

TANKAGE



QUALITY ASSURANCE PLAN

TANKAGE WORK

SL. NO.	ITEM/DESCRIPTION	TYPE OF CHECK	METHOD OF CHECKING	EXTENT OF CHECK/FREQUENCY	REF. DOCUMENT	ACCEPTANCE NORMS	FORMAT OF DOCUMENTS	RESPONSIBILITY (WHO PERFORMS WHAT?)			REMARKS
								Checking/ performed by	Witnessed by	Verified by	
MATERIALS											
1.	PLATES FOR TANK SHELL, BOTTOM ROOF, PONTON, WIND GIRDER, NOZZLE NECKS, REINFORCEMENT PADS, GUSSETS	1. PHYSICAL & CHEMICAL PROPERTIES	VERIFICATION OF MANUFACTURER'S CERTIFICATE	RANDOM	IS 2062	CERTIFICATION AS PER IS 2062	SUPPLIER'S TEST CERTIFICATE	2	-	3,4	
		2. DIMENSION	MEASURE-MENT BY TAPE/SCALE/ULT RASONIC THICK-NESS GAUGER	RANDOM	AS PER P.O/SPEC	REASONABLY RECTANGULAR PLATES. THICKNESS TOLLERENCE :- 5/6mm=+12.5%-5% 8/14mm=7.5%-5% 16& above= + 5%	INSPECTION RECORD	2	2	3,4	
		3. SURFACE QUALITY	VISUAL	RANDOM	IS 2062	NO DEFECTS/PITTING	INSPECTION RECORD	2	-	2,3	
		4. CHECK FOR LAMINATION	USING UTS GAUGE/VISUAL	RANDOM	SPEC/IS 2062	NO LAMINATION	INSPECTION RECORD	2	-	2,3	
2	STRUCTURALS/PIPES										
2.1	SECTION FOR CURB ANGLE, BRACKETS, STIFFENERS, COLUMNS, TRUSS ROLLING LADDER MEMBERS, SPIRAL STAIRCASE MEMBERS	1. PHYSICAL & CHEMICAL PROPERTIES	VERIFI. OF MANUF'S CERTIFICATE	RANDOM	IS 2062	AS PER IS 2062	MANUFACTURER'S CERTIFICATE	2	-	3,4	
		2. DIMENSION	MEASURE-MENT	RANDOM	AS PER DRG.	APPROVED DRG.	INSPECTION REPORT	2	-	3,4	
		3. SURFACE QUALITY	VISUAL	RANDOM	AS PER IS 2062	AS PER CODE	INSPECTION REPORT	2	-	2,3	

Engg & Proj Dept

2 – CONTRACTOR, 3 – TPIA, 4 – BPCL
QAPIPOL/Tankage/Rev 0 Aug 1999
1/10



QUALITY ASSURANCE PLAN

TANKAGE WORK

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2.2	PLATES, ROUNDS, SQUARE BARS FOR GRANTINGS, HAND RAIL	1.WELDABILITY 2.DIMENSIONAL & SURFACE QUALITY	WELD ABILITY MEASUREMENT/VISUAL	RANDOM	APPROVED DRG.	APPROVED DRG.	INSPECTION REPORT	2	3	3	
2.3	PIPES										
2.4	PIPES FOR NOZZLES, ROOF DRAIN, FOAM, COOLING RIM VENT, BLEEDER VENT, INLET / OUTLET NOZZLE	1.PHYSICAL & CHEMICAL PROPERTIES 2.HYDRAULIC TEST 3.DIMENSIONAL	VERIFI. OF MANUF'S CERTIFICATE PHYSICAL MEASUREMENT	100% 100%/AS PER SPEC 100%	API 5L AS PER SPEC. AS PER API 5L	CERTIFICATION AS PER API 5L AS PER CODE TOLERANCE AS PER API 5L	MFG. TEST CERTIFICATE MFG. TEST CERTIFICATE INSPECTION REPORT	2,3,4 2 2	- 3 -	3,4 3,4 3,4	
2.5	NON PRESSURE PIPES FOR ROOF SLEEVES, POSTS, GAUGE WELL, SLEEVE & POST, HAND RAIL	1.PHYSICAL & CHEMICAL 2.HYDRAULIC TEST 3.DIMENSIONAL	CORRELATION OF MANUFACTURER'S CERTIFICATE PHYSICAL MEASUREMENT	RANDOM RANDOM RANDOM	API 5L AS PER DRG. PO/SPEC	AS PER CODE AS PER SPEC	MFG. TEST CERTIFICATE MFG. TEST CERTIFICATE INSPECTION REPORT	3,4 2 2	- - -	3,4 3,4 3,4	
3	OTHER BOUGHT-OUT ITEMS										



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3.1	FLANGES	1. PHYSICAL, CHEMICAL PROPERTIES, HEAT TREATMENT 2. DIMENSIONS AND SURFACE QUALITY	VERIFYING MANUFACTURER'S TEST CERTIFICATE MEASUREMENT/VISUAL	100%	AS PER SPEC.	SHOULD BE CERTIFIED AS PER SPEC BY SUPPLIER APPROVED DRG.	MFG. TEST CERTIFICATE OR LAB REPORT INSPECTION REPORT	3,4 2	3,4	3,4	
3.2	PIPE FITTINGS	1. PHYSICAL & CHEMICAL PROPERTIES 2. DIMENSION & SURFACE QUALITY	VERIFYING MANUFACTURER'S TEST CERTIFICATES MEASUREMENT/VISUAL	100%	AS PER SPEC/APPD. DRGS. AS PER DRG.	AS PER MATL. CODE APPD. DRG./	LAB REPORT/CERTIFICATE FROM MANUFACTURER INSPECTION REPORT	2 2	2	3,4 3,4	
3.3	BOLTS, NUTS FOR NOZZLE FLANGES & STRUCTURALS	1. PHYSICAL CHEMICAL PROPERTIES, HEAT TREATMENT 2. DIMENSION	VERIFYING MANUFACTURER'S TEST CERTIFICATES MEASUREMENT	100% RANDOM	AS PER SPEC	AS PER CODE APPROVED DRG.	MFG. T.C. OR LAB REPORT INSPECTION REPORT	2 2	2	3 2,3	



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3.4	SWIVEL JOINT	1. PHYSICAL & CHEMICAL COMPONENTS 2. DIMENSIONAL 3. FUNCTIONAL CHECK FOR ROTATION 4. VERIFICATION OF CERTIFICATE FOR HYD. TEST 5. HYD TEST	VERIFYING MANUFACTURER'S TEST CERTIFICATES MEASURE-MENT PHYSICAL PHYSICAL VERIFYING MANUFACTURER'S TEST CERTIFICATES MEASURE-MENT PHYSICAL HYD TEST	100% 100% 100% 100% ONE SAMPLE PER LOT	AS PER SPEC AS PER DRG. AS PER SPEC. APPROVED DRG. AS PER SPEC	AS PER SPEC APPROVED DRG. FREE ROTATION NO LRAKAGE AT TEST PRESSURE OF 3 KG/SQ-CM NO LRAKAGE AT TEST PRESSURE OF 3 KG/SQ-CM	MFG. T.C. INSPECTION REPORT INSPECTION REPORT INSPECTION REPORT MFG. T.C./ LAB REPORT INSPECTION REPORT	2 2 2 2 2 2	2 2 3,4 3 3 -	2,3 3,4 3,4 3,4 3,4 3,4	
3.5	FOAM SEAL	1. PHYSICAL & CHEMICAL 2. DIMENSIONAL		100% 100%	APPROVED DRG. APPROVED DRG./SPEC	IS-7886 ASTM/D1584 AS PER DRG./SPEC	MFG. T.C./ LAB REPORT INSPECTION REPORT	2 2	3 -	3,4 3,4	



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3.7	RUBBER CASING	1. PHYSICAL & CHEMICAL PROPERTIES 2. DIMENSION	VERIFYING MANUFACTURER'S CERTIFICATE MEASUREMENT/	RANDOM 100%	SPEC	IS-8883 ASTM D-1584 APPD. DRG.	MFG. T.C./ LAB REPORT INSPECTION REPORT	2 2	3 3	3,4 3,4	
3.8	HARDWARE	1. PHYSICAL 2. GALVANIZING TEST 3. DIMENSIONAL	VERIFYING CERTIFICATE -DO- MEASUREMENT	RANDOM RANDOM RANDOM	AS PER DRG. AS PER CODE APPD. DRG.	MAT. CODE IS-4826 IS-5358 APPD DRG.	INSPECTION REPORT MFG. T.C./ IR INSPECTION REPORT	2 2 2	- - 2	4 4 4	
4.0	WIRE MESH	CHECK	VISUAL/MEASUREMENT	100%	APPD DRG	AS PER SPEC/DRG		2	3	3,4	
5.0	PRESSURE RELIEF LINE PIPE	CHECK	VISUAL/MEASUREMENT	100%	APPD DRG	AS PER SPEC/DRG		2	3	3,4	
6.0	SPLASH PLATE	CHECK	VISUAL	100%	APPD DRG	AS PER SPEC/DRG		2	3	3,4	
7.0	EARTHING/SHUNT IN F.R TANK	CHECK	VISUAL	100%	APPD DRG	AS PER SPEC/DRG		2	3	3,4	
8.0	SHELL EARTHING	CHECK	VISUAL	100%	APPD DRG	AS PER SPEC/DRG		2	3	3,4	

2 – CONTRACTOR, 3 – TPIA, 4 – BPOL
QAPIPOL/Tankage/Rev 0 Aug 1999
5/10

Engg & Proj Dept



QUALITY ASSURANCE PLAN

TANKAGE WORK

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9.0	SAND PAD FOUNDATION	EXCAVATION CHECK SAND PAD LAYERS COMPACTION TEST SLOPE IN SAND PAD SAND BITUMEN PRE-MIX LAYER	PHYSICAL MEASUREMENT VISUAL VERIFY LAB REPORT MEASUREMENT VERIFY LAB TEST REPORT	100% EACH LAYER RANDOM SAMPLE TOP LAYER RANDOM	CONTRACT /APPD DRAWING AS PER SPEC AS PER SPEC AS PER SPEC AS PER SPEC/DRG AS PER CONTRACT API 650/ SPEC.	AS IN APPD DRG/SPEC AS IN SPEC 95% OF DRY DENSITY AS PER SPEC (10mm IN 1M) 80-100 CUTBACK BITUMEN IN 1 CU-M SAND	INSPECTION REPORT INSPECTION REPORT LAB TEST REPORT INSPECTION REPORT LAB TEST REPORT	2 2 2 2 2	3 3 3 3 3	3,4 3,4 3,4 3,4 3,4	
9.1	TANK PAD LEVELS	LEVEL VARIATION	MEASUREMENT	100%		API 650/ SPECS	INSPECTION REPORT	2	3,4	2,3,4	
9.2	PROVISION OF PERMANENT BENCH MARK FOR TANK AND LEVELS OF TANK PERIMETER	VERIFICATION OF PHYSICAL EXISTENCE	CHECKING	PERMANENT BENCH MARK - INO P LEVELS EVERY 3 M	AS PER SPEC	AS PER SPEC	INSPECTION REPORT	2	3,4	2,3,4	
10.0	FABRICATION/ERECTION										
10.1	PLATE CUTTING FOR SHELL	DIMENSIONAL & CHECKING DIAGONAL	MEASUREMENT/ VISUAL	100%	CUTTING LAYOUT	APPROVED PLATE CUTTING DIAGRAM	INSPECTION REPORT	2	2	3,4	
10.2	PLATE CUTTING FOR BOTTOM, ROOF, WIND GIRDER ETC.	DIMENSIONAL & CHECKING DIAGONAL	MEASUREMENT/ VISUAL	100%	CUTTING LAYOUT	APPROVED PLATE CUTTING DIAGRAM	INSPECTION REPORT	2	2	3,4	
10.3	ROLLING OF PLATES	DIMENSIONS	MEASUREMENT	100%	APPD DRG.	API 650/ IS 803	INSPECTION REPORT	2		3,4	
10.4	BUTT JOINT FIT-UP	ALIGNMENT, DIMENSIONS	MEASUREMENT	100%	APPD DRG	API 650/ IS 803	INSPECTION REPORT	2	3,4	3,4	



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10.5	WELDING WORK										
10.5.1	WELDING PROCEDURE SPECIFICATION	CORRECTNESS	SCRUTINY	100%	SPECS/WPS	WPS-ASME-SEC. IX	WPS	2	3,4	3,4	
10.5.2	WELDING PROCEDURE QUALIFICATION	WELD SOUNDNESS	PHYSICAL TEST	100%	WPS	ASME-SEC. IX & WPS	TEST REPORT	2	3,4	3,	
10.5.3	WELDING PERFORMANCE QUALIFICATION RECORD	WELD SOUNDNESS	RADIOGRAPHY	100%	APPD. WPS	ASME SEC. IX & APPD. WPS	WPQ REPORT	3	3,4	3	
10.6.1	BUTT WELD (VERT/HOR) [FOR SHELL, ANNULAR PLATE]	1. VISUAL 2. RADIOGRAPHY TEST 3. PEAKING/BANDIGN	CHECKING MEASURE-MENT RT MEASURE-MENT BY GAUGE	RANDOM API-650 RM	APPD. DRG. API-650 API-650	APPD. DRG.	INSPECTION REPORT INSPECTION REPORT INSPECTION REPORT	2 2 3		3,4 3,4 3,4	
10.6.2	LAP WELD FOR BOTTOM PLATE, ROOF PLATE, BUOYS, PONTOONS, DECK PLATE	14. OVERLAP 2. WEDLING	MEASURE-MENT VISUAL/VACUUM TEST, PR. TEST, OIL CHALK TEST	100% 100%	APPD. DRG. API-650	API-650/IS 803/ API-650/IS 803	INSPECTION REPORT INSPECTION REPORT	2 2	2	3,4 3,4	
10.7	SHELL TO BOTTOM PLATE	WELD SOUNDNESS	VISUAL/DYE PENETRATER TEST	100%	APPD. DRG.	NO LEAKAGE	INSPECTION REPORT	2	3,4	3,4	

2-CONTRACTOR, 3-TPIA, 4-BPCL
QAP/POL/Tankage/Rev 0 Aug 1999
7/10

Engg & Proj Dept



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10.8	RE-INFORCEMENT PADS FOR SHELL APPURTENANCES	1.SHAPE AND DYE	MEASURE-MENT PHYSICAL	100%	APPD.DRG.	APPD.DRG.	INSPECTION REPORT	2	2,3	3,4	
		2.PNEUMATIC TEST		100% RANDOM	APPD.DRG.	APPD.DRG.		2	2,3	3,4	
		3.STRESS RELIEVING	STRESS RELIEVING	AS PER CODE	APPD.DRG.	API-650/ APPD.PROCEDURE	INSPECTION REPORT	2	3	3	
10.9	PLUGGING TEL-TALE HOLE	1.ALIGNMENT	MEASURE-MENT	100%	APPD.DRG.	APPD.DRG.	INSPECTION REPORT	2	2	3,4	
		2.DIMENSION	MEASURE-MENT	100%	APPD.DRG.	APPD.DRG.		2	2,3	3,4	
		3.WELDING	VISUAL/ PRESS TEST	100%	APPD.DRG.	NO LEAKAGE		2	3	3,4	
11.0	INSPECTION PRIOR TO RELEASE FOR HYDRO TEST	1.COMPLETENESS	VERIFICATION OF ALL RECORDS	100%	APPD.DRG.	APPD.DRG.	INSPECTION REPORT	3,4	-	3,4	
		2.PLUMBNESS	VERIFICATION OF ALL RECORDS	100%	APPD.DRG.	API 650/IS803		2	3	3,4	
		3.LEVLLING	VERIFICATION OF ALL RECORDS	100%	APPD.DRG.	API 650/IS803		2	-	3,4	



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12.0	FINAL INSPECTION/TESTING										
12.1	TEST FOR TANKS	1.FLOATATION TEST (FOR FR) 2.HAMMER TEST (SHELL)FOR CR & FR 3.COLLAPSIBILITY TEST (FOR CR) 4. FLOOD/ PUNCTURE TEST (FOR FR) 5.SETTLEMENT	HYD. TEST HYD. TEST PNEUMATIC TEST PROOF TEST MEASURE-MENT	100% 100% 100% RM 100%	TECH SPEC. TECH SPEC. TECH SPEC. TECH SPEC. TECH SPEC.	APPD.SPECS/ API 650 APPD.SPECS/ API 650 APPD.SPEC/ API 650. APPD.SPEC./ API 650 APPD.SPEC./ API 650	INSPECTION REPORT -DO- -DO- -DO- -DO-	2 2 2 2	3 3 3 3	3 3 3 3	
12.2	RADIOGRAPHY	PHYSICAL	AS PER PRACTICE	QUANTUM AS PER CONTRACT	IS 803/API 650	RADIOGRAPHY ACCEPTANCE AS PER ASME SEC 1X	RADIOGRAPHY FILM AND RECORD	3	3	3.4	
13.0	CLEANING	CLEANING EXTERNAL & INTERNAL AFTER HYDRO-TEST	VISUAL	100%		APPD.DRG/ TECH SPEC.	INSPECTION REPORT	2	2	3.4	
14.0	PAINTING										

Engg & Proj Dept

2-CONTRACTOR, 3-TPIA, 4-BPCL
QAP/POOL/Tankage/Rev 0 Aug 1999
9/10



QUALITY ASSURANCE PLAN

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14.1	PAINT AND PRIMER	VERIFICATION OF PRIMER AND PAINT QUALITY	VERIFICATION OF BRAND/ MANUFACTURER'S BATCH/TEST CERTIFICATE	RANDOM	AS PER CONTRACT/ SPEC	CONFORMING TO SPEC.	INSPECTION REPORT	2	3	3,4	
14.2	SURFACE PREPARATION	CHECKING DEGREE OF CLEANLINESS	VERIFICATION	RANDOM	SPEC/CONTRACT	CODE - SIS 05-5900:1967	INSPECTION REPORT	2	3	3,4	
14.3	APPLICATION	COATING INTERVALS/CLIMATE CONDITIONS/DFT/ WORKMANSHIP MEASUREMENT FOR EXACT SIZE	MEASUREMENT BY THICKNESS GAUGER	RANDOM	SPECIFICATION		INSPECTION REPORT	2	3	3,4	
14.4	LOGO AND PRODUCT IDENTIFICATION BAND	MEASUREMENT FOR EXACT SIZE	PHYSICAL MEASUREMENT	100%	OUR SPEC/STD	ENGG MANUAL	INSPECTION REPORT	2	4	4	
15.0	QA & QC DOCUMENTATION	REVIEW OF ALL TEST CERTIFICATES, INSPECTION REPORTS IN STAGES	VISUAL/COMPARISON WITH SHADE	100%	APPD.DRG / TECH SPEC./ CONTRACT/ CODES	APPD.DRG/ TECH SPEC/CONTRACT/ T/CODES	INSPECTION REPORT	2		3,4	

2 - CONTRACTOR, 3 - TPIA, 4 - BPCL
QAPIPOL/Tankage/Rev 0 Aug 1999
10/10

Engg & Proj Dept