### HL

			IIL		
GENERAL					
and the same and t	1200 No. 10	MAXIMUM C		TEST CONDITION	
PROCESS FLUID	SYMBOL	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 APPUR	TENANCES		11-41		
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	50500	REMARKS	
Ball	<75	BV03			
NOTES					

PROCESS FLUID  Mixed Liquor  PIPE  LOCATION  Tunnels, Pumphouses, and	SYMBOL	OPERATING I		TEST CONDITIO	ONS
Mixed Liquor PIPE LOCATION				TEST CONDITIO	JNS
PIPE LOCATION	247.0	(kPa)	TEMP.	PRESSURE (kPa)	DURATION (Min.)
PIPE LOCATION	MLQ	0-60	5-30	90	120
Tunnels, Pumphouses, and	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
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)	MATERIA	AL	SPECIFICATIONS	REMARKS
Funnels, Pumphouses, and Buildings	>75	Paint			
Below Structures	≥75	Conrete Surrond			
LININGS					
LOCATION	SIZE (mm)	MATERIAL SPECIFICATIONS		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
Funnels, 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 APPURTI	ENANCES	Control of the Contro			
TEM	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)	SPEC	TFICATIONS	REM	IARKS
Butterfly	≥75	BF02		TCL31	

GENERAL					
JEN VENETE:		CONTRACTOR OF THE PARTY OF THE	***		
PROCESS FLUID	SYMBOL	OPERATING LIMITS		TEST CONDITIONS	
PROCESS FLUID	STMBOL	PRESSURE	TEMP.	PRESSURE	DURATION
2 0 (D: File )	OF	(kPa)	(°C)	(kPa)	(Min.)
Overflow (Primary Filter)	OF	0-60	5-30	90	120
PIPE					
OCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Funnels, Pumphouses, and Buildings	≥75	Mild Steel, CW or ERW or	Std. Wt.	ASTM A53, Grade B	
		PVC	Schedule 80	CSA 137.3, ASTM D1785	
COATINGS					
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARKS
Funnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL SPECIFICATIONS		REMARKS	
Funnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
IOINTS		1			
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Funnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	
FITTINGS AND APPURT	ENANCES				
TEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel	Class 150 Schedule 80	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5 ANSI B16.9	
ELL – Short Radius	≥75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB	
ELL – Long Radius, Fees, Reducers, Reducing Outlets, Laterals and Caps	270	PVC	Schedule 80	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					

#### PA

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

PA (continued)

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
Сар	≥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.
- 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.
- 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"
- 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.
- Refer to Division 17 for flow control valve specifications.

### PE

GENERAL					
GENERAL		OPEDATING	IMITS	TEST CONDITI	ONE
PROCESS FLUID	SYMBOL PRESSURE TEMP		TEMP.	PRESSURE	DURATION
Redronder Control Control	3 I MIDOL	(kPa)	(°C)	(kPa)	(Min.)
Primary Effluent	PE	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	<75	PVC	Schedule 80		Note 1
Buildings	≥75	Mild Steel, CW or ERW,	Std. Wt.	ASTM A53, Grade B	
	400	PVC Mild Steel, CW or ERW	Schedule 80 Std. Wt.	ASTM A53, Grade B	
Submerged	400	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
COATINGS					
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	<75	N/A			
Buildings	≥75	Paint			
	400	N/A Paint			
Submerged	400	Epoxy, E2A		AWWA C210	1
LININGS					
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	<75	N/A		DI DOMINIONO	
Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
Submerged	400	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	<75	Solvent Weld	N/A	ASTM D2467, D2564	
Buildings		Unions	12 m	ASTM D2467	
	≥75	Butt Weld	N/A		
		Grooved Joint	20 m	AWWA C606	
		Bell & Spigot	N/A	AWWA	
Submerged	400	Butt Weld	N/A		
DESCRIPTION AND ADDRESS.	TINI LA TORIO	Grooved Joint	20 m	AWWA C606	
FITTINGS AND APPURT	THE RESERVE OF THE PERSON NAMED IN COLUMN		T 2:		T nervice
ITEM SE DE	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	<75	PVC	Schedule 80	AND DE COMPANIES DE CO	
	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1	
				Dimensions: ANSI B16.5 ANSI B16.9	
		PVC	Schedule 80	AINSI D10.9	1
ELL – Short Radius	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld	1
ELL – Short Radius,	≥75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB	0
Tees, Reducers,	_/3	oreer, oeumess	Switte as tipe	Dimensions: ANSI B16.9	
Reducing Outlets, Laterals		PVC	Schedule 80	ASTM D2467, Solvent Weld	
and Caps		100		1001.00	
Plug	<75	PVC	Schedule 80	ASTM D2467, Solvent Weld	7
	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1	
		0.000	Blind Flange	Dimensions: ANSI B16.5	
		PVC	Schedule 80	ASTM D2467, Solvent Weld	
Flanged Adaptors	≥75	Same as Pipe	Same as Pipe	Flange: ANSI B16.5	
Flanged Gaskets		BI. Neoprene			
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	

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VALVES			
TYPE	SIZE (mm)	SPECIFICATIONS	REMARKS
Knife Gate	≥75	KV01	
NOTES			

### **POLY**

GENERAL		MAXIMUM C	OMDITIONS	TEST CONDITION	ONIC
PROCESS FLUID	SYMBOL PRESSURI		TEMP.	PRESSURE	DURATION
I ROCESS I LOID	STMBOL	(kPa)	(°C)	(kPa)	(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		N/A			
LININGS	-	`			
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings		N/A			
JOINTS					
LOCATION	SIZE (mm)	ТҮРЕ	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	Solvent Weld Unions	N/A 12 m	ASTM D2467, D2564 ASTM D2467	
FITTINGS AND APPUR	TENANCES				
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					

### RAS

GENERAL		RA	10		
GERERAL		MAXIMUM CON	NDITIONS	TEST CONDITIO	NS
PROCESS FLUID	SYMBOL	PRESSURE	TEMP.	PRESSURE	DURATION
		(kPa)	(°C)	(kPa)	(Min.)
Return Activated Sludge	RAS	0-60	5-30	90	120
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	TOM HOLD
Buildings		or PVC	Schedule 80	CSA 137.3, ASTM D1785	Note 1
Submerged	≥75	Mild Steel, CW or ERW or	Std. Wt.	ASTM A53, Grade B	
		PVC	Schedule 80	CSA 137.3, ASTM D1785	Note 1
Below Structures	≥75	Mild Steel, CW or ERW or	Std. Wt.	ASTM A53, Grade B	
		PVC	Schedule 80	CSA 137.3, ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERI	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
Submerged	≥75	Paint N/A			
Below Structures	≥75	Concrete Surround			
LININGS					N 10 10 10 10 10 10 10 10 10 10 10 10 10
LOCATION	SIZE (mm)	MATERI	AL	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	N/A 20 m	AWWA C606	No. 1
		Bell & Spigot	N/A	AWWA	Note I
Submerged	≥75	Butt Weld Grooved Joint	N/A 20 m N/A	AWWA C606 AWWA	Note I
Below Structures	≥75	Bell & Spigot Butt Weld	N/A	1511 1175	110101
below structures	2/3	Grooved Joint Bell & Spigot	20 m N/A	AWWA C606 AWWA	Note I
FITTINGS AND APPURT	TENANCES	Total or obligor	1.0.11	1.11.11.11	
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	TC.MINIOS
		PVC	Schedule 80	1.1101.010.7	
ELL - Short Radius	≥75	Mild Steel, Seamless	Same as Pipe	Material: ASTM A234, WPB	
ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	213	PVC	Schedule 80	Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
		Mild Steel	Class 150 Blind Flange	Material: ASTM A181, Gr. 1 Dimensions: ANSI B16.5	
Plug	≥75	DVC			
Plug		PVC	Schedule 80	ASTM D2467, Solvent Weld	
Plug Flanged Adaptors	≥75 ≥75	Same as Pipe		ASTM D2467, Solvent Weld Flange: ANSI B16.5	
Plug		The second secon	Schedule 80	ASTM D2467, Solvent Weld	

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### DETAILED PROCESS PIPING SPECIFICATION SHEETS

### RAS (continued)

TYPE	SIZE (mm)	SPECIFICATIONS	REMARKS
Butterfly	≥75	BF02	
Check	≥75	CV02	
NOTES			

GENERAL					
		MAXIMUM CON	NDITIONS	TEST CONDITI	ONS
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	PRESSURE (kPa)	DURATION (Min.)
Raw Sewage	RS	0-60	5-30	90	120
PIPE					120
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Underground	≥75	HDPE	DR17	ASTM D3350, PE3408	KENTHAL
Tunnels, Pumphouses,	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	
Buildings and Submerged	213	or PVC	Schedule 80	CSA 137.3, ASTM D1785	Note 1
COATINGS		TIVE	Schedule 80	C3A (37.3, A31WI D1783	I Note I
LOCATION	SIZE (mm)	MATERIA	A I	CDECIEICATIONIC	REMARKS
Underground	The second second second second second	N/A	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses,	≥75		Vien	AWWA C210	E F24
Buildings and Submerged	≥75	Epoxy, E2A N/A		AWWA C210	Epoxy, E2A N/A
LININGS					_
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARK
Underground	≥75	N/A			18
Tunnels, Pumphouses, Buildings and Submerged	≥75	Epoxy, E2A N/A		AWWA C210	Epoxy, E2A N/A
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARK
Underground	≥75	Thermal Butt Fusion	BM	ASTM D 2657	
Tunnels, Pumphouses,	≥75	Butt Weld	N/A		
Buildings and Submerged		Grooved Joint	20 m	AWWA C606	
		Bell & Spigot	N/A	AWWA	Note 1
FITTINGS AND APPUR	TENANCES				
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARK:
Flanges	≥75	HDPE Mild Steel PVC	Same as pipe Calss 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	1
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	1
Flange Gaskets	213	Bl. Neoprene	Same as ripe	ASTM F477	1
Grooved Joint Gaskets	≥75	Di. I teoprene		AWWA C606	1
PVC Solvent	5.70			ASTM D2564	
VALVES				1101010000	
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Check	>75 ≥75	CV03		KEWAKKS	
Plug		PV01			
1 lug	≥75	1 101	and the second s		

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			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)	MATE	RIAL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	N/A			
LININGS					
LOCATION	SIZE (mm)	MATE	RIAL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	N/A			
JOINTS					
LOCATION	SIZE (mm)	ТҮРЕ	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Flanged			
FITTINGS AND APPUR	TENANCES				
N/A					
VALVES					
N/A					
NOTES					

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

1. Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.

NOTES

			SL			
GENERAL						
		OPERATING LIMITS		TEST CONDITIONS		
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	PF	RESSURE (kPa)	DURATION (Min.)
Sample	SL	0-35	5-30		55	60
PIPE						
LOCATION	SIZE (mm)	MATERIAL	RATING	SPEC	IFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	PVC	Sch. 80		ASTM D1785	Note 2
Submerged	<75	PVC	Sch. 80	CSA 137.3,	ASTM D1785	Note 2
COATINGS						
LOCATION	SIZE (mm)	MATER	JAL	SPEC	IFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A				
Submerged	<75	N/A				
LININGS			12744			
LOCATION	SIZE (mm)	MATER	IAL	SPEC	IFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	<75	N/A				
Submerged	<75	N/A				
JOINTS						
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS		REMARKS
Tunnels, Pumphouses,	<75	Solvent Weld	N/A	ASTM D2	467, D2564	Note 2
and Buildings		Unions	12 m	ASTM D2		NOTE OF STREET
Submerged	<75	Threaded Couplings N/A Unions 12 m		ASTM A1 ASTM D2	97, ANSI B16.3 467	Note 2
FITTINGS AND APPUR	TENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPEC	CIFICATIONS	REMARKS
Flanges,	<75	PVC	Sch. 80			
ELL - Short Radius, ELL - Long Radius, Tees, Reducers, Reducing Outlets, Laterals and Caps	<75	PVC	Sch. 80	ASTM D2	467, Solvent Weld	
Plug	<75	PVC	Sch. 80	ASTM D2467, Solvent Weld		
Flange Gaskets		Bl. Neoprene		ASTM F4	77	
PVC Solvent	<75			ASTM D2	564	
VALVES						
TYPE	SIZE (mm)	SPECIFICATION			REMARKS	
Ball	<75	BV03				
NOTES						

- 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.
- 4. Provide unions or flanges on either side of wall penetrations to allow for pipe disassembly.

		SF	RS		
GENERAL					
		OPERATING I	LIMITS	TEST CONDITI	ONS
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	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)	MATERL	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint			
LININGS					
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	≥75	Butt Weld	N/A		
Buildings		Grooved Joint	20 m	AWWA C606	
FITTINGS AND APPURT	ΓENANCES				
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					11.1
TYPE	SIZE (mm)	SPECIFICATIONS		REN	1ARKS
Knife Gate	≥75	KV01			
NOTES				****	

		St	J <b>B</b>		
GENERAL		LAND GUAGO	IDENOVIO.	T TROT GOLD TO	22.10
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	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)	MATERI	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS					
LOCATION	SIZE (mm)	MATERI	AL	SPECIFICATIONS	REMARK
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARK
Tunnels, Pumphouses, and Buildings	≥75	Butt Weld Grooved Joint Bell & Spigot	N/A 20 m N/A	AWWA C606 AWWA	Note 1
FITTINGS AND APPUR	TENANCES				
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARK
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	Same as Pipe Material: ASTM A234, WPB Dimensions: ANSI B16.9	
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	2400 page 11 company		AWWA C606	
PVC Solvent				ASTM D2564	1
VALVES					
Butterfly Valve	≥75	BF02			

<sup>1.</sup> Provide unions or flanges on either side of wall penetrations as shown on Drawings to allow for pipe disassembly.

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

- 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.

≥75

Check

NOTES

### VAC

		VA	ic .		
GENERAL					
		OPERATING I		TEST CONDITI	
PROCESS FLUID	SYMBOL	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)	MATERI	AI.	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint		or Bernelline	
Exposed, Aboveground	≥75	Paint			
LININGS					
LOCATION	SIZE (mm)	MATERI	ΔĪ	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Epoxy, E2A	TALL .	AWWA C210	KLAHIKK
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 APPURT	TENANCES	and the second s			
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)	SPEC	IFICATIONS	REN	MARKS
Butterfly	>75	BF03		100	
35.000 A P. S. S. S. W.		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			

		1	/NT		200 000
GENERAL					
		MAXIMUM CO	ONDITIONS	TEST CONDITIONS	
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	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)	MATER	RIAL	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 I
FITTINGS AND APPURT	ENANCES				
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	0.50
Flanged Gaskets	≥75	Bl. Neoprene			
PVC Solvent				ASTM D2564	
VALVES					
N/A					
NOTES					

		W	AS		
GENERAL					
DD O OFFICE FLLUE	orn (Dol	MAXIMUM CONDITIONS		TEST CONDITIONS	
PROCESS FLUID	SYMBOL	PRESSURE (kPa)	TEMP.	PRESSURE (kPa)	DURATION (Min.)
Waste Activated Sludge	WAS	100	30	700	120
PIPE	WAG	100	30	700	120
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	≥75	Mild Steel, CW or ERW	Std. Wt.	ASTM A53, Grade B	TCLWITTIGE.
Buildings	2/3	or PVC	Schedule 80	CSA 137.3, ASTM D1785	Note 1
COATINGS					
LOCATION	SIZE (mm)	MATERIA	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings	≥75	Paint N/A			
LININGS				1	1
LOCATION	SIZE (mm)	MATERI	AL	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and Buildings		Epoxy, E2A N/A		AWWA C210	
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
Tunnels, Pumphouses, and	≥75	Butt Weld	N/A		1
Buildings		Grooved Joint Bell & Spigot	20 m N/A	AWWA C606 AWWA	Note I
FITTINGS AND APPUR	TENANCES	Dell & Spigot	IN/A	AWWA	Note 1
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges, FF or RF	≥75	Mild Steel	Class 150	Material: ASTM A181, Gr. 1	KEWAKKS
rianges, 11 or rd	213			Dimensions: ANSI B16.5 ANSI B16.9	
		PVC	Schedule 80		
ELL – Short Radius ELL – Long Radius, Tees, Reducers, Reducing Outlets, Laterals	≥75	Mild Steel, Seamless PVC	Same as Pipe Schedule 80	Material: ASTM A234, WPB Dimensions: ANSI B16.9 ASTM D2467, Solvent Weld	
and Caps	225	Mild Stool	Clarateo	Married ACTIVATION CO.	
Plug	≥75	Mild Steel	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	-10	Bl. Neoprene		ASTM F477	
Grooved Joint Gaskets	≥75			AWWA C606	
PVC Solvent				ASTM D2564	1
VALVES	-		-		
TYPE	SIZE (mm)	SPECIFICATIONS		REMARKS	
Butterfly	≥75	BF02		The state of the s	
	-	O. L. C.			
Check	≥75	CV02			

### END OF SECTION