6013	SEP2020
24.	MAILAM INDIA LTD., PUDUCHERRY	MAILARC -18	E7018	SEP2020
25.	MAILAM INDIA LTD., PUDUCHERRY	MAILARC -18 PLUS	E7018-1	SEP2020
26.	MAILAM INDIA LTD., PUDUCHERRY	MAILARC -1 CR	E8018-B2	DEC2018
27.	MAILAM INDIA LTD., PUDUCHERRY	MAILARC -2 CR	E9018-B3	DEC2018
28.	ROYAL ARC ELECTRODES, VASAI	ROYAL THERME	E7018	SEP2018
29.	ROYAL ARC ELECTRODES, VASAI	ROYAL S	E6013	SEP2018
30.	ROYAL ARC ELECTRODES, VASAI	ROYAL THERM SPL.	E7018-1	SEP2021
31.	ROYAL ARC ELECTRODES, VASAI	ROYAL THERM MOLY	E7018-A1	FEB2018*
32.	ROYAL ARC ELECTRODES, VASAI	ROYAL CHROM 1	E8018-B2	NOV2017*
33.	ROYAL ARC ELECTRODES, VASAI	ROYAL CHROM 2	E9018-B3	NOV2017*
34.	RAJ KESARI ELECTRODES, UDAIPUR	SUPERLET 18	E7018	AUG2022
35.	RAJ KESARI ELECTRODES, UDAIPUR	SUPERLET 18 (SPL.)	E7018-1	AUG2022
36.	RAJ KESARI ELECTRODES, UDAIPUR	RAJCORD 13S	E6013	AUG2022
37.	RAJRATNA ELECTRODES, AHMEDABAD	RATNA 7018	E7018	FEB2018*

G. Radh Narayan
25/1/18

Sr. No.	Manufacturers	Brand name	AWS No.	Valid up to
38.	RAJRATNA ELECTRODES, AHMEDABAD	RATNA 7018 SPL.	E7018-1	MAR2020
39.	SUPERON SCHWEISSTECHNIK INDIA LTD. DELHI	GARANT MO	E7018-A1	SEP2020
40.	SUPERON SCHWEISSTECHNIK INDIA LTD. DELHI	SUPERCITO	E7018	SEP2019
41.	SUPERON SCHWEISSTECHNIK INDIA LTD. DELHI	SUPERCITO 7018-S	E7018-1	SEP2019
42.	SUPERON SCHWEISSTECHNIK INDIA LTD. DELHI	OVERCORD S	E6013	SEP2019
43.	SUPERON SCHWEISSTECHNIK INDIA LTD., DELHI	SUPER CROMO 1B	E8018-B2	DEC2020
44.	SUPERON SCHWEISSTECHNIK INDIA LTD., DELHI	SUPER CROMO 2B	E9018-B3	DEC2020
45.	VIJEY ELECTRODES & WIRES PVT. LTD., CHENNAI	VJ 6013 X	E6013	SEP2020
46.	VIJEY ELECTRODES & WIRES PVT. LTD., CHENNAI	VJ 7018	E7018	SEP2020
47.	VIJEY ELECTRODES & WIRES PVT. LTD., CHENNAI	VJ 7018 - 1	E7018-1	SEP2020
48.	WELD FAST ELECTRODES, NAGPUR	WELDFAST LH 18	E-7018	MAR2020
49.	WELD FAST ELECTRODES, NAGPUR	WELDFAST LH-18-1	E-7018-1	MAR2020
50.	WELD FAST ELECTRODES, NAGPUR	WELDFAST CROMO 0500	E7018-A1	JAN2018*
51.	WELD FAST ELECTRODES, NAGPUR	WELDFAST CROMO 1500	E8018-B2	JAN2018*
52.	WELD FAST ELECTRODES, NAGPUR	WELDFAST CROMO 2251	E9018-B3	JAN2018*

The approvals are granted in conformance to the requirements stipulated in latest edition of ASME Section II Part C. However, batch qualification wherever called for in specific cases, will have to be carried out separately.

Note: * Indicates renewal of approval is under progress


(G. Badrinarayana)
AD (QA), QA Analysis & Gr.3