

## QUALITY ASSURANCE PLAN

### A) DESIGN FEATURES

DESIGN CODE : ASME SEC VIII DIV 1 ED 2001 & TEMA Class 'C'

RADIOGRAPHY : SHELL : SPOT, DISH : FULL | EXPANSION BELLOW- FULL

HYDRO TEST PRESSURE : AS PER ORDER

SR. No.	COMPONENTS & OPERATION	CHARACTERISTICS CHECKS	REFERENCE DOCUMENT ACCEPTANCE NORMS	FORMAT OF RECORD	HOLD POINTS	
					EDES	CLIENT
<b>B) DOCUMENT CONTROL</b>						
1	Drg. Approval	As per Clients requirements.	P.O. and Specification.	Drg.	P	W
2.	Review of WPS / PQR	As per Welding details in Drgs.	ASME sec VIII Div 1 & Sec IX	Records	P	R
<b>C) INPROCESS CONTROL</b>						
3.	<b>Pressure part.</b> Material Identification for shell. dished ends, tubes , tubesheet	Dimension ,Surface Defects, Physical and Chemical properties, ICG, UT for thk above 25 mm etc.	As per respective material Specn & approved Drgs.& Lab T.C.	Test Certificates of Lab.	-	W / R
4.	<b>Non Pressure Parts.</b> Materials Identification for skirt support, baffles spacer tubes, tie rod, gussets etc.	Dimensions, Surface Defects	As per respective Materials specn. & Approved Drgs.	Inspection Report	W	-
5	PQR	Weld soundness, physical test.	ASME sec IX	Test Reports	P	-
6	Material stamp transfer for shell, channel shell tube sheet, dished end, tubes etc.	Dimensions, Material grade.	As per respect. Materials Specn. & Approved Drgs.	Inspection Report	W	R
7	Set up of long seams of main shell courses , skirt shell, channel shell and fabricated pipes etc	Weld geometry offset. Profile W.R.T Template ID, ovality. Etc.	ASME Sec VIII Div I	Internal Inspection Report	W	R
8	Back chip of long seam welding & D. P. test	Welding defects.	ASME Sec V	Internal Inspection Report	W	R
9	Dished ends forming	Profile as per the template and Dimensions Including thinning DP Test on knuckle portion at KR, SF, and edge etc.	ASME Sec VIII Div I & Approved Drg.	Internal Inspection Report	W	R



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					EDES	CLIENT
10	Tube sheet inspection after reaming	Dimension as per approved drg, No. of holes, pitch, Tube holes finish grooving details	ASME Sec VIII Div I ,TEMA & Approved Drg.	Internal Inspection Report	W	R
11	Circ Seams set up of main shell courses, and channel shell to dishend	Weld geometry offset, Alignment & Dimensions.	ASME Sec VIII Div I & Approved Drg.	Internal Inspection Report	W	R
12	D.P. test of Back chip of Circ Seam welding of Shells.	Welding defects	ASME Sec V	Internal Inspection Report	W	R
13	Set up of nozzle pipes to Nozzle Flanges.	Weld Geometry, Gasket Seat facing tell/tale hole.	Approved Drg.	Internal Inspection Report	W	R
14	Set up of Nozzles on main shell and channel shells	Weld geometry, orientations, height, bolt hole Straddling	ASME sec VIII Div I & Approved Drg.	Internal Inspection Report	W	R
15	DP test of back chip of nozzles on main shell & channel shell welding	Welding Defects	ASME sec V	Internal Inspection Report	W	R
16	Set up of body flanges to channel shell	Weld geometry, orientations, bolt hole Straddling	ASME sec VIII Div I & Approved Drg.	Internal Inspection Report	W	R
17	Flush grinding of all nozzles from inside and rounding off of corners	Corners to be rounded off to a minimum of 3-mm radius.	ASME sec VIII div 1	Inspection Report	W	R
18	Pneumatic test of RF pads of all concerned nozzles	Test Pressure : 1.25 kg/cm <sup>2</sup> Medium : air, to be checked with soap solution	ASME sec VIII Div 1	Inspection Report.	W	R
19	Inspection of tube bundle before insertion in shell	No. of baffles, baffle orientation, spacing tightness of spacers,	ASME Sec VIII Div I ,TEMA & Approved Drg.	Internal Inspection Report.	W	R



SR. No.	COMPONENTS & OPERATION	CHARACTERISTICS CHECKS	REFERENCE DOCUMENT ACCEPTANCE NORMS	FORMAT OF RECORD	HOLD POINTS	
					SKF	CLIENT
20	Fit up of tube sheets to shell	Orientation, tube sheet to tube sheet distance, weld geometry, squareness of tube sheets w.r.t shell bolt hole straddling.	ASME Sec VIII Div I ,TEMA & Approved Drg.	Internal Inspection Report.	W	R
21	Hydro test of shell side after tubes expansion	Test pressure 2.0 kg/cm <sup>2</sup> g	ASME sec VIII Div - 1	Inspection Report.	H	W
22	Visual and Final dimensional inspection prior to hydro test of shell and channel shells.	Under cuts, tacks, ensure that all welding is completed, dimensions, etc	ASME Sec VIII Div I & Approved Drg.	Inspection Report.	H	W
23	Hydrostatic testing of shell side	Test press : 7.222 Kg/cm <sup>2</sup> g Medium : Water Period :30 min	ASME Sec VIII Div I & Approved Drg.	Inspection Report.	H	W
24	Hydrostatic testing of tube side	Test press : 7.53 Kg/cm <sup>2</sup> g Medium : Water Period :30 min	ASME Sec VIII Div I & Approved Drg.	Inspection Report.	H	W
25	Polishing	Surface finish	180 GRID	Internal Inspection Report.	-	W
26	Cleaning and painting of cs part	Surface finish	SKF Std Procedure	Inspection Report.	-	W
27	Pre- dispatch & Issue of Release note.	Review of documents like Material Heat Chart, Test Certificates Inspection Reports for previous stages etc	-	Inspection Report	R	R