

**HIGH DENSITY CROSSLINKED POLYETHYLENE (HDXLPE)  
STORAGE TANKS  
STORAGE OF CALCIUM CHLORATE**

**PART 1 – GENERAL**

1.01 Scope of Work

- A. Furnish all labor, materials, equipment, and incidentals required to install, field test, complete, and make ready for service (Quantity) \_\_ vertical, high density crosslinked polyethylene storage tank(s) as shown on the drawings as specified herein, and as indicated on the attached tank schedule.

1.02 Related Work

1.03 Submittals

- A. Submit to the ENGINEER as provided in Section \_\_\_\_\_, shop drawings, details of construction and erection for each tank as follows:

1. Dimensions of tank, fittings and attachments, with bolt and gasket material.
2. Wall thickness calculations per ASTM D 1998-97 using 600-psi design hoop stress @ 100 degrees F.
3. Locations of fittings and attachments and size of manway openings.
4. Resin used and a complete manufacturer specification of the resin used.
5. Weight of tanks.
6. Statement that fabrication is in accordance with these Specifications.
7. Certificate of Compliance from the tank manufacturer stating:
  - a. All fittings, heat tracing, insulation, etc. have been installed by the tank manufacturer.
  - b. Hydrostatic tests have been performed by the manufacturer and all fittings were installed prior to the tests.
8. Samples of a representative tank wall.
9. Details on packaging.
10. Instructions for handling, storage and installation of tanks.
11. Statement that materials and resin used are suitable for intended service.
12. Drawing details for ladder and safety cage as recommended by MANUFACTURER. (Optional)

B. Drawing Approval

1. Shop drawings shall be approved by the ENGINEER prior to any manufacturing of tanks, fittings, etc. Approval of drawings by the ENGINEER shall not release the CONTRACTOR of responsibility of compliance with these specifications. All proposed changes to these Specifications shall be stated in writing.

C. Samples

1. Representative samples of the high density crosslinked polyethylene tanks shall be furnished at the time of shop drawing review. These samples shall be from plant production and shall be representative of quality and impact resistance of tanks to be furnished. The ENGINEER may reject any tank which does not meet the standard of the representative samples.

#### D. References

1. Submit to ENGINEER list of previous five similar use site installations in the past 36 months or provide a list of three or more customers using tanks for the same chemical applications and similar weather conditions for at least ten years.
2. Submit to the ENGINEER supporting information of UL tank manufacturing capabilities.
3. Submit to the ENGINEER supporting information of ISO 9001 certification.

#### 1.04 Reference Standards

##### A. American National Standards Institute (ANSI)

1. ANSI B16.5 – Pipe Flanges and Flanged Fittings.

##### B. American Society of Testing Materials (ASTM)

1. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
2. ASTM D746 – Brittleness Temperature of Plastics and Elastomers by Impact.
3. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
4. ASTM D883 – Standard Definitions of Terms Relating to Plastics.
5. ASTM D1505 – Density of Plastics by the Density-Gradient Technique.
6. ASTM D1525 – Vicat Softening Temperature of Plastics.
7. ASTM D1693 – ESCR Spec. Thickness .125" F50 – 10% Igepal.
8. ASTM D1998 – Standard Specification for Polyethylene Upright Storage Tank: Section 11.3: Low Temperature Impact Test and Section 11.4: Oxylene-Insoluble Fraction (Gel Test).

- C. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

#### 1.05 Quality Assurance

- A. Tanks shall be constructed by a firm that has at least ten years prior experience in construction of similar crosslink polyethylene tanks in similar applications.
- B. The tank shall be of High Density Crossedlinked Polyethylene (HDXLPE).
- C. Tanks shall be manufactured by a firm with a nationally accepted quality standard (i.e. ISO 9001 or equal).

## **PART 2 – PRODUCTS**

## 2.01 General

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Like items of materials, equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.

## 2.02 Materials

### A. Plastic

- 1. The tanks shall be molded from high density crosslinked polyethylene. The resin used shall be Marlex CL-200 YJN as manufactured by Phillips Petroleum Company, Plastics Division or Paxon 7004 as manufactured by Paxon, Inc. or of resins of equal physical and chemical properties.

### B. Fillers and Pigments

- 1. The plastic shall not contain any fillers. All plastic shall contain a minimum of 0.25 percent U.V. stabilizer and maximum of 0.60 percent. Pigments may be added as desired by the OWNER or as designated by the manufacturer, not to exceed 0.5 percent of dry blended or 2 percent if melt compound of the total weight of the tank.

## 2.03 High Density Crosslinked Polyethylene Tanks

### A. The high density crosslinked polyethylene tanks shall be designed for the following:

- |                                   |                            |
|-----------------------------------|----------------------------|
| 1. Tank description               | Upright                    |
| 2. Outer tank diameter:           | 8 feet, 6 inches           |
| 3. Straight wall vertical height: | 10 feet, 0 inches          |
| 4. Straight wall capacity:        | 4150 Gallons               |
| 5. Resin selected:                | CL-200 YJN or Paxon 7004   |
| 6. Chemical stored:               | Calcium Chlorate @ max 30% |
| 7. Specific gravity:              | 1.90 @ 30%                 |
| 8. Tank color:                    | Natural                    |
| 9. Number of tanks:               | 1                          |

### B. The high density crosslinked polyethylene tanks shall be manufactured by Poly Processing Company or approved equal. Unless otherwise indicated, the plastics terminology used in this standard shall be in accordance with the design, manufacturing, and testing requirements found in ASTM D1998.

### C. The high density crosslinked polyethylene tanks shall be constructed by the rotational molding process.

### D. The nominal properties of the material are as follows based on molded parts:

Property	ASTM	Value
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	Specification	
Density	D1505	.940 to .945 g/cc
ESCR Spec. Thickness .125"F50 10% Igepal	D1693	>1,000 hours
Tensile Strength Ultimate 2 in/min	D638 Type IV Spec	2,600 psi
Elongation at Break 2 in/min.	D638	400 percent
Vicat Softening Temperature	D1525	240 degrees F
Brittleness Temperature	D746	-130 degrees F
Flextural Modulus	D790	100,000 to 110,000 psi

## 2.04 Upright Storage Tanks

- A. Tanks shall consist of a crosslinked polyethylene primary tank. The primary tank shall be vertical, cylindrical, flat bottom, dome top, and seamless in construction.
- B. The tank diameter shall be measured externally. Tolerance on the outside diameter including out of roundness shall be plus or minus three percent. Measurement shall be taken in a horizontal position. The knuckle radius at bottom to wall shall be a minimum of one inch.
- C. The minimum wall thickness shall be 0.187 inch in all places (or see 2.03A).
- D. All edges cut out, such as entrance manway, shall be trimmed to have smooth edges.

## 2.05 Accessories

- A. Manways

1. The manway openings for tanks 2000-gallons and over shall be a minimum of 24" and a minimum of 17" for tanks under 2000-gallons. The manway cover shall be a bolt on type or screw on type lid manufactured out of crosslink polyethylene. Bolts used on the bolt on type lid shall be polyethylene, nylon or a compatible plastic material.

#### B. Side Wall Fittings

1. All fittings which are below the liquid level shall be either two-flange style or stainless steel bulk head style. Materials options for the two-flange fittings are stainless steel, PVC, CPVC. Gasket material options are Viton, EPDM. Chemical bolt options are stainless steel, C-276 Alloy.

#### C. Tie Down Systems

1. Carbon Steel/Galvanized or 316 Stainless Steel clips, bolts, and accessories shall be provided to securely anchor the tank to the cylindrical tank concrete pad. Anchor bolts shall be supplied by the contractor.

### 2.06 System Description

- A. Flange faces shall be protected from damage. All openings are to be covered to prevent the entrance of dirt and debris.
- B. Instructions shall be provided for unloading and installation of tanks.

### 2.07 Shop Testing

- A. The tank manufacturer shall have quality control procedures adequate to insure that all fabrications comply with these Specifications. Quality control shall include in process inspections as well as a final inspection by the manufacturer and written record of these inspections. The objective of manufacturer's quality control and inspection procedure shall be to have the tank comply with the Specifications and Drawings at the time of the first inspection, thus eliminating any need for rework by the manufacturer or a second inspection by the ENGINEER.
- B. Inspection records shall be made for each tank. Inspection records shall be available to the ENGINEER. Upon request, manufacturer shall send a copy of his inspection records to the ENGINEER for review prior to inspection by the ENGINEER.
- C. Final acceptance by the ENGINEER may be contingent upon satisfactory inspection upon arrival, the delivery and installation at the job site.
- D. The tank manufacturer shall perform the tests described below prior to shipping. Test samples shall be taken from the cut out areas of where fittings are inserted in each tank. The Engineer or representative shall have the option of witnessing these factory tests.

1. Impact Test: ASTM 1998-Section 11.3 shall be used for this test. Sample shall not shatter at 120 foot pounds with sample at minus 20 degrees F for a ½ inch wall thickness. For a wall thickness less than ½ inch, the sample shall not shatter at 100 foot pounds and minus 20 degrees F.
2. Degree of Crosslinking Test: ASTM 1998-Section 11.4 shall be used in this test. A minimum of 70 percent Gel must be obtained.
3. Hydrostatic Test: Each tank shall be filled with water and checked for leaks no less than one hour after filling.
4. Wall Thickness: Each tank shall have an actual wall thickness measurement taken at every 90 degrees, at each one foot elevation, up to three feet from the bottom of the tank.

### **PART 3: Execution**

#### 3.01 Installation

- A. Install the high density crosslinked polyethylene tanks in accordance with the Drawings and the manufacturer's instructions.
- B. All fitting connections must be installed with flexible type connections as per the Manufacturers recommendations.
- C. Make all pipe connections to tanks as shown on the Drawings.
- D. Following the field test, tanks and support members shall be anchored in their final position according to the manufacturer's recommendations.

#### 3.02 Field Testing

- A. After installation, each tank connecting pipes, and valving shall be field tested by filling with water. The tank and fittings shall hold water without loss, evidence of weeping or capillary action for a period of 24 hours prior to acceptance. The ENGINEER may also inspect each tank for defects, damage, and conformance with the Specifications.
- B. After testing, the tanks shall be thoroughly cleaned and dried.
- C. Should any defects become evident during inspection, testing, or within the guarantee period, the CONTRACTOR shall repair or replace the defective tank or fitting as approved by the ENGINEER.