SHOP DRAWING REVIEW FORM AND TRANSMITTAL

DATE: **November 23, 2021**

TO: Carl Hendrickson
Project Manager
Veolia Water
825 West Water Street
Taunton, MA 02780

FROM: Michael Andrus, P.E.
Project Manager
BETA Group, Inc.
701 George Washington Hwy
Lincoln, Rhode Island 02865

RE: City of Taunton, MA
WWTF Phase 1 Improvements
Contract S-2021-1

Shop Drawing No. 11400-01 – Polyethylene Chemical Storage Tanks

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BETA COMMENTS:

Item	Action Code	Description/Comments
1	**1**	**Polyethylene Chemical Storage Tanks (Snyder)** **1.** Acceptable as submitted.

Action Codes
1 - No Exception Taken
2 - Make Corrections Noted
3 - Amend and Resubmit
4 - Rejected, See Remarks

a. Installation shall proceed only when Action Code is '1' or '2'.
b. Submittals action coded '3' shall be resubmitted within time limit set in Contract.
c. Review does not relieve Contractor from responsibility of compliance with the Contract Documents.

Hart Engineering Corporation

SUBMITTAL:
11400-01

PROJECT: 9900. - Veolia/Taunton WWTF Phase 1 Improvements **DATE: 10/29/2021**

SUBMITTAL: 11400-01 - Polyethelyne Chemical Storage Tank
REVISION: 0
STATUS: Eng
SPEC #: 11400

TO:
Michael Andrus
Beta Group Inc.
6 Blackstone Place
Lincoln, RI 02865
MAndrus@BETA-Inc.com

FROM:
Ryan Murphy
Hart Engineering Corporation
800 Scenic View Drive
Cumberland, RI 02864
rmurphy@hartcompanies.com

Item	Revision	Description	Status	Date Sent	Date Returned
11400-01	0	Polyethelyne Chemical Storage Tank	Eng	10/29/2021	
Notes:					

SHOP DRAWING REVIEW

☑ 1 – Approved ☐ 2 – Approved as Noted
☐ 3 – Revise and Resubmit ☐ 4 - Rejected
☐ 5 – Record File Only – No Action Taken

(Above Check Designates Action Code – See Review Comments)

IMPORTANT NOTE FOR CONTRACTOR

Review is only for general compliance with the design concept and information provided in Contract Documents. Corrections and comments made on the Shop Drawings during review do not relieve the Contractor from compliance with the requirements of the plans and specifications. Review and/or approval of a specific item shall not include review or approval of an assembly of which the item is a component. No approval or correction of a Shop Drawing shall be construed as an order for extra work. The Contractor is responsible for: all quantities and dimensions to be confirmed and correlated; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of the Work with that of all trades and subcontractors; and performing all Work in a safe and satisfactory manner.

BETA GROUP, INC. Checked By: MLA

By: MLA Date: 11/23/21

Additional Notes:

Status Codes
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

DATE: 10/29/2021

Submittal

October 28, 2021

Scherbon Consolidated Inc.
40 Haverhill Road
Amesbury, MA 01913
Phone:978 388-3132

To: Hart Engineering Corp
800 Scenic View Drive
Cumberland RI 02864

Attention: Ryan Murphy

Re: Taunton MA WWTF – Phase 1 Improvements

Job Number:

We are sending you							
X	Attached	☐	Under Separate Cover via:			the following:	
X	Shop Drawings	☐	Prints	☐	Plans	☐	Other:
☐	Copy of Letter	☐	Change Order	☐	Samples		
☐	Total Quantity	☐	Reproducible	☐	Specification		

Submittal	Quantity	Date	DWG. #	Description
11400-1-0	1	10/28/21		Polyethylene Chemical Storage Tanks Submittal

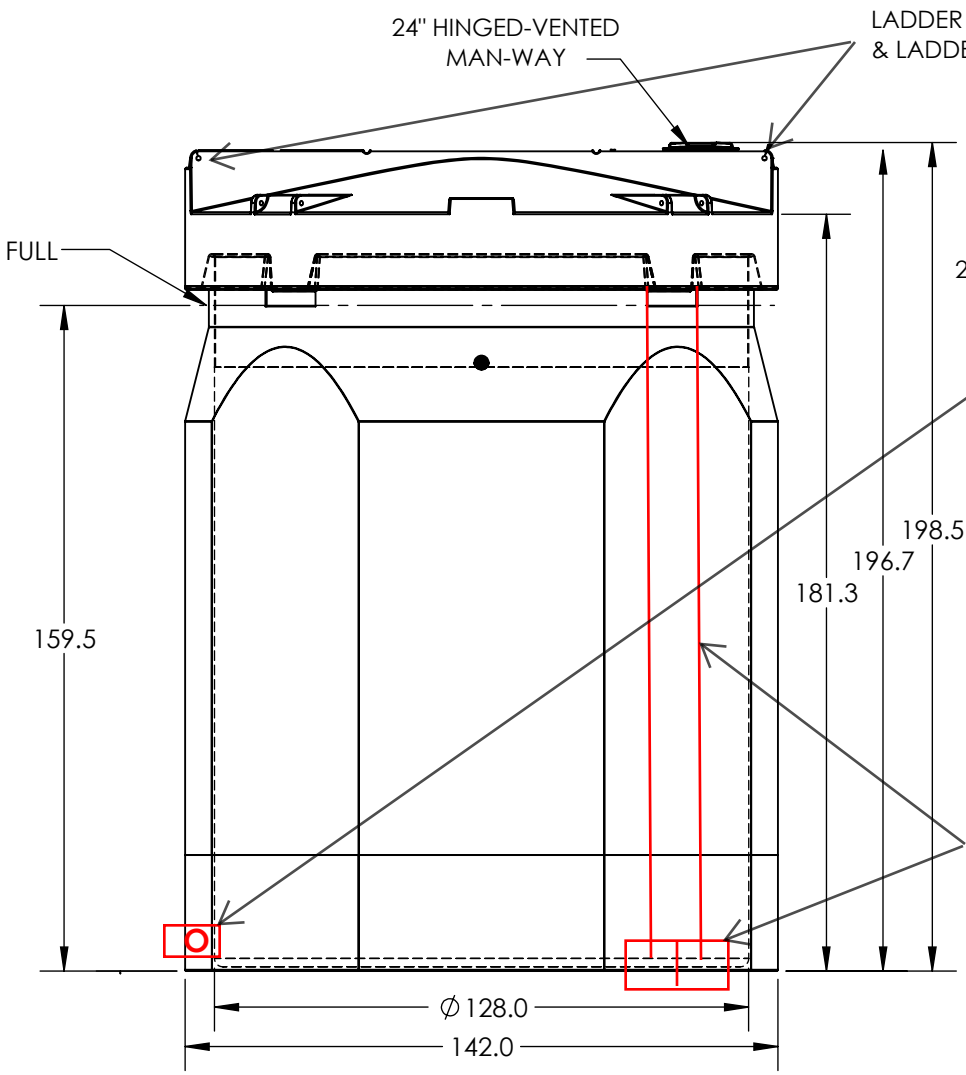
These are transmitted as checked below					
X	For Approval	☐	Approved as Submitted	☐	Resubmit copies for approval
☐	For Your Use	☐	Approved as Noted	☐	Submit [#] copies for distribution
☐	As Requested	☐	Returned for Corrections	☐	Return [#] corrected prints
☐	For Review and Comment	☐	Revise and Resubmit/Work May Not Proceed		
☐	FOR BIDS DUE:			☐	PRINTS RETURNED AFTER LOAN

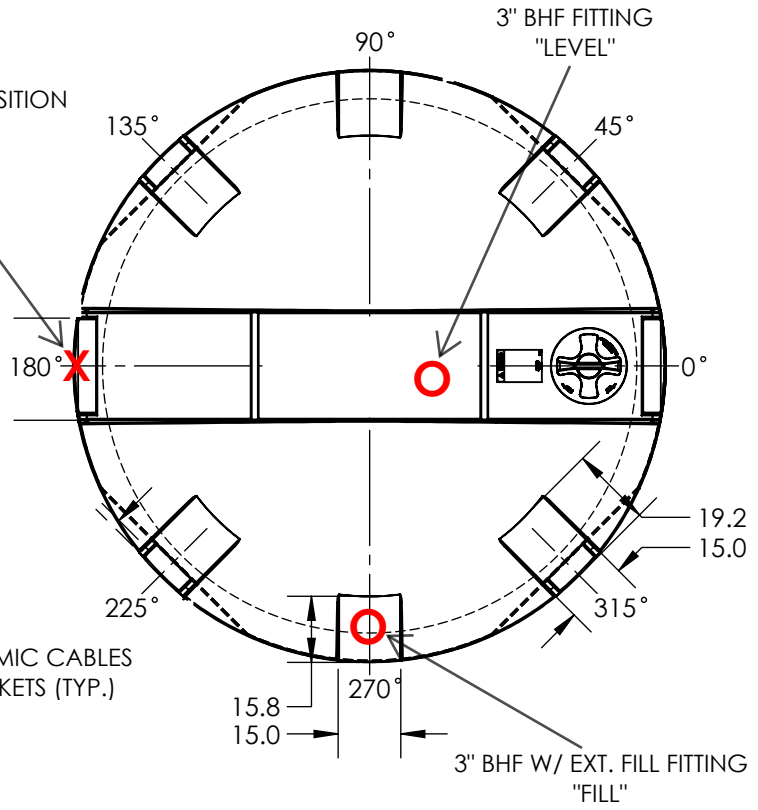
Comments:

Copy to:

Joe Witts, Scherbon Consolidated, Inc. 10.28.21
Signature

TAUNTON MA WWTF IMPROVEMENTS -PHASE 1
SODIUM HYPOCHLORITE BULK TANK - DUAL WALL





NOTES:

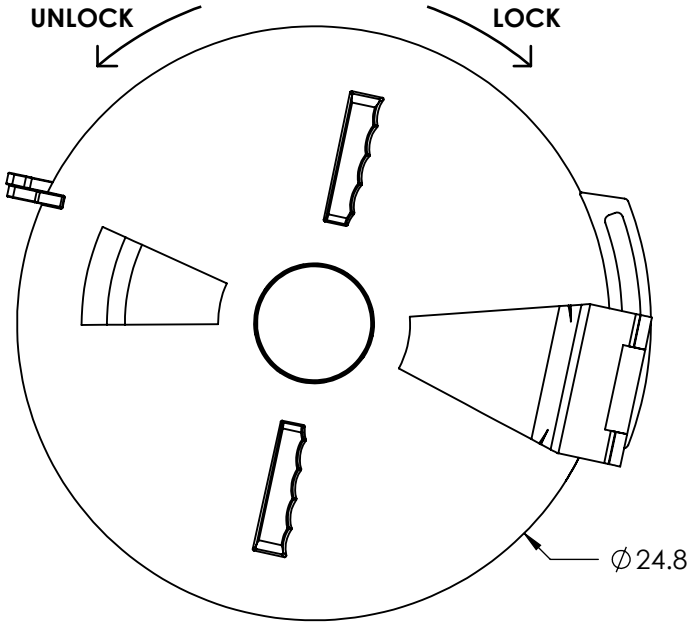
BHF = BULKHEAD FITTING (PVC-VITON)
DBLFF = DOUBLE-FLANGED FITTING (PVC-VITON-TITANIUM)
UFO = UNIFIED FITTING OUTLET (PVC-VITON)
LEAK DETECTION SENSOR & AUDIBLE ALARM / LIGHT - NEMA 4X, INCLUDED.
FRP LADDER & LADDER CONNECTION KIT, INCLUDED
GALVANIZED SEISMIC RESTRAINT SYSTEM (ANCHORS/CABLES), INCLUDED.
HYDROSTATIC TESTING & ASTM DOCUMENTATION, INCLUDED.

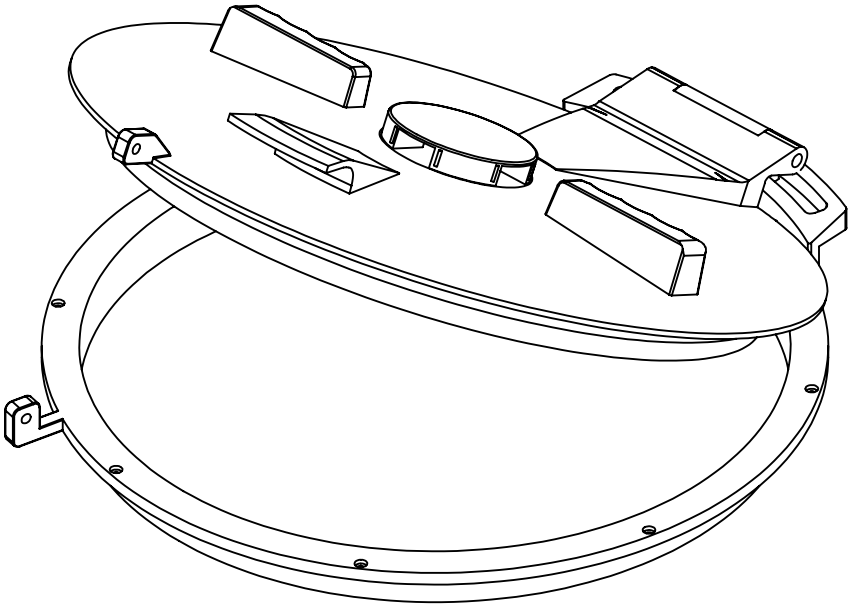
ALL DIMENSIONS ARE IN INCHES, NOMINAL, & SUBJECT TO CHANGE WITHOUT NOTICE.
ALL DIMENSIONS ON ROTATIONAL MOLDED PARTS ARE SUBJECT TO A ± 3% TOLERANCE.

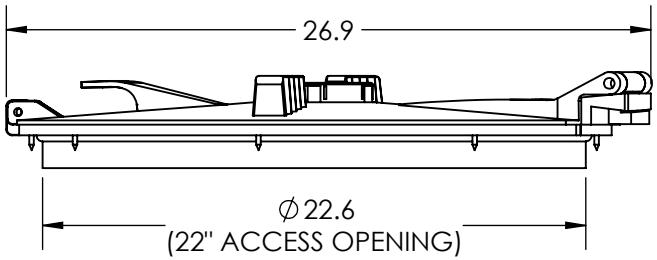
DO NOT SCALE	DRAWN BY	TITLE:	REVISION
STATUS: Released	ET3	ASM TK 8700CP X 128	B
			SHEET 1 OF 1

SNYDER INDUSTRIES
(402) 467-5221
www.snydernet.com

PART NO. 1006400N & 1006500N	ENG. ID. A003592







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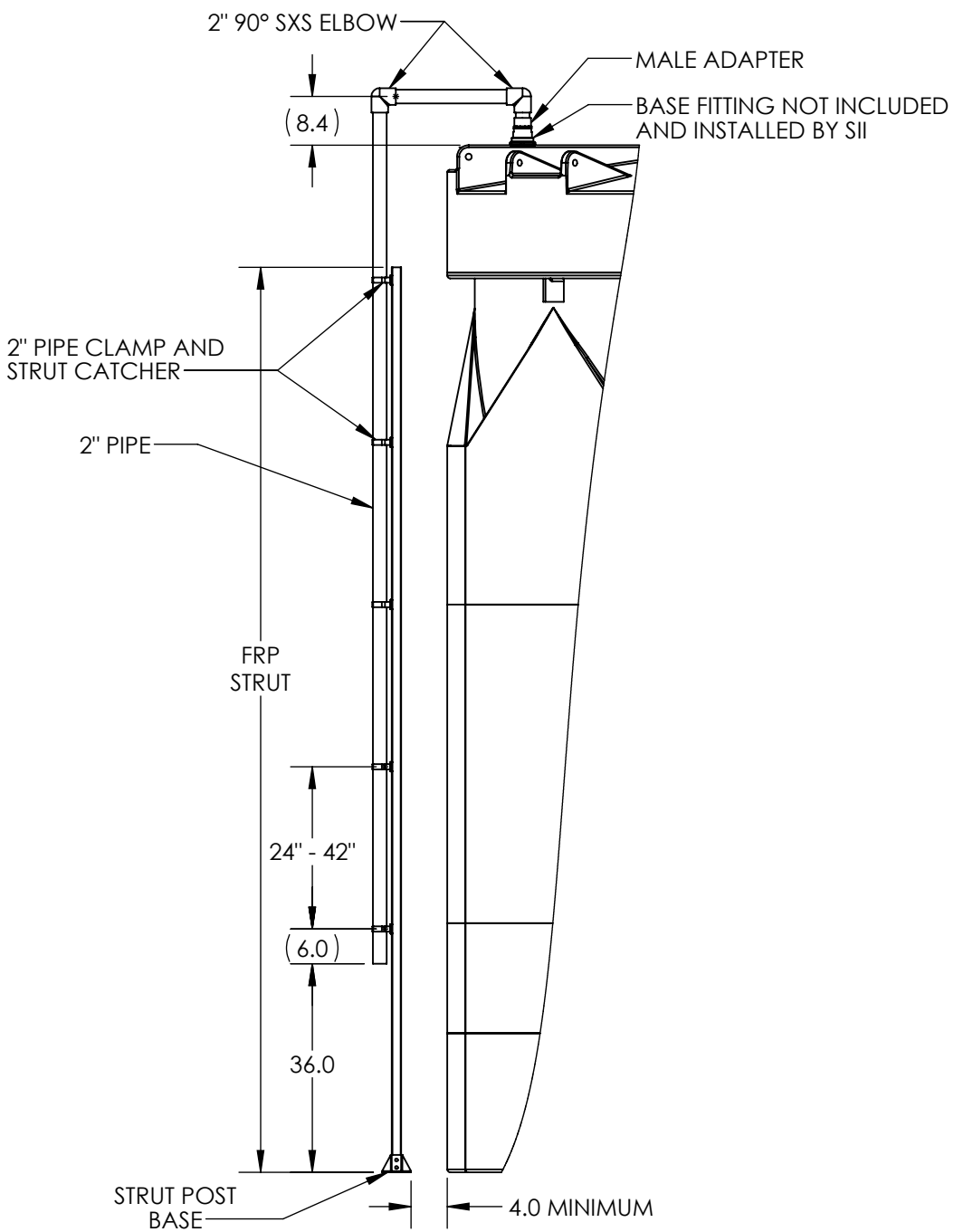
DO NOT SCALE	DRAWN BY	SNYDER INDUSTRIES, INC.	TITLE: ASM MANWAY 24 IN PP HINGED-VENTED	REVISION A
STATUS: Released	Admin			SHEET 1 OF 1
		(402) 467-5221 www.snydernet.com	PART NO. 34701562	ENG. ID. D005820

3 inch "FILL" - Ground Supported



CAPTOR SERIES GROUND SUPPORTED EXTERNAL DOWN PIPE

TANK SIZE	2"	3"	4"	MATERIAL	FT OF PIPE
550	34700071	N/A	N/A	PVC SHC. 80	5'
550	34701408	N/A	N/A	CPVC SHC. 80	5'
1100/2200	34701056	34701063	34701070	PVC SHC. 80	8.5'
1100/2200	34701077	34701084	34701091	CPVC SHC. 80	8.5'
2500	34701057	34701064	34701071	PVC SHC. 80	10'
2500	34701078	34701085	34701092	CPVC SHC. 80	10'
1550/3000	34701058	34701065	34701072	PVC SHC. 80	12'
1550/3000	34701079	34701086	34701093	CPVC SHC. 80	12'
3500	34701059	34701066	34701073	PVC SHC. 80	13'
3500	34701080	34701087	34701094	CPVC SHC. 80	13'
4000/5500	34701060	34701067	34701074	PVC SHC. 80	14.5'
4000/5500	34701081	34701088	34701095	CPVC SHC. 80	14.5'
5000	34701062	34701069	34701076	PVC SHC. 80	18'
5000	34701083	34701090	34701097	CPVC SHC. 80	18'
4500/6500	34701061	34701068	34701075	PVC SHC. 80	16.5'
4500/6500	34701082	34701089	34701096	CPVC SHC. 80	16.5'
8700	34701728	34701737	34701892	PVC SHC. 80	15.5'
8700	34701742	34701743	N/A	CPVC SHC. 80	15.5'
10,000	34701692	34701695	34701898	PVC SHC. 80	16.5'
10,000	34701632	34701620	34701619	CPVC SHC. 80	16.5'
12,500	34702321	34702324	34702318	PVC SHC. 80	23'

***ALL EXTERNAL PIPING MUST BE INDEPENDENTLY SUPPORTED.**
***ONLY BASE FITTINGS TO BE LEFT INSTALLED AT TIME OF SHIPMENT PER SII PROCEDURE.**
***Consult Snyder's Guidelines for Use and Installation prior to delivery.**
Available on-line at http://www.snyderindustriestanks.com/Technical

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DO NOT SCALE | DRAWN BY: SB
STATUS: Released

SNYDER INDUSTRIES, INC.
(402) 467-5221
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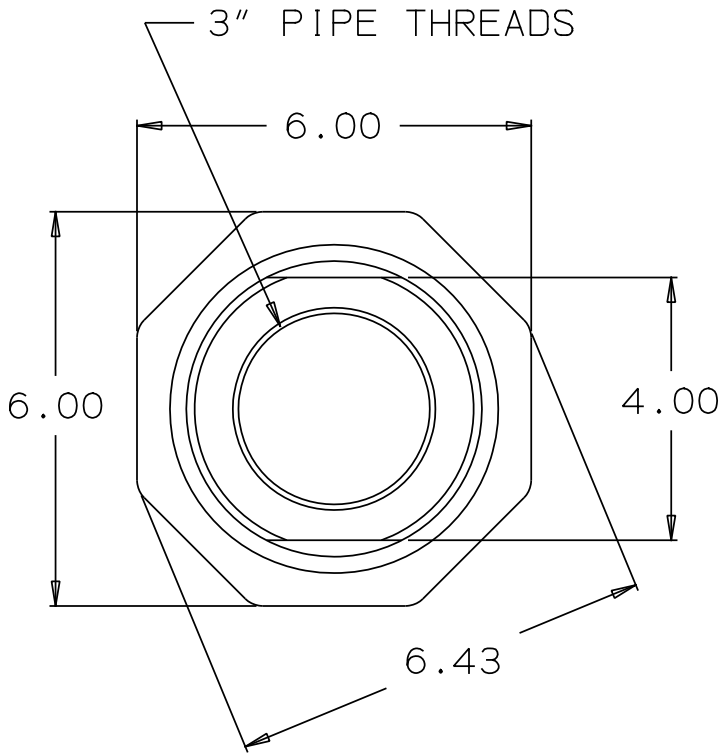
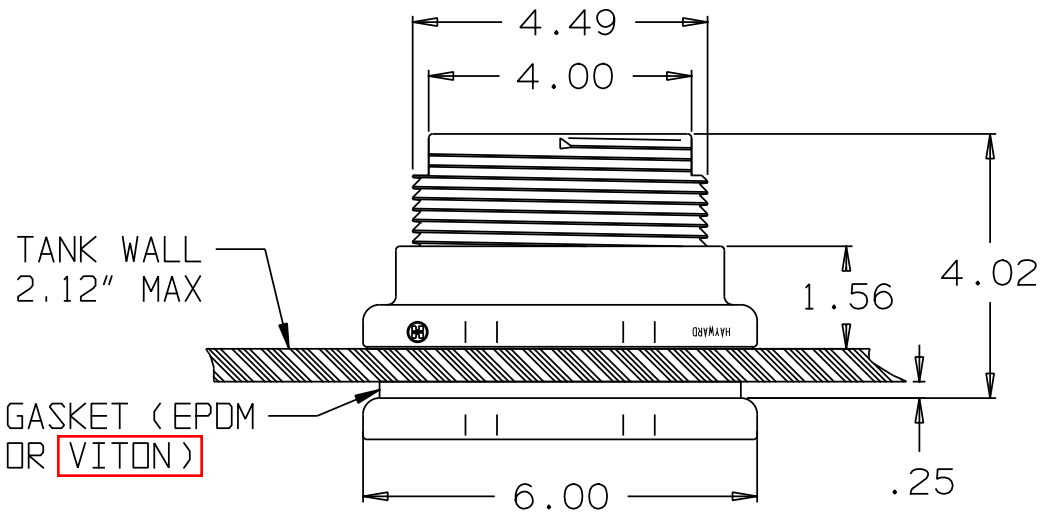
TITLE: CAPTOR EXTERNAL DOWN-PIPE ASSEMBLY W/FRP
REVISION: A
SHEET: 1 OF 1
PART NO.: SEE CHART
ENG. ID.: A004071

(all dimensions in inches)

"FILL" & "LEVEL"





MATERIAL	EPDM	VITON	STYLE
PVC	34200016	34700239	SOCxTHD
CPVC	34400122	34700754	SOCxTHD
PP	34100052	34700172	THDxTHD

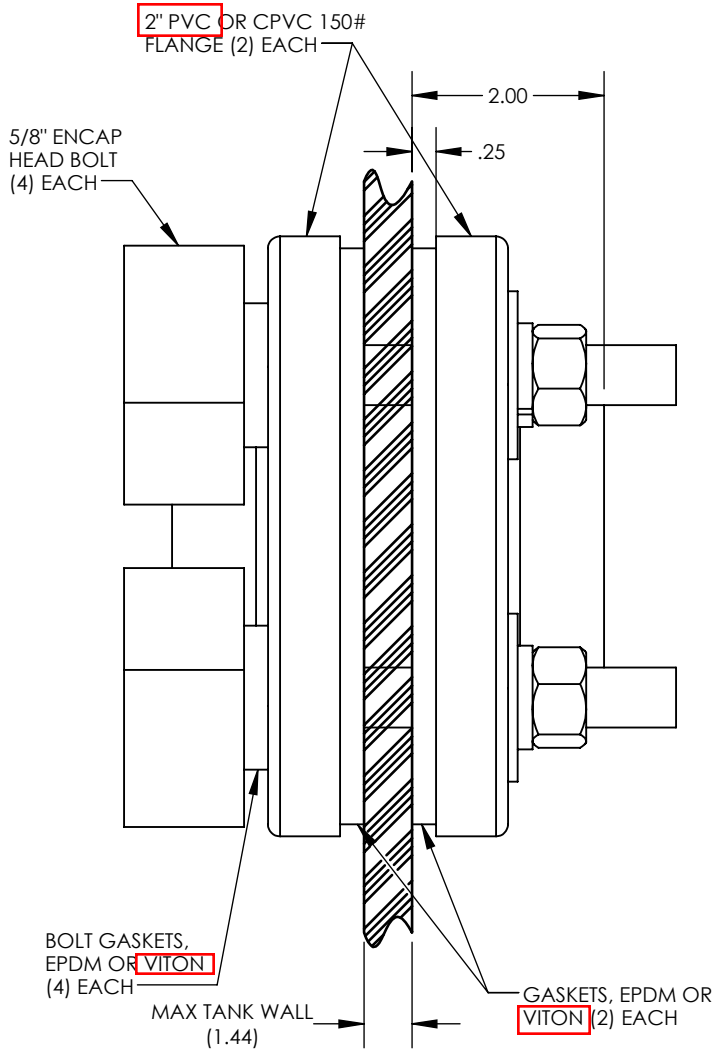
3" THREADED BULKHEAD STYLE FITTINGS

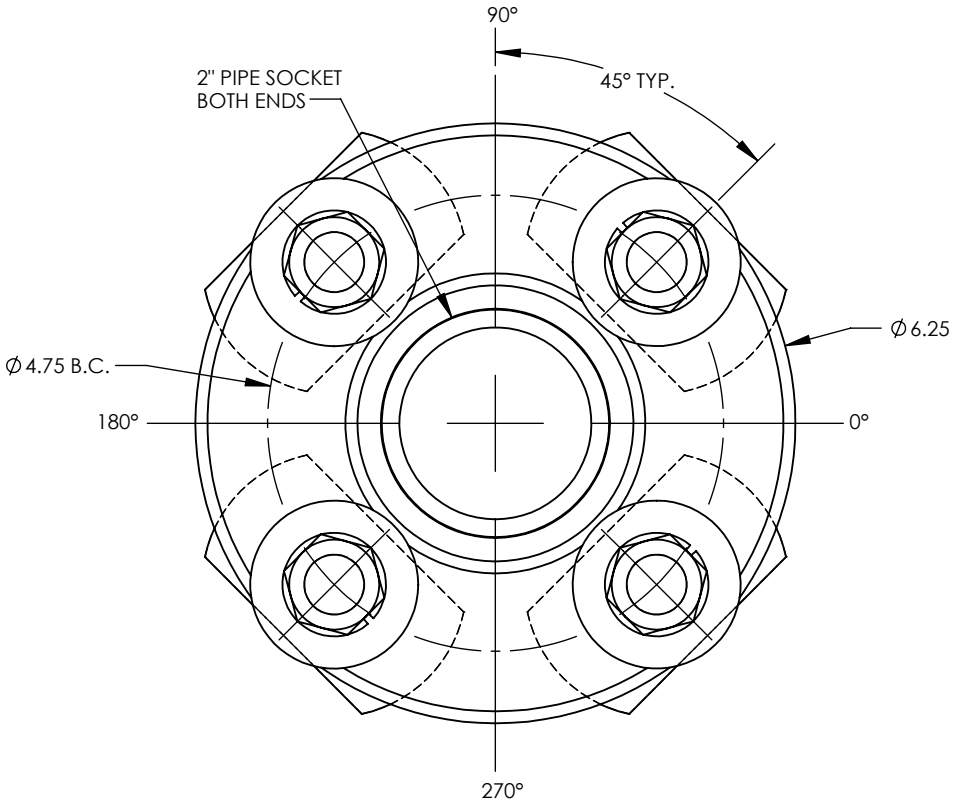
SNYDER INDUSTRIES INC.

FILE: 3THREAD.ckd 11/02/09

2 INCH "OUTLET"

FITTING PART NUMBER	FLANGE MATERIAL	GASKET MATERIAL	HARDWARE MATERIAL
34700221	PVC	EPDM	SS
34700222	PVC	VITON	SS
34700658	PVC	EPDM	HASTELLOY
34700659	PVC	VITON	HASTELLOY
34700686	PVC	EPDM	TITANIUM
34700687	PVC	VITON	TITANIUM
34700758	CPVC	EPDM	SS
34700759	CPVC	VITON	SS
34700886	CPVC	VITON	HASTELLOY
34700891	CPVC	VITON	TITANIUM





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DO NOT SCALE	DRAWN BY: IGG
STATUS: Released	

SNYDER INDUSTRIES
(402) 467-5221
www.snydernet.com

TITLE: **2IN DOUBLE FLANGED PVC/CPVC BOLTED FITTINGS**

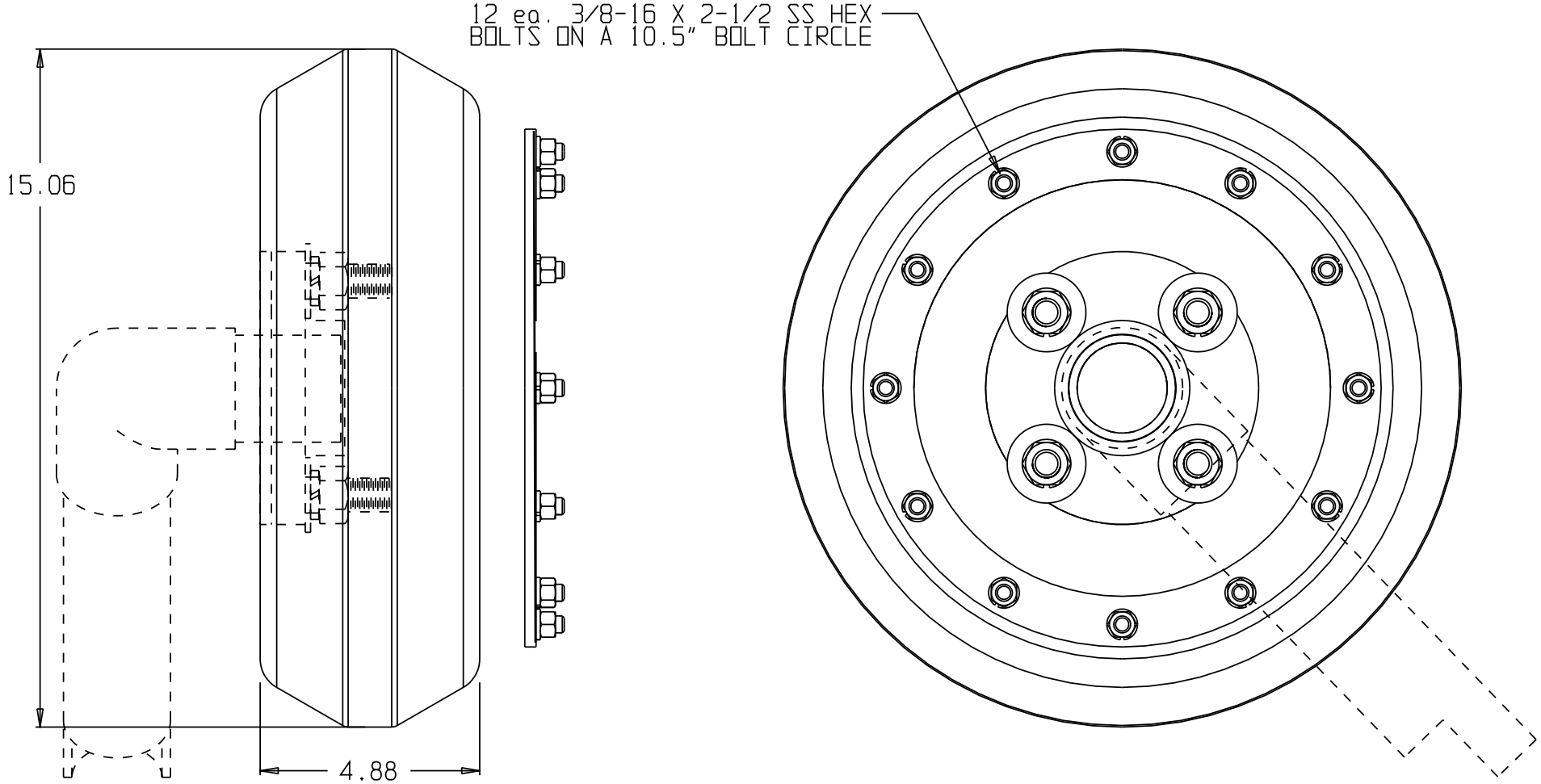
REVISION: A

SHEET: 1 OF 1

PART NO.: **SEE CHART**

ENG. ID.: **D011329**

2 INCH "OUTLET" - Transition Fitting



NOTE:
UFO SHOWN WITH 2" PVC DBL FLANGED BOLTED FITTING & OPTIONAL SIPHON TUBE. UFO's AVAILABLE FOR PP, SS, CPVC AND PVC DBL FLANGED BOLTED FITTINGS FROM SIZES 2" - 4".

(all dimensions in inches)

UFO TRANSITION FITTING

PART # 10700--

REF#: 00000

02/11/04

SNYDER INDUSTRIES INC.

PROCO™

SERIES 440

molded PTFE expansion joints

One (1) x 1" Style 445-BD (PTFE)

The PROCO Series 440 PTFE Molded Expansion Joints are used for corrosive applications found in: Chemical-Petrochemical, Industrial Process Piping Systems, Power Generation Plants, Pulp/Paper Plants, Water-Wastewater Sewage and Pollution Control Systems where metallic joints/lap joints or PTFE & FEP-lined rubber expansion joints may have been previously used or specified. Specify PROCO Series 440 expansion joints for installation between anchor points or next to mechanical equipment such as: Absorption Machines, Blowers, Chillers, Fans, Graphite Heat Exchangers, Glass Lined Vessels, Pumps, and Exotic Alloy/Plastic/Glass Lined Piping Systems. The Series 440 expansion joints are designed to: (1) Absorb Pipe Movements/Stress, (2) Reduce System Noise, (3) Reduce Mechanical Vibration, (4) Compensate Alignment/Offset, (5) Eliminate Electrolysis, (6) Protect against Start-up/Surge Forces. Our history in the manufacture of expansion joint products dates back to 1930. When an engineered solution is needed to solve a piping problem, call PROCO.

Engineered For Your Application. The PROCO Series 440 PTFE expansion joints are available in 2, 3, and 5 convolutions. Each convolution profile offers different overall lengths (face-to-face dimensions), movements and pressure/temperature rating to fit the required specification. Available styles include:

- **Style 442-BD:** Features two convolutions for minimal movements, higher pressure/temperature ratings and short face-to-face opening requirements. Style 442-BD sizes range from 1" to 24" diameter. (See Table 1)
- **Style 443-BD:** Features three convolutions and is designed for moderate movement and ease of system installation. Style 443-BD sizes range from 1" to 24" diameter. (See Table 2)
- **Style 445-BD:** Features five convolutions, and is designed for maximum movements, low pressure/temperature ranges, vibration reduction and greater face-to-face lengths. Style 445-BD sizes range from 1" to 20" diameter. (See Table 3)
- **Style 440-BE:** Features varying Neutral Lengths with Styles' 440-BD Limit Bolts. (See Table 4)

Absorbs Pipe-Wall and Fluid-Borne Noise. The quiet operating PROCO Series 440 PTFE expansion joints are a replacement for "sound transmitting" metallic/lap joints. Pipe Wall sound loses energy and is absorbed as the noise carried by the piping enters and exits the PTFE section. Fluid-borne noise is absorbed by the volumetric expansion (breathing of the connector). This action cushions water hammer and smoothes out pumping impulses.

Isolates Vibration and Motion. PROCO Series 440 PTFE expansion joints should be installed immediately after and ahead of equipment generating vibration in order to isolate the rotating/vibrating equipment from the rest of the piping system. For optimum performance, the PROCO Series 440 PTFE expansion joints should be installed horizontally to the shaft. Vertical and perpendicular installations are also acceptable as these expansion joints will accept axial, lateral and angular movements as well as vibration. Note: For maximum vibration transmission reduction, the pipe section beyond the PTFE expansion joints must be anchored or sufficiently rigid.

Reduces System Stress and Strain. Rigid attachment of piping to critical or mechanical equipment can produce excessive loading. Thermal or mechanically created strain-stress-shock are cushioned and absorbed with the installation of a flexible, low spring rate, PROCO Series 440 PTFE expansion joint. The PROCO Series 440 PTFE expansion joint adds a flexible component to the system that automatically self-corrects for misalignment created by structural movements caused by settling, pipe expansion or ground shifts.

Tested Force Pound and Spring Rate Tables. At PROCO we have machine tested nearly every size of the Series 440 PTFE expansion joints for Axial and Lateral Spring Rates and have provided Thrust/Force factors so designers can properly design system restraints. It should be noted that the PROCO Series 440 PTFE expansion joints are in accordance with the performance characteristics of the Fluid Sealing Association's Non-Metallic Expansion Joint Division.

Superior "Flex Life" and Strength. The PROCO Series 440 PTFE expansion joints are contour molded from extruded tubing providing superior "Flex Life" and Strength. Utilizing TEFLON® T-62 resins from DuPont, the PROCO Series 440 PTFE expansion joints provide dramatically more cycle life than that of PFA or FEP.

Flange and Limit Bolts. All PROCO Series 440 PTFE expansion joint flange configurations are coated with a rust inhibitive primer to prevent corrosion and are dimensionally tapped to ANSI 125/150# Standards. Hole drilling on center line, other drilling standards, or other flange materials, such as 316 stainless, 304 stainless, or Epoxy Coated flanges are available on special order. In addition, all PROCO Series 440 PTFE expansion joints are supplied with factory set limit bolts to prevent over-extension during operation.

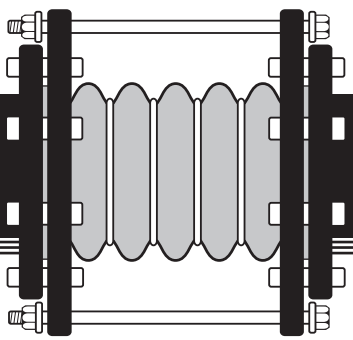
Chemical Service Capability at Minimal Cost. Expensive, exotic metal, PTFE or FEP lined rubber expansion joints for severe chemical service can be replaced with the low cost PROCO Series 440 PTFE expansion joints. The PTFE bellows are van stoned to the flanges which allows all wetted surfaces to come in contact with only the PTFE material. Specify the PROCO Series 440 PTFE expansion joints where high temperatures coupled with lower pressures or lower temperatures coupled with higher pressures are proposed. The PROCO Series 440 PTFE offers the lowest cost expansion joint that is impervious to chemical attack. Use the PROCO "Chemical to Elastomer Guide" for reference on chemical compatibility.

Services and Locations. PROCO Series 440 PTFE Expansion Joints have been supplied and successfully used by a range of customers worldwide in the process industries for use in both organic and inorganic chemical processing and production, including such demanding applications as agrochemical and pharmaceutical chemical production, acid processing and food manufacture.

Information • Ordering • Pricing • Delivery. Day or night, weekends and holidays…the PROCO phones are monitored 24 hours around the clock. When you have a question, you can call us.

Toll-Free Phone ..... 800 / 344-3246 USA/CANADA
International Calls ..... 209 / 943-6088
Fax ..... 209 / 943-0242
Email ..... sales@procoproducts.com
Website ..... www.procoproducts.com

Weekday office hours are 5:30 a.m. to 5:15 p.m. Pacific Time.



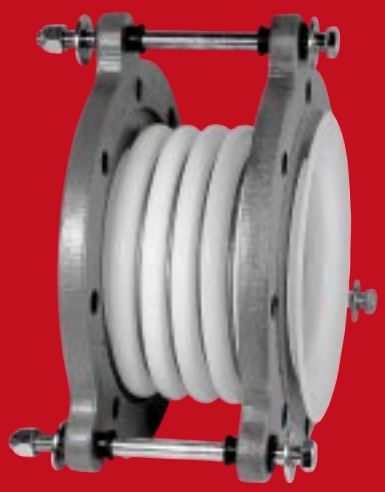
Protecting Piping And Equipment Systems From Stress/Motion

Rev. 3 2/09

PROCO™

STYLE

445-BD

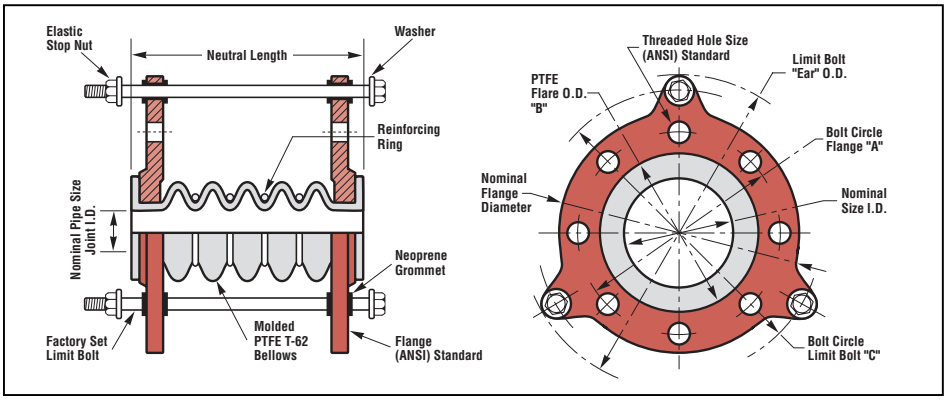


molded PTFE expansion joints

Table 3: Sizes • Movements • Spring Rates • Flange Standards • Temperatures • Vacuum • Weights

NOMINAL SIZE I.D.	NEUTRAL LENGTH INCHES	MOVEMENT CAPABILITIES BASED ON FIVE CONVOLUTION DESIGN [1]			SPRING RATE CAPABILITY [2]				EXPANSION JOINT FLANGE DRILLING									PRESSURE AT TEMPERATURE (PSIG) @ °F								VACUUM RATING [3]	WEIGHT / LBS
		± AXIAL (Δx) MOVEMENT	LATERAL (Δy) DEFLECTION	ANGULAR DEFLECTION	COMPRESSION SPRING RATE	EXTENSION SPRING RATE	LATERAL SPRING RATE	THRUST FACTOR	# HOLES	THREADED HOLE SIZE	BOLT CIRCLE FLANGE "A"	PTFE FLARE O.D. "B"	FLANGE THICKNESS	NOMINAL FLANGE O.D.	LIMIT BOLT DIAMETER	BOLT CIRCLE LIMIT BOLT "C"	LIMIT BOLT "EAR" O.D.	70°	100°	150°	200°	250°	300°	350°	400°	Hg at Temp.	
		IN	IN	DEG.	LB_f/IN	LB_f/IN	LB_f/IN																				
1.00	3.000	0.500	.500	20	30	44	22	2.81	4	1/2- 13	3.125	2.000	.313	4.250	.250	5.125	6.000	72	61	46	40	34	29	27	24		2
1.25	2.670	0.394	.470	20	36	114	171	2.25	4	1/2- 13	3.500	2.520	.394	4.630	.250	5.196	6.850	62	56	42	36	30	26	22	22	NOT	5
1.50	3.500	0.750	.500	20	75	83	46	5.09	4	1/2- 13	3.875	2.875	.344	5.000	.250	5.875	6.750	72	61	46	40	34	29	27	24		5
2.00	4.000	1.000	.500	20	60	47	50	9.11	4	5/8- 11	4.750	3.625	.438	6.000	.375	6.875	8.125	72	61	46	40	34	29	27	24		9
2.50	4.600	0.980	.510	20	116	319	285	10.08	4	5/8- 11	5.500	4.125	.500	7.000	.375	8.125	9.375	62	56	42	36	30	26	22	22	DESIGNED	11
3.00	5.000	1.000	.500	20	55	60	170	16.91	4	5/8- 11	6.000	5.000	.500	7.500	.375	8.750	10.000	72	61	46	40	34	29	27	24		14
4.00	5.250	1.250	.625	20	72	60	80	25.40	8	5/8- 11	7.500	6.188	.625	9.000	.375	9.875	11.125	72	61	46	40	34	29	27	24		20
5.00	6.000	1.250	.625	20	140	388	400	32.33	8	3/4- 10	8.500	7.313	.750	10.000	.500	11.500	13.000	62	56	42	36	30	26	22	22	FOR	26
6.00	6.000	1.250	.625	20	190	130	195	50.24	8	3/4- 10	9.500	8.500	.750	11.000	.500	12.500	14.000	72	61	46	40	34	29	27	24		31
8.00	8.000	1.250	.625	20	304	388	457	76.07	8	3/4- 10	11.750	10.625	.938	13.500	.500	14.750	16.250	48	42	34	30	26	22	22	22		49
10.00	8.750	1.250	.625	20	458	388	457	128.55	12	7/8- 9	14.250	12.750	1.000	16.000	.500	17.500	19.000	48	42	34	30	26	22	22	22	VACUUM	64
12.00	9.000	1.375	.688	20	529	445	457	144.72	12	7/8- 9	17.000	15.000	1.000	19.000	.625	20.500	22.000	48	42	34	30	26	22	22	22		88
14.00	12.790	1.375	.688	20	203	371	514	233.59	12	1- 8	18.750	16.250	1.188	21.000	1.420	24.172	27.313	48	42	34	30	26	22	22	22		143
16.00	13.500	1.625	1.000	20	180	383	514	259.68	16	1- 8	21.250	18.500	1.188	23.500	1.420	27.563	31.500	48	42	34	30	26	22	22	22	SERVICE	179
20.00	20.470	1.625	1.000	20	185	371	571	374.57	20	1 1/8- 8	25.000	23.000	1.188	27.500	1.420	31.500	35.438	48	42	34	30	26	22	22	22		243

NOTES: 1. Movements are non-concurrent and based from Neutral Length with Limit Bolts installed.
2. Spring Rate Capability is based on 1" of movement at zero pressure conditions.
3. Style 445-BD is not designed for Vacuum Service.



SERIES 445-BD MATERIALS OF CONSTRUCTION		
DESCRIPTION	1" THROUGH 12"	14" THROUGH 20"
BELLOWS	PTFE T-62	PTFE T-62
FLANGES	DUCTILE IRON	ZINC PLATED CARBON STEEL
REINFORCING RINGS	STAINLESS STEEL	STAINLESS STEEL
LIMIT BOLTS	CARBON STEEL	CARBON STEEL
NUTS	CARBON STEEL	CARBON STEEL
GROMMETS	NEOPRENE	NEOPRENE
WASHERS	CARBON STEEL	CARBON STEEL

Installation Instructions for Series 440 PTFE Expansion Joints

TORQUE TABLE LISTING

SIZE I.D. (IN)	1.0	1.25	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0
TORQUE (FT/LBS)	10	16	25	52	47	82	54	80	100	135	125	155
TOLERANCE (+/-)(FT/LBS)	2	3	6	13	11	20	13	20	24	32	31	38

Notes: 1. Bolt Torque requirements may vary depending on mating flange material and installation.
2. "Over-Torque" may cause the PTFE material to creep.

1. Service Conditions: Make sure the expansion joint ratings for temperature, vacuum, spring rates and movements match the system requirements. Contact PROCO if the system requirements exceed those of the expansion joint selected.

2. Alignment: PROCO Series 440 PTFE expansion joints are not designed to make up for piping misalignment error. Pipe misalignment should be no more than 1/8" in any direction. Misalignment of an expansion joint will reduce the rated movements and can cause stress of material properties, thus causing reduced service life.

3. Limit Bolts: Limit bolts are factory set at the maximum allowable travel position to prevent over extension. Do not remove or alter nuts at any time. Damage or personal injury can result due to changes in limit bolt settings.

4. Anchoring: Solid anchoring is required whenever the pipeline changes direction. PROCO Series 440 PTFE expansion joints should be located as close as possible to these anchor points. If an anchoring system is not used, any associated pressure thrust can cause excessive movement, ultimately damaging the expansion joint. **(It should be noted that the attached limit bolts/cables are designed to limit movement and are not designed to handle pressure thrust.)**

5. Pipe Support: Piping must be supported by hangers or anchors so expansion joints do not carry any pipe weight.

6. Personnel Protection: It is strongly recommended that spray shields be used for all hazardous service to protect against serious personal injury in the event of expansion joint failure. (Contact PROCO for spray shield information.)

7. Installation:

a. Store expansion joints with wood covers in-place to protect PTFE flange surfaces from damage until ready to install.

b. Check to make sure PTFE surfaces are clean and free of foreign sediment. Remove nicks, burrs and deep scratches with a fine emery cloth. If surface irregularities cannot be completely removed, install a PTFE envelope-type gasket to obtain an adequate seal.

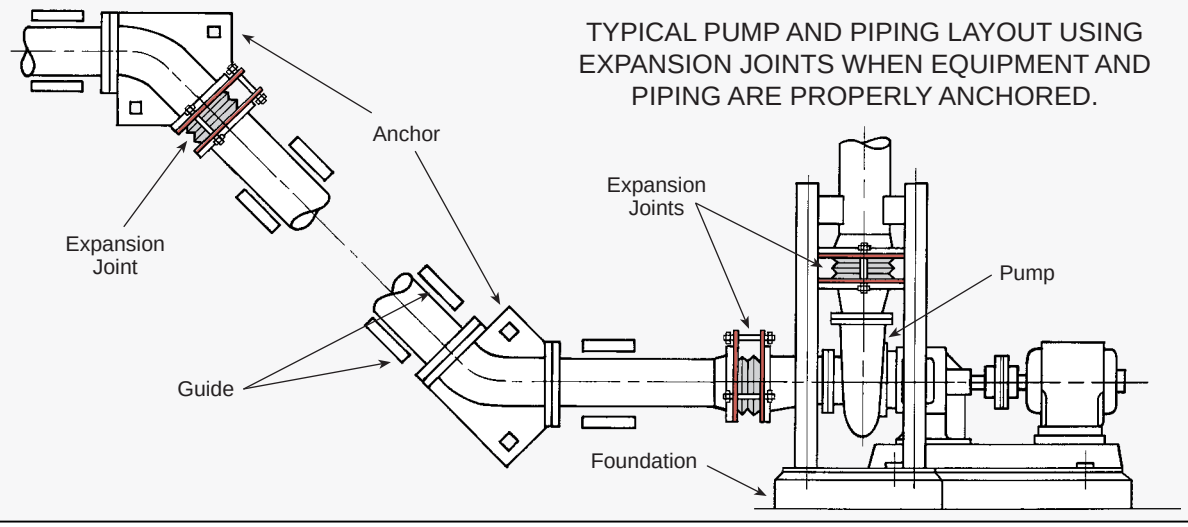
c. Install the PROCO Series 440 PTFE expansion joints to the prescribed neutral lengths. If expansion joints are used in high temperature processes, it is recommended that units be installed at/near the extended values. For cold process installations, expansion joints should be installed in a nearly compressed length. These settings will enable the expansion joint to realize full travel capabilities. (See appropriate Tables for Neutral Lengths.)

d. Thread installation bolts from mating flange side to prevent possible damage to PTFE elements. Extend bolts beyond the expansion joint flange by no more than 1–2 threads. Nuts are not necessary due to threaded flange holes.

e. Tighten flange bolts with a torque wrench. Tighten in an alternate crossing pattern in 20% increments until 80% of final bolt torques have been achieved. Tighten to final torque values (listed in Torque Table Listing) in a clockwise fashion around the flange to ensure bolts carry equal stress burdens.

f. Re-tighten bolts after first cycle of operation. Re-tighten as necessary after every planned maintenance shutdown. All bolts should be re-torqued to the above listed values.

8. Operations: After expansion joints are installed, it may be necessary to air blast the exterior to remove foreign debris, such as metal chips, from between the convolutions. The expansion joint should then be covered with a shield to protect from damage and foreign debris during operation. **(Note: Do not weld in immediate vicinity of expansion joint unless it is properly protected.)**



ENGINEERING DESIGN NOTES:

1. It is essential that piping system thrusts be calculated to ensure correct sizing of anchors and pipe supports, plus ensure that allowable thrust forces on adjacent mechanical and rotating equipment are not exceeded. Please use the following formulas:

$$T_p = P \cdot T_f$$

T_p is the pressure thrust (lb_f), **P** is the system operating pressure (Psig) and T_1 is the thrust factor (or bellows effective area [in^2]). The pressure thrust, T_p, will act in the axial direction and must be added to the axial spring force **(Fx•Δx)** to give the total axial reaction force, **Rx**.

$$Rx = T_p + (Fx \cdot \Delta x)$$

Rx is the pipe support reaction force (lb_f), T_p is the pressure thrust (lb_f), **Fx** is the axial spring force of the unit and **Δx** is the expected or designed axial movement of the unit (See Tables 1–3).

2. It should be noted that axial spring rate values found in Tables 1 through 3 are based on an ambient temperature (70°F) and will decrease as the system temperature rises. In addition, spring rates decrease over time due to thermoplastic creep if units are operated under pressure.

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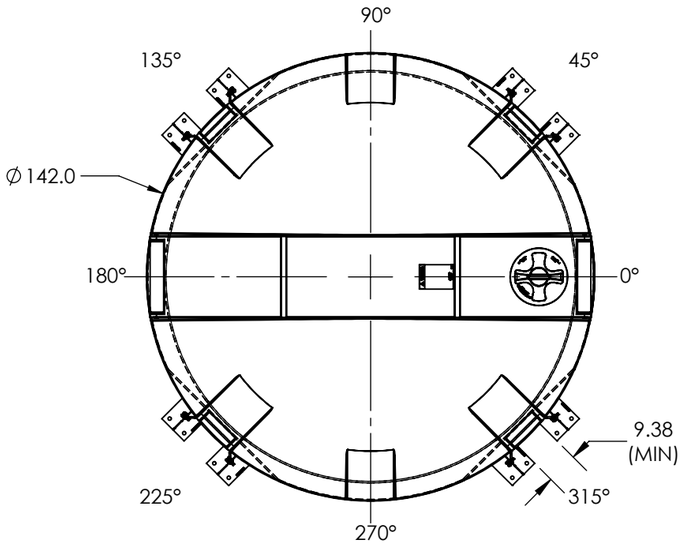
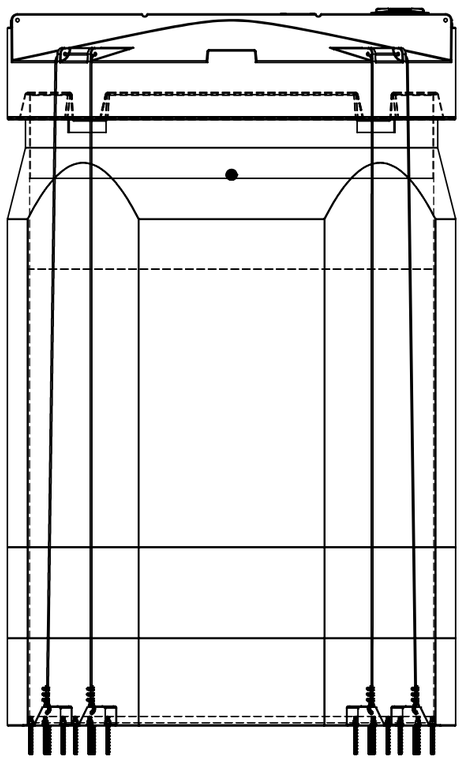
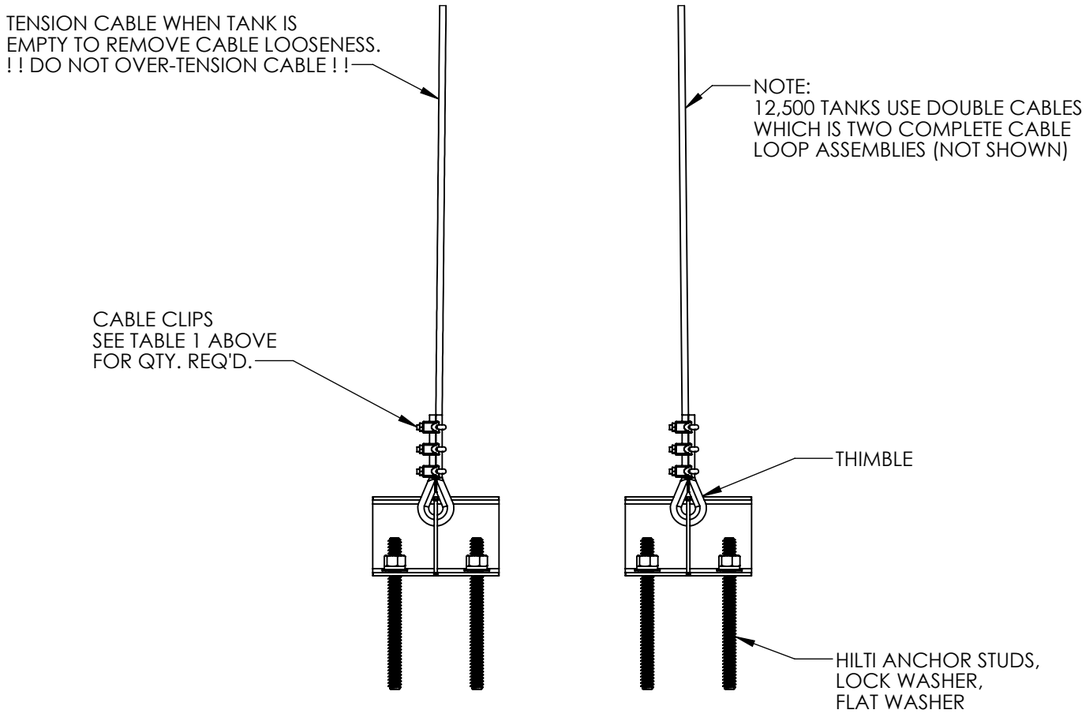




Galvanized Seismic Restraint / Tie-Down System

TABLE 1				
CLIP SIZE (INCHES)	ROPE SIZE (INCHES)	MINIMUM # OF CLIPS REQD.	AMOUNT OF ROPE TURN-BACK (INCHES)	*TORQUE IN Ft. Lbs
1/4	1/4	2	4-3/4	15
3/8	3/8	2	6-1/2	45
1/2	1/2	3	11-1/2	65
5/8	5/8	3	12	95
*THE TIGHTENING TORQUE VALUES SHOWN ARE BASED UPON THE THREADS BEING CLEAN, DRY, AND FREE OF LUBRICATION				



CODES:
- CBC 2019
- IBC 2018
- ASCE 7-16 SECTION 15.7.6
- CURRENT ADOPTED AISC MANUAL

SEISMIC DESIGN
- ZIP CODE = 92701, SITE CLASS C - Fa=1.0, Fv=1.5, Ss=1.4, S1=0.5, I=1.5, R=3.0
- Fp=(Vi*Wi+Vc*Wc)/(We+Wct*SG) = 0.448 W

WIND DESIGN:
- IBC/CBC - 150MPH - EXPOSURE "C"
- Qz=0.00256KzKztKdV^2=46.51 PSF
- (Kz=0.85, Kzt=1.0, Kd=0.95 (RISK III))

GENERAL:
1. ALL CONSTRUCTIONS SHALL MEET LOCAL BUILDING CODE REQUIREMENTS AND BE APPROVED BY THE BUILDING OFFICIAL.
2. THESE GUIDELINES HAVE BEEN PROVIDED TO SPECIFY THE RESTRAINT RECOMMENDATIONS FOR SNYDER INDUSTRIES BULK STORAGE TANKS.

CONCRETE:
1. CONCRETE SHALL HAVE A MINIMUM DESIGN AS PER DRAWING REFERENCED IN SPECIFICATION CHART BELOW.
2. CONCRETE PAD DESIGN SHOULD BE REVIEWED AND APPROVED BY THE BUILDING OFFICIAL BASED ON SPECIFIC APPLICATION AS OTHER DESIGN PARAMETERS ARE POSSIBLE DEPENDING UPON SITE CONDITIONS.

STRUCTURAL STEEL:
1. ALL STRUCTURAL STEEL COMPONENTS SHALL BE NEW AND OF BASIC OPEN HEARTH PROCESS STEEL CONFORMING TO ALL APPLICABLE REQUIREMENTS OF ASTM A36 (STRUCTURAL STEEL FOR BRIDGES AND BUILDINGS - Fy=36,000 PSI).
2. ALL ARC WELDING ELECTRODES SHALL CONFORM TO ASTM A743 / A743M - 19 FOR STEEL ARC WELDING ELECTRODES. ELECTRODES SHALL BE AS RECOMMENDED BY THE MANUFACTURERS FOR THE POSITIONS AND OTHER CONDITIONS OF ACTUAL USE. WELDING SHALL CONFORM TO REQUIREMENTS OF AMERICAN WELDING SOCIETY AWS D1.1.
3. ALL SHARP EDGES AND CORNERS SHALL BE REMOVED ON ALL STRUCTURAL STEEL COMPONENTS.
4. CABLES TO BE 7X19 STRANDED CORE CONSTRUCTION SIZED PER CHART. MATERIAL TO BE SPECIFIED BY CUSTOMER ORDER (MINIMUM BREAKING STRENGTH EQUAL TO OR GREATER THAN 304 SS RATING).
5. ANCHOR BOLTS TO BE HILTI ADHESIVE ANCHORS, MODEL HIT-RE 500 V3 WITH SIZE, MATERIAL, AND EMBEDMENT AS SPECIFIED PER SPECIFICATION CHART BELOW.
   ALL OTHER FASTENER MATERIALS MUST CORRESPOND TO THE TYPE OF ANCHOR SELECTED.
6. CABLES & ANCHORS IN GALVANIZED STEEL, 304SS OR 316SS

~~1.5 SPECIFIC GRAVITY~~

TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE
8700	142"	D007827	8	1" HILTI HIT-RE 500 V3	32	9"↧	1/4"	D007846
10000	142"	D007827	8	1" HILTI HIT-RE 500 V3	32	9"↧	1/2"	D007846
12500	142"	D007827	8	1" HILTI HIT-RE 500 V3	32	9"↧	2x 1/2"	D007846

1.9 SPECIFIC GRAVITY

TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE
8700	142"	D007827	8	1" HILTI HIT-RE 500 V3	32	9"↧	3/8"	D007846
10000	142"	D007827	8	1" HILTI HIT-RE 500 V3	32	9"↧	1/2"	D007846
12500	142"	D007828	8	1" HILTI HIT-RE 500 V3	48	9"↧	2x 1/2"	D007846

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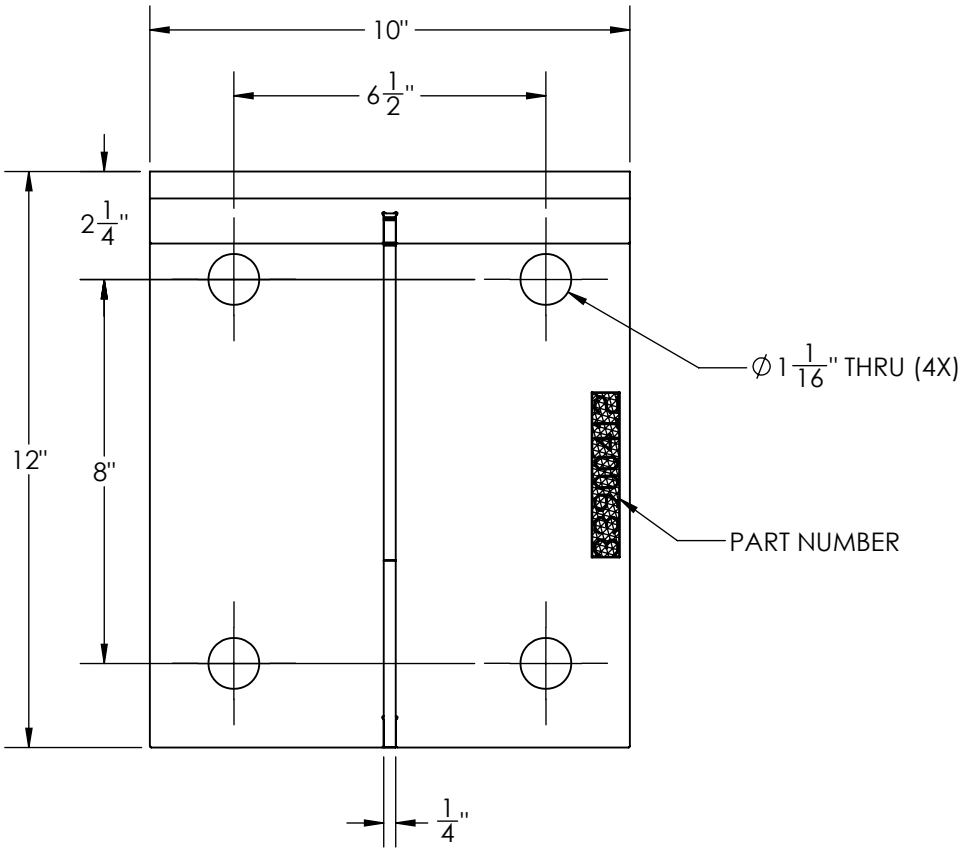
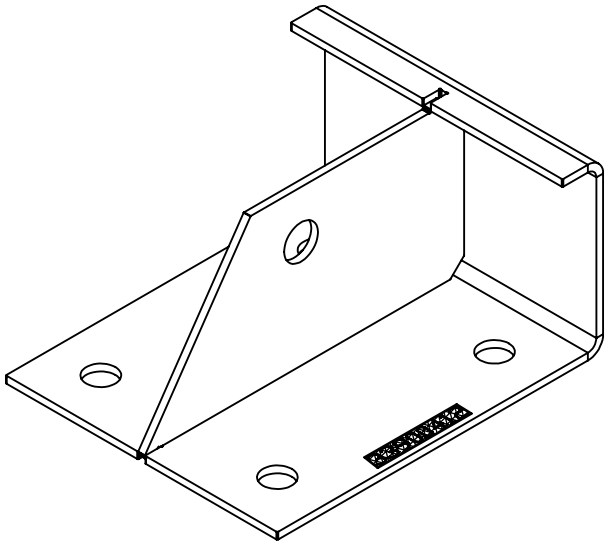
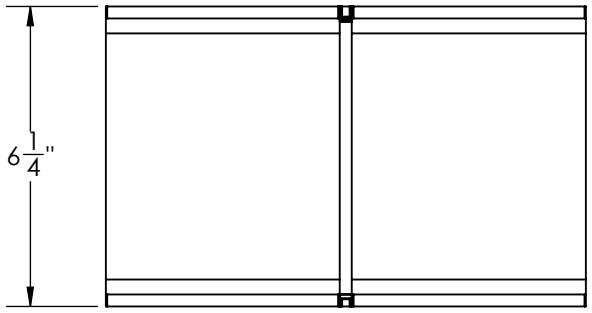
TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGULAR = ±1/2°
FRACTIONAL = ±1/16"
X = ±0.1", .XX = ±.03", .XXX = ±.010"

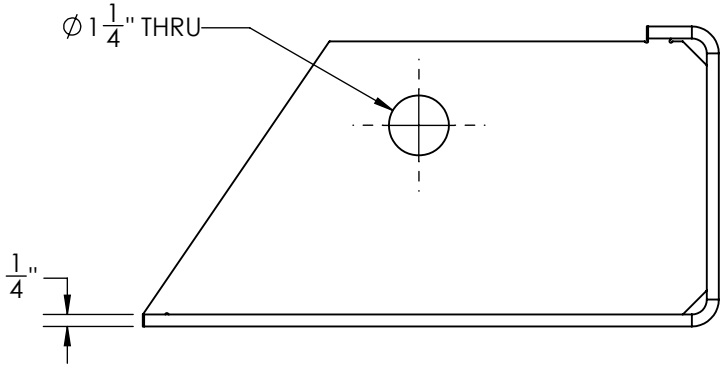
TITLE: **8700-13700G CCS SEISMIC RESTRAINT SYSTEM**
REVISION: C
SHEET: 1 OF 1
PART NO.
ENG. ID.: A010509

PART NUMBER	DESCRIPTION
33900407	ANCHOR PLATE GS 4-BOLT - 1IN
33900412	ANCHOR PLATE 304SS 4-BOLT - 1IN
33900417	ANCHOR PLATE 316SS 4-BOLT - 1IN









ALL DIMENSIONS ARE IN INCHES, NOMINAL, & SUBJECT TO CHANGE WITHOUT NOTICE.
ALL DIMENSIONS ON ROTATIONAL MOLDED PARTS ARE SUBJECT TO A ± 3% TOLERANCE.

DO NOT SCALE	DRAWN BY	SNYDER INDUSTRIES, INC.	TITLE: ANCHOR PLATE 4-BOLT - 1 IN	REVISION A
STATUS: Released	ET3			SHEET 1 OF 1
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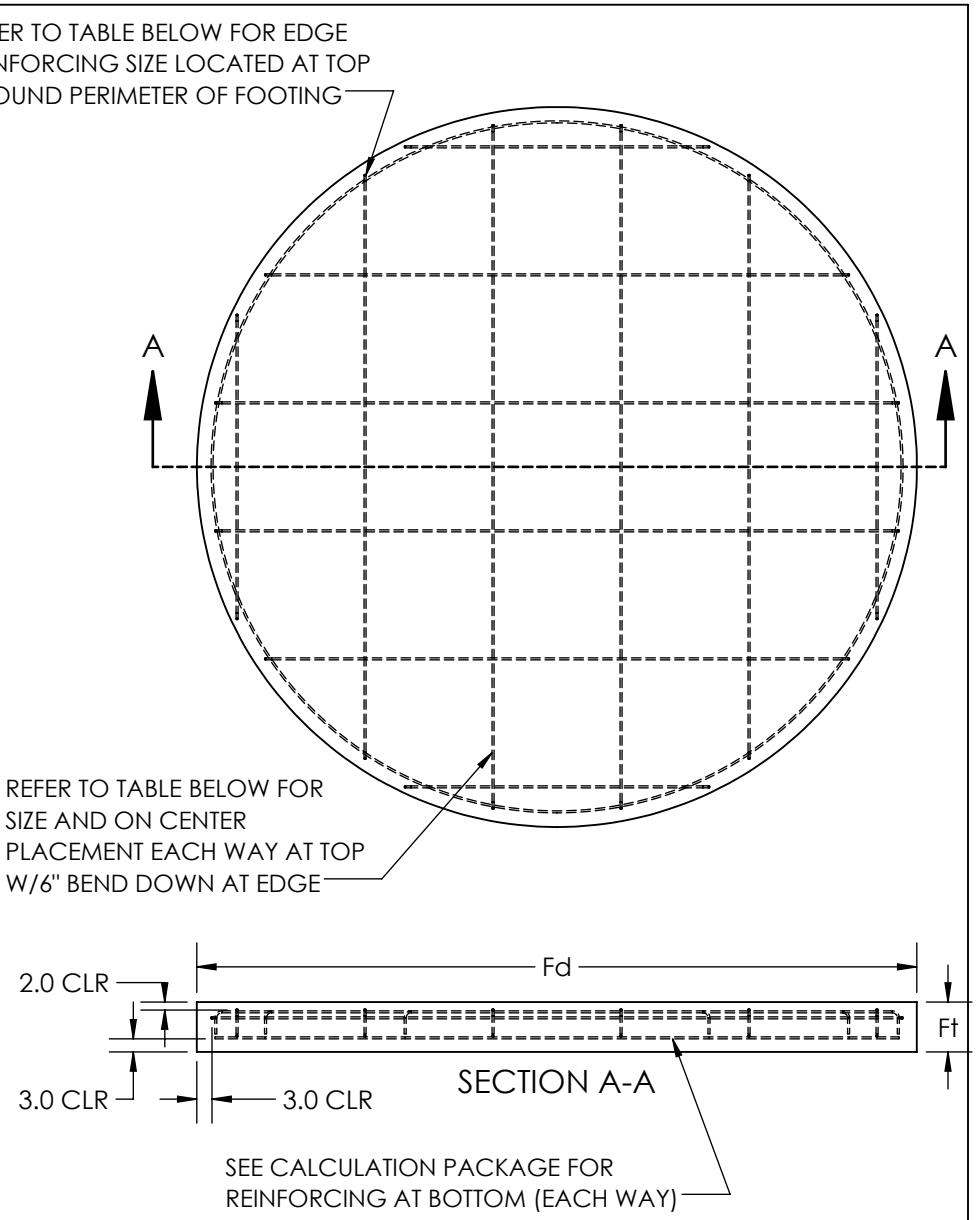
NOTES:

1. REFER TO CALCULATION PACKAGE FOR ADDITIONAL INFORMATION. PAD DIAMETER (Fd) AND PAD THICKNESS (Ft) PER CALCULATION PACKAGE.
2. ALL CONSTRUCTION TECHNIQUES SHALL CONFORM TO CBC 2019 AND IBC 2018.
3. CONCRETE SHALL OBTAIN A MINIMUM ULTIMATE 28 COMPRESSIVE STRENGTH OF Fc=4000 PSI OR 2500 PSI U.N.O. (SEE CHART BELOW).
4. REINFORCING STEEL SHALL CONFORM TO REQUIREMENTS OF ASTM A615 GRADE 60, Fy=60,000 PSI.
5. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2" ON THE TOP, 3" ON THE SIDES AND BOTTOM OF THE PAD AS SHOWN.
6. PAD IS ASSUMED TO BE PLACED ON A COMPACTED LEVEL SURFACE WITH AN ALLOWABLE SOIL BEARING VALUE OF 1500 PSF. THIS IS THE MAXIMUM ASSUMED SOIL BEARING ALLOWED WITHOUT SITE INSPECTION. IF SITE INSPECTION IS AVAILABLE, PAD DIMENSIONS COULD BE DECREASED. PLEASE CONSULT WITH LOCAL CIVIL ENGINEER FOR REVIEW.
7. BOTTOM OF SLAB FOUNDATION SHALL BE 12" BELOW FINISHED GRADE OR EXISTING CONCRETE.
8. ANY PAD SHAPE BUILT (SQUARE OR HEXAGON) THAT WOULD ENCOMPASS THIS ROUND PAD DESIGN AND BUILT USING THE SAME THICKNESS, REINFORCEMENT CRITERIA (ADJUSTED FOR SHAPE AND SIZE), AND DESIGN SPECIFICATIONS WOULD BE CONSIDERED ACCEPTABLE UNDER THESE CALCULATIONS AND CRITERIA.

PART #	TANK GAL.	TANK Ø	Hc	Ht	Fd		Ft		REBAR SIZE		SPACING O.C.		CONCRETE PSI	
					1.5	1.9	1.5	1.9	1.5	1.9	1.5	1.9	1.5	1.9
57001--	120	2.58	3.48	4.26	4.58	4.58	1.00	1.00	#4	#4	16"	16"	2500	2500
57101--	150	2.58	4.35	5.13	4.58	4.58	1.00	1.00	#4	#4	16"	16"	2500	2500
59905--	250	2.67	6.20	6.93	4.67	4.67	1.00	1.00	#4	#4	16"	16"	2500	2500
57401--	275	3.58	4.35	5.23	5.58	5.58	1.00	1.00	#4	#4	16"	16"	2500	2500
57601--	360	4.08	4.35	5.23	6.08	6.08	1.00	1.00	#4	#4	16"	16"	2500	2500
59907--	405	3.75	5.32	6.09	5.75	5.75	1.00	1.00	#4	#4	16"	16"	2500	2500
57801--	500	4.08	5.87	6.74	6.08	6.08	1.00	1.00	#4	#4	16"	16"	2500	2500
50400--	550	5.54	3.54	5.21	7.54	7.54	1.00	1.00	#4	#4	16"	16"	2500	2500
59901--	1000	6.23	4.58	5.75	8.23	8.23	1.00	1.00	#4	#4	16"	16"	2500	2500
54700--	1100	5.54	6.69	8.63	7.54	7.54	1.00	1.00	#4	#4	16"	16"	2500	2500
59903--	1500	7.21	5.23	6.40	11.00	11.00	1.00	1.00	#4	#4	16"	16"	2500	2500
54900--	1550	5.54	9.58	11.33	9.33	9.33	1.00	1.00	#4	#4	16"	16"	2500	2500
55700--	2000	7.71	6.35	8.52	11.50	11.50	1.00	1.00	#4	#4	16"	16"	2500	2500
55800--	2500	7.71	7.94	10.10	11.50	11.50	1.00	1.00	#4	#4	16"	16"	2500	2500
55900--	3000	7.71	9.56	11.73	11.50	11.50	1.00	1.00	#4	#4	16"	16"	2500	4000
56000--	3500	7.71	10.94	13.10	11.71	11.71	1.00	1.00	#4	#4	16"	15"	4000	4000
56100--	4000	7.71	12.51	14.69	11.71	12.05	1.00	1.00	#4	#4	15"	11"	4000	4000
56200--	4500	7.71	14.13	16.29	11.87	13.05	1.00	1.00	#4	#4	12"	8"	4000	4000
56300--	5000	7.71	15.73	17.90	12.71	13.87	1.00	1.00	#4	#4	8"	6"	4000	4000
56600--	5500	9.21	11.83	14.21	13.21	13.37	1.00	1.00	#4	#4	15"	12"	4000	4000
56700--	6500	9.21	14.42	16.46	13.71	14.87	1.00	1.00	#4	#4	10"	7"	4000	4000
10064--	8700	11.08	13.32	16.32	15.08	16.42	1.00	1.00	#4	#4	13"	7"	4000	4000
10066--	10000	11.08	15.72	18.72	16.42	17.92	1.00	1.00	#5	#5	11"	7"	4000	4000
10311--	12500	11.08	18.70	21.42	18.58	20.24	1.00	1.00	#5	#6	6"	6"	4000	4000



Hc=HEIGHT OF TANK CONTENTS
Ht=HEIGHT OF TANK TOP
Fd=FOOTING (PAD) DIAMETER
Ft=FOOTING (PAD) THICKNESS

DO NOT SCALE	DRAWN BY	SNYDER INDUSTRIES	TITLE: 120 - 12500 GAL DCT/CCS SEISMIC FOUNDATION
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			SHEET 1 OF 1
		TOLERANCES UNLESS OTHERWISE SPECIFIED ANGULAR = ±1/2° FRACTIONAL = ±1/16" .X = ±0.1", .XX = ±.03", .XXX = ±.010"	PART NO.
			ENG. ID. D007846

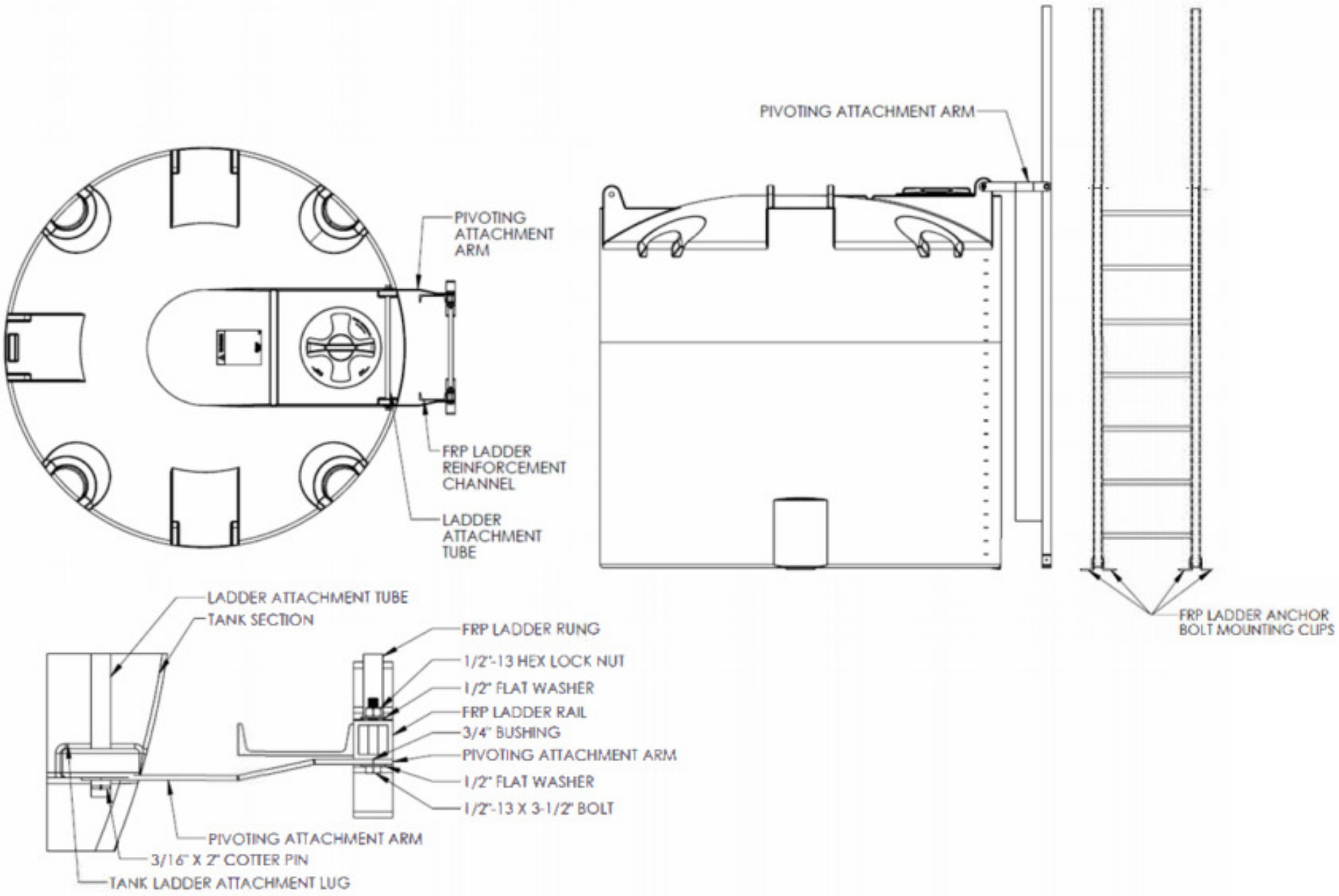
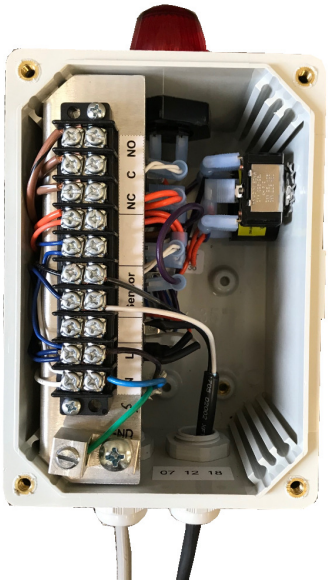

PIVOTING ATTACHMENT ARM
PIVOTING ATTACHMENT ARM
FRP LADDER REINFORCEMENT CHANNEL
LADDER ATTACHMENT TUBE
FRP LADDER ANCHOR BOLT MOUNTING CLIPS
LADDER ATTACHMENT TUBE
TANK SECTION
FRP LADDER RUNG
1/2"-13 HEX LOCK NUT
1/2" FLAT WASHER
FRP LADDER RAIL
3/4" BUSHING
PIVOTING ATTACHMENT ARM
1/2" FLAT WASHER
1/2"-13 X 3-1/2" BOLT
PIVOTING ATTACHMENT ARM
3/16" X 2" COTTER PIN
TANK LADDER ATTACHMENT LUG

Figure 8.7

SNYDER INDUSTRIES, INC.

SNYDER LEAK DETECTION SENSOR WITH AUDIBLE AND VISUAL LIGHT ALARM AND RELAY FOR OUTPUT

- **Part # 34702756** – For Snyder 275 - 1500 gallon DCTs and 550-4000 gallon Captor Containment Systems
- **Part # 34702757** – For Snyder 4,500 – 12,500 gallon Captor Containment Systems



The System is designed and fabricated in a sturdy weathertight NEMA 4X enclosure for indoor or outdoor installation.

The system includes durable PBT potted capacitance sensor and cable designed to be dropped to the bottom of the interstitial space of the tank.

The system powered with 110 VAC and includes a cord grip for both the AC power and leak sensor.

The leak detection system is supplied with audible and visual alarms. Additionally it includes a normally open (NO) or normally closed (NC) auxiliary output that can be wired to another alarm source such as a PLC or auto-dialer.

When a leak is detected a single red light will illuminate solid and a loud, audible horn will activate @ 95 dB (user can silence with integral silence button switch on the side of the control box).

Unit has an integral test button on the side for the user to verify system is operating.

Installation is as simple as connecting 110 VAC and wiring in the sensor assembly. You are up and running in no time!

One year factory warranty. Manufactured in the USA.

Specifications:

Enclosure/Controller Power: 110 VAC, <1 AMP draw

Sensor Power: 110 VAC supplied from directly from sensor input

Enclosure Rating: NEMA 4X, 7.75” X 4.5” X 4.5”

Leak Probe & Cable: 19 feet/cable, capacitive type, PBH material

Horn and silence: 95dB

Visual Alarm: Strobe light with red lens

Process connection: cable grip for both power and sensor inputs

Snyder Industries ● 6940 ‘O’ Street, Suite 100 ● Lincoln, Nebraska 68510
402-467-5221 ● www.snydernet.com

ExxonMobil™ HDPE HD 8660 Series

High Density Polyethylene Resin

Product Description

HD 8660 Series are high density hexene copolymers designed to offer superior toughness and stiffness. They are ideally suited for applications that require the optimum balance of low temperature toughness, creep resistance, stiffness, ESCR, and tear properties.

General

Availability [1]	▪ Latin America	▪ North America
Additive	▪ HDP8660.29: Long Term UV-15 Stabilizer: Yes	▪ HD 8660.29: Long Term UV-15 Stabilizer: Yes
Applications	▪ Industrial Products	▪ Intermediate Bulk Containers ▪ Large Agricultural Tanks
Revision Date	▪ 09/01/2014	

Resin Properties	Typical Value (English)		Typical Value (SI)		Test Based On
Density	0.941	g/cm³	0.941	g/cm³	ExxonMobil Method
Melt Index (190°C/2.16 kg)	2.0	g/10 min	2.0	g/10 min	ASTM D1238

Thermal	Typical Value (English)		Typical Value (SI)		Test Based On
Deflection Temperature Under Load (DTUL) at 66psi - Unannealed	135	°F	57	°C	ASTM D648
Deflection Temperature Under Load (DTUL) at 264psi - Unannealed	100	°F	38	°C	ASTM D648
Peak Melting Temperature	264	°F	129	°C	ASTM D3418

Molded Properties	Typical Value (English)		Typical Value (SI)		Test Based On
Tensile Strength at Yield					ASTM D638
2.0 in/min (50 mm/min)	2800	psi	19	MPa	
Elongation at Yield (2.0 in/min (50 mm/min))	10	%	10	%	ASTM D638
Flexural Modulus - 1% Secant	130000	psi	900	MPa	ASTM D790B
Environmental Stress-Crack Resistance					ASTM D1693A
10% Igepal, F50	40	hr	40	hr	
100% Igepal, F50	560	hr	560	hr	

Impact	Typical Value (English)		Typical Value (SI)		Test Based On
Impact Strength					ARM
-40°F (-40°C), 0.125 in (3.18 mm)	68	ft·lb	92	J	
0.250 in (6.35 mm)	190	ft·lb	258	J	

Additional Information

- All physical properties were measured on 3 mm. rotomolded samples unless a different value is shown, except for ESCR, which was measured on compression molded samples.
- Tensile testing was conducted at a crosshead speed of 50 mm/min. The tensile strength reported refers to the maximum stress reached during the test.
- Test procedures may be modified to accommodate operating conditions or facility limitations.

Legal Statement

Contact your ExxonMobil Chemical Customer Service Representative for potential food contact application compliance (e.g. FDA, EU, HPFB).

This product is not intended for use in medical applications and should not be used in any such applications.

ExxonMobil™ HDPE HD 8660 Series
High Density Polyethylene Resin

Notes

Typical properties: these are not to be construed as specifications.

[1] Product may not be available in one or more countries in the identified Availability regions. Please contact your Sales Representative for complete Country Availability.

For additional technical, sales and order assistance: www.exxonmobilchemical.com/ContactUs

exxonmobilchemical.com

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High Density Linear Polyethylene (HDLPE) versus High Density Cross-Link Polyethylene (HDXLPE)

We commonly get asked "what is the best material – HDLPE or XLPE"? This is difficult to answer because there is no one type of resin that is best suited for every application and general guidelines of material selection are not advisable. It is always best to provide the tank manufacturer with specific application details (chemical, concentration, specific gravity, temperature, dimensions, mechanical loading) so a proper tank design recommendation can be made by the factory or the distributor. The chemical type, concentration and temperature must be considered in order to select the most appropriate resin. While polyethylene resins, as a class, are excellent materials for storing a wide range of chemicals because of their toughness and weatherability, there is no "super" resin that will work in every application. However, in most cases, there is testing information and performance history available to help determine which resin (HDLPE or HDXLPE) is best suited for the application. Snyder Industries has funded independent testing conducted in conjunction with the University of Nebraska and resin producers to help determine the best polyethylene resins available for a wide variety of chemical applications. The recommendations from this study can be found on our **Chemical Resistance Recommendation Chart.**

Snyder has the ability and technology to supply tanks made with either resin (HDLPE or HDXLPE). Therefore, we are able to make unbiased recommendations for tank designs. As for differences in HDLPE and HDXLPE, the chart below will give you another comparison of the HDLPE and HDXLPE resins that have been developed by Exxon:

Product Attributes	HDLPE	HDXLPE
General Chemical Resistance	Excellent	Excellent
Impact Resistance	Excellent	Excellent
Weatherability	Excellent	Excellent
Initial Material Costs	Excellent	Good
Stress Crack Resistance **	Excellent **	Excellent **
Maximum Service Temperature	130 F	140 F
Density (ASTM D1505)	0.940-0.948 g/cc	0.938-0.946 g/cc
Contains UV inhibitor	Yes	Yes
NSF/FDA Acceptability	Yes	No
Can be welded (hot gas)	Yes	No
Recyclability	Yes	No

** Stress Crack Resistance is excellent when proper resin is chosen for the chemical application. See Snyder's **Chemical Resistance Recommendation Chart** for proper resin selection.

MATERIAL SELECTION

Since there is no one type of resin that is best suited for every application, Sii offers tanks manufactured using both high density crosslinked polyethylene (HDXLPE) and high density linear polyethylene (HDLPE) resin. While HDXLPE tanks are preferred in some applications such as storing certain polymers and surfactants, field experience and laboratory testing demonstrate that in many applications, the HDLPE tanks are equivalent or superior to HDXLPE tanks.

Continued, next page

MECHANICAL PROPERTIES
Prior to the advancements in HDLPE resin technology, HDXLPE resins had superior mechanical properties. Today, however, the HDLPE resins used by Sii have greater tensile strength and greater elongation than current HDXLPE resins.

ENVIRONMENTAL STRESS CRACK RESISTANCE (ESCR)
In theory, HDXLPE should be better than HDLPE for environmental stress crack resistance. However, several years ago HDXLPE resin suppliers were forced to modify their processes because of environmental and economical factors. Today, HDXLPE resins are no longer superior to HDLPE resins.

The test (ASTM D 1693) that companies often refer to when discussing environmental stress crack resistance (ESCR) is misleading. The test shows the environmental stress crack resistance of a material when exposed to one specific chemical, igepal, which is an anionic surfactant. Because of the limitations of this test, it does not represent the stress crack resistance of the material exposed to other chemicals such as sulfuric acid and sodium hypochlorite. In fact, there are many chemicals where HDXLPE performance is inferior compared to specific types of HDLPE resins.

TOUGHNESS
The toughness (impact resistance) of a tank is affected much more by the cure of the material than by the properties of the type of polyethylene resin used. Consequently, test data which compares the impact "toughness" (impact strength) of HDXLPE compared to HDLPE is not necessarily representative of the performance of the resin type. Rather the performance of these samples represents variations in the cure of the different materials.

CHEMICAL RESISTANCE
The most important factor in determining tank performance is chemical resistance. While there are definitely applications where HDXLPE out performs HDLPE, such as when storing certain surfactants and polymers, independent testing at the University of Nebraska and field experience indicate that selected grades of HDLPE are less vulnerable to attack by certain chemicals (i.e. sulfuric, sodium hypochlorite, etc.) than HDXLPE.

IN SUMMARY
In every case, the chemical type, concentration and temperature must be considered in order to select the most appropriate resin. While polyethylene resins, as a class, are excellent materials for storing a wide range of chemicals because of their toughness and weatherability, there is no "super" resin that will work in every application. Regardless of the properties that an unexposed resin may have, the long term affects of the chemical on the processed resin is the determining factor.

At Snyder, we feel very confident that our studies and case histories can help us to determine the best resin for the application. Snyder has always taken pride in our ability to get the full development of the physical properties of the processed resins which translate into superior chemical resistance and longer tank life.
Since Snyder has the ability and technology to supply either resin (HDLPE or HDXLPE), we are able to make unbiased recommendations for tank design. The crosslinked polyethylene and the high density linear offered by Snyder are both virgin number one grade resins. Please consult Snyder, or an authorized distributor, to determine which resin is best suited for your application.

SECTION 11400

POLYETHYLENE CHEMICAL STORAGE TANKS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This specification covers upright, double wall, high density polyethylene storage tank assemblies for chemical storage, including the Sodium Hypochlorite storage tank.

1.02 RELATED SECTIONS

A. SECTION 01300 – SUBMITTALS

B. SECTION 01730 – OPERATION AND MAINTENANCE MANUALS

C. SECTION 02620 – HIGH DENSITY POLYETHYLENE PIPE

D. SECTION 11300 – CHEMICAL METERING PUMPS

E. SECTION 11961 – INTERIOR AND EXTERIOR PROCESS PIPING

F. SECTION 13321 – INSTRUMENTATION AND CONTROL SYSTEM

1.03 REFERENCES

A. ASTM D618 – Conditioning Plastics and Electrical Insulating Materials for Testing

B. ASTM D638 – Tensile Properties of Plastics

C. ASTM D790 – Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D. ASTM D883 – Definitions of Terms Relating to Plastics

E. ASTM D1505 – Density of Plastics by the Density-Gradient Technique

F. ASTM D1525 – Test Method for Vicat Softening Temperature of Plastics

G. ASTM D1693 – Test Method for Environmental Stress-Cracking of Ethylene Plastics

H. ASTM D1998 – Standard Specification for Polyethylene Upright Storage Tanks

I. ASTM D2765 – Degree of Crosslinking in Crosslinked Ethylene Plastics as Determined by Solvent Extraction

J. ASTM D2837 – Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

K. ASTM D3892 – Practice for Packaging/Packing of Plastics

L. AATM F412 – Definitions of Terms Relating to Plastic Piping Systems

M. ARM (Association of Rotational Molders) Low Temperature Impact Resistance (Falling Dart Test Procedure)

N. ANSI B-16.5 Pipe Flanges and Flanged Fittings

O. OSHA 29 CFR 1910.106 Occupational Safety and Health Administration, Flammable and Combustible Liquids

1.03 SUBMITTALS

A. Shop Drawings in accordance with specification Section 01300.

B. Submit to the Engineer shop drawings showing details of construction and erection for each tank as follows:

1. Dimensions of tank, fittings and attachments, with bolt and gasket material.
2. Locations of fittings and attachments and size of manway openings.
3. Wall thickness calculations for each tank. Calculations shall be per ASTM D 1998-99 using 600 PSI design hoop stress @ 100º F.
4. Resin used and a complete manufacturers specification of the resin use.
5. Knuckle radius.
6. Weight of tank.
7. Corrosion data for all materials in contact with the chemicals.
8. Certificate of Compliance stating:
    i. All fittings, insulation, et cetera, have been installed by the tank manufacturer.
    ii. H_20 tests have been performed by the manufacturer and all fittings were installed prior to H_20 tests.
    iii. All tanks are designed and manufactured in accordance with ASTM-D 1998 Type 1.

C. Operation and Maintenance Manual in accordance with specification Section 01730.

1.04 MARKING, DELIVERY, STORAGE, AND HANDLING

A. In accordance with specification Section 01600.

B. The tanks shall be marked to identify the product, date (month and year) of manufacture, capacity, and serial number. The tank shall be shipped with a bar code label containing tank description, manufacturing order number, part number, serial number, manufacturer, and date.

C. The proper caution or warning signs as prescribed by OSHA standard 29 CFR 1910.106 shall be customer determined and supplied.

D. All packing, packaging, and marking provisions of ASTM Practice D3892 shall apply to this standard. Tank shall be wrapped in polyethylene to protect it from dirt, grease, oil, etc. during shipping and storage.

E. Customer specified labeling shall be available.

F. Tank shrink wrapping and bagging shall available upon customer request.

G. All fittings shall be installed, removed and shipped separately.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Poly Processing Company Monroe, LA
B. Assmann Corporation, Garrett, IN
C. Snyder Industries, Inc., Lincoln, Nebraska
D. Approved equal.

2.02 DESIGN

A. The assembly shall consist of one cylindrical inner primary tank and one blended form outer secondary tank. The tanks shall be designed for above-ground, vertical installation and be capable of containing chemicals at atmospheric pressure. The assembly shall be designed to prevent rainwater from entering the containment tank. The containment tank shall be designed to hold a minimum of 115% of the normal fill capacity of the primary tank.

2.03 CHEMICAL COMPATIBILITY

A. Tanks shall be capable of storing a 50% solution of Sodium Hydroxide (NaOH).

B. Chemical compatibility shall be according to the following chemical resistance guides:

1. Pruett, Kenneth M., "Chemical Resistance Guide for Elastomers", Compass Publications.
2. Pruett, Kenneth M., "Compass Corrosion Guide II", Compass Publications.

C. Construction

1. All tanks shall be:
    a. Type I – molded from Cross-linked Polyethylene Resin, or

2.04 MATERIALS

Snyder will only allow HDLPE on Sodium Hypochlorite Storage or will void the manufacturer warranty this XLPE/OR-1000 spec can only be met by PolyProcessing. The OR-1000 liner is MDLPE linear polyethylene, Snyder will be providing HDLPE , which is High-Density Linear Polyethylene, which is stronger than MDLPE, which is Medium Density Linear Polyethlyene.

A. The Sodium Hypochlorite tank shall be molded from Grade I high density cross-linked polyethylene with an integral, internal lining molded from oxidation resistant polymer. The resin shall be Poly CL or Paxon 7000 Series, as manufactured by Exxon/Mobil Chemical Company with the anti-oxidant resistant liner being OR-1000 or approved equal.

B. For sodium hypochlorite storage, the resin shall include additional medium density polyethylene (OR-1000) with four times (4X) the anti-oxidant properties of a standard polyethylene bonded to the interior surface during the manufacturing process. The oxidation resistant lining shall be an integrally molded part of the tank.

C. All polyethylene resin material shall contain a minimum of a UV-8 stabilizer as compounded by the resin manufacturer. Pigments shall not exceed 0.25% (dry blended) of the total weight.

D. Mechanical Properties of Type I tank material:

PROPERTY	ASTM	VALUE
Density (Resin)	D1505	0.938-0.946 g/cc
Tensile (Yield Stress 2"/min)	D638	3290 PSI
Elongation at Break (2"/min.)	D638	640%
ESCR (100% Igepal, Cond. A, F50)	D1693	>1000 hours
ESCR (10% Igepal, Cond. A, F50)	D1693	>1000 hours
Vicat Softening Degrees F. Temperature	D1525	248
Flexural Modulus	D790	88,700 PSI

2.05 TANK DESIGN

A. The double-wall tank capacity shall be as indicated on the tank schedule and consist of an inner and outer tank each molded separately. The inner tank shall be one piece molded with a domed top. The outer tank shall be open top style with an internal flange.

B. The tanks shall be designed for 1.9 Specific Gravity using a hoop stress value of no greater than 600 psi at 100º F, with a safety factor of no less than 2, using the Barlow Formula for calculating wall thickness. For applications in excess of 100º F design conditions, lower values for the design hoop stress shall be used.

C. All edges cut out for manway or other openings shall be trimmed to have smooth edges.

D. The finished surface shall be as free as commercially practical from visual defects such as foreign inclusions, air bubbles, pin holes and craters.

E. The knuckle radius at bottom to wall shall be a minimum of 1". The minimum thickness of the radius shall not be less than the maximum thickness of the cylinder wall.

2.06 DIMENSIONS AND TOLERANCES

A. All dimensions will be taken with the tank in the vertical position, unfilled. Tank dimensions will represent the exterior measurements.
   1. The tolerance for the outside diameter of the primary tank, including out of roundness, shall be per ASTM D1998.
   2. The tolerance for fitting placements shall be +/- 0.5 in. in elevation and 2 degrees radial at ambient temperature.

2.07 TEST METHODS

A. TEST SPECIMENS

1. Test Specimens shall be taken from fitting location areas or piggy-back test molds.

B. LOW TEMPERATURE IMPACT TEST

1. Test specimens shall be conditioned at -40 degrees Fahrenheit for a minimum of 2 hours.
2. The test specimens shall be impacted in accordance with the standard testing methods as found in ASTM D1998. Test specimens < 1/2" thickness shall be tested at 100 ft.-lb. Test specimens > 1/2" thickness shall be tested at 200 ft.-lb.

C. DEGREE OF CROSSLINKING TEST

Only required on XLPE tanks

1. The test method used is to be the o-xlene insoluble fraction (gel test) per ASTM D2765 Method C. This test method is for determination of the ortho-xlene insoluble fraction (gel) of crosslinked polyethylene.
2. The percent gel level on the inside 1/8 in. of the wall shall be a minimum of 60%.

D. ULTRASONIC TANK THICKNESS TEST

1. All tanks 2000 gallons or larger shall be measured for tank wall thickness at 6", 1ft., 2ft. and 3ft. on the tank sidewall height at 0° and 180° around the tank circumference with 0° being the tank manway and going counter-clockwise per ANSI standard drafting specifications. A copy of this test report can be ordered when placing the original tank order. All tanks shall meet design thickness requirements and tolerances.

E. HYDROSTATIC WATER TEST

1. The hydrostatic water test shall consist of filling the tank to brim full capacity for a minimum of four hours and conducting a visual inspection for leaks. A hydrostatic water test will be conducted if ordered by the customer.

2.08 WORKMANSHIP

A. The finished tank wall shall be free, as commercially practicable, of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, crazing, cracking and delaminations that will impair the serviceability of the vessel. Fine bubbles are acceptable to the degree in which they do not interfere with proper fusion of the resin melt.

B. All cut edges where openings are cut into the tanks shall be trimmed smooth.

2.09 TANK FITTINGS

A. DOME FITTINGS

1. All dome fittings shall be flanged Universal Ball Dome style. There shall be a single 150 Lb. ANSI PVC flange with a ¼" gasket attached to the outside tank wall. The flange shall be bolted to the tank from the inside with a minimum of four (4) ½" diameter all thread bolts with bolt heads encapsulated in polyethylene. The encapsulation shall be a minimum 2" in diameter x .75" thick and fully cover the bolt head and a minimum of ¼" of the threads closest to the bolt head. Each bolt shall have a ¼" gasket which is on the inside of the tank. All dome fittings shall be fume tight. Bolts and gaskets shall be as specified in the tank data sheet.

B. VENT FITTINGS

1. The vent shall be built into the manway cover as described in Part 2.10 (A) below.

C. SIDE WALL FITTINGS FOR OUTER TANK DRAIN AND/OR OVERFLOW FITTING

1. Outer tank drain fitting shall be bolted flange style. There shall be a single 150 Lb. ANSI PVC flange and a ¼" gasket attached to the outside tank wall. The flange shall be bolted to the tank from the inside with a minimum of four (4) ½" diameter all thread bolts with bolt heads encapsulated in polyethylene. The encapsulation shall be a minimum 2" in diameter x .75" thick and fully cover the bolt head and a minimum of ¼" of the threads closest to the bolt head. Each bolt shall have a ¼" gasket which is on the inside of the tank. Bolts and gaskets shall be as specified in the tank data sheet.

D. THRU-WALL OUTLET FITTING

1. A through the double wall pump suction fitting shall be provided on each double-wall tank. Nozzle construction shall be designed to maintain secondary containment integrity. The inner tank fitting shall be a bolted flange type fitting with internal siphon with bolts and gaskets as specified. Attached to the secondary containment tank shall be a bellows type transition fitting PTFE expansion joint as specified and designed to accommodate movement of primary tank in design accordance with ASTM-D 1998 tolerances. PTFE Expansion joint to have a minimum of 3 convolutions, stainless steel limit cables and composite flanges. Expansion joint must meet the following minimum performance requirements: Axial Compression ≥ .67", Axial Extension ≥ 0.67", Lateral Deflection ≥ 0.51", Angular Deflection ≥ 14º, Torsional Rotation ≥ 4º. Bellows transition fitting shall be capable of connecting to a double-wall piping system over the primary pipe. Bolts and gaskets shall be as specified in the tank data sheet.

2.10 TANK ATTACHMENTS

A. TIE DOWN SYSTEM

1. Tank manufacturer shall supply an outdoor seismic and wind restraint system. Restraint clips and cables shall be supplied by the tank manufacturer. Material of construction shall be galvanized steel. There shall be no protrusions through the wall. Anchor bolts shall be supplied by the GENERAL CONTRACTOR

B. ULTRASONIC LEVEL INDICATOR

Not in our Scope - Supplied by I&C SCADA - we provided 3" BHF Fitting for Level Transducer Mounting on Dome of Tank

1. In accordance with specification Section 13321.

C. LEAK DETECTOR UNIT

1. The leak detector unit shall consist of a polypropylene optic sensor, a welded 2 in. fpt connection, a 2 in. bung plug with a ¾ in strain relief, and an indicator box. The sensor is placed in the interstitial space between the primary and secondary tanks approximately 1 in. above the tank bottom. The indicator box shall be NEMA 4X rated and factory pre-wired for 110 VAC power. All connections shall be labeled to prevent errors in field installation. The leak detector panel shall have a red LED push-to-test leak alarm light, an alarm horn, and silence and reset pushbuttons. The panel shall transmit a remote alarm to the facility I&C system.

2.11 TANK ACCESSORIES

A. MANWAY AND VENT

1. The manway openings for tanks shall be a minimum of 24" and have a combination type manway cover. Covers shall be 16-bolt and have a 10" coarse threaded cover with a push plate and XLPE gasket. The cover shall have two (2) XLPE foam gaskets and the bolts shall be polyethylene.
2. Each tank must be properly vented for the type of material and flow rates expected. Vents must comply with OSHA 1910.106 (F) (iii) (2) (IV) (9) normal venting for atmospheric tanks or other accepted standard, or shall be as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 in. nominal inside diameter.

B. LADDERS

1. Ladders shall be constructed of FRP. Ladders must be mounted to the tank so as to allow for tank expansion and contraction due to temperature and loading changes. All top ladder mounts shall be connected to integrally molded in attachment lugs that allow for tank movement.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install the tank in accordance with the drawings and the manufacturers instructions.

B. Install the process piping in such a manner which allows the tank to expand and contract when filled and drained, as per the manufacturer's recommendation. All piping must be supported in accordance with the pipe manufacturer's recommendations. The expansion joint shall isolate the tank from the rest of the piping.

C. Upon successful completion of 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 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.

END OF SECTION

Vertical Double Wall Captor™
Polyethylene Tank Specification

PART 1 - GENERAL

8700 gallon Captor - 1.9 SG - HDLPE
Sodium Hypochlorite Bulk Tank

1.01 Scope

A. This specification covers upright, double wall, flat bottom storage tank assemblies. The assembly consists of one cylindrical inner primary tank and one blended form octagonal outer secondary tank. Each tank is molded in one-piece seamless construction by rotational molding (laminated or fabricated tanks will not be accepted). The tanks are designed for above-ground, vertical installation and are capable of containing chemicals at atmospheric pressure. The assembly shall be designed to prevent rainwater from entering the containment tank. The design shall allow direct primary tank base retention for up to seismic conditions per IBC code requirements. The containment tank shall be designed to hold a minimum of 115% of the normal fill capacity of the primary tank. Included in this specification are requirements for material properties, design, construction, dimensions, tolerances, workmanship, and appearance. Tank capacities are from 550 gallons (2082 L) up to 12,500 gallons (47,313 L).

B. This specification does not cover the design of vessels intended for use at pressures above or below atmospheric conditions. It is also not for vessels intended for use with liquids heated above their flash points, temperatures above 140 degrees Fahrenheit for Type I materials, or temperatures above 130 degrees Fahrenheit for Type II materials. (Note: See 1.08 A.2. for chemicals being stored above 100 degrees F)

C. Contractor shall supply and install all materials, equipment, appurtenances, specialty items, and services required to provide an upright, double wall, flat bottom, closed top, polyethylene storage tank for storage of the chemical application(s) described in Table I. Each tank is to be molded in one-piece seamless construction according to ASTM D 1998 (laminated or fabricated tanks will not be accepted) and will be capable of storing the chemical application at atmospheric pressure.

1.02. Manufacturer

A. Tanks shall be manufactured by Snyder Industries Inc. or approved equal.

1.03 Applicable Documents

A. ASTM (American Society for Testing and Materials) Standards:

1. D618 Conditioning Plastics and Electrical Insulating Materials for Testing
2. D638 Tensile Properties of Plastics
3. D790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
4. D883 Definitions of Terms Relating to Plastics
5. D1505 Density of Plastics by the Density-Gradient Technique
6. D1525 Test Method for Vicat Softening Temperature of Plastics
7. D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics
8. D1998 Standard Specification for Polyethylene Upright Storage Tanks
9. D2765 Degree of Crosslinking in Crosslinked Ethylene Plastics as Determined by Solvent Extraction
10. D2837 Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
11. D3892 Practice for Packaging/Packing of Plastics
12. F412 Definitions of Terms Relating to Plastic Piping Systems

B. ARM (Association of Rotational Molders) Standards: Low Temperature Impact Resistance (Falling Dart Test Procedure)

C. ANSI Standards: B-16.5 Pipe Flanges and Flanged Fittings

D. OSHA Standards: 29 CFR 1910.106 Occupational Safety and Health Administration, Flammable and Combustible Liquids

E. UBC CODE: Uniform Building Code 2006 Edition

F. IBC CODE: International Building Code 2015 Edition

G. CBC Code: California Building Code 2016 Edition

H. NSF/ANSI Standard 61 – Drinking Water System Components (Type II resin)

I. 40 CFR-264.193

1.04. Submittals

A. Drawings and Data: The manufacturer's shop drawings shall be approved by the engineer or contractor prior to the manufacturing of the tank(s). Data and specifications for the equipment shall include, but shall not be limited to the following submittals.

B. Contractor shall submit for review sufficient literature, detailed specifications, and drawings to show dimensions, materials used, design features, internal construction, weights and any other information required by the ENGINEER for review of storage tanks and accessories.

C. Information to be included with the submittals is specified below:

1. Shop drawings for the tanks shall include as a minimum the following:

    a. Service Conditions: Chemical environment and temperature.

    b. Statement that fabrication shall be in accordance with ASTM D 1998, where applicable.

    c. Sizing and description of the fittings and accessories for each tank that are to be supplied by the tank manufacturer.

    d. Layouts and assembly schedules for each tank identifying the location and elevation from the bottom of the tank for all connections and appurtenances supplied by the tank manufacturer.

2. Resin - A copy of the resin data sheet from the resin manufacturer for the tank is to be supplied and the tank manufacturer is to certify that it will be the resin used in the manufacture of the tank. Verification may be required if the resin is to be FDA or NSF 61 listed.

3. Wall thickness - Prior to the manufacture of the tank the designed wall thickness audit is to be supplied based upon 600 psi hoop stress (ASTM D 1998) @ 100 degrees F. (Note: See 1.08 A.2 for chemicals being stored above 100 degrees F)

4. Tank restraint – If supplied, the drawings and calculations for the system are to be provided. Note: Wet stamped or site specific drawings and calculations may be required.

5. Supporting information on fittings and accessories to be supplied; heat system, insulation, mastic coating, etc.

6. Technical Manuals: The tank manufacturer's "Guideline for Use & Installation" is to be submitted for review.

7. Installation certificate: Once installed the installer is to certify that the tank system has been installed according to the tank manufacturer's Guidelines for Use & Installation.

8. Manufacturer's warranty

9. Manufacturer Qualifications: The manufacturer is to have rotationally molded polyethylene tanks based upon ASTM D 1998 utilizing Type I and Type II resins for the last 10 years.

10. Factory Test Report: Upon completion of the tank the manufacturer's inspection report is to be supplied for each tank.

    a. Verification of wall thickness (See 1.09 E.)
    b. Impact test (See 1.09 C.)
    c. ~~Gel test – (Type I resin only) (See 1.09 D.)~~
    d. Hydrostatic test (See 1.09 F.)
    e. Verification of fitting placement (See 1.09 B.)
    f. Visual inspection (See 1.09 G.)
    g. Verification of materials

1.05. Service Conditions

Note: The tank color will be based upon the chemical application and UV exposure of the installation. Tank color is to be natural, black or opaque white.

Table I – Service Conditions

Tank #	Chemical Stored	Concentration / Specific Gravity	Tank Location Inside/Outside	Operating Temperature	Fitting Material	Gasket Material	Bolt Material
8700CCS	NaOCl	1.20	Outside	TBD	PVC	Viton	Titanium

1.06. Chemical Compatibility

A. Chemical compatibility shall be according to the following chemical resistance guides:

Compass Publications -
Pruett, Kenneth M., “Chemical Resistance Guide for Plastics”
Pruett, Kenneth M., “Chemical Resistance Guide for Metals and Alloys”
Pruett, Kenneth M., “Chemical Resistance Guide for Elastomers III”

B. These references shall be considered as general guidelines only. In many cases, combinations of these chemicals are used in such a way that only the customer (by testing molded product samples) can make a determination in regards to acceptability.

Note: Contact the manufacturer for applications that are not listed below.

Chemical	Concentration	Tank Resin	Tank Design Info	Fitting Material	Gasket Material	Bolt Material
Acetic Acid	60	HDLPE & XLPE	1.5/ASTM	PP/PVC	EPDM	316SS/Hastelloy/Titan.
Acetic Acid	80	HDLPE	1.9/ASTM	PP	EPDM	316SS/Hastelloy/Titan.
Acrylic Emulsions	50	XLPE	1.9/ASTM	PVC	EPDM	316SS
Aluminum Sulfate	50	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Ammonium Sulfate	40	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Calcium Carbonate	Saturated	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Calcium Chloride	40	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
DEF (Diesel Exhaust Fluid)	32.5	HDLPE & XLPE	1.35/ASTM	316 SS	EPDM	316SS
Deionized Water <5 Megohm		HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS
Deionized Water >5 Megohm		HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS
Ethyl Alcohol	100	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS
Ethylene Glycol	100	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Ferric Chloride	50	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	Hastelloy/Titan.
Ferric Sulfate	60	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Ferrous Chloride	Saturated	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	Hastelloy/Titan.
Ferrous Sulfate	20	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	Hastelloy
Hydrochloric Acid	37	HDLPE	1.9/ASTM	PVC	Viton	Hastelloy
Hydrofluoric Acid	48	HDLPE	1.9/ASTM	PP/PVC	Viton	Hastelloy
Hydrofluosilicic Acid	26	HDLPE/XLPE*	1.9/ASTM	PP/PVC	Viton	Hastelloy
Hydrogen Peroxide	50	HDLPE	1.9/ASTM	PVC	Viton	316SS/Hastelloy/Titan.
Isopropyl Alcohol	100	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS
Magnesium Chloride	30	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Methyl Alcohol	100	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS
Motor Oil	100	HDLPE & XLPE	1.9/ASTM	316SS	Viton	316SS
Phosphoric Acid	85	HDLPE	1.9/ASTM	PVC	Viton	316SS
Phosphoric Acid	50	HDLPE	1.9/ASTM	PVC	Viton	316SS
Polymers (Deposition)		XLPE	1.5/ASTM	PVC	EPDM	316SS
Potable Water		HDLPE	1.5/ASTM	PVC	EPDM	316SS
Potassium Carbonate	50	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Potassium Hydroxide	Saturated	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Sodium Carbonate	30	HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Sodium Carbonate	Saturated	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS**/Hastelloy/Titan.
Sodium Hydroxide	50	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Sodium Hypochlorite-in (Non-UV)	<16.5	HDLPE	1.9/ASTM	PVC	Viton	Titanium
Sodium Hypochlorite-out (UV)	<16.5	HDLPE #880059	1.9/ASTM	PVC	Viton	Titanium
Sodium Hypochlorite-out (UV)	<16.5	HDLPE Insulated	1.9/ASTM	PVC	Viton	Titanium
Sodium Thiosulfate	40	HDLPE & XLPE	1.9/ASTM	PVC	EPDM	316SS
Sulfuric Acid	98	HDLPE #880046*	1.9/ASTM	CPVC	Viton	Hastelloy
Sulfuric Acid	93	HDLPE #880046*	1.9/ASTM	CPVC	Viton	Hastelloy
Surfactants		XLPE	1.5/ASTM	PVC	EPDM	316SS
Urea Solution	50	HDLPE & XLPE	1.35/ASTM	PP/PVC	EPDM	316SS
Water w/Ozone up to 10 PPM		HDLPE & XLPE	1.5/ASTM	PVC	EPDM	316SS

**Chemical may cause tank material to discolor.*
*** 316SS may pit upon drying.*
For chemicals or chemical blends not listed on the above chart, please contact Snyder Industries

1.07. Materials – Resin Classification

A. Tanks are classified according to the resin type. It is the responsibility of the purchaser to specify ~~Type I~~ or Type II.

1. ~~Type I – Tanks molded from cross-linkable polyethylene resin.~~
2. Type II - Tanks molded from linear polyethylene resin (not cross-linkable resin).

B. The material used shall be virgin polyethylene resin as compounded and certified by the manufacturer. Type I tanks shall be made from crosslinked polyethylene (XLPE) resin as manufactured by ExxonMobil Chemical, or resin of equal physical and chemical properties. Type II tanks shall be made from high density linear polyethylene (HDLPE) resin as manufactured by ExxonMobil Chemical, or resin of equal physical and chemical properties.

C. All polyethylene resin material shall contain a minimum of a U.V. 15 stabilizer as compounded by the resin manufacturer. Pigments may be added at the purchaser's request, but shall not exceed 0.25% (dry blended) of the total weight.

~~D. Mechanical Properties of Type I tank material: Cross-linked (XLPE)~~

PROPERTY	ASTM	VALUE
Density (Resin)	D1505	0.942 -0.946 g/cc
Tensile (Yield Stress 2"/min)	D638	2700 - 2900 PSI
Elongation at Break (2.0in/min (50 mm/min)	D638	300-800%
ESCR (100% Igepal, Cond. A, F50)	D1693	>1000 hours
ESCR (10% Igepal, Cond. A, F50)	D1693	>1000 hours
Flexural Modulus 1% Secant	D790	110,000 PSI

E. Mechanical Properties of Type II tank material: High density Linear (HDLPE)

PROPERTY	ASTM	VALUE
Density (Resin)	D1550	0.941-0.950 g/cc
Tensile (Yield Stress 2"/min)	D638	2800 - 3500 PSI
Elongation at Break (2"/min.)	D638	>1000%
ESCR (100% Igepal, Cond. A, F50)	D1693	>500 hours
ESCR (10% Igepal, Cond. A, F50)	D1693	40 - 48 hours
Flexural Modulus 1% Secant	D790B	130,000 – 145,000 PSI

1.08 Design Requirements

Note: The designed specific gravity of the tank shall be based upon the actual chemical, its' concentration and temperature. From these factors it can be determined if polyethylene can be used and if so which family of polyethylene is to be used. There are chemical applications where both the ~~(cross-linked - Type I) XLPE~~ and HDLPE (high-density linear - Type II) resin will work. There are also applications where only one of these families of resin is recommended. If FDA or NSF 61 is required the Type II HDLPE resin will be required.

A. The minimum required wall thickness of the cylindrical shell at any fluid level shall be determined by the following equation, but shall not be less than 0.187 in. thick.

$$T = P \times O.D./2\,SD = 0.433 \times S.G. \times H \times O.D./2\,SD$$

T = wall thickness
SD = hydrostatic design stress, PSI
P = pressure (.433 x S.G. x H), PSI
H = fluid head, ft.
S.G. = specific gravity, g/cm^3
O.D. = outside diameter, in.

1. The hydrostatic design stress shall be determined by multiplying the hydrostatic design basis, determined by ASTM D2837 using rotationally molded samples, with a service factor selected for the application. The hydrostatic design stress would be ≤ 660 PSI at 73 degrees Fahrenheit for Type I and Type II materials based the resin density. In accordance with the formula in 1.08 A., the tank shall have a stratiform (tapered wall thickness) wall. In no case shall the wall thickness be less than the minimum allowed per calculation of ASTM D1998.

2. The hydrostatic design stress shall be derated for service above 100 degrees Fahrenheit and for mechanical loading of the tank.

3. The standard design specific gravity shall be 1.5 or 1.9.

B. The minimum required wall thickness for the cylinder straight shell must be sufficient to support its own weight in an upright position without any external support. Secondary containment tanks shall be designed per the manufacturer's standard containment thickness requirements. The secondary containment shall be configured to allow shipment of the primary tank inside of the secondary tank. The shipment shall be done without the aid of additional spacer blocks which can be lost during shipment causing tank damage.

C. The top head must be integrally molded with the cylinder shell. The minimum thickness of the top head shall be equal to the top of the straight wall. The primary tank top shall be configured to prevent rain water from entering the secondary containment tank. The top head of tanks with 550 or more gallons of capacity shall be designed to provide a minimum of 1300 square inches of flat area for fitting locations. The primary tank shall be keyed to the secondary tank preventing primary tank rotation. The secondary containment shall have 115% of the normal fill capacity of the primary tank.

D. Tanks with 550 or more gallons of capacity shall have a minimum of 3 lifting lugs integrally molded into the top head. The lifting lugs shall be designed to allow erection of empty primary and secondary tanks. Tanks shall be capable of being lifted into position as a unit (primary and secondary tanks).

E. The tank shall be designed to provide a minimum of 4 tie-down lugs integrally molded into the top head. The tie-down lugs shall be designed to allow tank retention in wind and seismic loading situations without tank damage. The primary/secondary tank unit shall be configured to allow direct primary tank base retention for seismic load conditions. The base retention unit shall be anchor bolted to an appropriate structure and not require additional spacer blocks. Refer to section 2.02 H. for tank tie-down accessories.

Table II – Tank Schedule

Tank Reference #	8700 Captor			
Quantity	One (1)			
Capacity - Side Wall	8700-gallons			
Specific Gravity– designed	1.9			
Diameter (nominal)	128" - 142"			
Height (feet) maximum	17'			
Tank Resin (primary/secondary)	HDLPE / HDLPE			
Type I XLPE				
Type II HDLPE	HDLPE			
Color	Natural			
Manway Type	Hinged-Vented			
Fitting Material	PVC			
Gasket Material	Viton			
Bolt Material	Titanium			

Note: Useable Volume is the height between the drain outlet and the "Full" line on the tank. Specified tank volume is larger than the useable volume. Check useable volume for tanks designed to take full truck loads.

1.09. Quality Assurance & Test Methods

A. The tanks of the same material furnished under this Section shall be supplied by a manufacturer who has been regularly engaged in the design and manufacturing of rotationally molded polyethylene chemical storage tanks using cross-linked and high density linear polyethylene tanks for over ten years.

B. Dimensions and Tolerances

1. All dimensions will be taken with the tank in the vertical position, unfilled. Tank dimensions will represent the exterior measurements.

2. The tolerance for the outside diameter, including out of roundness, shall be per ASTM D1998.

3. The tolerance for fitting placements shall be +/- 0.5 in. in elevation and 2 degrees radial at ambient temperature.

C. Low Temperature Impact Test *(copy of the test report will be provided if ASTM documents are ordered)*

1. Test specimens shall be taken from fitting location areas.
2. Test specimens shall be conditioned at (- 40) degrees Fahrenheit for a minimum of 2 hours.
3. The test specimens shall be impacted in accordance with the standard testing methods as found in ASTM D1998. Test specimens < ½" thickness shall be tested at 100 ft. lb. Test specimens > ½" thickness shall be tested at 200 ft. lb.

~~D. Degree of Crosslinking Test (% Gel – Type I Resin Only)~~

1. The test method used is to be the o-xylene insoluble fraction (gel test) per ASTM D2765 Method C. This test method is for determination of the ortho-xlene insoluble fraction (gel) of crosslinked polyethylene. A Gel test will be conducted if ordered by the customer.
2. The percent gel level for Type I tanks on the inside 1/8 in. of the wall shall be a minimum of 65%.

E. Ultrasonic Tank Thickness Test *(copy of the test report will be provided if ASTM documents are ordered)*

1. All primary tanks 2000 gallons or larger shall be measured for tank wall thickness at 6", 1ft., 2ft. and 3ft. on the tank sidewall height at 0° and 180° around the tank circumference with 0° being the tank manway and going counter-clockwise per ANSI standard drafting specifications. A copy of this test report can be ordered when placing the original tank order. All tanks shall meet design thickness requirements and tolerances.
2. Tanks smaller than 2000 gallons are only periodically measured at the start of a production run or after any design changes. Customers can place an order for tank wall thickness measurements on smaller tank sizes when placing the original order. A copy of the test report will be provided if ordered.

F. Hydrostatic Water Test

1. The hydrostatic water test shall consist of filling the primary tank to brim full capacity for a minimum of four hours and conducting a visual inspection for leaks. A hydrostatic water test will be conducted if ordered by the customer.

G. Workmanship

1. The finished tank wall shall be free, as commercially practicable, of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, crazing, cracking and delaminations that will impair the serviceability of the vessel. Fine bubbles are acceptable with Type II tanks to the degree in which they do not interfere with proper fusion of the resin melt.
2. All cut edges where openings are cut into the tanks shall be trimmed smooth.

Table III – Fitting and Accessory Schedule

Tank Number	**TNK - 8700CCS**	**TNK -**	**TNK -**	**TNK -**
Description	**Quantity / Size**	**Quantity / Size**	**Quantity / Size**	**Quantity / Size**
Inlet / Fill	3" BHF			
Outlet	2" DBLFF w/ UFO			
~~Drain~~				
~~Overflow~~ LEVEL	3" BHF			
~~Vent~~				
~~Surge Protection Lid~~				
Manway	24" Hinged-Vent			
Ladder - FRP or Galv. Steel	FRP			
Lifting Lugs	Yes			
Tie-down Lugs	Yes			
Seismic/Wind Tie-down	Yes - Galvanized			
~~Ultrasonic Level Indicator~~				
~~Reverse Float Level Indicator~~				
Leak Detection System	Yes - NEMA 4X			
~~Heat System~~				
~~Maintenance Temperature~~				
~~Min. Ambient Temperature~~				
~~Insulation w/mastic coating~~				

PART 2 – FITTINGS & ACCESSORIES

2.01. Tank Fittings

A. Fittings – Threaded Bulkhead

1. Threaded bulkhead fittings are available for above liquid installation depending on the tank diameter and the placement of the fitting in the tank. Fittings must be placed away from tank knuckle radius' and flange lines. Consult manufacturer for placement questions. The maximum allowable size for bulkhead fittings placed on a curved cylindrical section of tanks 48 in. to 142 in. in diameter is 2 inch. Tank wall thickness must be considered for bulkhead fitting placement. The maximum wall thickness for each fitting size is shown below.

Fitting Size	Maximum Wall Thickness
1/2 in.	2 in.
3/4 in.	2 in.
1 in.	2 in.
1 1/4 in.	2 in.
1 1/2 in.	2 in.
2 in.	2 in.
3 in.	2.125 in. (Flat Surface Only)

2. The bulkhead fittings shall be constructed of PVC, PP, or other specified material. Gaskets shall be a minimum of 1/4" thickness and constructed of ~~40-50 durometer EPDM~~, 60-70 durometer Viton®, or other specified material.

B. Fittings - Bolted Double 150 lb. Flange Fittings

1. Bolted double flange fittings are available for below liquid level installation for sizes 2 in. through 4 in. depending on the placement of the fitting in the tank. Fittings must be placed away from tank knuckle radius' and flange lines. Consult SII for placement questions. Bolted double flange fittings provide the best strength and sealing characteristics of any tank fitting available. Allowable fittings sizes based on tank diameter for curved surfaces are shown below.

Tank Diameter	Maximum Bolted Fitting Size Allowable
48 in. - 86 in.	3 in.
90 in. - 102 in.	6 in.
120 in. - 142 in.	8 in.

The bolted double flange fittings shall allow tank wall thickness up to 2 1/2 in.

2. The bolted double flange fitting shall be constructed with 2 ea. 150 lb. flanges, 2 ea. 150 lb. flange gaskets, and the correct number and size of all-thread bolts for the flange specified by the flange manufacturer. The flanges shall be constructed of PVC Type I, Grade I, or other specified material. Gaskets shall be a minimum of 1/4" thickness and constructed of ~~40-50 durometer EPDM~~, 60-70 durometer Viton® or other specified material. There shall be a minimum of 4 ea. full thread bolts. The bolts may have gasketed flanged metal heads or bolt heads encapsulated in Type II polyethylene material. The encapsulated bolt shall be designed to prevent metal exposure to the liquid in the tank and prevent bolt rotation during installation. The polyethylene encapsulation shall fully cover the bolt head and a minimum of 1/4" of the threads closest to the bolt head. The polyethylene shall be color coded to distinguish bolt material ~~(white - 316 S.S., yellow - Hastelloy C276~~ green - Titanium). Each encapsulated bolt shall have a gasket to provide a sealing surface against the inner flange.

3. Standard orientation of bolted double flange fittings shall have bolt holes straddling the principal centerline of the tank in accordance with ANSI/ASME B-16.5 unless otherwise specified.

C. Fittings – Unified Fitting Outlet (UFO™)

1. The UFO shall provide a flexible containment seal between the inner primary tank and the outer secondary containment tank. This fitting outlet when used in combination with fittings as per sections 2.01 C and D provides access for connecting piping to the inner primary tank while maintaining containment integrity between the inner primary tank and the outer secondary containment tank. This fitting outlet may be used for 2, ~~3, and 4~~ in. fitting sizes.

~~D. Vents~~

1. Each tank must be properly vented for the type of material and flow rates expected. Vents must comply with OSHA 1910.106 (f) (2) (iii) or other accepted standard. All tanks must be vented for atmospheric pressure as well as any pressure created by filling and emptying the tank. Some applications may require a sealed tank with a vent line going to a scrubber system for proper chemical safety. Venting equipment should be sized to limit pressure or vacuum in the tank to a maximum of 1/2" of water column (0.02 psi). U-Vents are offered in sizes

from 1 in. to 6 in. with or without mesh insect screening. U-Vents with mesh screening may require additional sizing due to reduced air-flow rates. Consult the manufacturer for necessary venting and placement information.

2. All u-vents shall be constructed of PVC or other specified materials.

3. When a tank is being filled from a pressurized tanker truck or rail car steps need to be taken to avoid pressurizing the tank. The tank may require a secondary surge protection lid to avoid any pressure build up. The surge protection lid is to be a 14" or 18" hinged and be design that it is self-closing.

4.. To avoid the air surge and over-pressurization from a tank being filled from a pressurized tanker truck or rail car, the 18" (26" x 11.7") polyethylene mushroom vent could be used. The mushroom vent is rotationally molded with Type II, HDLPE. The vent is to be attached to the tank with (8) screws and a bead of silicone sealant. The underside of the vent has 1/8" poly mesh insect screen. The mushroom vent requires a 19" diameter flat surface on the tank for installation.

E. Flexible Connections

1. All tank fitting attachments shall be equipped with flexible couplers or other movement provisions provided by the tank customer. The tank will deflect based upon tank loading, chemical temperature and storage time duration. Tank piping flexible couplers shall be designed to allow 4% tank design movement. Movement shall be considered to occur both outward in tank radius and downward in fitting elevation from the neutral tank fitting placement.

2. The flexible connection is to be manufactured of the same material as the tank or a compatible material approved by the project engineer. If an elastomer flexible connection is used control bolts are required if recommended by the manufacturer. The flexible connection is to be designed for a minimum of 4% tank movement. The flexible connection is to be designed with 150# flange connections to allow for attachment to the tank and the piping system. The flexible connection is to be attached as close as possible to the tank to reduce stress.

2.02. Tank Attachments

A. Leak Detector Unit

1. The leak detector unit shall consist of a proximity sensor, a welded 2 in. fpt connection, a 2 in. bung plug with a ¾ in strain relief, and an indicator box. The sensor is placed in the interstitial space between the primary and secondary tanks approximately 1 in. above the tank bottom. The indicator box shall be Nema 4 rated and factory pre-wired for 110 VAC power. All connections shall be labeled to prevent errors in field installation. The indicator box will show a green light when power is on and the sensor is not detecting a liquid. The light is a push to test light allowing the operator to test for power outage or malfunction. If the green light goes out there are two possibilities. The green light does not come on when the button is pushed. This would indicate a lack of power to the unit or the light bulb is burned out. If the green light comes on when pushed, then a possible leak condition is indicated.

B. Threaded Manways and Fill Caps

1. Manways are available in an 18 in. vented or non-vented threaded design or hinged style (minimum opening diameter of 15 in.) and a 24 in. vented or non-vented threaded or hinged style (minimum opening diameter of 22 in.) on various tank sizes. Check the manufacture's specification drawing for availability and position.

2. All caps and manways shall be constructed of polyethylene material.

C. Down Pipes and Fill Pipes

1. External Fill / Down Pipes

a. External fill pipes shall be prepared per the customer approved drawings and specifications. All external fill pipes shall be supported at 3 ft. maximum intervals with a support structure independent of the tank (ground supported). All designs shall be done according to the specific needs of the customer.

b. All external fill pipes shall be constructed of PVC or other specified materials.

D. Ladders

1. Ladders shall be constructed of ~~galvanized mild steel or~~ FRP.

2. Safety cages shall be provided with ladders as optional equipment unless required by OSHA standards.

3. All ladders shall be designed to meet applicable OSHA standards. Reference: OSHA 2206; 1910.27; fixed ladders.

4. Ladders must be mounted to the tank to allow for tank expansion and contraction due to temperature and loading changes. All top ladder mounts shall be connected to integrally molded-in attachment lugs that allow for tank movement due to temperature and loading changes.

5. Mild steel parts shall be deburred and galvanized.

E. Tie Down Systems

1. The tie down system shall be designed to withstand 150 MPH wind loads. Tie down systems must meet seismic requirements per IBC 2015 / CBC 2016 code with seismic loads ≤ .445g (Seismic Design Category "D" - Fa=1.0, Fv=1.5, Ss=1.4, S1=0.5). Anchor bolts shall be provided by the contractor per the calculations and the base plates for the system. A registered engineer's wet stamped calculations and or drawings may be required.

2. The tie down system shall be offered in either galvanized steel, ~~304 or 316 stainless steel.~~

3. Mild steel parts shall be deburred and galvanized.

2.03 Warranty

A. The tank shall be warranted for three years in regards to defects in materials and workmanship. The warranty on fittings and accessories supplied by the tank manufacturer will be for one year. The warranty will begin at time of shipment.

B. Snyder Industries may offer extended warranties on tanks (up to a maximum of 5 years) in regards to defects in materials and workmanship in certain applications or as a purchased option. Please consult Snyder Industries if you have any questions regarding extended warranty coverage and/or requirements.

2.04 Marking, Packing and Packaging

A. The tanks shall be marked to identify the product, date (month and year) of manufacture, capacity, and serial number. The tank shall be shipped with a 3 of 9, HRI bar code label containing tank description, manufacturing order number, part number, serial number, manufacturer, and date.

B. The proper caution or warning signs as prescribed by OSHA standard 29 CFR 1910.106 shall be customer determined and supplied.

C. All packing, packaging, and marking provisions of ASTM Practice D3892 shall apply to this standard.

D. Customer specified labeling is available.

E. Tank shrink wrapping and bagging is available upon customer request.

F. All fittings that do not interfere with tank shipment shall be installed unless otherwise specified. Fittings and accessories that interfere with tank shipment or could be broken during shipment are shipped separately.

G. Permanent Labels:

1. National Fire Protection Association label specifically coded for the tank contents in accordance with NFPA 30. (to be supplied by the contractor).
2. Stencil the chemical label on to the tank wall to be clearly visible from outside the tank enclosure. Must be ordered by customer.

PART 3 - EXECUTION

3.01 Shipping, Delivery & Storage

A. Since there are variations in methods of shipping, SII's instructions shall be followed in all cases.

B. Transportation, handling, storage of the tanks, and installation shall be in accordance with the manufacturer's printed instructions.

C. Upon receipt of the tank and accessories the purchaser and/or his agent shall be responsible for inspection for damage and to verify that the system is complete. If damage has occurred, a claim should be filed with the carrier by the purchaser, and the manufacturer should be notified prior to the tank being put into service. All fittings and accessories need to be installed and adjusted in the field according to the manufacturer's Guidelines for Use & Installation.

D. Consult the manufacturer's "Guideline for Use and Installation" booklet included with your tank for unloading instructions on specific tanks. This booklet can be found attached to the cap or manway area on the inside of the tank. Tanks with capacities of 550 gallons or more have molded-in lifting lugs provided to assist with handling the empty tank. Shipping cables are attached to secure the primary and secondary tank together to be moved assembled and must remain intact while moving the tank. Once the tank is in position, the shipping cables shall be removed from the tank.

E. If tank shall be stored for over one month before being put into service, it should be stored in an upright vertical position. If outdoors it shall be secured to prevent movement or overturn during high wind situations.

3.02 Installation & Field Testing

A. Install the tanks in strict accordance with Snyder Industries' Guidelines for Use and Installation and shop drawings.

B. Snyder Industries recommends that all tanks be hydro-tested (water test) for 24 hours before introduction of chemical. Once completed, if necessary, remove all test water to prevent any possible reaction with chemical to be stored.

C. All tank fitting attachments shall be equipped with flexible couplers or other movement provisions provided by the tank customer. The tank will deflect based upon tank loading, chemical temperature and storage time duration. Tank piping flexible couplers shall be designed to allow 4 percent tank design movement. Movement shall be considered to occur both outward in tank radius and downward in fitting elevation from the neutral tank fitting placement.

D. The installer is to certify in writing that the tank system has been installed according to the tank manufacturer's Guidelines for Use & Installation

End of Section

STANDARD LIMITED WARRANTY

Distributors and their authorized distribution have the responsibility of calling to the attention of their customers any exceptions to the Snyder Industries standard limited warranty, prior to acceptance of an order from the customer for any Snyder Industries product.

Snyder Industries warrants to the purchaser for use that if any manufactured tank product is proven to be defective in material or workmanship within 3 YEARS from the date of original invoice from factory, and Snyder Industries is notified within 15 days after such defect is discovered, Snyder Industries will (at company option) either replace or repair said part. Snyder Industries warrants to the purchaser for use that if any tank fitting, attachment, or accessory product is proven to be defective in material or workmanship within 1 YEAR from the date of original invoice from factory, and Snyder Industries is notified within 15 days after such defect is discovered, Snyder Industries will (at company option) either replace or repair said part. This Snyder Industries Standard Limited Warranty does not apply to damage resulting from misuse, improper application of recommended materials, neglect, material wear, accident, or improper installation or maintenance. Said part will not be considered defective if it substantially fulfills performance specifications. THE FOREGOING STANDARD LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESSED OR IMPLIED. Snyder Industries neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said tank product and will not be liable for incidental or consequential damages. THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS STANDARD WARRANTY. CLAIMS UNDER THIS STANDARD LIMITED WARRANTY SHALL BE HANDLED UNDER THE SNYDER INDUSTRIES SERVICE POLICY. Snyder Industries will not be responsible for any charges incurred in repairing or servicing any Snyder Industries product except as such repairs are made at Snyder Industries or by Snyder Industries personnel or as approved in writing from Snyder Industries Customer Service.

Due to the uniqueness of tank applications, Snyder Industries may offer warranties other than the standard warranty. These warranty statements will be in writing from Snyder Industries. The warranty period may be longer than 3 years as in the case for purchased extended warranties, or the warranty period may be shorter than 3 years as in the case for certain chemical/material applications. Please consult Snyder Industries if you have any questions regarding warranty coverage and/or requirements.

WARRANTY CLAIM PROCEDURE

Snyder Industries has specific procedures for return merchandise and warranty claims. To make a claim, please contact the Customer Service Department at Snyder Industries by mail, phone or e-mail:

Snyder Industries
6940 “O” Street, Suite 100
Lincoln, NE 68510
(402) 467-5221
FAX: (402) 465-1220
E-mail: sales@snydernet.com

The following information will be required to assist in filing your claim:

1. Product identification (tank size, part number, serial number, etc.)
2. Snyder Industries customer order number
3. Name and phone number of person making the claim
4. Distributor/company name, address, and phone number
5. Description of reason for claim
6. Pictures of failure and installation
7. MSDS of chemicals stored
8. Temperature of tank application

SNYDER INDUSTRIES, INC.

6940 “O” Street, Suite 100 ● Lincoln, Nebraska 68510 ● (402) 467-5221 ● FAX (402) 465-1220

RE: Certification of manufacturer’s experience

To Whom It May Concern:

Snyder Industries has been in business since 1957 and has been successfully molding XLPE tanks since 1973 and HDLPE tanks since 1984. Snyder has over 40 years of successful rotational molding experience.

Sincerely,

Jason Harrington

Jason Harrington
National Sales Manager – Industrial Bulk Tank Division
Snyder Industries, Inc.
Lincoln, Nebraska