

DETAILED PROCESS PIPING SPECIFICATION SHEETS

HL					
GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Hydrated Lime	HL	750	30	1000	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	PVC	Schedule 80	CSA 137.3 ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	Solvent Weld Unions	N/A 12 m	ASTM D2467, D2564 ASTM D2467	Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges	<75	PVC	Schedule 80		
ELL - Short Radius ELL - Long Radius, Couplings, Tees, Reducers, Reducing Outlets, Plugs, Caps	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld	
Flange Gaskets		Bl. Neoprene		ASTM F477	
PVC Solvent				ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Ball	<75	BV03			
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

MLQ					
GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Mixed Liquor	MLQ	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
Below Structures	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	>75	Paint			
Below Structures	≥75	Concrete Surround			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A		AWWA C210	
Below Structures	≥75	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint	N/A 20 m	AWWA C606	
Below Structures	≥75	Butt Weld Grooved Joint	N/A 20 m	AWWA C606	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	>75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB Dimensions: ANSI B16.9	
Plug	≥75	Mild Steel	Class 150 Blind Flange	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene			
Grooved Joint Gaskets	≥75			AWWA C606	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS			REMARKS
Butterfly	≥75	BF02			
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

OF					
GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Overflow (Primary Filter)	OF	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
N/A					
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

PA

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Process Air	PA	0-115	-40 to 150	175	120 See Note 6
PIPE					
LOCATION	SIZE (mm)	MATERIAL	WALL THICKNESS	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<100	304L Stainless Steel	2.03 mm	ASTM A240 ASTM A778 with scale removed or ASTM 312	Note 1 Note 7
	100 - 200	304L Stainless Steel	14 Gauge		
	250 - 300	304L Stainless Steel	12 Gauge		
Submerged	100	304L Stainless Steel	14 Gauge		
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	>30	Insulation and Recovering		See drawings	Note 2
Submerged	>30	N/A		See drawings	
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	>30	N/A			
Submerged	>30	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	>30	Butt Welded Flanged	N/A 24 m	ANSI B16.9 ASTM 351, ASTM 403 or ASTM A774 with scale removed.	Note 7
Submerged	>30	Butt Welded	N/A		

DETAILED PROCESS PIPING SPECIFICATION SHEETS

PA (continued)

FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Van Stone Flanges, Rolled Angle,	>50	Same as pipe, with Galvanized Steel Back-Up Ring	Class 150	Pipe Material: ASTM A240 Flanges: ASTM 285 Fabrication: ASTM A351, A403 or A774 with scale removed Pattern: ANSI B16.9	Note 7 Note 9
ELL – Short Radius ELL - Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	>50 <450	Same as Pipe	Same as Pipe	General: MSS SP 43 Material: ASTM A351, A403 or A774 with scale removed Dimensions: MSS SP43	Note 3 Note 7
5 piece ELL	450 - 1200	Same as Pipe	Same as Pipe	Material: ASTM A351, A403 or A774 with scale removed Dimensions: ANSI B16.9	Note 7
Cap	≥50	Same as Pipe	Same as Pipe	Material: ASTM A351, A403 or A774 with scale removed. Dimensions: MSS SP43	
Expansion Joints	>50	EPDM Flange, with Galvanized Steel Back-Up Ring	Same as Pipe		Note 4
Expansion Couplings	N/A	N/A	N/A	N/A	Not Acceptable
Flange Gaskets		Compressed Kevlar With Neoprene Binder Free of Carbon Black			Full face gaskets are allowed for Van Stone & raised face flanges over 100 mm ND.
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Butterfly	≥75	BF01			
Check	≥75	CV04			
NOTES					
1. All structural penetrations shall consist of a type 304L stainless steel schedule 10s thimble.					
2. Insulation shall be a minimum 50 mm thickness and as required for personnel protection at the design temperature of the pipe, ensuring the surface temperature is below 40°C. Also, ensuring the pipe surface does not sweat. Refer to Section 15059 for pipe insulation and recovering.					
3. Fabricate mitered elbows from pipe sections, except as indicated in section 15050.2.4					
4. Where the exposure is buried or submerged and when shown in the drawings, use stainless steel bellows type expansion joints.					
5. Provide isometric drawings and thermal analysis stamped and signed by a professional engineer as per Section 15050. IN the design, take into account the surging pressure for the piping. Information provided by the blower manufacturer indicates that for these blowers, surging consists of rapid cycles of discharge from the blower to the process air piping system at the bioreactor from a low of 14 to 21 kPa to highs of 84 to 102 kPa. The rapid cycling between these low and high pressures, almost instantaneous, lasts for approximately 10 seconds when the blower is in automatic.					
6. Test pressure shall be applied and sustained for 120 min, then all joints shall be tested with soapy water.					
7. Thoroughly remove all internal and external scale or other surface deposits from pipe and fittings before welding.					
8. Provide stenciled warning on outdoor piping as follows: "WARNING – EXTREMELY HOT"					
9. Provide a stainless steel back-up ring for the submerged connection between the PRA piping supplied by the Contractor and PRA piping supplied by the fine bubble aeration Supplier.					
10. Refer to Division 17 for flow control valve specifications.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

PE

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Primary Effluent	PE	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	PVC	Schedule 80	ASTM A53, Grade B	Note 1
	≥75	Mild Steel, CW or ERW,	Std. Wt.		
	400	PVC	Schedule 80		
Submerged	400	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
	400	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
	≥75	Paint			
	400	N/A			
Submerged	400	Paint			
	400	Epoxy, E2A		AWWA C210	
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
	≥75	Epoxy, E2A		AWWA C210	
	400	N/A			
Submerged	400	Epoxy, E2A		AWWA C210	
	400	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	Solvent Weld	N/A	ASTM D2467, D2564	
	≥75	Unions	12 m	ASTM D2467	
	≥75	Butt Weld	N/A		
	≥75	Grooved Joint	20 m	AWWA C606	
Submerged	400	Bell & Spigot	N/A	AWWA	
	400	Butt Weld	20 m	AWWA C606	
	400	Grooved Joint	20 m	AWWA C606	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	<75	PVC	Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
	≥75	Mild Steel	Class 150		
	400	PVC	Schedule 80		
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
	≥75	Mild Steel, Seamless	Same as Pipe		
	400	PVC	Schedule 80		
Plug	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
	≥75	Mild Steel	Class 150		
	400	PVC	Blind Flange Schedule 80		
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets	≥75	BI. Neoprene			
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	

DETAILED PROCESS PIPING SPECIFICATION SHEETS

PE (continued)

VALVES			
TYPE	SIZE (mm)	SPECIFICATIONS	REMARKS
Knife Gate	≥75	KV01	
NOTES			
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.			

DETAILED PROCESS PIPING SPECIFICATION SHEETS

POLY

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Polymer	POLY	750	30	1000	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	PVC	Schedule 80	CSA 137.3 ASTM D1785	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	Solvent Weld Unions	N/A 12 m	ASTM D2467, D2564 ASTM D2467	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges	<75	PVC	Schedule 80		
ELL - Short Radius ELL - Long Radius, Couplings, Tees, Reducers, Reducing Outlets, Plugs, Caps	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld	
Flange Gaskets		Bl. Neoprene		ASTM F477	
PVC Solvent				ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS			REMARKS
Ball	<75	BV03			
Check	<75	CV06			
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

RAS

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Return Activated Sludge	RAS	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	Note 1
Submerged	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	Note 1
Below Structures	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
Submerged	≥75	Paint N/A			
Below Structures	≥75	Concrete Surround			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
Submerged	≥75	Epoxy, E2A N/A		AWWA C210	
Below Structures	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
Submerged	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
Below Structures	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	

DETAILED PROCESS PIPING SPECIFICATION SHEETS

RAS (continued)

VALVES			
TYPE	SIZE (mm)	SPECIFICATIONS	REMARKS
Butterfly	≥75	BF02	
Check	≥75	CV02	
NOTES			
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.			

DETAILED PROCESS PIPING SPECIFICATION SHEETS

RS					
GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Raw Sewage	RS	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Underground	≥75	HDPE	DR17	ASTM D3350, PE3408	
Tunnels, Pumphouses, Buildings and Submerged	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Underground	≥75	N/A			
Tunnels, Pumphouses, Buildings and Submerged	≥75	Epoxy, E2A N/A		AWWA C210	Epoxy, E2A N/A
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Underground	≥75	N/A			
Tunnels, Pumphouses, Buildings and Submerged	≥75	Epoxy, E2A N/A		AWWA C210	Epoxy, E2A N/A
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Underground	≥75	Thermal Butt Fusion	BM	ASTM D 2657	
Tunnels, Pumphouses, Buildings and Submerged	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges	≥75	HDPE Mild Steel PVC	Same as pipe Class 150 Schedule 80	ASTM D3350, AWWA C906 Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL - Short Radius ELL - Long Radius, Couplings, Tees, Reducers, Reducing Outlets, Caps	≥75	HDPE Mild Steel, Seamless PVC	Same as pipe Same as pipe Schedule 80	ASTM D3350, AWWA C906 Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flange Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Check	≥75	CV03			
Plug	≥75	PV01			
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

SCR

GENERAL					
PROCESS FLUID	SYMBOL				
Screenings	SCR				
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Stainless Steel Duct	4.7 mm thick, 7 gauge		
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Flanged			
FITTINGS AND APPURTENANCES					
N/A					
VALVES					
N/A					
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

SE

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Secondary Effluent	SE	750	20	1000	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	 Note 1
Underground	≥75	HDPE	DR17	ASTM D3350, PE3408	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint			
Underground	≥75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
Underground	≥75	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	 Note 1
Underground	≥75	Thermal Butt Fusion	BM	ASTM D 2657	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL. – Short Radius ELL. – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
N/A					
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

SL

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Sample	SL	0-35	5-30	55	60
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	PVC	Sch. 80	CSA 137.3, ASTM D1785	Note 2
Submerged	<75	PVC	Sch. 80	CSA 137.3, ASTM D1785	Note 2
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
Submerged	<75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A			
Submerged	<75	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	Solvent Weld Unions	N/A 12 m	ASTM D2467, D2564 ASTM D2467	Note 2
Submerged	<75	Threaded Couplings Unions	N/A 12 m	ASTM A197, ANSI B16.3 ASTM D2467	Note 2
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges,	<75	PVC	Sch. 80		
ELL - Short Radius, ELL - Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	<75	PVC	Sch. 80	ASTM D2467, Solvent Weld	
Plug	<75	PVC	Sch. 80	ASTM D2467, Solvent Weld	
Flange Gaskets		BI. Neoprene		ASTM F477	
PVC Solvent	<75			ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATION		REMARKS	
Ball	<75	BV03			
NOTES					
<p>3. Where pipe crosses a structural joint, install at the joint location an EPDM lined elastomer spherical moulded type expansion joint capable of 0.25 degrees angular movement and ± 20 mm axial movement.</p> <p>4. Provide unions or flanges on either side of wall penetrations to allow for pipe disassembly</p>					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

SRS

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Screened Raw Sewage	SRS	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint	N/A 20 m	AWWA C606	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel	Class 150 Blind Flange	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS			REMARKS
Knife Gate	≥75	KV01			
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

SUB

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Subnatant	SUB	750	25	1000	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	 Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	 Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
Butterfly Valve	≥75	BF02			
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

TWAS

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Thickened Waste Activated Sludge	TWAS	1000	30	2000	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	 Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	 Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS			REMARKS
Ball	≥75	BV02			
Check	≥75	CV03			
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					
2. Use mild carbon steel on the vacuum piping on the TWAS tank.					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

VAC

GENERAL					
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Vacuum	VAC	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
Exposed, Aboveground	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint			
Exposed, Aboveground	≥75	Paint			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A		AWWA C210	
Exposed, Aboveground	≥75	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint	N/A 20 m	AWWA C606	
Exposed, Aboveground	≥75	Grooved Joint Butt Welded	N/A	AWWA C606	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB Dimensions: ANSI B16.9	
Plug	≥75	Mild Steel	Class 150 Blind Flange	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		BI. Neoprene			
Grooved Joint Gaskets	≥75			AWWA C606	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS			REMARKS
Butterfly	≥75	BF03			
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

VNT

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Vent	VNT	250	70	1.5 times design working press.	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	PVC	Schedule 80	CSA 137.3, ASTM D178.5	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	N/A			Note 1
LININGS					
Not Applicable					
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Bell & Spigot	N/A	AWWA	Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	PVC	Schedule 80		
ELL - Short Radius ELL - Long Radius, Tees, Reducers, Reducing Outlets, Laterals, Plugs and Caps	≥75	PVC	Schedule 80	ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets	≥75	Bl. Neoprene			
PVC Solvent				ASTM D2564	
VALVES					
N/A					
NOTES					

DETAILED PROCESS PIPING SPECIFICATION SHEETS

WAS

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION (Min.)
Waste Activated Sludge	WAS	100	30	700	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or PVC	Std. Wt. Schedule 80	ASTM A53, Grade B CSA 137.3, ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel PVC	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
Plug	≥75	Mild Steel PVC	Class 150 Blind Flange Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	
VALVES					
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Butterfly	≥75	BF02			
Check	≥75	CV02			
NOTES					
1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.					

END OF SECTION