

# Technical Specifications

DESCRIPTIONS/SPECIFICATIONS		<u>STATEMENT OF COMPLIANCE</u> (State "Comply or not Comply" for each item description and specifications and attach your company shop/drawing and or brochures / and or Literatures)
<b>PR NO. 17-02-01-022 &amp; 17-11-01-050 – Supply and Delivery 1 Lot uPVC &amp; 1 Lot BI Transmission/Distribution Pipes</b>		
The following images are provided for reference only. We are not specifying/endorsing any particular brand of equipment/material/fittings. IT IS STRONGLY ADVISED TO STRICTLY FOLLOW THE TABLE OF MATERIAL (with dimension and end connection specifications) AND MATERIAL SPECIFICATIONS PROVIDED.		
<b>General Specifications</b>		
<b>Materials</b>	At a minimum, the materials to be purchased shall conform with the international standards mentioned below and other equivalent. All materials in contact with potable water shall not have detrimental effects on the properties of the water. When used under conditions for which they are designed, pipe materials shall not constitute a toxic hazard; shall not support microbial growth nor give rise to unpleasant taste or odor, cloudiness or discoloration of the water. The concentrations of substances, chemicals and biological agents leached from pipe materials and the measurements of relevant organoleptic/physical parameters shall not exceed the maximum values recommended by the Department of Health in its publication <i>Philippine National Standards for Drinking Water</i> . Certificates of compliance from independent testing institutes as well as declarations concerning suitability for the use with potable water shall be provided.	
<b>Gate Valves and Service Valves</b>	Valves shall be designed to provide a clear bore through the valve when fully open. It shall be equipped with a nut and shall open by turning the nut in a counterclockwise direction when viewed from the top after installation.	
<b>Coating of Ductile Iron Valves and Ductile Iron/Cast Iron Fittings</b>	All valves and fittings including strainers, saddle clamps, flange adapters, pipe couplings and push-in fittings for PE pipes made from ductile iron shall be internally and externally fusion bonded epoxy powder coated according to the general requirements of AWWA C550/C213 and EN DIN 30677-2, DIN 3476 and RAL Quality Mark 662 with following specific requirements:	
	Coating thickness: min. 250 microns	
	Adhesion: min. 12N/mm <sup>2</sup>	
	Impact resistance: = min. impact energy 5 Nm at drop height of 1 m	
	Porosity: zero porosity at 3,000 V  Certificates of compliance from independent testing institutes shall be provided.	
<b>uPVC TRANSMISSION/DISTRIBUTION PIPES</b>		
<b>Pipe</b>		
<b>Material Type</b>	uPVC	
<b>End Connection</b>	PO X PE	
<b>Dimensions</b>	1. 92pieces 75mmØ x 6m	
	2. 92 pieces 100mmØ x 6m	
	3. 32 pieces 150mmØ x 6m	
	4. 2 piece 200mmØ x 6m	
	5. 2 piece 250mmØ x 6m	
	6. 4 pieces 300mmØ x 6m	
	7. 1 piece 400mmØ x 6m	
<b>Others</b>	With rubber gasket	
	Pipes and fittings, unless otherwise specified, shall conform with PNS 65 and/or ISO 4422.	

	Base compound material shall conform to the applicable requirements of ISO 4422; with minimum required strength (MRS) at 50 years and at 20°C of at least 25 MPa (3625 psi), and with maximum allowable hydrostatic design stress of 10MPa (1450 psi).	
	The extracted quantities of lead or tin measured as metals in accordance with ISO 3114 shall not exceed the limits specified in the table below. Likewise, cadmium and mercury shall not be more than the limits indicated in ISO 6992.	

Toxic Substances	Maximum Limits (mg/L)
Lead, mg/L	0.05
Di-alkyl Tin, C4, and other higher monologues measured as tin, mg/L	0.02
Cadmium, mg/L	0.01
Mercury, mg/L	0.001

**Limits of Extractable Toxic Substances for uPVC**

	Pipes and fittings shall be classified as Series 8 of ISO 4422, with nominal working pressure of 1.25 MPa (181 psi).	
	Pipe dimensional requirements shall be as specified in table below when tested in accordance with ISO 3126.	

Nominal Pipe Size, mm	Nominal Outside Diameter, mm	Outside Diameter, mm		Wall Thickness, mm		Tolerance on Ovality, mm	Minimum Depth of Engagement, mm
		Min.	Max.	Min.	Max.		
50	63	63	63.3	3.8	4.4	1.5	64
75	90	90	90.3	5.4	6.2	1.8	70
100	110	110	110.4	6.6	7.6	2.2	75
150	160	160	160.5	9.5	10.9	3.2	86
200	225	225	225.7	13.4	15.4	4.5	100
250	280	280	280.9	16.6	19.1	9.8	112
300	355	355	356.1	21.1	24.3	12.4	124
400	450	450		26.7			

**Dimensional Requirements for uPVC pipe**

	pipes shall be 6m in length with tolerance of +20mm	
	No Negative tolerance is allowed	
	Pipes spigot ends shall be chamfered in accordance with PNS 65	
	Pipe color shall be extruded blue, nearest to RAL 5012, and shall be uniformly dispersed throughout the entire surface.	
	Pipes shall not show signs of delamination or disintegration when immersed in acetone	
	The value for the longitudinal reversion shall not be greater than 5% when tested in accordance with ISO 2505-1, method A or B, at 150 ± 2°C for the duration specified in the table below.	

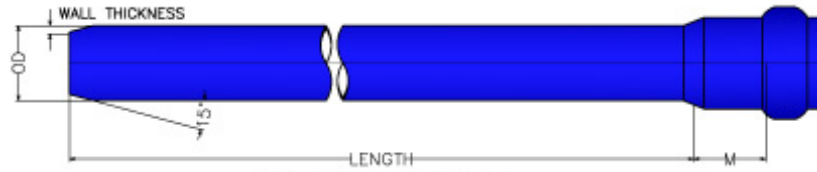
	Method A (Using Liquid Bath)	Method B (Using Air Oven)
Duration (min.) e is the wall thickness in mm	15 for e ≤ 8 30 for e > 8	60 for e ≤ 8 120 for 8 < e ≤ 16 240 for e > 16

**Exposure Duration for Longitudinal Reversion for uPVC pipe**

	Pipes shall withstand the test pressures indicated in the table below under the specified conditions when tested in accordance with ISO 1167.	
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Test	Minimum Duration	Temp., °C	Test Pressure MPa (psi)
Burst Pressure Test	60 sec.	28	5.0 (725)
Short Term Pressure Test	1 hr.	28	4.9 (710)
Long Term Pressure Test	100 hrs.	28	4.0 (580)
Sustained Pressure Test	1000 hrs.	60	1.5 (218)

**Hydrostatic Pressure Test for uPVC pipe**



**Steel Pipe (B.I. Schedule 40/CI)**

Dimensions		Outside Diameter	Wall Thickness
1.	2 length 75mmØ x 6m	89 mm (min.)	5.5 mm (min.)
2.	2 length 100mmØ x 6m	114.3 mm (min.)	6 mm (min.)
3.	2 length 125mmØ x 6m	141.3 mm (min.)	6.55 mm (min.)
4.	4 lengths 150mmØ x 6m	168.2 mm (min.)	7.11 mm (min.)
5.	4 lengths 200mmØ x 6m	219 mm (min.)	8.17 mm (min.)
6.	3 lengths 250mmØ x 6m	273 mm (min.)	9.2 mm (min.)
7.	3 lengths 300mmØ x 6m	323.85 mm (min.)	10.3 mm (min.)
8.	2 length 400mmØ x 6m	406 mm (min.)	12.7 mm (min.)
9.	2 length 450mmØ x 6m	457.2 mm (min.)	14.2 mm (min.)
<b>Make</b>	Black Iron		
<b>Length</b>	6 meters		
<b>Working Pressure</b>	150 psi		
<b>Other Requirements</b>	Original Maufacturer's Product Brochures/Manual/Literatures		
	Specify Delivery Packaging		