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DIVISION 11

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GENERAL PROCESS PROVISIONS

1. GENERAL

1.1 Intent

- .1 Provide complete, fully-tested, and operational process systems to meet requirements described herein and in complete accord with applicable codes and ordinances.
- .2 Contract Documents and Drawings of this Division are diagrammatic and approximately to scale unless stated otherwise. They establish scope, material, and installation quality, and are not detailed installation instructions.
- .3 Follow manufacturer's recommended installation instructions and procedures for equipment, supplemented by requirements of Contract Documents.
- .4 Install equipment generally in locations and routes shown, with minimum interference with other services or free space. Remove and replace improperly installed equipment to satisfaction of the Contract Administrator at no extra cost.
- .5 Install equipment to provide access and ease of maintenance.
- .6 Connect to equipment specified in other Sections and to equipment supplied and installed by other contractors or by the City. Uncrate equipment, move in place and install complete; start-up and test.

1.2 Regulations

- .1 All Work carried out under this Division shall be in full accordance with all applicable Codes, Regulations, Bylaws, and Ordinances and nothing in the Drawings and Specifications shall remove this responsibility.

1.3 Permits, Fees and Inspections

- .1 Apply for all permits, supply all test certificates and pay all fees to authorities having jurisdiction regarding the installation and inspection of the complete process systems, installed under this Contract.

1.4 Existing Conditions and Other Trades

- .1 Visit the Site to determine existing conditions affecting the Work of this Division. Failure to do so shall not remove the responsibility for the effects of such conditions on the Work.
- .2 Examine all Drawings and become fully familiar with the Work of other trades in all Divisions under this Contract.
- .3 Cooperate with all other trades. Pay particular attention to the proximity of the Work to all electrical cables, control conduits, and utilities. Maintain maximum clear ceiling heights throughout. Provide connections of sizes as shown on the Drawings for connection by other trades.

GENERAL PROCESS PROVISIONS

1.5 Materials

- .1 Materials and equipment installed shall be new, full weight, and of quality specified. Use same brand or manufacturer for each specific application.

1.6 Scope of Work

- .1 Consideration will not be granted for any alleged misunderstanding of the extent of the Work to be performed. Submitting a Bid shall convey full agreement to all items and conditions specified, indicated on the Drawings, and required by the nature of the Site.

1.7 Discrepancies and Omissions

- .1 These Specifications shall be considered as an integral part of the Drawings, which accompany them, and neither the Drawings nor Specifications shall be used alone. Any items or subject omitted from one but which is mentioned or indicated in the other shall be considered as properly and sufficiently specified and shall therefore be provided.
- .2 Should the Contractor find discrepancies or omissions in the Contract Documents, or be in doubt as to the intent thereof, he shall immediately obtain clarification from the Contract Administrator.

1.8 Transportation and Hoisting

- .1 Assume responsibility for transportation, hoisting, warehousing, and demurrage for all equipment and materials to be furnished and installed under this Division.

1.9 Definitions and Interpretations

- .1 Where the term "Provide" is used herein, it shall be understood to include labour, materials, and services necessary to supply, install, and make functional the items or Work referenced.
- .2 Where the term "Instructions" or "As Instructed" or "Where Instructed", etc. is used herein, it shall be understood to mean as instructed in writing by the Contract Administrator.
- .3 Where the term "Listed" is used herein, it shall be understood to mean that the materials or equipment have been tested in accordance with applicable standards and methods, have been approved and listed for the intended use by a testing authority which itself has been approved by the authorities having jurisdiction.
- .4 Where the term "Approved", "Approval", etc. is used herein, it shall be understood to mean approved by Authorities having jurisdiction as conforming to Codes, Standards, Bylaws, etc.
- .5 Where the term "Acceptable" or "Acceptance", etc. is used herein, it shall be understood to mean acceptable to the Contract Administrator as conforming to the requirements of the Contract Documents.
- .6 Where the term "Submit for Review" is used herein, it shall be understood to mean submit to the Contract Administrator.

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- .7 Where the term “Subject to Review” etc. is used herein, it shall be understood to mean Work shall be laid out for review by the Contract Administrator. No Work shall proceed until written instructions have been obtained from the Contract Administrator. Submit further information, Shop Drawings, samples, etc. as specified and/or as may be reasonably requested by the Contract Administrator.
- .8 Where the term “Accessible” is used herein, it shall be understood to mean readily approachable by person or tools as required and where obstacles may be removed and replaced without cutting or breaking out materials.
- .9 Where working pressure or pressure ratings are specified or shown on the Drawings for valves, piping, fittings, equipment, etc., these items shall be suitable for operating at specified pressures and corresponding temperature unless noted otherwise.

1.10 Shop Drawings

- .1 Refer to Section 01300 for the general requirements for Shop Drawings.
- .2 For specific requirements for Shop Drawings for various pieces of equipment, refer to the relevant specific Sections describing the equipment.
- .3 Shop Drawings shall be complete; capable of illustrating fully that the product to be supplied is in accordance with the Specifications; including design considerations, materials, and accessories and spare parts. Include wiring diagrams for power supply and control schematics for all electrically powered and/or controlled equipment.
- .4 It is the responsibility of the Contractor to ensure that all submittals are in accordance with the requirements of the Specifications. Shop Drawings which are not considered complete will be returned to the Contractor “Not Reviewed”.
- .5 Submit Shop Drawings in accordance with the Contract requirements and allow sufficient time for review and implementation prior to Contract completion.
- .6 Shop Drawings of equipment supplied under other Contracts will be made available to the Contractor to assist in the installation.

1.11 Coordination

- .1 Coordinate locations of openings, housekeeping pads, and anchor bolts with other Divisions.
- .2 Coordinate the connection of the services of other Divisions to the equipment and material supplied under this Division.

1.12 Minor Changes

- .1 Equipment and materials shall be installed and arranged generally as shown on the Drawings. However, minor changes may be required to suit the precise requirements of the actual equipment or materials supplied, or to avoid conflict between services.

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- .2 Prior to the installation of the relevant equipment or materials, the Contractor shall advise the Contract Administrator of the requirement for any minor changes (including box-outs and coring) and shall undertake such minor changes as instructed by the Contract Administrator. Such changes shall be undertaken at no extra cost except where the connection or arrangement is modified in length, or alignment, or position, by more than one metre, or if the change requires the addition of more than two fittings greater than 150 mm in diameter.

1.13 Metric Conversion

- .1 All units in this Division are expressed in SI units.
- .2 Submit all Shop Drawings and maintenance manuals in SI units.
- .3 On all submittals (Shop Drawings etc.) use the same SI units as stated in the Specifications.
- .4 Equivalent nominal diameters of pipes - metric and Imperial:

mm	inches	mm	inches	mm	inches
3	1/8	65	2-1/2	375	15
6	1/4	75	3	450	18
10	3/8	100	4	500	20
15	1/2	125	5	600	24
20	3/4	150	6	750	30
25	1	200	8	900	36
30	1-1/4	250	10	1050	42
40	1-1/2	300	12	1200	48
50	2				

- .1 Where pipes are specified with metric dimensions and Imperial sized pipes are available, provide equivalent nominal Imperial sized pipe as indicated in the table, and provide at no extra cost adapters to ensure compatible connections to all metric sized fittings, equipment, and piping.
- .2 When CSA-approved SI metric pipes are provided, the Contractor shall provide at no extra cost adapters to ensure compatible connections between the SI metric pipes and all new and existing pipes, fittings, and equipment.

1.14 Cutting and Patching

- .1 Provide holes and sleeves, cutting and fitting required for mechanical Work. Relocate improperly located holes and sleeves.
- .2 Drill for expansion bolts, hanger rods, brackets, and supports.
- .3 Obtain written approval from the Contract Administrator before cutting or burning structural members.

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- .4 Patch building where damaged from equipment installation, improperly located holes etc. Use matching materials as specified in the respective Section.

1.15 Substantial and Total Performance

- .1 Prior to Substantial Performance Inspection, provide complete list of items, which are deficient at the time of the Substantial Performance Inspection.
- .2 Perform the following items prior to Substantial Performance Inspection.
 - .1 Make systems capable of operation with alarm controls functional and automatic controls in operation generally, but not necessarily finally calibrated.
 - .2 Make necessary tests on equipment including those required by authorities. Obtain certificates of approval.
 - .3 Complete valve tagging and identify equipment. Paint equipment and piping, and install escutcheons.
 - .4 Lubricate equipment as per manufacturer's instructions.
 - .5 Mail warranty forms to manufacturer. Provide copy of original warranty for equipment which has warranty period longer than one year.
- .3 Prior to Total Performance Inspection, provide declaration in writing that deficiencies noted at time of Substantial Performance Inspection have been corrected and the following items completed prior to the Total Performance Inspection:
 - .1 Complete final calibration of controls.

1.16 Equipment Protection and Clean-Up

- .1 Protect equipment and materials in storage on-site during and after installation until final acceptance. Leave factory covers in place. Take special precautions to prevent entry of foreign material into working parts of piping and duct systems.
- .2 Protect equipment with crates and polyethylene covers.
- .3 Thoroughly clean both existing and new piping, ducts and equipment of dirt, cuttings, and other foreign substances.
- .4 Ensure that existing equipment is carefully dismantled and not damaged or lost. Do not reuse existing materials and equipment unless specifically indicated.

1.17 Temporary Usage

- .1 Usage by the City of any process device, apparatus, machinery, or equipment prior to Total Performance being issued is not to be construed as acceptance.

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1.18 Acceptable Products and Acceptable Manufacturers

- .1 The first product specified in a product list is considered the “Design Standard” unless noted otherwise. The Design Standard product has been used as the basis for design. Dimensions, operating protocol, basic materials, etc. of the Design Standard have been incorporated in the design.
- .2 Where one or more Acceptable Products or Acceptable Manufacturers have been listed for an item of equipment, these are accepted as equivalent in concept to the Design Standard, if a Design Standard is listed. Incorporation of equipment options to satisfy the intent of the Specifications such that the process system would function as intended with the Design Standard is the responsibility of the Contractor. Modifications to the equipment services, supports, structure, etc., to suit Acceptable Products shall be the responsibility of the Contractor.
- .3 It remains the responsibility of the Contractor to ensure the products supplied are equal to the specified products in every respect, operate as intended, and meet the performance Specifications and physical dimensions of the specified product.
- .4 The Contractor shall be fully responsible for any additional Work or materials, to accommodate the use of equipment from the acceptable manufacturers and suppliers’ list.
- .5 Within 14 days of Contract award, submit a copy of the list indicating the manufacturers whose prices were carried in the Bid. If no manufacturer names are submitted, it shall be assumed that the price carried in the Bid was that of the specified manufacturer or, where the specified product is generic, the first acceptable manufacturer listed for each item and equipment.

1.19 Delivery Schedule

- .1 The Contractor shall coordinate the equipment and material delivery schedule with the suppliers of the equipment and materials supplied under this Contract to suit the construction schedule. The dates for delivery shall be identified within 20 working days of Contract award. These delivery dates may be altered by mutual agreement between the Contractor and the Contract Administrator.

1.20 Delivery

- .1 The Contractor shall be responsible for unloading the equipment and materials supplied under this Contract and shall examine all packages on delivery, compare with the shipping list, and inform the supplier, the Contract Administrator and the carrier of any visible damages or defects. The Contractor shall arrange with the supplier to have the supplier replace any damaged or defective items.

1.21 Storage

- .1 The Contractor shall provide temporary buildings and covered space for storage at the Site of all equipment prior to installation. The location of such buildings will be subject to acceptance by the Contract Administrator and the City.

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- .2 Pipe and any other materials shall be stored in a manner which prevents rust, deformation, weathering, or any other physical deterioration. Covered space shall be provided by the Contractor if necessary to provide for this protection.
- .3 The Contractor shall adhere to the manufacturers' storage recommendations.
- .4 Heated covered storage space shall be provided by the Contractor for sensitive items of equipment such as motors and pumps, as well as other equipment or supplies specified in this Division or other Divisions.

1.22 Spare Parts and Special Tools

- .1 If spare parts or special tools are to be provided with any equipment specified, the specific parts or tools will be listed in the relevant Specification Section and are to be supplied with the equipment.
- .2 Where the operation of the equipment for a period of two years would require that some specific spare parts are likely to be required, but are not listed in the Specification, the Contractor shall so inform the Contract Administrator. Costs, delivery periods, and any other information relevant to the procurement of the identified spare parts shall be identified.
- .3 Where special tools are required for the maintenance or operation of a specific item of equipment, but are not listed, the Contractor shall so inform the Contract Administrator. Costs, delivery periods, and any other information relevant to the procurement of the identified special tools shall be provided.
- .4 This clause does not relieve the Contractor of the responsibility to provide, at no cost, any spare parts required during the warranty period to repair malfunctioning or failed equipment. At the end of the maintenance period, the spare parts inventory shall be replenished to allow for the above.

END OF SECTION

PROCESS PIPING

1. GENERAL

1.1 Description

- .1 This Section describes the pipe materials, fittings, appurtenances, installation and testing of the process systems.
- .2 Use the general requirements specified in this Section integrally with the more specific requirements listed in Section 11055 – Detailed Piping Specification Sheet.
- .3 Piping supports are generally not shown on the process Drawings. Provide the design of piping supports, pipe guides, expansion joints and anchors based upon final piping layout. Typical support details and structural attachments shown on the Drawings indicate the level of quality that will be considered acceptable.
- .4 The Contractor must provide the necessary submittals and ensure the proper registration of piping systems and system components as required by Manitoba Labour and Immigration.
- .5 Standard of Acceptance: items specified by manufacturer's name and/or catalogue number form part of this Specification in order to define the standard regarding performance, quality of material and workmanship. When used in conjunction with a referenced standard, shall be deemed to supplement the standard.

1.2 Definitions

- .1 Pressure terms used in this and other related sections are defined as follows:
 - .1 Operating Limits: the minimum and maximum pressure at which the piping system operates for sustained periods of time
 - .2 Test Pressure: the hydrostatic pressure used to determine system compliance.
- .2 Pipe and appurtenance location terms used in this and other related sections are defined as:
 - .1 Submerged: regularly or occasionally immersed in liquid; inside tanks or channels, and within 3.0 m above maximum water level of open tankage, including pipe and appurtenances within manholes, vaults, and chambers.

1.3 Reference Standards

- .1 Conform to the most recent version of the following reference standards:
 - .1 ANSI/ASME A13.1, Scheme for the Identification of Piping Systems
 - .2 ANSI/ASME B31.3, Process Piping
 - .3 ASTM D1785, Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
 - .4 ASTM D2467, Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

PROCESS PIPING

- .5 ASTM D2564, Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
- .6 CPC, Canadian Plumbing Code
- .7 CSA CAN3-Z299.3, Quality Verification Program Requirements
- .8 MIL-STD-810C, Environmental Test Methods
- .9 MSS SP25, Standard Marking System for Valves, Fittings, Flanges and Unions
- .10 SSPC-P3, Canadian Government Standards Board
- .11 SSPC-SP6, Canadian Government Standards Board
- .12 SSPC-SP10, Canadian Government Standards Board
- .13 National Fire Code of Canada
- .14 NFPA 300 (2003 Edition)
- .15 NPC, National Plumbing Code
- .16 TSSA, Technical Standards and Safety Association
- .17 Provincial Building Code
- .18 Provincial Plumbing Code

1.4 Design Requirements

- .1 All process piping shall meet requirements of the Process Piping Code, B31.3, whether or not it falls within the Code scope. Manitoba Labour and Immigration shall be the Code Authority whenever the piping system falls within the Code scope. The Contract Administrator shall be the Code Authority for process piping that does not fall within the Code scope.
- .2 Piping and Instrumentation Drawings, piping schematics, and piping layout Drawings are contained in the Drawings set. The Piping and Instrumentation Drawings (P&IDs) indicate all major pipework, valves, and appurtenances (other than cleanouts, purge points, etc.) The layout Drawings indicate the design concepts and are intended to illustrate a constructible method for the piping systems. Some appurtenances, supports, guides and anchors, and expansion joints are not fully shown. The Contractor's design will complement and detail these Drawings.
- .3 It is understood that some conflicts may arise that will require that the Contractor re-route some of his piping to allow for the installation of wiring, ventilation duct, or similar.

PROCESS PIPING

1.5 Submittals

- .1 For each piping system refer to Section 11055, submit documentation listing pipe, fittings, flexible connectors, expansion joints, linings, coatings, and valving to be used for each pipe size and category.
- .2 A copy of this Specification Section and all referenced sections with each paragraph check-marked to show compliance or highlighted to indicate deviation.
- .3 Provide hanger, guide, and anchor, support system design details including locations, load information, design calculations and illustrative drawings, signed and sealed by a Professional Engineer registered in the Province of Manitoba. Refer to Section 11052.

1.6 Coordination

- .1 Process and Utility Piping identification
- .2 Process and utility piping is identified in the Drawings by a two component alpha-numeric code (Line Label), as follows:
 - .1 The first component of the code indicates the nominal line size.
 - .2 The second component of the code identifies the process fluid being conveyed (commodity). The commodity codes are defined in the Drawings.
- .3 Routing
 - .1 Coordinate piping installation routes and elevations with installation of sheet metal, process equipment, HVAC, instrumentation, and electrical work.

1.7 Conflicts

- .1 Review the Drawings prior to installation of piping, conduits, services, and fixtures by this or any other division. Identify any conflicts and cooperate with the Contract Administrator to determine the adjustments necessary to resolve these conflicts.
- .2 Confirm the routing of each section of pipework with other services prior to commencement of installation. Advise the Contract Administrator of any conflicts with existing services or services yet to be installed. Where necessary, change the routing of pipework to avoid conflict and confirm with the Contract Administrator.

1.8 Shipment, Protection and Storage

- .1 Deliver pipe, fittings, and specials to Site using loading methods which do not damage pipe or coatings.
- .2 Piping materials delivered to Site will be clearly marked to indicate size, type, class/schedule, and coatings.
- .3 Protect non-UV light inhibited plastic from sunlight.

PROCESS PIPING

- .4 Ship pipe expansion joints, anchors, guides and flexible connectors pre-assembled to the degree which is practical.

1.9 Warranty

- .1 Contractor shall supply new materials and re-do the Work should materials be found to be defective or not in compliance with the Specifications, or should the workmanship be found to be inadequate or the Work was not performed in accordance with the Specifications and referenced standards, codes and regulations. This warranty shall remain in effect for the maximum period of time allowed under Law.
- .2 Neither the Contract Administrator's inspections, checks, or any other tests or subsequent authorization to proceed with the Work, nor the Contract Administrator's waiving of the Contract Administrator's right to perform such tests, nor the Contract Administrator's decision not to solicit submission of material certificates or other quality assurance documentation relieve the Contractor from any degree of responsibility in regard to the Work or the corresponding warranty above. The Contractor agrees that the Contract Administrator's ability to fully assess the suitability of materials, procedures, worker qualifications and other relevant issues is limited. The Contractor bears full responsibility and is solely liable in these matters.
- .3 The use of faulty materials or materials that do not meet the Specifications and referenced standards, codes and regulations shall constitute a hidden defect.
- .4 Employment of labour not properly qualified, the performance of the Work not in accordance with the Specifications and the referenced standards, codes and regulations, and the use of inadequate or sub-standard workmanship shall constitute hidden defects.

2. PRODUCTS

2.1 Function

- .1 Provide the pipe materials, fittings, and appurtenances as described below, for the piping systems shown.

2.2 Pipe Materials - General

- .1 All pipe materials to be new, free from defects and conforming to the reference standards identified in Section 11055.
- .2 Where any standard referenced has been superseded prior to bidding, the Contractor shall comply with the new standard.

PROCESS PIPING

3. EXECUTION

3.1 Preparation

- .1 Prior to installation, inspect and field measure to ensure that previous work is not prejudicial to the proper installation of piping.
- .2 Make all minor modifications to suit installed equipment and structural element locations and elevations.
- .3 Piping arrangements indicated on the Drawings have been established on the basis of the "Design Standard" listed in the specific process equipment sections. If the equipment to be provided is not the Design Standard, modify the piping arrangement as necessary at no additional expense to the City.
- .4 Advise the Contract Administrator of all modifications. Do not commence work on the related piping until all modifications have been reviewed by the Contract Administrator.
- .5 Include any piping modifications in the Shop Drawings submitted prior to fabrication or installation.

3.2 Pipe Handling

- .1 Inspect each pipe and fitting prior to installation. Do not install damaged pipe or pipe with damaged protective coatings. Do not use sections of large diameter, thin walled stainless steel piping that may have been deformed out of roundness or dimpled. Such damaged sections shall be discarded.
- .2 Remove all foreign matter from inside of pipe prior to installation.

3.3 Installation

- .1 Fabricate and install process and pressure piping in accordance with the Process Piping Code B31.3 and the Manitoba Department of Labour and Immigration. Fabricate and install domestic hot and cold water piping, sanitary piping, and storm drainage piping in accordance with the National Plumbing Code.
- .2 Make adequate provision in piping and pipe support systems for expansion, contraction, slope, and anchorage. Supports, bracing, and expansion joints shown in the Drawings are schematic only. The Contractor is responsible for the design, supply, and installation of the piping system in general accordance with the indicated requirements.
- .3 Install pipe support system to adequately secure the pipe and to prevent undue vibration, sag, or stress.
- .4 Install expansion joints where shown and at other locations as necessary to allow for piping expansion and contraction.
- .5 Provide temporary supports as necessary during construction to prevent overstressing of equipment, valves, or pipe.

PROCESS PIPING

- .6 Do not cut or weaken the building structure to facilitate installation.

3.4 Testing

- .1 Give the Contract Administrator 24 hours notice prior to testing.
- .2 Do not insulate or conceal Work until piping systems are tested and accepted.
- .3 Supply all water, air, inert gases, and other media required for pressure testing.
- .4 Supply all pumps, compressors, gauges, etc., required for testing.
- .5 Cap or plug all lines which are normally open-ended. Remove on completion of testing.
- .6 Test all existing piping where it connects to new piping to the first valve in the existing piping. Repair any failures in existing piping which occur as a result of the test after informing the Contract Administrator of such failure.
- .7 Isolate all low-pressure equipment and appurtenances during testing so as not to place any excess pressure on the operating equipment.
- .8 Where defective material or equipment is identified, repair or replace using new material.
- .9 Release pressure safely, flush and drain liquid pipes after pressure tests. Release pressure safely and purge if needed all gas pipes after pressure tests.
- .10 Dispose of flushing water in manner which causes no damage to buildings or Siteworks, as approved by the Contract Administrator.

3.5 Pressure Testing of Liquid Lines

- .1 Hydrostatically test all lines normally used for the conveyance of liquid using water as the test medium.
- .2 Test pressures and durations shall be as specified in the Detailed Piping Specification Sheets.
- .3 Fill all lines with water. Bleed air from all high spots using the taps provided specifically for that purpose.
- .4 Zero leakage is permitted throughout the specified test period for all exposed piping, buried insulated piping, and liquid chemical lines.
- .5 Leakage rates shall not exceed 0.01 L/h per mm pipe diameter per 100 m of pipe length for buried piping, unless otherwise specified.
- .6 Test drains in accordance with the National Plumbing Code.

END OF SECTION

DETAILED PIPING SPECIFICATION

1. GENERAL

1.1 Work Included

- .1 The piping specification sheets on the following pages detail the requirements for each type of process pipe included in the Work.
- .2 The piping materials are listed on the specification sheets.

1.2 Process Piping Commodity Summary

SA	Soda Ash	PVC Sch80
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2. PRODUCTS

2.1 Schedule

- .1 Page 2 following.
- .2 Piping inside the SBR headspace is defined as "submerged"

DETAILED PIPING SPECIFICATION

SA

GENERAL					
PROCESS FLUID	SYMBOL	MAXIMUM CONDITIONS		TEST CONDITIONS	
		PRESSURE (kPa)	TEMP. (°C)	PRESSURE (kPa)	DURATION
Soda Ash	SA	750	30	1000	120 minutes
PIPE					
LOCATION	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
All	10 – 200	PVC	Schedule 80	ASTM D1785, CSA 137.3	
COATINGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
All	10 – 200	N/A			
LININGS					
LOCATION	SIZE (mm)	MATERIAL		SPECIFICATIONS	REMARKS
All	10 – 200	N/A			
JOINTS					
LOCATION	SIZE (mm)	TYPE	MAXIMUM SPACING	SPECIFICATIONS	REMARKS
All	≥75	Solvent Weld	N/A	ASTM D2467, D2564	Note 1
	≥75	Flanges	12m	ASTM D2467	
FITTINGS AND APPURTENANCES					
ITEM	SIZE (mm)	MATERIAL	RATING	SPECIFICATIONS	REMARKS
Flanges	10 – 200	PVC	Schedule 80		
ELL - Short Radius ELL - Long Radius, Couplings, Tees, Reducers, Reducing Outlets and Laterals	10 – 200	PVC	Schedule 80	ASTM D2467, Solvent Weld	
Plug	10 – 200	PVC	Schedule 80	ASTM D2467, Solvent Weld	
Cap	≥75	PVC	Blind Flange Schedule 80		
Flange Gaskets		Bl. Neoprene, Viton		ASTM F477	Note 3
PVC Solvent				ASTM D2564	Note 3
NOTES					
<ol style="list-style-type: none"> Provide unions or flanges as shown on Drawings to allow for pipe disassembly. Where pipe crosses a structural joint, install at the joint an EPDM lined elastomer spherical moulded type expansion joint capable of 0.25 degrees angular movement and ±20 mm axial movement. Gaskets and solvent material to be compatible with designated chemical solution. 					

END OF SECTION