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- **Contractor Quality Control Plan for Piping Construction**

No.	Item description	Responsibility		
		CC	TPI	Owner
4.	Piping			
4.1	Materials of each piping/fitting/valves			
4.1.1	Die stamp or stencil of piping fitting/valves	H		
4.1.2	Color code marks on piping 1) Carbon steels 2) Low and intermediate alloy steels 3) Stainless steels (Duplex steel) 4) Titanium and titanium alloy 5) Copper and copper alloy 6) Nonferrous	H		
4.1.3	Material certificates of piping, fittings and valves	H		
4.2	Threaded joints			
4.2.1	Visual	H		
4.2.2	Alignment	H		
4.3	Flanged joints			
4.3.1	Visual	H		
4.3.2	Alignment	H		
4.3.3	condition of flange alignment between equipment and pipe line	H		
4.4	Erection and installation of aboveground pipes/ fitting / valves (Refer to the section 4.1.2)			
4.4.1	Location and position	H		
4.4.2	Arrangement order 1) Orientation 2) Horizontality / verticality 3) All in-items completely installed	H		
4.4.3	Alignment	H		
4.4.4	Dimension / type / pressure	H		
4.4.5	Proper installation of spectacle blind, pipe guide, anchors and shoes	H		
4.4.6	Clod spring, if any	H		
4.4.7	Visual check (Included cleaning of interanl) 1) Spool I.D No. & others marking 2) Cleaning (interior & exterior) & end cap	H		

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	3) Physical damage 4) Flow direction (valve/other in-line items)			
4.4.8	Drainage and flushing	H		
4.5	Erection and installation of underground pipes / fitting / valves (Refer to the section 4.1.2)			
4.5.1	Location and position	H		
4.5.2	Arrangement order 1) Orientation 2) Bedding, slope and grade are within 3) Excavation of trench	H		
4.5.3	Alignment	H		
4.5.4	Dimensions fabricated are within tolerance	H		
4.5.5	Visual check (Included cleaning of internal) 1) All pipe laying 2) Coating and wrapping 3) Calibration of pressure gauge 4) Drawing and drying 5) Cleaning (interior & exterior) & end cap 6) Physical damage 7) Flow direction (valve / other in-line items)	H		
4.5.6	Peel test	H		
4.5.7	Holiday test	H		
4.5.8	Cathodic protection test			
4.6	Piping supports			
4.6.1	Location	H		
4.6.2	Arrangement	H		
4.6.3	Condition of fixing	H		
4.6.4	Tightness of fixed end	H		
4.6.5	Movement of sliding end	H		
4.6.6	Clearance between other licensor structures after thermal movement	H		
4.6.7	Rigidity during valve operation	H		
4.6.8	Removal of temporary stopper on sliding end	H		
4.6.9	Tightness of connection and fastening	H		
4.6.10	Pre-installation check	H		
4.7	Pipe wall thickness			

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4.7.1	Wall thickness at specified points (if required)	H		
4.7.2	Pipe thickness after removal of tack welded pieces (if required)	H		
4.8	Pressure test			
4.8.1	1) Isolation of equipment and instruments 2) Rotating machinery 3) Pressure relieving devices 4) Equipment lined with castle or other materials 5) Instruments 6) Piping to be normally opened to atmosphere 7) Any other specified equipment	H		
4.8.2	Hydrostatic test	H		
4.8.3	Pneumatic test	H		
4.8.4	NFPA test of fire water piping system	H		
4.9	Cleaning			
4.9.1	Visual inspection of chemical cleaning (if required)	H		
4.9.2	Visual inspection of mechanical cleaning (if required)	H		
4.10	Fire hydrant			
4.10.1	Materials	H		
4.10.2	Pre-installation check	H		
4.10.3	Identification marking	H		
4.10.4	Installation of equipment 1) Location 2) Assembling layout and arrangement 3) Visual check	H		
4.10.5	Function test	H		
4.11	Tracing			
4.11.1	Steam tracing service test (if required)	H		
4.12	Titanium piping (Special requirement)			
	1) Iron contamination test 2) Weld quality test - Bend testing - Hardness testing	H		

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4.12	Insulation for piping (Refer to the section 8. insulation)	H		
4.13	Painting for piping (Refer to the section 9. painting)	H		

CC: Construction Contractor

TPI: Third Party Inspection

H: Hold Point; Hold on the production till TPI Inspector performs inspection and supervise the required test