BAILIFF ENTERPRISES, INC.

Popular Fittings & Options

for Bailiff Vertical Tanks

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PLANT
305 E Rogers Road
Willis, TX 77378

PIPE CONNECTION FITTINGS · 1

Thermoplastic Welded Couplings

Welded couplings provide secure threaded fittings for plastic tanks without the need for gaskets. They also allow for vertical pipe connections on sloped areas of the tank dome.



How we build them

We use thermoplastic welding to fuse couplings directly to the tank, creating a gasket-free, threaded connection.

- No gaskets to maintain or replace
- Vertical pipe connections on sloped dome areas
- All sizes are female NPT (FNPT)

Materials & pipe sizes

POLYETHYLENE	POLYPROPYLENE	PVDF
1″ – 4″ FNPT	1″ – 4″ FNPT	½″ – 6″ FNPT

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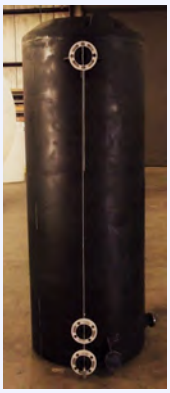
PIPE CONNECTION FITTINGS · 2

Thermoplastic Welded Flanges

Welded flanges provide secure fittings for plastic tanks without the need for gaskets. We use thermoplastic welding to fuse flanged fittings to our tanks in a wide range of sizes.







Specifications

- Available in polyethylene, polypropylene and PVDF
- **ANSI 150#** flanges
- Raised face flanges with **Vanstone loose backing rings** for easy fit-up to your pipes

Materials & diameters

POLYETHYLENE	POLYPROPYLENE	PVDF
¾″ – 30″	1″ – 10″	½″ – 11″

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PIPE CONNECTION FITTINGS · 3

Tank Fitting Options: Bulkheads

Standard bulkheads provide a way to attach pipes to a tank. They are usually threaded (FIPT) and made from stainless steel, polypropylene, PVC or CPVC. Other metals and plastics are available but much less common.

> Selection criteria: **chemical compatibility** for the application, the **work setting** and amount of abuse the fitting will receive, and **price**.



Stainless Steel Bulkheads

Used in rugged environments. Bolted through the tank, with 4-bolt and 6-bolt configurations as the standard types depending on fitting size.

Sizes: ½″ · ¾″ · 1″ · 1-½″ · 2″ · 3″ · 4″ **Gaskets: Viton · EPDM · Buna (others available)**



Polypropylene Bulkheads MOST COMMON

The most commonly used bulkhead — reliable and reasonably priced.

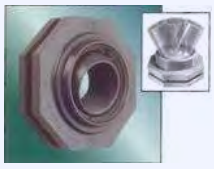
Sizes: ½″ · ¾″ · 1″ · 1-½″ · 2″ · 3″ · 4″ **Gaskets: Viton · EPDM · Buna (others available)**



PVC & CPVC Bulkheads

Available in threaded and socket styles. Socket types allow PVC or CPVC pipe to be glued in place — when done properly, a more secure seal than a threaded connection.

Sizes: ½″ · ¾″ · 1″ · 1-½″ · 2″ · 3″ · 4″ **Gaskets: Viton · EPDM · Buna (others available)**



Self-Aligning Bulkheads

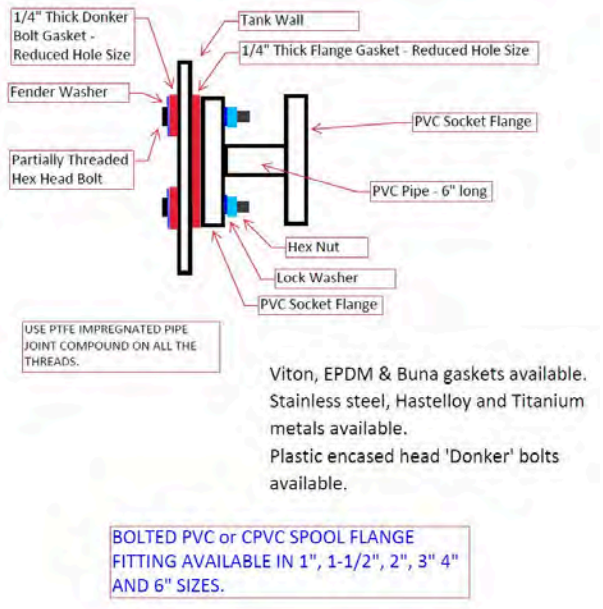
Used on the tank dome, where a standard bulkhead's threads would sit at an odd angle. A ball with pass-through threads adjusts to meet the plumbing. Top of tank only — not for use where liquid contacts the fitting. Polypropylene or PVC.

Sizes: 2″ · 3″

PIPE CONNECTION FITTINGS · 4

Bolted Flanges

Bolted flanges provide a secure way to attach pipes to a tank and are often used in industrial applications. They are usually made from PVC, CPVC, polypropylene and stainless steel; other metals and plastics are available but much less common.





Bolted Spool Flanges

Offer a secure connection to the tank and an extended flange face for attaching valves or pipes. Our PVC and CPVC spool flanges have **loose flange rings** on the extended flange for easier connection to pipe or valve flanges.

Available options

- Viton, EPDM & Buna gaskets
- Stainless steel, Hastelloy and titanium metals
- Plastic-encased head “Donker” bolts

Bolted PVC / CPVC spool flange sizes

1″ · 1-½″ · 2″ · 3″ · 4″ · 6″

Selection criteria: chemical compatibility, work setting and abuse, and price.

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PIPE CONNECTION FITTINGS · 5

PVC Bulkhead Flanges

Screw-on PVC bulkhead flanges offer safe, quick pipe connections for standard-wall plastic tanks. We use Spears Schedule 80 bulkheads or their equivalent.



RATING	SCHEDULE	THREADS
150 PSI	80	NPT

- **Left-hand threads** on the tightening ring keep it from loosening
- EPDM or FPM (Viton) gaskets standard; other gasket materials may be sourced

Connection styles

- Thread × Thread (TxT) — default
- Thread × Socket (TxS)
- Socket × Socket (SxS)

Thread × Thread is supplied unless otherwise specified.

Pipe sizes

½″ · ¾″ · 1″ · 1-½″ · 2″ · 3″ · 4″ · 6″

Some larger sizes are not available on small-diameter tanks.

Installation tip: When connecting threaded fittings, use Teflon (PTFE) impregnated plumber's paste rather than Teflon tape. Tape can bunch up and cause a fitting to crack.

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PIPE CONNECTION FITTINGS · 6

Sanitary Tri-Clamps

When Sanitary Tri-Clamps are the preferred fitting, we use a combination of welded couplings and Tri-Clamp adapters.





1 · Welded coupling

Bonds to the tank material.

2 · Tri-Clamp adapter

Changes the connection to a Tri-Clamp.

Less thread exposure

Half couplings can replace full double-threaded couplings to reduce threaded surface.

Materials & pipe sizes

POLYETHYLENE	POLYPROPYLENE	PVDF
1″ – 4″	½″ – 4″	½″ – 4″

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VENTS, VALVES & PIPING · 7

PVC U-Vents

Screened PVC U-Vents are a common type of vent for plastic tanks. Since plastic tanks are designed for atmospheric pressure only, it is important that they be vented to keep from developing a vacuum or over-pressure situation.



Sizing rule of thumb

> Use a vent that is **1″ larger in diameter** than the largest inlet or drain fitting. For a 3″ flange or coupling, you would typically use a **4″ vent**.

Options

- Screened or unscreened versions
- Fabricated U-vents available for sizes larger than 4″

STANDARD SIZE	STANDARD SIZE	STANDARD SIZE
2″	**3″**	**4″**

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VENTS, VALVES & PIPING · 8

Common Valves

We stock several types of valves to fit the requirements of many applications. These are the most common types.



True Union Ball Valves $$$

Designed for industrial settings — the valve body can be replaced without dismantling surrounding piping. PVC and CPVC, with FPM (Viton-type) or EPDM O-rings and PTFE seats. Threaded or socket connections. Automated (actuated) versions available.



Polypropylene Bolted Ball Valves $$

Rugged polypropylene construction with PTFE seats and a 150 psi design pressure rating. Locking arms available to keep unauthorized persons from opening or closing the valve.



Compact Ball Valves $

Simple, inexpensive valves in PVC and CPVC with Viton or EPDM seals. Threaded or socket connections.



Check Valves

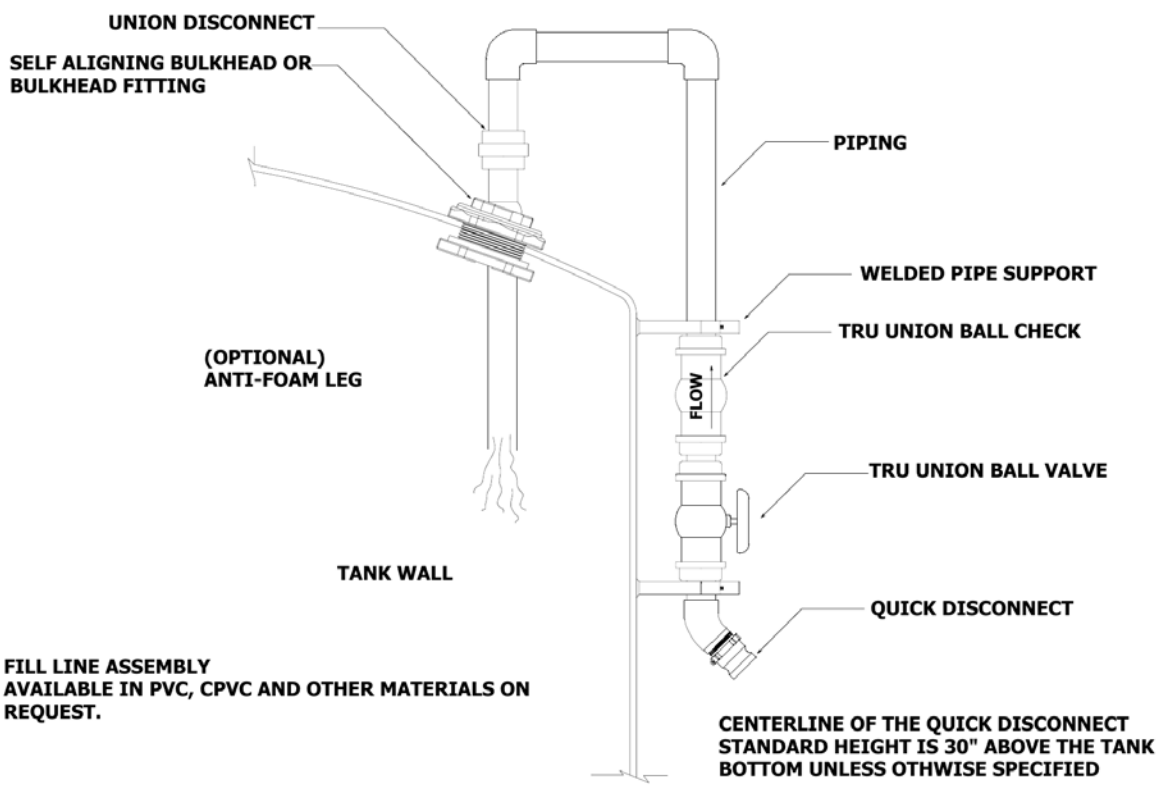
Keep liquid flowing in one direction only and can prevent siphoning back. PVC and CPVC with Viton or EPDM seals. Threaded or socket connections.

We can also supply less common valve types — including **butterfly valves** and **PVDF valves** — where they suit your application better. Just let us know what you need.

VENTS, VALVES & PIPING · 9

Top Fill Line Assembly

A complete fill line that enters through the tank top, so the tank can be filled from ground level. Available in PVC, CPVC and other materials on request.



Components

Self-aligning bulkhead or bulkhead fitting, union disconnect, piping, welded pipe support, true union ball check and ball valve, quick disconnect.

Standard height

Quick-disconnect centerline is **30″ above the tank bottom** unless otherwise specified.

Optional

Anti-foam leg inside the tank.

CUSTOM-FIT TO YOUR APPLICATION

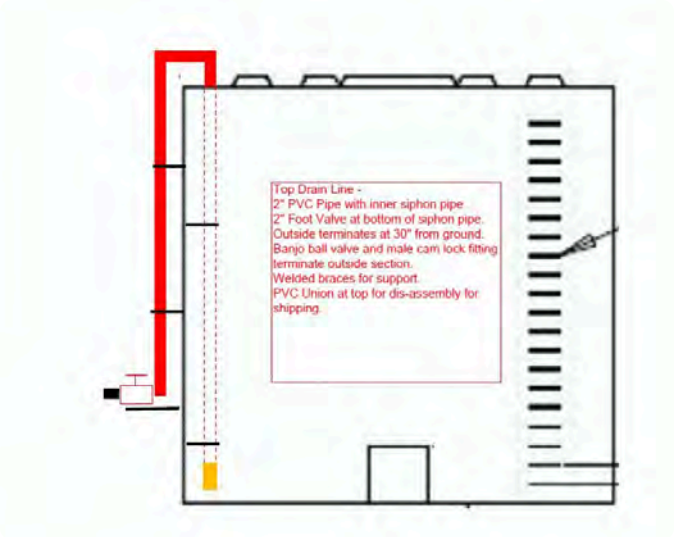
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VENTS, VALVES & PIPING · 10

Top Drain Line

A siphon drain that exits through the top of the tank — no sidewall penetration needed at the bottom of the tank.



What's included

- 2″ PVC pipe with inner siphon pipe
- 2″ foot valve at the bottom of the siphon pipe
- Outside line terminates at 30″ from ground
- Banjo ball valve and male cam-lock fitting terminate the outside section
- Welded braces for support
- PVC union at the top for disassembly for shipping

CUSTOM-FIT TO YOUR APPLICATION

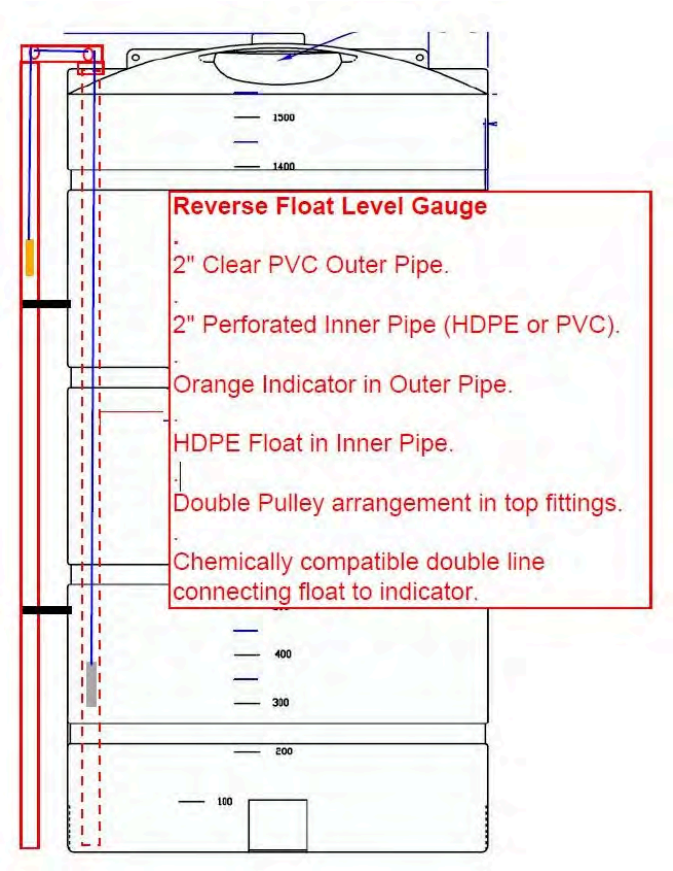
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LEVEL INDICATORS · 11

Reverse Float Level Indicator

Our Reverse Float Level Indicator is a simple, effective mechanical method for tracking the fill level of a storage tank.



Especially good for **double wall tanks**, since it does not require sidewall penetrations.

How it's built

- 2″ clear PVC outer pipe with orange indicator
- 2″ perforated inner pipe (HDPE or PVC) with HDPE float
- Double pulley arrangement in the top fittings
- Chemically compatible double line connects the float to the indicator

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LEVEL INDICATORS · 12

Ultrasonic Level Sensor / Display

Non-contact, continuous level measurement with a local display and optional pump and alarm control, using Flowline instrumentation.

Highlights

- **EchoSonic® II ultrasonic transmitter** — continuous level measurement up to 32.8′ (10 m) with a 4-20 mA output; well suited to corrosive, ultrapure, sticky or dirty liquids
- **DataView™ LI55 level controller** — displays level in gallons, liters, inches, feet, meters or percent
- Optional 2 or 4 programmable relays to control pumps, valves or alarms, plus an isolated 4-20 mA repeater for a PLC, SCADA or another display
- AC or DC powered, with a NEMA 4X faceplate

Manufacturer data sheets follow

Flowline DataView™ LI55 Level Controller (pages 14–15) and EchoSonic® II LU23/27/28/29 Ultrasonic Level Transmitter (pages 16–17).

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DataView™ LI55

Level Controller

FLOWLINE™
LEVEL BEST

Application

The general purpose AC or DC powered level controller displays engineering units with one 4-20 mA level transmitter input and is offered in three configurations with optional 2 or 4 programmable relays, and an isolated 4-20 mA repeater. Each relay can be configured on a single set point (high level alarm or low level alarm) or latched on two set points for automatic fill or empty in simplex (one pump or valve) or duplex (two pumps) level control modes.



Features

- LED main display and secondary unit display with relay status
- Easy configuration via the push button display module
- DIN enclosure with NEMA 4X faceplate and shallow case
- Isolated power supply to sensor with optional 4-20 mA repeater
- Non-volatile memory with security password protection
- 32-point linearization function for volumetric measurement

Key Benefits

- Capable of displaying units in gallons, liters, inches, feet, meters or percent of liquid
- Add 2 or 4 relays to control tank pumps, valves or alarms
- Add repeater output to repeat the 4-20 mA signal to another PLC, SCADA or display
- Available in AC or DC powered configurations

Compatible Products



LG10/LG11

ECHOWAVE®

Guided Wave Level Transmitter



LU28

ECHOSONIC®

Ultrasonic Level Transmitter



DL14

ECHOPOD®

Ultrasonic Level Transmitter



LU83

ECHOSPAN®

Ultrasonic Level Transmitter



LR15

ECHOPULSE®

Pulse Radar Level Transmitter

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DataView™ LI55

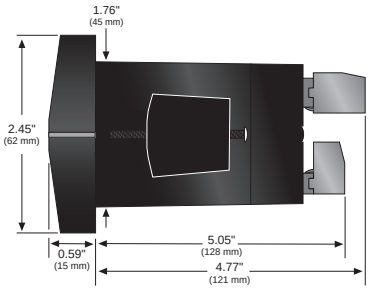
Level Controller

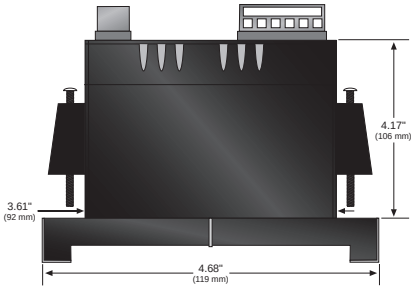
FLOWLINE™ LEVEL BEST

Specifications

Display type:	LED, 6-digit
Display units:	Engineering
Display output:	-99999 to 999999
Display height:	Main: 0.6” (15mm)
	Secondary: 0.46” (12mm)
Decimal point:	Floating
LED indication:	Relay status
Configuration:	Push button
Memory:	Non-volatile
Linearization:	2-32 point function
Sensor input:	(1) 4-20 mA or 0-10 VDC
Supply voltage:	-1_ _1: 85-265 VAC @ 50-60 Hz
	-8_ _1: 12-24 VDC ±10%
Consumption:	VAC: 20 watts max.
	VDC: 15 watts max.
Sensor supply:	24 VDC ± 5% @ 200 mA
Repeater output:	4-20 mA, 24 VDC ± 5%
	@ 40 mA supply
Contact type:	-12_1: (2) SPDT relays
	-14_1: (4) SPDT relays
Contact rating:	3A @ 30 VDC, 250 VAC
	resistive load
Ambient temp.:	F: -40° to 149°
	C: -40° to 65°
Enclosure type:	1/8 DIN, panel mount
Enclosure rating:	NEMA 4X (IP65) faceplate
Enclosure mat’l:	Polycarbonate
Classification:	General purpose
Compliance:	CE
Approvals:	UL, cULus listed,
	E160849, 508 industrial
	control equipment

Dimensions





Accessories



P/N	DESCRIPTION
LM92-1002	Single indicator windowed, 1/8 DIN, PC



LM92-2002	Two indicator windowed, 1/8 DIN, PC



LI56-1011	4-20 mA repeater card
LI56-1201	2 relay card
LI56-1211	2 relay with 4-20 mA repeater card
LI56-1401	4 relay card
LI56-1411	4 relay with 4-20 mA repeater card

Ordering

LI55 - ☐ ☐ ☐ 1

SUPPLY VOLTAGE

- **1** 85-265 VAC
- **8** 12-24 VDC

CONFIGURATION (1) (2)

- **0** Meter only
- **2** Meter with 2 relays
- **4** Meter with 4 relays

REPEATER CONFIGURATION

- **0** No repeater
- **1** 4-20 mA repeater

NOTES

1) For field mount installation in a NEMA 4X, polycarbonate windowed enclosure, order the single or two indicator box.
2) Expansion cards may be purchased separately to replace or expand the capability of the controller.

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EchoSonic® II LU23/27/28/29 Ultrasonic Level Transmitter

Application



LU27 LU23/28/29

Offered in a type 6P enclosure with cable interface, the general purpose ultrasonic level transmitter provides continuous level measurement up to 32.8' (10m) with a 4-20 mA signal output, and is configured via our free Webcal software. This non-contact liquid level sensor is ideally suited for corrosive, ultrapure, sticky or dirty liquids, and is broadly selected for bulk storage, day tank, lift station and process tank level applications.

Features

- Offered in 4 measurement ranges from 9.8' (3m) to 32.8' (10m)
- DSP auto adaptive filters enable plug and play operation optimizing signal output filtering and obstacle recognition
- Submersible type 6P enclosure is ideal for sump and below grade installations
- Configuration is fast and easy via WebCal software and USB adapter
- Narrow 2" or 3" beam width for applications with limited measurement space
- Short 4" or 8" dead band maximizes the measurable filling capacity of the tank
- PVDF transducer and 6P polycarbonate enclosure for corrosive liquids
- Automatic temperature compensation for accurate measurement

Success



Ultrasonic level sensors are often used to measure open channel water flow thats discharged from rivers, streams, creeks, lakes or ponds. Here an EchoSonic II level sensor is installed on the upstream side of a weir. The non-contact sensor measures the gravity-fed, liquid surface height as it passes through the V-notch, and provides a continuous 4-20 mA signal output. The PLC converts level height into flow volume with rate, totalization and data-logging functions for wastewater treatment and environmental reporting.

Compatible Products

DataLoop™
Level Indicator



LI25

DataView™
Level Controller



LI55

Commander™
Multi-Tank Level Controller



LI90

DataPoint™
Level Controller



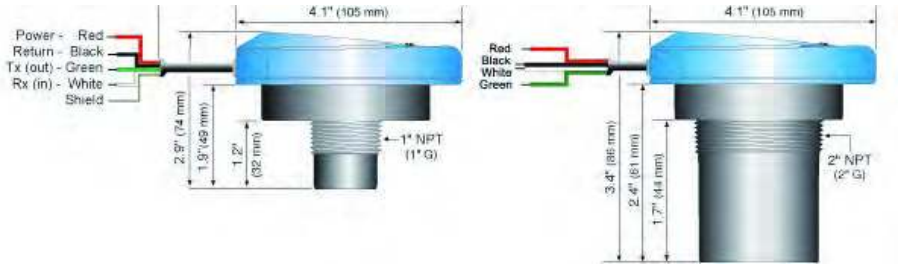
LC52

EchoSonic® II LU23/27/28/29 Ultrasonic Level Transmitter

Specifications

Range:	LU27: 4” to 9.8’ (10cm to 3m)
	LU23: 8” to 18.0’ (20cm to 5.5m)
	LU28: 8” to 26.2’ (20cm to 8m)
	LU29: 8” to 32.8’ (20cm to 10m)
Accuracy:	± 0.2% of range
Resolution:	LU27: 0.019” (0.5mm)
	LU23: 0.039” (1mm)
	LU28/29: 0.079” (2mm)
Dead band:	LU27: 4” (10cm)
	LU23/28/29: 8” (20cm)
Beam width:	LU27: 2” (5cm)
	LU23/28/29: 3” (7.6cm)
Configuration:	WebCal® PC
	Windows® USB 2.0
Memory:	Non-volatile
Supply voltage:	24 VDC (loop)
Consumption:	0.5W
Loop resistance:	500 ohms @ 24 VDC
Signal output:	4-20 mA, two-wire
Signal invert:	4-20 mA or 20-4 mA
Signal fail-safe:	4 mA, 20 mA, 21 mA,
	22 mA or hold last
Process temp.:	F: -4º to 140º
	C: -20º to 60º
Temp. comp.:	Automatic
Ambient temp.:	F: -31º to 140º
	C: -35º to 60º
Pressure:	MWP = 30 PSI (2 bar)
Enclosure rating:	Type 6P, encapsulated, corrosion resistant & submersible
Encl. material:	Polycarbonate
Trans. material:	PVDF
Cable jacket mat:	Polyurethane
Cable type:	4-conductor, shielded
Cable length:	10’ (3m)
Process mount:	LU27: 1” NPT (1” G)
	LU23/28/29: 2” NPT (2” G)
Mount gasket:	Viton®
Classification:	General purpose
Compliance:	CE, RoHS
Approvals:	cFMus

Dimensions



Configuration

The level sensor is configurable via our free WebCal PC software and Fob USB adapter. The sensors are offered with and without Fobs. Fobs are universal and can be used to configure any WebCal compatible product. Download your free copy of WebCal in English or Chinese at www.flowline.com/webcal.php.



LI99-1001

Fittings

For optimum performance, install the level sensor using the below recommended or direct equivalent fittings.



P/N	Description
LM52-1400	2” NPT x 1” NPT (Sch. 40)
LM52-2400	3” NPT x 2” NPT (Sch. 40)
LM52-2800	3” NPT x 2” NPT (Sch. 80)
LM52-3800	4” NPT x 2” NPT (Sch. 80)



LM52-1410	2” Socket x 1” NPT (Sch. 40)
LM52-2410	3” Socket x 2” NPT (Sch. 40)
LM52-3410	4” Socket x 2” NPT (Sch. 40)
LM52-2810	3” Socket x 2” NPT (Sch. 80)
LM52-3810	4” Socket x 2” NPT (Sch. 80)



LM52-2890	2” NPT Bulkhead Fitting, PVC



LM50-1001-1	1” NPT Bracket, Polypropylene
LM50-1001	2” NPT Bracket, Polypropylene

Ordering

LU2[ ]-[ ][ ]

Sensor range
- *7 — 3m (9.8')*
- *3 — 5.5m (18.0')*
- *8 — 8m (26.2')*
- *9 — 10m (32.8')*

Process mount (1)
- *0 — NPT (US)*
- *1 — G (Metric)*

Fob USB adapter (2)
- *0 — Without Fob*
- *1 — With Fob*

Notes

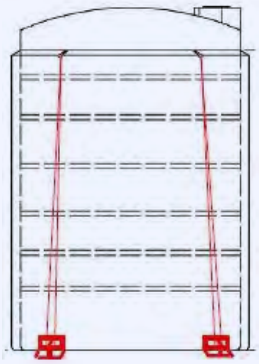
1) Install the level sensor using Flowline installation fittings or equivalents.
2) The level sensor is configured via our WebCal software and one LI99-1001 Fob USB adapter. The level sensor is offered with and without a Fob. Fobs are universal and can be Used to configure any WebCal compatible product. WebCal is a free download from our website at www.flowline.com/webcal.php.

TANK OPTIONS · 13

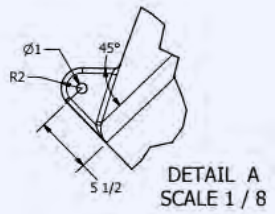
Seismic & Wind Restraint System

For Bailiff Enterprises vertical tanks under 5,000 gallons in capacity.

WIND RATING	TIE-DOWN LUGS	CABLE
120 mph	**2 or 4** by tank size	**¼″** galvanized steel









System components

- Heavy-duty tie-down lugs (2 or 4, based on tank size) molded into the upper sidewall of the tank
- ¼″ thick galvanized steel cable with excellent flexibility and good abrasion resistance
- 4″ tall × 4″ deep × ½″ thick cable anchors fabricated from galvanized A36 steel
- Cables loop through the molded tie-downs and attach to the anchors with ¼″ galvanized steel shackles

> Third-party engineered seismic ratings for a specific location are available at additional cost.

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TANK OPTIONS · 14

Interstitial Leak Detector

For double wall tanks: a conductance probe in the interstitial space alerts you if the primary tank leaks.

Highlights

- Leak Minder® LDA-1 system in a sturdy, weathertight NEMA 4X enclosure
- Single conductance probe on 16 ft of cable, dropped to the bottom of the interstitial space
- Mounts at the top of the tank on a 2″ NPT connection with a liquid-tight seal
- Standard audible and visual alarms; optional auxiliary relay for connection to an external PLC or control system
- Simple installation — connect 110 VAC power and wire in the probe assembly

Manufacturer data sheets follow

Leak Minder® LDA-1 Interstitial Leak Detection System for double wall storage tanks (page 20).

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Leak Detection System
Model: Leak Minder ®™LDA-1

JWB Company
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Interstitial Leak Detection System for Doublewall Storage Tanks



Interstitial Leak Detection Control Box and Probe

System is designed and fabricated in a sturdy weathertight NEMA 4X enclosure.
The system includes a single conductance probe with 16 feet of cable designed to be dropped to the bottom of the interstitial space of the tank.
The system is mounted at the top of the tank with a 2" NPT connection providing a liquid tight seal at the enclosures base.



Installation

Installation is as simple as connecting 110 VAC power and wiring in the probe Assembly. You are up and running in no time!



Audible & Visual Alarms

Standard system is supplied with audible and visual alarms. As an option an auxiliary relay (Form C, NO/NC 5A @ 120 VAC) can be provided to connect to an external PLC or control system.
When a leak is detected a single red stobe light will illuminate and a loud audible horn will activate (user can Silence) @ 95 dB.
If the leak probe fails or becomes disconnected, the alarm light will go on solid.

Quick Specification

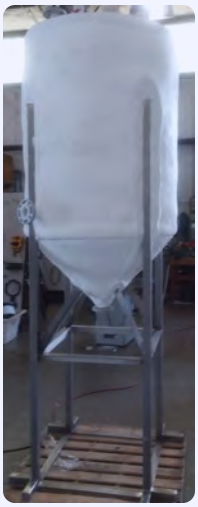
Each tank shall be installed with a leak detection system to detect liquids within the interstitial space between the primary and secondary tank. Leak detection control system shall be mounted in a NEMA 4X enclosure. The system shall include both audible and visual alarms, as well as a optional auxiliary relay output rated at 5A @ 120 VAC. The audible alarm shall have an output of approximately 95 dB at two week distance. A flashing strobe light shall be mounted at the bottom of the enclosure as well a button to silence the audible alarm. The leak detection probe shall be conductance type and be provided with 16 feet of interconnection cable. The leak detection system shall be Model Leak Minder®™ manufactured by JWB Company in the USA.

TANK OPTIONS · 15

Tank Insulation

We offer insulated tanks using spray-on closed-cell polyurethane foam.





STANDARD THICKNESS
2″ 3″ or 4″ available

R-VALUE
6.7 per inch

OVERALL R-VALUE AT 2″
Over 13

UV-protective mastic coating

The foam is coated with a white mastic sealant that gives UV protection. A mastic is used so it will stretch when the tank expands and contracts during temperature changes.

Pair with Heat Trace

Heat tracing is very often chosen with insulation. Electrical heat pads can maintain a minimum temperature of the liquid inside the tank.

Manufacturer data sheet follows

BASF SPRAYTITE® 178 Series technical data sheet (pages 22–23).

CUSTOM-FIT TO YOUR APPLICATION

We fit tanks with the fittings, options and accessories you need.

Dan Miller · Direct
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dmiller@plasticstoragetanks.com

Technical Data Sheet

SPRAYTITE® 178 Series
BUILDING ENVELOPE INSULATION
ICC-ES ESR-2642, Intertek CCRR-1031

DESCRIPTION:

SPRAYTITE 178 is a two-component closed-cell spray polyurethane foam system utilizing an EPA-approved, zero ozone-depleting blowing agent. It is designed for use in residential construction and common commercial insulation applications. **SPRAYTITE 178** is compatible with most common construction materials, but can only be processed with ELASTOSPRAY® 8000A Isocyanate. The benefits of **SPRAYTITE 178** include:

- Superior insulation
- Controls moisture infiltration
- Controls air infiltration
- Non-fibrous
- Structural enhancement

REACTIVITIES AVAILABLE	AMBIENT TEMPERATURE RANGE
SPRAYTITE 178 XF	20°F to 65°F
SPRAYTITE 178 F	60°F to 120°F

TYPICAL PROPERTIES(1)

PROPERTY	METHOD	SPRAYTITE 178
Resin:		
Specific Gravity @ 70°F	ASTM D 1638	1.175
Viscosity @ 70°F (cps)	Brookfield	500
Cured Foam:		
Density, core (pcf @ 2" lifts)	ASTM D 1622	2.0 – 2.3
Thermal Resistance (aged)		
k-factor (Btu in/ft² hr °F)	ASTM C 518	0.149 @ 1-in thick 0.145 @ 4-in thick
R-value (ft² hr °F/Btu in)(2)	Calculated	6.7 / in @ < 4-in thick 6.9 / in @ ≥ 4-in thick
Compressive Strength (psi)	ASTM D 1621	26 +/. 5%^
Water Vapor Transmission – Permeability (perm-inch)	ASTM E 96	1.39
Water Vapor Transmission – Permeance (perms)	ASTM E 96	1.39 @ 1" thickness 0.70 @ 2" thickness 0.46 @ 3" thickness 0.35 @ 4" thickness
Water Absorption (vol %)	ASTM D 2842	0.60
Tensile Strength (psi)	ASTM D 1623	62.4 (Type C)
Response to Thermal and Humid Aging (% linear change)		
158°F / 97% RH / 168 hrs	ASTM D 2126	4.9
Closed Cell Content (%)	ASTM D 6226	98
Surface Burning Characteristics		
Flame Spread Index(3)	ASTM E 84	≤ 25
Smoke Developed Index	ASTM E 84	≤ 450

^The coefficient of thermal expansion varies between $3x10^{-5}$ and $4x10^{-4}$ 1/K or $1.5x10^{-5}$ and $2x10^{-4}$ 1/°F. The lower end of the range relates to closed-cell SPF while the higher values were reported for open-cell foams.

spraytite® Closed-Cell Spray Polyurethane Foam Insulation

Seal and Insulate with ENERGY STAR — LEARN MORE AT energystar.gov

ADDITIONAL TESTING, APPROVALS & CERTIFICATIONS:

- ASTM E 84 (Class I) with Product Listing (3) (4)
- NFPA 285 complying assemblies available
- Fire Resistant assemblies available
- ICC-ES Evaluation Report ESR-2642; including Seal & Insulate with ENERGY STAR® Supplement
- INTERTEK Code Compliance Research Report CCRR-1031
- ASTM C 1029 – Type II Compliant
- AIR LEAKAGE

PROPERTY	METHOD	SPRAYTITE 178
Air Leakage (L/s*m² @ 75 Pa ΔP)	ASTM E 283	<0.005 @ 1.0 inch

- Thickness is not limited when installed behind a code-prescribed thermal barrier (per ICC-ES AC377)
- Approved for Attics & Crawl Spaces Installations with and without prescriptive ignition barriers per ICC-ES AC377, Appendix A1.2.2 and Appendix X
- Florida Building Code Approval *FL 13001 – Spray Polyurethane Foam Adhesive System; Fillet Application (Outside HVHZ)*
  - *Fillet and Full Insulating Layer applications*
  - *Plywood and OSB decks*
  - *Design Pressure range = -160 psf to -293 psf*
- Miami-Dade NOA 15-1228.12
  - *Subcategory; Wood Connectors – Design Pressure +/- 125 psf*
- California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation
- GREENGUARD and GREENGUARD Gold Certification for VOC emissions
- Meets the requirements of CDPH Section 01350 for VOC emissions and formaldehyde
- Mold resistant per ASTM C1338 – "Pass" rating (no growth)

Odor level of spray polyurethane foam is dependent on proper application using the recommended processing parameters and proper ventilation.

Please contact your local Sales or Technical Representative for specific questions regarding **SPRAYTITE 178** properties, approvals, or certifications.

(1) These physical property values are typical for this material as applied at our development facility under controlled conditions. SPF performance and actual physical properties will vary with differences in application (i.e. ambient conditions, process equipment and settings, material throughput, etc). As a result, these published properties should be used as guidelines solely for the purpose of evaluation. Physical property specifications should be determined from actual production material.

The above data was collected from samples prepared using equipment configurations pertinent to lab conditions. Parameters can be obtained upon request by calling 800-706-1712.

(2) The data chart shows the R-value of this insulation. "R" means resistance to heat flow. The higher the R-value, the greater the insulating power. Compare insulation R-values before you buy. There are other factors to consider. The amount of insulation will depend upon the climate, the type and size of your house, and the fuel use patterns and family size. If you buy too much insulation it will cost you more than what you will save on fuel. To achieve proper R-values, it is essential that this insulation be installed properly.

(3) This numerical flame spread rating does not reflect hazards presented by this or any other material under actual fire conditions. Polyurethane foam systems should not be left exposed and must be protected by a minimum 15-minute thermal barrier or other code-compliant material as allowed by applicable building code(s) and Code Officials. Building Codes provide guidelines representing minimum requirements. Further information is available at www.iccsafe.org. Consult all Authorities Having Jurisdiction (AHJ) over an area for additional or specific requirements prior to beginning any project.

(4) ASTM E 84 is a test designed for sample thickness up to four (4) inches. NFPA 286 is a building code recognized alternative test conducted on large-scale assemblies to evaluate foam thickness in excess of four (4) inches as permitted in 2012 IBC Section 2603.10; 2006 & 2009 IBC Section 2603.9; 2009 & 2012 IRC Section R316.6; 2006 IRC Section R314.6.

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(800) 706-0712
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Revision Date: November 9, 2017

SPRAY FOAM COALITION

SPRAYTITE 178® SERIES
BUILDING ENVELOPE INSULATION
ICC-ES ESR-2642, INTERTEK CCRR-1031

GENERAL INFORMATION:

SPRAYTITE 178 is a spray polyurethane foam (SPF) system intended for installation by qualified contractors trained in the processing and application of SPF systems, as well as the plural-component polyurethane dispensing equipment required to do so. Contractors and applicators must comply with all applicable and appropriate storage, handling, processing and safety guidelines. BASF technical service personnel should be consulted in all cases where application conditions are questionable.

SPRAYTITE 178 has an estimated theoretical yield range of 4,200-4,800 board feet per set. Actual yield performance can be in excess of or below the referenced estimated theoretical range based on factors affecting density including, however, not limited to: multiple lifts, substrate texture, substrate temperature, overspray loss, windy conditions, altitude, container residue, equipment characteristics & temperatures, applicator technique, etc. For help estimating yield for this and other spray foams, please consult Spray Polyurethane Foam Alliance's SPFA-121 SPF Estimating Reference Guide.

CAUTIONS AND RECOMMENDATIONS:

SPRAYTITE 178 is designed for an application rate of ½ inch minimum to 2 inches maximum per pass. Once installed and material has cooled it is possible to add additional applications in order to increase the overall installed thickness of SPF. Thicker installations are allowed based on large scale testing. Please see ESR-2642 for additional information. This application procedure is in compliance with the Spray Polyurethane Foam Alliance (SPFA).

SPRAYTITE 178 is NOT designed for use as an EXTERIOR roofing system. BASF offers a separate line of products for exterior roofing applications. For more information, please contact your sales representative.

Cold-storage structures such as coolers and freezers demand special design considerations with regard to thermal insulation and moisture-vapor drive. SPRAYTITE 178 should NOT be installed in these types of constructions unless the structure was designed by a design professional for specific use as cold storage.

SPRAYTITE 178 is designed for installation to most standard construction materials such as wood, wood based products, plastics, metal and concrete. SPRAYTITE 178 has performed successfully when sprayed onto wood substrates down to 20°F using special cold weather application techniques. For heat sink-materials such as metal or concrete, SPRAYTITE 178 can be sprayed onto substrates down to 30°F, using a flash pass method. BASF recommends the use of mock ups or sample spray before starting the full-scale project. This will provide an opportunity to see how all materials are installed and evaluate their properties prior to proceeding.

EQUIPMENT SETTING GUIDELINES		
Climate	A side, B side, Hose Temp (Adjust in +/- 5° increments)	Proportioner set pressure (Spraying pressure)
Colder	120°F – 130°F	1150 – 1450 psi (900 – 1200 psi)
Warmer	110°F – 125°F	1150 – 1450 psi (900 – 1200 psi)

Foam plastic materials installed in walls or ceilings may present a fire hazard unless protected by an approved, fire-resistant thermal barrier with a finish rating of not less than 15 minutes as required by building codes. Rim joists/header areas, in accordance with the IRC and IBC, may not require additional protection. Foam plastic must also be protected against ignition by code prescribed or properly tested materials in attics and crawl spaces. See relevant Building Codes and www.iccsafe.org for more information.

In addition to reading and understanding the SDS, all contractors and applicators must use appropriate respiratory, skin and eye Personal Protective Equipment (PPE) when handling and processing polyurethane chemical systems. Personnel should review the following documents published by Spray Polyurethane Foam Alliance (SPFA): AX-171 *Course 101-R Chapter 1: Health, Safety and Environmental Aspects of Spray Polyurethane Foam and Coverings* www.spraypolyurethane.org

Also, the following document is available from the Center for the Polyurethanes Industries (CPI): *Model Respiratory Protection Program for Compliance with the Occupational Safety and Health Administration's Respiratory Protection Program Standard 29 C.F.R. §1910.134*

As with all SPF systems, improper application techniques should be avoided. Examples of improper application techniques include, but are not limited to excessive thickness of SPF, off-ratio material and spraying into or under rising SPF. Potential results of improperly installed SPF include: dangerously high reaction temperatures that may result in fire and offensive odors that may or may not dissipate. Improperly installed SPF must be removed and replaced with properly installed materials.

LARGE MASSES of SPF should be removed to an outside safe area, cut into smaller pieces and allowed to cool before discarding into an appropriate trash receptacle.

SPF insulation is combustible. High-intensity heat sources such as welding or cutting torches must not be used in contact with or in close proximity to SPRAYTITE 178 or any polyurethane foam. The insulation must not be used in areas that have a maximum service temperature greater than 180°F(82°C).

SHELF LIFE AND STORAGE CONDITIONS:

SPRAYTITE 178 Series has a shelf life of approximately six (6) months from the date of manufacture when stored in original, unopened containers at 50-80°F. As with all industrial chemicals this material should be stored in a covered, secure location and never in direct sunlight. Storage temperatures above the recommended range will shorten shelf life. Storage temperatures above the recommended range may also result in elevated headspace pressure within packages.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY:

The information herein is to assist customers in determining whether our products are suitable for their applications. Our products are only intended for sale to industrial and commercial customers. Customer assumes full responsibility for quality control, testing and determination of suitability of products for its intended application or use. We warrant that our products will meet our written liquid component specifications. We make no other warranty of any kind, either express or implied, by fact or law, including any warranty of merchantability or fitness for a particular purpose. Our total liability and customers' exclusive remedy for all proven claims is replacement of nonconforming product and in no event shall we be liable for any other damages.

While descriptions, designs, data and information contained herein are presented in good faith and believed to be accurate, they are provided for guidance only. Because many factors may affect processing or application/use, BASF recommends that the reader make tests to determine the suitability of a product for a particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be sued without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of BASF's terms and conditions of sale. Further the descriptions, designs, data, and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the description, designs, data or information given or results obtained, all such being given and accepted at the reader's risk.

Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

TANK OPTIONS · 16

Heat Trace

HTD Heat Trace pads and controllers provide freeze protection and process heating designed specifically for plastic tanks.

Highlights

- **SPX plastic tank heating pads** — ultra-low watt density, flexible, waterproof epoxy-glass pads with adhesive backing, designed for heat-sensitive plastic tanks
- Two pad sizes and power outputs for conventional, small and custom-shaped tanks
- **2XTC microprocessor tank heating controller** — process temperature control with hi-limit protection, for up to 6 heaters
- High-temperature, low-temperature and low-current alarms, with an alarm contact for your systems
- NEMA 4X, IP66 polycarbonate enclosure; 100-277 VAC

Manufacturer data sheets follow

HTD Heat Trace 2XTC Tank Heating Controller (pages 25–26) and SPX Plastic Tank Heating Pad (pages 27–28).

CUSTOM-FIT TO YOUR APPLICATION

We fit tanks with the fittings, options and accessories you need.

Dan Miller · Direct
936-228-1520
dmiller@plasticstoragetanks.com

Microprocessor Based Tank Heating Controller



The 2XTC Tank Heating Controller is the most complete and versatile tank heating controller in existence. Use this product to accurately control SPX and EGLX tank heating pads as well as WinterSafe Self-Regulating Heating Cable.

PRODUCT FEATURES

- Process temperature control with hi-limit protection
- 100-277 VAC, 50/60 HZ, 30A
- Use with up to 6 heaters
- Push-on heater connections for a quick installation
- Simple operation and customizable preset
- High temperature, low temperature, and low current alarms
- Alarm contact for communication with customer systems (NO or NC, selectable)
- NEMA4X, IP66, polycarbonate enclosure
- 4-20mA retransmission output
- Includes two RTDs
- cETLus approved for use in the USA and Canada



Contact HTD Heat Trace today to discuss your heat tracing requirements
908-788-5210
sales@htdheattrace.com
www.htdheattrace.com

Description

The HTD Heat Trace 2XTC Temperature Maintenance Heating System Controller is specifically designed for heating systems requiring process temperature control with high limit temperature protection. The most common tank heating applications using process and high limit control are non-metallic tanks, lined tanks or tanks with heat sensitive contents. This controller is designed for use with SPX heating pads, EGLX heating panels, heating cable and any other electric trace heater. The 2XTC controller is provided in a NEMA4X/IP66 polycarbonate enclosure for use indoors or outdoors

The 2XTC controller can be used on power supplies from 100 to 277 VAC for maximum versatility. The controller switches up to a 30A heating load using active arc suppression for maximum relay contact life.

The controller provides indication of process sensor temperature, over limit sensor temperature and heater current using a simple main setting menu. Indication is provided using high visibility LED number indication as well as LED lights showing set values and system status.

The 2XTC controller provides alarm and system status for use with remote monitoring such as DCS or SCADA systems. Alarms are provided for low temperature, high, temperature and low current alarm. These alarms are indicated by lights on the front of the controller and relay contacts for remote indication. Alarm relay contacts are selectable for close or open on alarm. In addition the controller offers current interval testing to periodically test for correct heating current. The current alarm can be set to off if not desired or test frequencies of 24, 168 or 720 hours. A 4-20 mA retransmission output is also provided for remote indication of the process temperature.

Technical Specifications

General

Power Input:	100-277 VAC, 50/60HZ, 30 Amps maximum
Operating Temperature:	-40°F to 113°F (-40 to 45°C)
Process Control:	On/Off with adjustable hysteresis
Process Control Output:	SPST NO Relay rated 30 Amps at 277 VAC with active arc suppression

Setting Range

Process Temperature:	0-200°F
High Limit Temperature:	0-250°F
Low Temperature Alarm:	0-200°F
High Temperature Alarm:	0-200°F
Low Current Alarm:	OFF or 0.5 to 30 Amps

Alarm and System Status

Alarms:	Low Temperature, High Temperature and Low Current
Alarm Indication:	LEDs on the controller face
Alarm Outputs:	SPST Relays rated 5 A at 277 VAC/5A at 30 VDC
Alarm Output Type:	Relay contact Selectable open or close alarm
Retransmission Output:	4-20 mA indication of process temperature with selectable span

Sensor Input

Sensor Type:	1KΩ Platinum RTD, 2 wire
Sensor α:	0.00385

Approval

UL 508

CSA 22.2 #14

SPX

For freeze protection and process heating applications on Plastic Tanks

PLASTIC TANK HEATING PAD

- *Specifically designed for safe, reliable operation on heat sensitive plastic storage tanks*
- *Proven epoxy-glass laminate platform performance, with thousands of major installations worldwide*
- *Two pad sizes and power outputs for conventional, small and custom-shaped tanks.*
- *Quick, simple, low cost, one person installation*
- *Ultra low watt density, high efficiency, flexible heating pads with adhesive backs.*
- *Pending FM and CSA approval to all current IEEE and NEC Standards*

The HTD Heat Trace SPX heater pad is the latest step in the improvement of the SilcoPad range of heaters for plastic tanks.

The SPX epoxy/glass composite construction was first developed and used in the Eagle Panel range of products for heating FRP tanks.

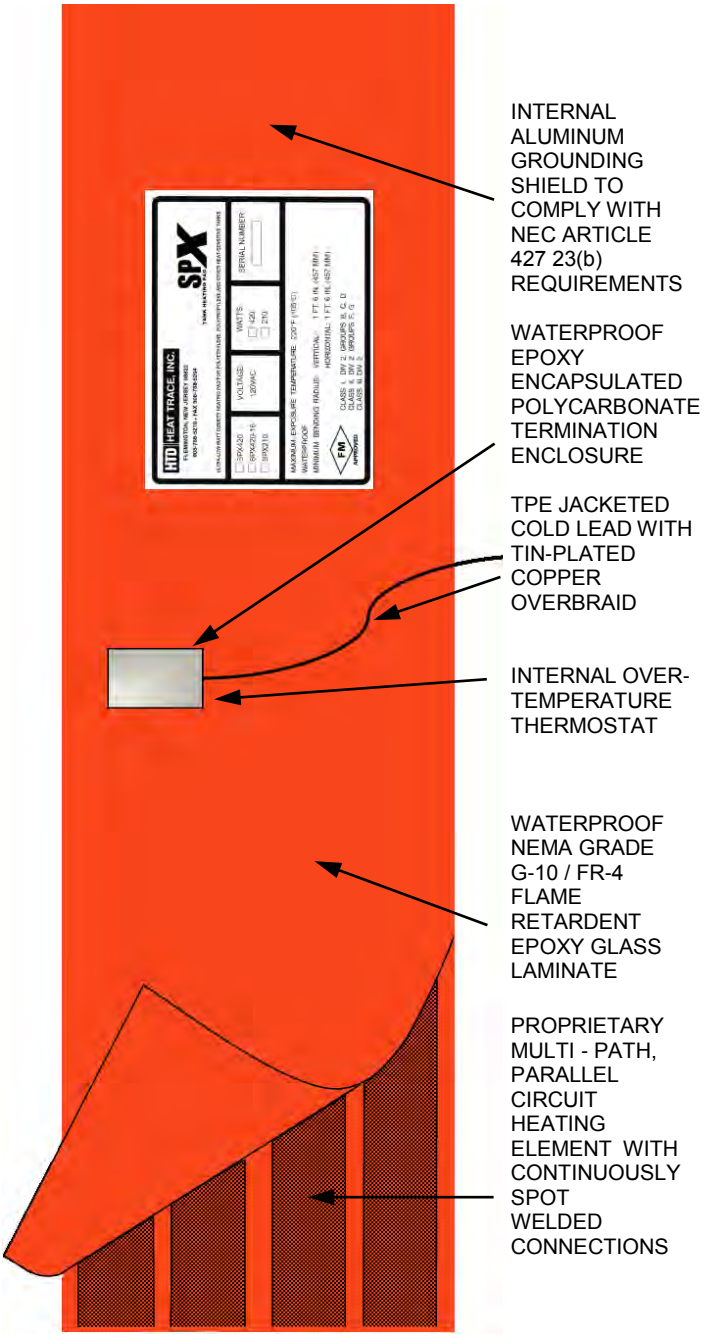
This rugged construction has been re-engineered for performance on heat-sensitive tanks, resulting in a new, ultra-low watt density, highly flexible, waterproof heating pad that includes adhesive backing for quick and simple installation.

The SPX tank heater pad has been specifically designed for temperature maintenance and freeze protection on heat-sensitive polyethylene and polypropylene tanks. These tanks require ultra-low watt density, evenly applied heat.

The SPX heater pad provides this with the added safety feature of an internal over-temperature thermostat. This extra feature ensures that the pad cannot operate above the maximum permissible temperature of the tank.

Being completely waterproof, the new SPX heater pad will continue to operate as designed even if rain, flooding or tank overflow infiltrates between the tank and the thermal insulation.

The new HTD Heat trace SPX 210 and SPX 420**:** engineered for efficiency, long life and safety.



HTD HEAT TRACE

8 Bartles Corner Road, Unit # 104
Flemington, NJ 08822-5758 USA

Tel (908) 788-5210
Fax (908) 788-5204

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WWW.HTDHEATTRACE.COM

SPECIFICATIONS

PLASTIC TANK HEATING PAD

PRODUCT FEATURES

ULTRA-LOW WATT DENSITY	SPX Tank Heater pads have a power rating of 0.39 w/sq.in for ultra-safe operation and reliability on heat-sensitive applications
LAMINATED CONSTRUCTION WITH PEEL AND STICK APPLICATION	With its laminated, epoxy composite construction, the SPX heater pad is superbly qualified to meet the rigorous requirements for use in all industrial and climatic environments. It is extremley rugged, completely waterproof, dust-tight and corrosion-resistant.
MULTI-PATH PARALLEL CIRCUIT HEATING ELEMENT	SPX heater pads are built with unique, multi-path, parallel circuit heating elements that are significantly safer and more reliable than the series type heating elements used in competitors products.

PRODUCT REFERENCES, RATINGS AND SIZES

SPX 420	420 Watts (0.39 w/sq.in) 60" long by 18" wide (457 x 762 mm)
SPX 210	210 Watts (0.39 w/sq.in) 30" long by 18" wide (457 x 1524 mm)

APPLICATIONS AND USAGE

TANK MATERIAL	APPLICATION RANGES	SPX 420	SPX 210
Polyetheylene, Polypropylene	Up to 150° F (66°C)	YES	YES
FRP	Up to 150° F (66°C)	YES	YES
Steel, Stainless Steel	Up to 150° F (66°C)	YES	YES

DESIGN RATINGS

MAX MAINTAIN TEMP	150° F (66°C)
MAX EXPOSURE TEMP	220°F (104° C)
MIN INSTALLATION TEMP	50 °F (10°C)
MINIMUM BENDING RADIUS	18" (457mm) Do not install SPX panels on any tank that is less than 36 "(914mm) diameter
VOLTAGE RATINGS	120 VAC *Consult HTD for 240 VAC applications

CONSTRUCTION

HEATING ELEMENTS	Multi-path, parallel circuitry
CIRCUIT CONNECTIONS	Stainless steel bridge pieces continuously spot welded with triple welding passes
DIELECTRIC CONSTRUCTION	Multi-layer glasscloth composite
LAMINATE PROPERTIES	Density - 0.069 lbs/cu.in Rockwell Hardness - 115 Flexural Strength - 50,000 psi Dielectric Strength - 550 vpm Flammability Rating - UL-94.V.O
GROUND SHIELD	5 mil thick aluminum mesh
TERMINATION METHOD	Epoxy encapsulated polycarbonate termination box
COLD LEAD CABLE	3-16 AWG conductors with TPE outer jacket and Tin-Plated Copper overbraid
COLD LEAD LENGTHS	Standard type SPX420 pad and SPX 210-10 FT (3 M) SPX 420-16, 16 FT (4.87 M)

APPROVALS & STANDARDS

Factory Mutual re-approval pending
CSA approval under application

HTD HEAT TRACE

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Fax (908) 788-5204

e-mail: sales@htdheattrace.com
WWW.HTDHEATTRACE.COM

TANK OPTIONS · 17

Fiberglass Ladders & Cages

DEFI fiberglass ladder and cage systems meet or exceed OSHA requirements and are a preferred choice for chemical plants and other corrosive environments.

Highlights

- Lightweight, strong and easy to install
- Corrosion, chemical and fire resistant; non-conductive and dimensionally stable
- Will outlast aluminum and steel, with little or no maintenance
- Standard and custom configurations, including walk-through and access ladders, with or without cages

Manufacturer data sheets follow

DEFI Fiberglass Ladder & Cage Systems (pages 30–32).

CUSTOM-FIT TO YOUR APPLICATION

We fit tanks with the fittings, options and accessories you need.

Dan Miller · Direct
936-228-1520
dmiller@plasticstoragetanks.com

LADDER & CAGE SYSTEMS





DEFI's fiberglass ladders and ladder cages are used in a wide range of industries. DEFI's fiberglass ladder and cage systems meet or exceed OSHA requirements and have become the preferred system for use in chemical plants and other corrosive environments. Fiberglass ladder and cage systems are light weight, corrosion resistant, easy to install, will outlast aluminum and steel, and require little or no maintenance.





Applications

- Industrial
- Marine
- Mining
- Chemical
- Oil and Gas
- Power Plants
- Off Shore
- Recreation
- Building Construction
- Water / Wastewater
- Transportation
- Electrical

Benefits

- Lightweight
- Low Maintenance
- Strong
- Easy to Install
- Corrosion Resistant
- Chemical Resistant
- Fire Resistant
- Non Conductive
- Dimensionally Stable

DEFI
DESIGN • ENGINEER • FABRICATE • INSTALL
STRUCTURAL FIBERGLASS

17111 Rolling Creek Drive, Suite 105 | Houston, TX 77290 | USA
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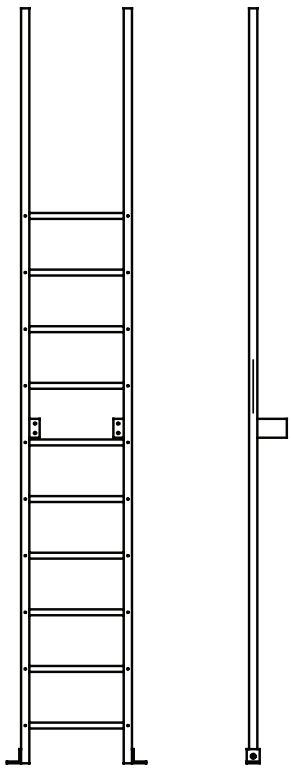




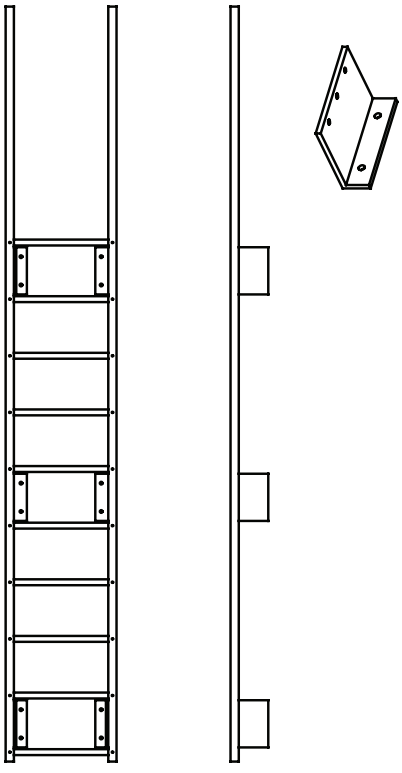
Sizes & Availability

DEFI's ladder and cage systems are designed and fabricated to meet the requirements of OSHA 1910.27. DEFI's ladders are fabricated in various lengths with a standard 18"rung width configuration with 12" rung spacing. Custom colors and custom designed ladders and cages can be fabricated upon request. Ladders can be shipped pre-assembled or as a kit for installation in the field.

Access Ladder with Walkthru
Base Mounted with Wall Brackets



Access Ladder with Walkthru
Heavy Duty Wall Brackets



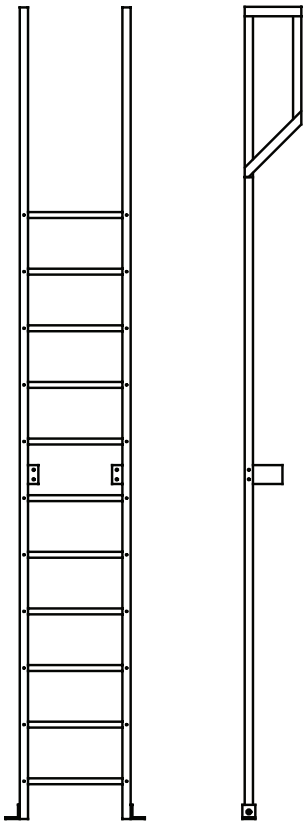




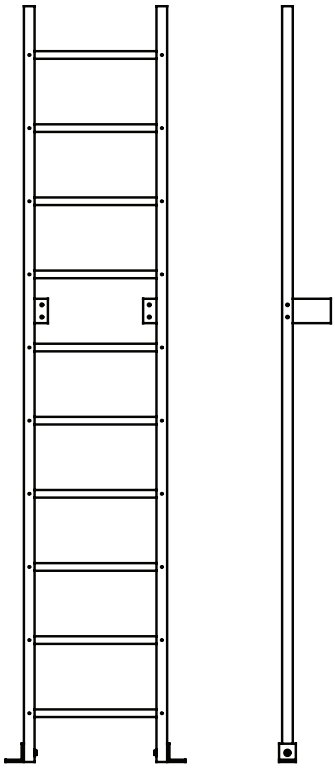
Materials of Construction

DEFI's fiberglass ladders and cage systems are constructed from pultruded shapes produced using a premium grade polyester resin system with flame retardant and ultraviolet (UV) inhibitor additives. For extremely corrosive environments an optional vinyl ester resin system is available. Side rails and cages are pigmented OSHA safety yellow. The rungs are a pultruded fiberglass fluted tube or a solid rod with non-skid surface.

Access Ladder
with Walkthru and Return



Standard Access Ladder
Base Mounted with Wall Brackets



Walkthru Ladder with Cage
Base Mounted with Wall Brackets

