Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

TECHNICAL SPECIFICATIONS

Project Title: Proposed pipe laying of 2" Φ HDPE Pipe water transmission line for the Alburquerque, Bohol Weather Surveillance Doppler Radar Building

Project Location: Sitio Lam-ao, Brgy. Basacdacu, Alburquerque, Bohol

Specifications for High Density Polyethylene Pipe and Fittings

1. General Terms and Conditions

1.1. Scope: This specification conforms to ISO R161/1/ISO 3607 Series, SDR PR based on controlled outside diameter and in accordance to PNS ISO 4427-2002

1.2. Engineers Approved Plans: Drinking water lines located underground shall be constructed in accordance with plans and specifications prepared by a Professional Engineer.

1.3. Standards. All standards and specifications referenced shall be the latest edition and version thereof. This includes AWWA, ASTM, ANSI, and PNS.

1.4. Licenses and Permits. All construction work related to the installation of potable water pipe shall be performed by a licensed and bonded General Contractor. Permits and licenses must be obtained prior to construction.

1.5. Inspections. An Authorized Representative of the Owner shall inspect all work. The Authorized Representative shall have the authority to halt construction if these specifications, construction standards, or OSHA or Owners safety policies are not being followed. Construction shall be halted until the portion of the specification or standard is corrected. Written notice of the violation is required. A copy of the written notice shall be filed with the Contractor's license application for future review. If the deficiencies are not corrected, the contractor's surety shall be required to complete the work.

1.6. Warranty and Acceptance. Materials and workmanship shall have a one-year warranty to be free from defects in workmanship and materials. The warranty

will be from the date of completion of construction. If work has been done to the requirements of this specification, a letter of acceptance shall be provided to the contractor upon final inspection. If deficiencies are discovered during the warranty period, the Contractor shall be required to correct these deficiencies without additional charge to the Owner or his agent. The Project Engineer shall determine the need for warranty repair work to be performed by the Contractor. The Project Engineers determination of a deficiency will bind the Contractor to make a repair in accordance with this Contract.

2. High Density Polyethylene Pipe and Fittings

2.1. Qualifications of Pipe Manufacturers. The HDPE pipe shall be manufactured in a plant capable of providing continuous quality control through inspection. The facility shall have the necessary testing equipment to verify that the pipe meets the requirements of ISO R161/1/ISO 3607 Series, SDR PR and Philippine National Standards ISO 4427-2002.

2.2. Qualifications of the Fittings Manufacturer. The facility shall have the necessary testing equipment to verify that the fittings meet the requirements of ISO R161/1/ISO 3607 Series, SDR PR and Philippine National Standards ISO 4427-2002for sizes 20mm. to 630mm.

2.3. Materials. Physical Properties

Property	ASTM Test	Value
Density, GMS/CC	D 1505	0.955
Melt flow (Condition F), MS/10 Min. Environmental Stress Cracking Resistance, (Hrs.)	D 1238	1.5
Condition A, B & C	D 1693	>1500 No Failures
Tensile Strength, Yield, PSI		
20 In./Min.	D 638	4800
2 In./Min.	Die IV	3200
Elongation, % 2 In./Min.		>600
Impact Strength, Ft. Lbs./In. Notch, Specimen Thickness		
0.250 inch	D 256	7

0.125 inch		12
Vicat Softening Temperature, ^oF	D 1525	257
Brittleness Temperature, ^oF	D 746	180
Thermal Conductivity, BTU, In./Ft./Hrs. ^oF	C 177	3.7
Flexural Modulus, PSI	D 790	140M
Modulus of Elasticity, PSI	D 638	100M
Hardness, Shore D	D 2240	65
Coefficient of Linear Thermal Expansion In./In./ ^oF	D696	1.2×10^6

2.4. Working Pressure

SDR	Nominal Pressure, PSI (Bars) for Materials Class	
	PE 80	PE 100
21	-	116 (8)
17	116 (8)	145 (10)
13.6	245 (10)	181 (12.5)
11	181 (12.5)	232 (16)
9	232 (16)	290 (20)

2.5. Interchangeability of Pipe and Fittings. High-density polyethylene pipe and fittings can be supplied by different manufacturers as long as they meet the above ISO R161/1/ISO 3607 Series, SDR PR and Philippine National Standards ISO 4427-2002 cell classification.

2.6. 2 Inches and Smaller – The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

2.7. 3 Inches and Larger - The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

2.8. Pipe Manufacturer's Quality Control. The pipe manufacturer shall have an ongoing Quality Control program for incoming and outgoing materials. High-density polyethylene (HDPE) resins for manufacturing of pipe shall be checked for density, melt flow rate, and contamination. The manufacturer of the HDPE

resin shall certify the Cell Classification as indicated in section 2.3. These incoming resins shall be approved by plant Quality Control. Pipe shall be checked for outside diameter, wall thickness, length, roundness, and surface finish on the inside and outside and end cut.

2.9. Fittings Manufacturer's Quality Control. The fitting manufacturer shall have an ongoing quality control program for incoming and outgoing materials. The resin shall be checked as indicated in section 2.3 and section 2.4.

2.10. Compliance Testing. If requested, the pipe or fittings manufacturer can be required to retest or verify certification data. All retesting shall be at the requestor's expense, and shall be performed as required in the specifications.

3. Compression Type Joining (Quick Joint)

3.1. The High-grade PP compression type pressure fittings shall conform to ISO R-161 and allows the maximum working pressure of 16 bar for diameter from 20mm. to 63mm. at temperature of 20°C.

4. Installation

4.1. Pipe and fittings shall be installed using the procedures recommended by the manufacturer.

5. General. Pipe and fittings shall be packaged in a manner suitable for shipment by a commercial carrier. Upon receipt at job site, a receiving inspection shall be prepared. The quantity shall be verified and any shipping damage shall be reported to the supplier within 7 days.

5.1. Excavation. Pipes shall not be buried as per recommendation of the local municipal water district of the Municipality of Corella.

5.2. Flange Adapter Installation. Flanges adapters shall be attached to pipe and fittings based from the pipe manufacturer recommended procedure.

5.3. Testing. Pressure testing shall be conducted in accordance with ASTM F 2164, Field Leak Testing of Polyethylene Pressure Piping Systems Using Hydrostatic Pressure. The HDPE pipe shall be filled with water, raised to test pressure and allowed to stabilize. The test pressure shall be 1.5 times the operating pressure at the lowest point in the system. The pipe shall pass if the final pressure is with 5% of the test pressure for 1 hour. For safety reasons, hydrostatic testing only will be used.

6. Basis of Payment

Pay Item Number	Description	Unit Measurement
1001(1)c, 1002(2)	2" dia. HDPE Pipe SDR 11 Laying	l.m.

SCOPE OF WORKS

Project Title: Proposed pipe laying of 2” Φ HDPE Pipe water transmission line for the Alburquerque, Bohol Weather Surveillance Doppler Radar Building

Project Location: Sitio Lam-ao, Brgy. Basacdacu, Alburquerque, Bohol

1. Supply and Delivery of Temporary Field Office for PAGASA Engineer with portalet. (Rental)
2. Supply and Delivery of Contractor’s Workmen accommodation with portalet. (Rental)
3. Fabrication and installation of Project Signage (DPWH Standard).
4. Supply and Delivery of 2” dia. HDPE pipe to Alburquerque, Bohol.
5. Submission of materials specifications of 2” dia. HDPE pipe and fittings.
6. Tapping the 2” dia. HDPE pipe to Corella water district source.
7. Laying of 2” dia. HDPE pipe from Corella tapping point to Alburquerque Bohol Weather Surveillance Building.
8. Connecting the Basacdacu Cistern Tank to the 2” dia. HDPE pipe main transmission line.
9. Connecting the Alburquerque Bohol Weather Surveillance Building cistern tank to the 2” dia. HDPE pipe main transmission line.
10. Installation of High Grade Polypropylene Fittings.
11. Leak testing of the 2” dia. HDPE main transmission line by hydro testing.