

## QUALITY ASSURANCE PLAN FOR METALLIC COLUMN

CLIENT : UPL LTD, DAHEJ, UNIT-12	DOCUMENT NO: QAP – PROJ - M_COLUMN – UPL – U12	REV:R0	DT:10/04/2019
PROJECT NAME: SPM-02	CODE: ASME SECTION VIII DIV 1 LATEST EDITION	UPL PO NO & DT:	
VENDOR NAME:	EQUIPMENT TAG NOS:		

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					VEN DOR	TPI	UPL		
A	DOCUMENTATION CONTROL								
1	Drawing approval	Order specifications, MDS	Order specifications	Order specifications	P	R			Drawing approval by DEC/UPL
2	Welding procedures	TPI approved WPS/PQR/WPQ for the complete Job before start of fabrication	Approved WPS/PQR/WPQ	ASME SEC IX	H	R*		WPS/PQR/WPQ	New procedure approval is vendor’s responsibility
B	RAW MATERIAL INSPECTION (Items applicable as per drawing)								Refer Note 3 for Make
1	<u>Pressure Plates &amp; Pipes</u> : <b>i.e.</b> <b>Plates</b> for Shell, Dish, Cone, Plate fabricated Nozzle necks, RF Pad, Pad flanges, Body flanges etc.  <b>Pipes</b> for Nozzle neck	1) Original MTC as per EN10204 type 3.1: a) Chemical Composition, Mechanical Properties, IGC E for process wetted SS Materials, Macro analysis of seamless pipes, Impact test on CS/LTCS materials for DT ≤ 0°C unless exempted by code. b) Heat treatment as per code c) UT for plates ≥ 14mm thk 2) Dimensional & Visual checks: a) Thickness and other dimensions b) Pitting, laminations, and any transit damages c) Co-relation of Heat/Lot No Marking with MTC 3) Marking & TPI Stamp transfer before cutting for traceability	ASME SEC II Part A/B, ASME SEC VII DIV 1,  SA435 S1  Approved Drawing	ASME SEC II Part A/B, ASME SEC VII DIV 1,  SA435  Approved Drawing	P  P  P	R*  W  H ^		MTC, Lab test report	*In absence of original MTC or Non availability of any properties as per B1-1(a) in Original MTC, 100% check testing to be carried out, separate for plate & pipe for all applicable properties mentioned in B1-1(a) in NABL approved labs which will be witnessed by TPI.  ^ Marking transfer shall include Heat No, MOC, Thickness, job/Tag number, Nozzle number & Pipe size as applicable
2	<u>Forgings</u>  <b>i.e.</b> Nozzle Flanges	1) Original MTC as per EN10204 type 3.1: a) Chemical Composition, Mechanical Properties, IGC E for SS WN flanges, Impact test on CS/LTCS materials for DT ≤ 0°C unless exempted by code. b) Heat treatment as per code	ASME SEC II Part A/B, ASME SEC VII DIV 1,	ASME SEC II Part A/B,	P	R*		MTC, Lab test report	*In absence of original MTC, random check testing (1 per lot) to be carried out for all applicable properties mentioned in B2-1 (a) in NABL

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		c) UT for forgings $\geq 40\text{mm}$ thk. 2) Dimensional & Visual checks: a) Thickness, PCD and other dimensions b) Pitting, laminations, gasket seating area and any transit damages, c) Co-relation of heat/lot no marking with MTC 3) Job/Tag number, nozzle number & TPI stamp transfer for traceability	SA 388  Approved Drawing & ASME B16.5	ASME SEC VIII  Approved Drawing & ASME B16.5	P  P	W  H			approved labs which will be witnessed by TPI.
3	Gaskets, Fasteners & Other Non-Pressure parts	1) MTC as per EN10204 type 3.1: a) Chemical Composition, Mechanical Properties, IGC E for process wetted SS materials 2) Dimensional & Visual checks: a) Thickness and other dimensions b) Pitting, laminations and any transit damages	ASME SEC II Part A/B  Approved Drawing	ASME SEC II Part A/B  Approved Drawing	P  P	R*  R		MTC, Lab test report	*In absence of MTC, 100% check testing to be carried out for all applicable properties mentioned in B3-1 (a) in NABL approved labs which will be reviewed by TPI
4	Weld Consumables	Manufacturer's test certificate / Batch TC	MTC	ASME SEC II Part C	P	W*		MTC	Filler wire must be used in cut length having grade marking at one end. (*Physical verification with MTC)
<b>C</b>	<b>BOUGHT OUTS</b>								
1	Dish Ends	1) Dimensional & Visual checks: a) SF, Height, Thk at KR & CR, Profile, Ovality & other dimensions. b) DP from inside & outside on KR, CR & weld edges c) Pitting, laminations and any transit damages 2) Heat treatment / SR as per code	Approved drawing  ASME SEC VIII Div 1	Approved drawing  ASME SEC VIII Div 1	P  P	W  R		Dish Inspection report	Vendor to provide template for profile inspection  _Weld joint on dish center to be avoided to overcome fouling with nozzle opening

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		3) 100% RT after forming in case of welded construction			P	R			
<b>E</b>	<b>IN-PROCESS FABRICATION &amp; INSPECTION</b>								
1	-LS joints of Shell & Nozzles	1) Fit Up (WEP, Root Gap, Alignment, Ovality) 2) DPT# (Refer Note 1) 3) Heat treatment / SR as per code 4) Radiography of BW joints	WPS/PQR, Approved drawing	WPS/PQR, ASME SEC IX / V / VIII Div 1	P P P P	W R R R*		Stage Inspection visit report, RT Films	*RT extent as per drg. 100% RT for Nozzle LS welds
2	-CS joints of Shell, Shell to Dish/Cone, - Shell to Body flange joint - Nozzle Neck to WNRF flange weld	1) Fit Up (WEP, Root Gap, Alignment, Ovality, Bolt hole straddleness) 2) DPT# (Refer note 1) 3) Radiography of BW joints	WPS/PQR, Approved drawing	WPS/PQR, ASME SEC IX / V / VIII Div 1	P P P	RW R R*		Stage Inspection report, RT Films	*Extent of RT as per drawing -100% RT for Nozzle pipe to WNRF flange weld joints
3	Nozzle assembly to Shell / Dish joints	1) Nozzle Marking on Shell & Dish 2) Fit up (WEP, Root Gap, Inclination, projection, bolt hole straddleness) 3) DPT# (Refer note 1)	Approved Drawing, ASME SEC VIII DIV 1 / IX	Approved Drawing, ASME SEC VIII DIV 1 / IX / V	P P P	W R R		Stage Inspection visit report	
<b>F</b>	<b>FINAL ASSEMBLY</b>								
1	Final Dimensions & Completeness of equipment	- Segment wise ID, thickness & height - Segment wise Dummy passing - Lug dimensions, Qty, PCD & Orientation - Guide support dimensions & Orientation - Fillet weld sizes - Bolt hole straddleness - Cladded flange dimensions & thickness including body flange step dimensions - Nozzle Dimensions, Inclination, Elevation, Projection, Orientation	Approved drawing, ASME SEC VII Div 1	Approved drawing, ASME SEC VII Div 1	P	W	W	Final Dimension report	Dimensions of dummy to be verified with UPL before start of inspection.

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		- Internal attachment dimensions, including Location, Thickness, hole c/c, hole size & nos if any - Feed pipe dimensions & installation - Gasket seating surfaces							
2	PMI of all SS/Ni alloy surfaces & welds	Chemical composition	ASME SEC II Part A/B	ASME SEC II Part A/B	P	W		PMI report	-All internal attachments to be covered in PMI
3	Pneumatic test of RF Pads, Flanges *	Leak proof-ness with soap solution	ASME SEC VIII Div 1	No leakage	P	W		Pneumatic test report	* Slip on / Pad flanges & Cladded flanges Including body flanges
4	Column Verticality	Straightness/Plumbness, Ovality & Overall length of column	ASME SEC VIII Div 1 / Drawing	ASME SEC VIII Div 1/ Drawing	P	W	W	Verticality check report	In assembled condition & horizontal position
5	Column Hydro with Main service gasket	Pressure holding for 1 hour & leak proof-ness	ASME SEC VIII Div 1	ASME SEC VIII Div 1	P	W		Hydro test report	
6	Vacuum test	Leak rate	As per drawing	As per drawing	P	W	W	Test report	If specified in drawing
7	Pre-dispatch	1) Inside drying & cleanliness 2) Name plate verification & Rub off marking 3) Painting DFT on CS surfaces 4) Pickling & Passivation of SS Surfaces & Welds ( Visual appearance) 5) Protection of open nozzle flanges with heavy plastic cap or wooden plank 6) Marking of Degree & nozzle numbers on individual nozzles of equipment 7) Commissioning spares' packing list physical verification (Size, Qty & MOC)	Approved drawing & PO specifications	Approved drawing & PO specifications	P	W		Pre-dispatch Inspection report	-All TT holes shall be plugged with hard grease after hydro testing  - SS Canopy for all mounting lugs to be provided

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8	Final Documentation (3Hard + 1 CD)  -As built drawing size should be min A3	1) As built Drawings & Approved QAP 2) Copy of approved WPS/PQR/WPQ 3) MTC & Lab test reports of all raw materials, bought outs & weld consumables 4) Heat Chart 5) NDE reports 6) All stage-wise inspection visit reports 7) Final dimensional & verticality reports 8) Hydro, Pneumatic & vacuum test reports 9) PMI reports 10) Pre-dispatch inspection report 11) Inspection release note	Approved Drawing, PO	Approved Drawing, PO	P	H		Final Dossiers	Vendor to compile documents in separate files for each equipment, right from the start of the job & submit it to TPI during each of his visit.
9	Issue of IRN	- Completeness of equipment as per PO - Clearance of Non compliances - Final dossier files	All Inspection visit reports	Approved drawing / PO Specifications	H	H	H	IRN	Vendor to take dispatch clearance from UPL before dispatch of equipment based on IRN

**#Note 1:** All Butt welds joints & nozzle attachment welds accessible from inside shall be back chipped, DP tested & re-welded from inside. If these welds are inaccessible from inside for back chipping then the root run shall be full penetration by TIG welding & DP checked.

**Note 2:** Measuring instruments used for inspection should have valid calibration certificates of national agencies.

**Note 3:** Raw materials shall be of approved Make as per MDS/Sub vendor list

**Note 4:** Water used for hydro testing of SS equipments shall have chloride content less than 30 ppm

<i>Truptesh Vyas</i>		
FOR UPL LIMITED, JAGHADIA	FOR TPI AGENCY	FOR VENDOR

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