Tanks, pH Monitoring Systems & Sinks

Polyethylene Tanks & Sinks | pH Monitoring Systems

OrionFittings.com

ORION®
A WATTS Brand

Table of Contents

All tank and tank accessory submittals can be found online at www.OrionFittings.com.

Chemical Treatment Systems - Overview

Tanks (Waste, Neutralization, Dilution)

Orion offers a wide range of chemical waste tanks, dilution traps, dilution tanks, solids interceptors and accessories. They are designed to facilitate the dilution and neutralization of corrosive liquid waste, thereby rendering the waste suitable for discharge into the sanitary sewer system. This protects the environment from contamination and downstream piping systems from chemical corrosion.

pH Monitoring Systems

In addition, Orion manufactures pH monitoring equipment that enables the owner to continuously measure and record the pH of the chemical waste discharge prior to it entering the sewer system. The monitoring systems are equipped with visual and audible alarms as well as data acquisition recording devices that can be used for permanently recording pH discharge levels.

Sinks

Orion's sinks are molded from durable virgin polyethylene. They are easy-to-install and are designed to provide years of tough service, even in intense chemical environments. Standard models and ADA-compliant sinks are available.

The Importance of pH - Corrosion / Environmental Impact

pH is a measure of the hydrogen ion, (H+), concentration in a liquid and classifies liquids as being acidic or caustic.

Liquid discharges that are either too acidic or too caustic may cause corrosion damage to downstream piping systems and may also adversely affect the environment, or create problematic conditions for waste water treatment plants.

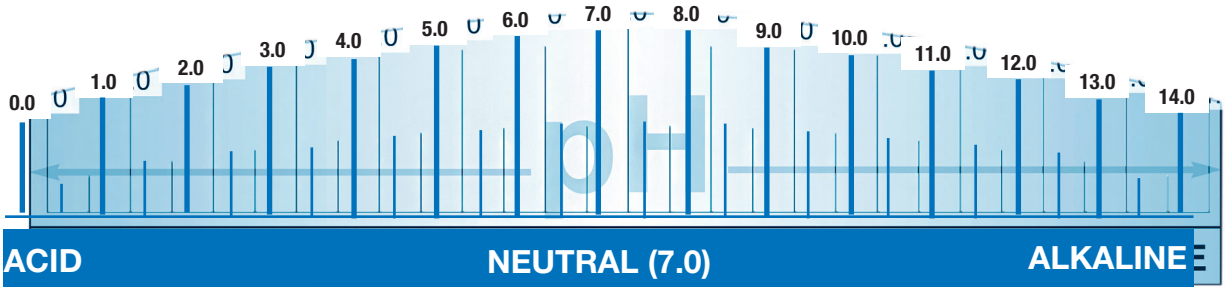
It should be noted that acidic and caustic liquids can be equally harmful and they should be treated with equal attention.

Chemical effluent should be treated to ensure that the pH level is as close to 7 as possible, (or other values dictated by the local governing body).

pH Scale

pH values range from 0 - 14 and indicate the degree of acidity or alkalinity of a liquid. A liquid with a pH value below 7 is considered acidic and a liquid with a pH value above 7 is considered alkaline. A pH of 7 indicates that a liquid is neutral. The pH scale is logarithmic rather than linear. This means that for each change in a whole number on the pH scale the hydrogen ion concentration varies by a factor of 10.
Example:

A liquid with a pH of 8 is 10 times more caustic than one with a pH of 7.
A liquid with a pH of 6 is 10 times more acidic than one with a pH of 7.
Liquids with pH's of 8 and 6 both have hydrogen ion concentrations 1000 times that of pH7 and have the same corrosive ability.
A liquid with a pH of 5 is 100 times more acidic than one with a pH of 7.



pH Values of Common Liquids

Liquid	pH	Liquid	pH	Liquid	pH
Apple Juice	2.9 - 3.3	Lemons	2.2 - 2.4	Baking Soda	8.0
Beer	4.0 - 5.0	Bleach	10.9 - 11.2	Detergent	9.5 - 10.0
Grapefruit Juice	3.0 - 3.3	Lime Juice	1.8 - 2.0	Milk	6.3 - 6.6
Soda	2.0 - 4.0	Vinegar	2.4 - 3.4	Wine	2.8 - 3.8

Chemical Waste Discharge Guidelines

Generally effluent with a pH range of 5.5 - 8.5 can be disposed of without treatment, but local requirements may vary and must be adhered to. However, even mild caustics and acids within this range can cause severe damage to piping systems depending on the piping material. It is recommended therefore that the compatibility of individual piping materials be checked prior for suitability against the predicted pH discharge level and the individual chemicals being discharged to ensure compatibility. Many common products can cause severe damage over a period of time. The items listed on page 3 are some common liquids with varying pH levels, many of which would cause piping damage if not treated before hand.

*Typical Application - Check Local Governing Authority for specific pH discharge levels; where applicable.

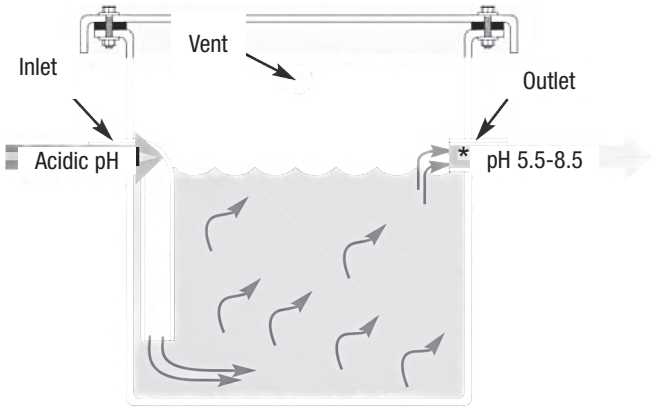
Typical Chemical Waste Treatment Applications

Laboratories	Decontamination Waste Holding	Commercial / Industrial
Middle School	Hospital Decontamination Areas	Chemical Plants
High School	Emergency Ambulance Stations	Battery Charging Facilities
Universities	Chemical Manufacturing Plants	Linen Cleaning Facilities
Medical Research	Fire Departments	Photographic Developing
Pharmaceutical	Nuclear Facilities	Printing Shops
Biotechnology		Food & Beverage Facilities
Pathology		
Forensic		

Neutralization

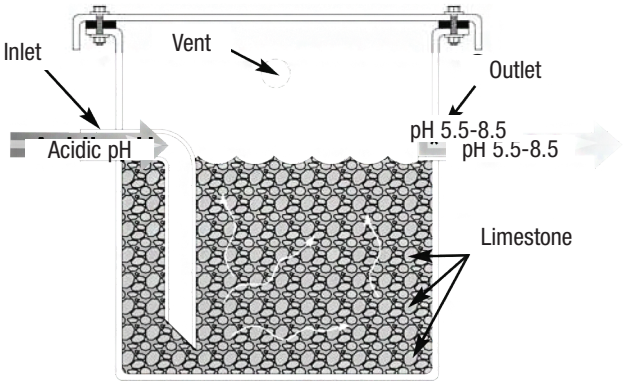
Neutralization is a chemical reaction resulting from the physical mixing or extended contact of a base and an acid to form a neutral solution of water and salt. This neutral solution is suitable for discharge into sanitary sewer systems. Orion accomplishes neutralization by utilizing one of two methods:

- Dilution
- Limestone Chips, (calcium carbonate)



Dilution

Dilution is the physical mixing of the chemical waste with water in order to stabilize the waste. Initial dilution can be as simple as flushing the chemical with water at the sink and discharging the mixture through a p-trap and the associated drainage piping. Alternatively, dilution can be accomplished via a large dilution trap, or dilution tank, located under the bench at each sink. In either case the waste piping should discharge into a central neutralization system for further treatment prior to discharge into the sewer system.



Limestone Chip Neutralization

In the Orion standard system acidic waste is drained into an Orion tank filled with high purity limestone chips. After a designed dwell time in the tank of approximately 3 hours the chemical is neutralized and subsequently discharged by gravity flow into the sewer. The chemical reaction creates an off-gassing and therefore these tanks should be vented.

Chemical Reaction Example with Hydrochloric Acid

$$CaCO_2 + HCl = CaCl_2 + + CO_2$$

The CO2 is off-gassed through the venting system.

* Typical Applications - Check Local Governing Authority for specific pH discharge levels; where applicable.

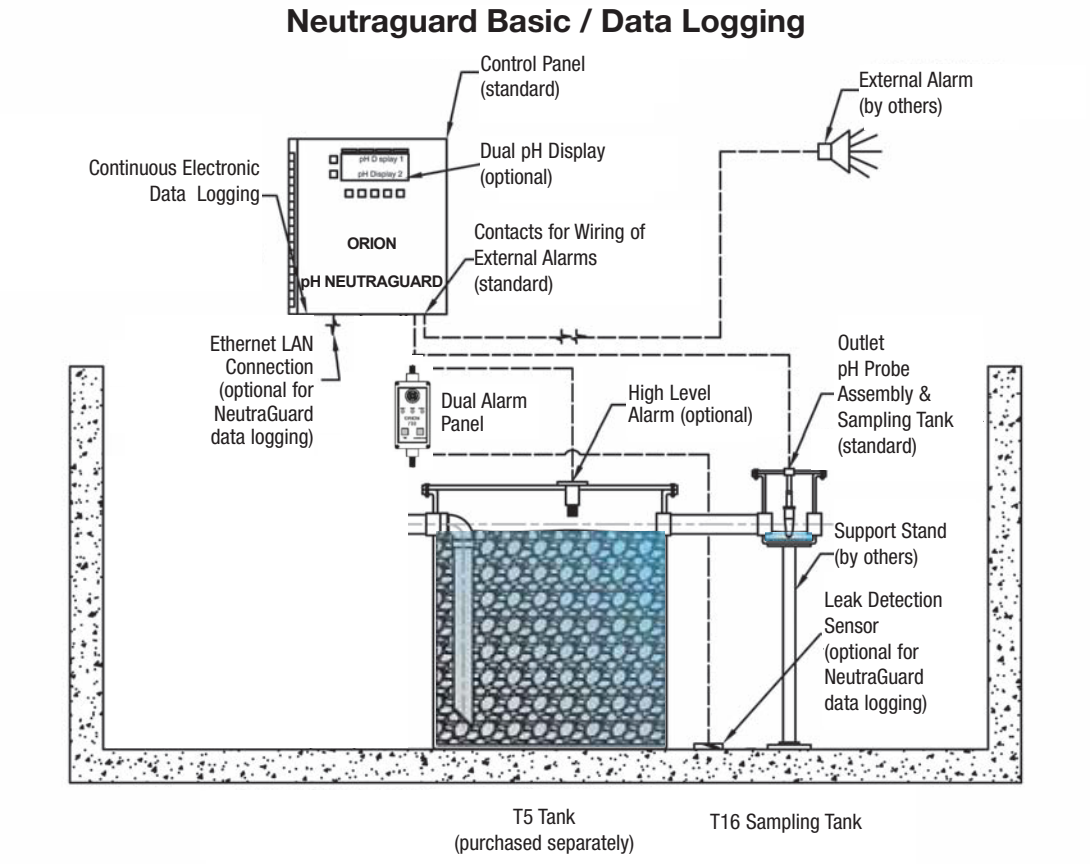
Monitoring Systems

Many state and local authorities require that the pH level of chemical waste discharged into the sewer is monitored and quite frequently that the results are permanently recorded. Orion achieves these requirements through it's NeutraGuard III systems.

The basic NeutraGuard III Moniter continuously monitors the pH level of the discharge and sounds an alarm when an extreme acidic or basic solution is detected.

In addition to pH monitoring, the Neutraguard III Data Logging version digitally captures the pH level of the discharge. This data can be either locally or remotely accessed.

NeutraGuard III Basic / Data Logging



Construction

Orion tanks are manufactured by rotationally molding virgin resin to uniform wall thicknesses and are stress and defect free. Tank shells are held in stock and each tank is completed to individual customer specifications with respect to:

- Inlet, outlet, vent size, location and style
- Tank lid type
- Access port type and size
- FRP (fiberglass reinforced), wrap for direct burial or plain tank.

A variety of tank configurations and styles are available, an overview of which is shown on page 9 for dilution tanks and page 16 for neutralization tanks.

Tank Features

- Lightweight and easy to install
- Wide standard size range
- Custom sizes and configurations available
- Load bearing and non-load bearing tops available - plastic and plastic/metal combinations
- Direct buried tanks available
- Manholes and easy access gamma ports available for inspection and limestone filling
- Fast delivery from factory
- Can handle most chemical waste requirements
- Minimum/easy maintenance
- High impact resistance
- High stress cracking resistance
- Cost effective
- Fiberglass reinforced (FRP), models available

Polyethylene

Orion tanks are manufactured as standard from high density polyethylene resin conforming to ASTM D-1248. These are held in stock and can be used at temperatures up to 180° F in continuous service or 212° F intermittently. Tanks are black in color as standard, but may also be supplied in opaque or white in larger sizes. Tank lids are bolted. Maintenance access ports can be polyethylene threaded plugs, bolted manways, gamma cover with quick start thread. All fittings and penetrations are polyethylene and are located according to the engineer's specification.

Polypropylene

Custom tanks can be manufactured from polypropylene resin conforming to ASTM D-4101. These tanks can be used at temperatures up to 212°F in continuous service and in areas of high chemical concentration. Polypropylene tanks are translucent. Tank lids are bolted. Maintenance access ports can be polypropylene threaded plugs or bolted manways. All fittings and penetrations are polypropylene and are located according to the engineer's specification.

Dilution Tanks

In some low volume and low concentration chemical flow applications the dilution of the chemical waste may be enough to bring the liquid into an acceptable pH range. In this case mixing copious amounts of water, at approximately pH7, with relatively low concentrations and volumes of acid or base may be sufficient to render the pH of the resulting liquid mix acceptable for discharge into the sewer system. This dilution may occur in the sink traps, or more appropriately in under-bench dilution tanks. Orion manufactures a variety of tanks that are designed for this type of point of use dilution as shown below. To facilitate tank removal and maintenance, tanks should be properly supported to avoid over-stressing of connecting piping and tank welds.

P-Trap

Orion p-traps can facilitate the initial dilution process, providing that both the chemical volumes and concentrations are very low. When higher concentrations and/or volumes are expected either a dilution tank or a combination of dilution tank and neutralization tank must be used to ensure complete chemical waste neutralization.

T5 Tank (5 USG)

The Orion T5 tank is a bolted cover tank allowing for easy access and maintenance. The standard connection locations of the 2" inlet, outlet and vent are shown but additional configurations can be produced to match a customer's requirements.

When used without limestone chips, the tank serves as a dilution basin.

T6 Rectangular Tank (1, 2 & 5 USG)

Orion's T6 rectangular bolted cover tank have the same cover, connection and access options as our standard T5 tanks. The standard connection locations of the 2" inlet, outlet and vent are shown but additional configurations can be produced to match a customer's requirements.

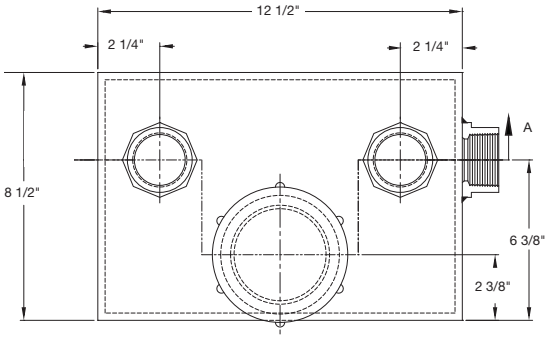
When used without limestone chips, the tank serves as a dilution basin.

T8 Dilution Tank/Trap (1-1/2 USG)

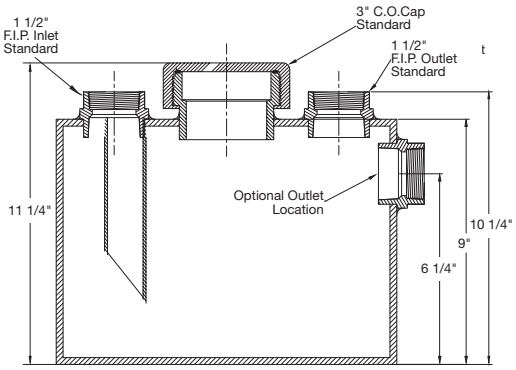
Orion's T8 tanks are designed for under-sink use for low volumetric flow applications. When used without limestone chips the tank serves as a dilution basin/ trap.

The tanks are compact in design allowing for easy fitting. A 1-1/2" or 2" female threaded connection is provided on the tank top to facilitate easy fitting to the sink drain tail piece. A 3" clean out is mounted on the tank top to facilitate inspection and maintenance. An additional 1-1/2" or 2" female threaded outlet is either side or top mounted for connection to discharge piping.

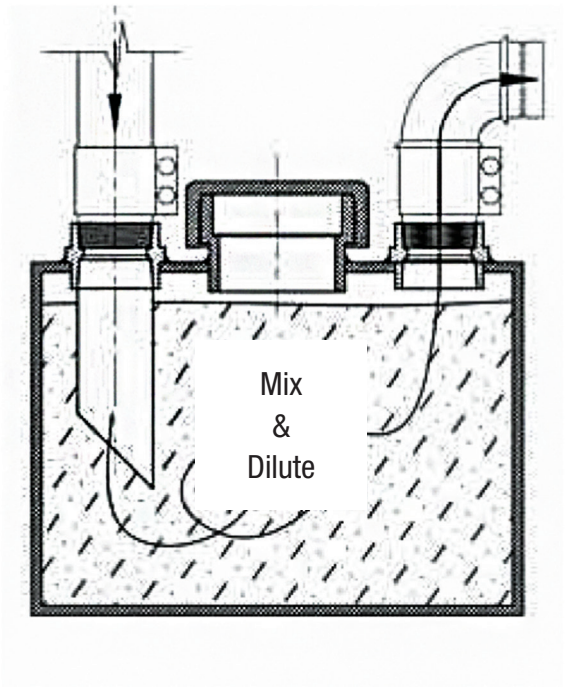
The standard tank configuration is shown and held in stock.



Standard T8 - Top Inlet/Outlet/Cleanout
Optional T8 - Top Inlet & Clean out with Side Outlet



T8 Dilution

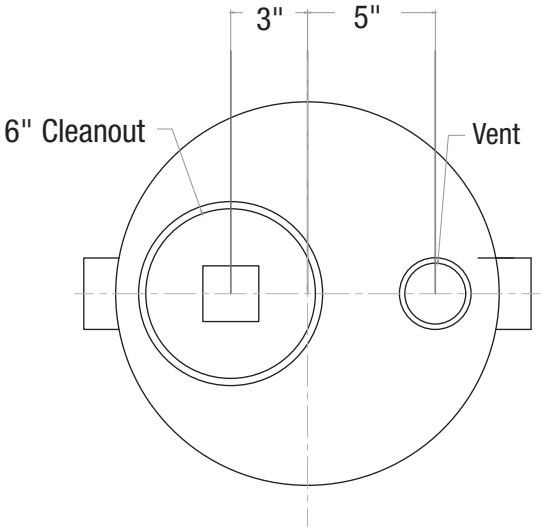


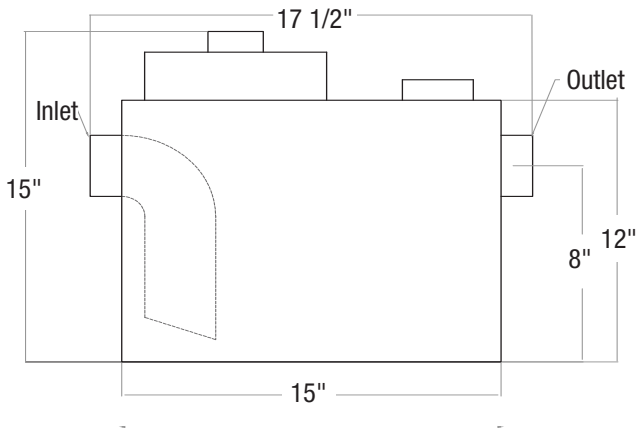
T9 Dilution Tank (5 USG)

Orion T9 tanks are designed for under-sink use where a larger capacity is required. When used without limestone chips the tank serves as a dilution basin.

The tanks are compact in design allowing for easy fitting. Standard connections are 2" female threaded inlet and outlet, 1-1/2" female threaded vent. A 6" cleanout is mounted on the tank top to facilitate inspection and maintenance.

The standard tank configuration is shown and held in stock.



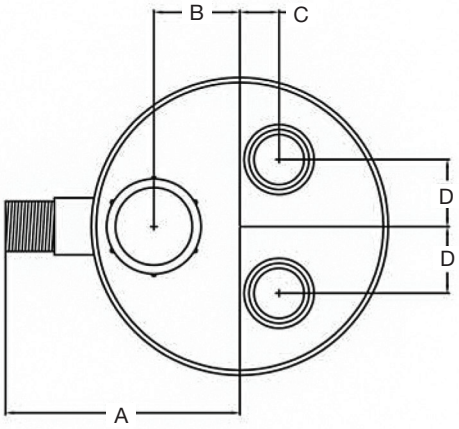


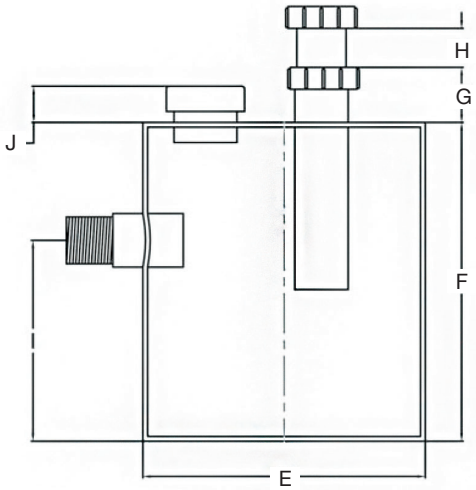
T10 Dilution Tank/Trap (1-1/2 USG)

Orion T10 tanks are designed for under-sink use where a moderate flow is anticipated. When used without limestone chips the tank serves as a dilution basin/ trap. The tanks may be ordered as opaque allowing liquid levels to be visually ascertained.

The tanks are compact in design allowing for easy fitting. Standard connections are 1-1/2" or 2" female threaded inlet, 2" male threaded outlet. A 2" cleanout is mounted on the tank top to facilitate inspection and maintenance.

Single or dual inlets can be provided. Tanks are available in white or black and are held in stock.





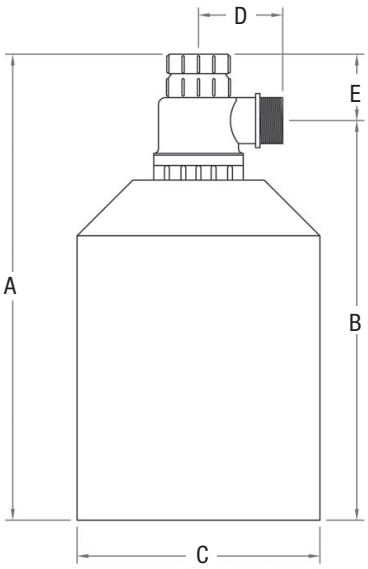
Dimensional Table

# of Inlets	A	B	C	D	E	F	G	H	I	J	Inlet	Outlet
1 or 2	7.25"	2.00"	1.19"	2.00"	9.00"	10.00"	2.00"	0" - 10"	6.75"	1.64"	1.5" or 2"	2"

T11 Anti-Siphon Dilution Trap (1, 2 & 5 USG)

Orion T11 anti-siphon dilution traps can be used solely as a dilution trap. They are available in 1, 2 and 5 gallon sizes for under-sink applications. The inlet and outlet locations are fixed.

The standard tank configuration is shown and held in stock.



Dimensional Table

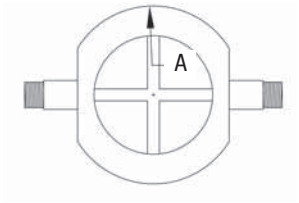
USG	A	B	C	D	E (min.)	E (max.)
1	12.25"	8.25"	7.50"	2.88"	4.00"	12.00"
2	16.75"	14.00"	7.50"	2.88"	2.75"	11.00"
5	19.50"	16.75"	11.50	2.88"	2.75"	11.00"

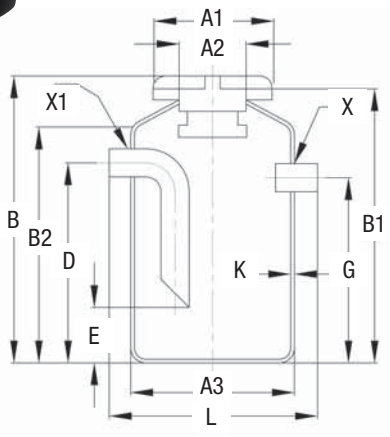
T12 Dilution Trap (6 USG)

Orion T12 tanks are specifically designed for under-sink use where large flows are anticipated.

When used without limestone chips, the tank serves as a dilution basin/trap. The tanks have a quick start thread cover for easy access and maintenance.

The standard tank configuration is shown and held in stock; 1-1/2" & 2" inlets & outlets available.





Dimensional Table

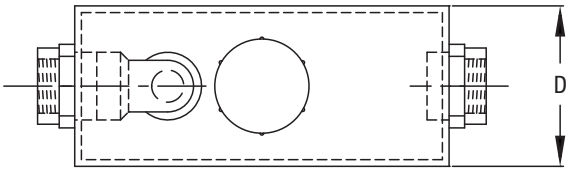
X - (MPT)	X1 - (MPT)	A	A1	A2	A3	B	B1	B2	D	E	G	L	K
1.5" or 2"	1.5" or 2"	12"	8"	5.5"	11"	18.5"	17.75"	16"	13.5"	2"	12.5"	16"	.25

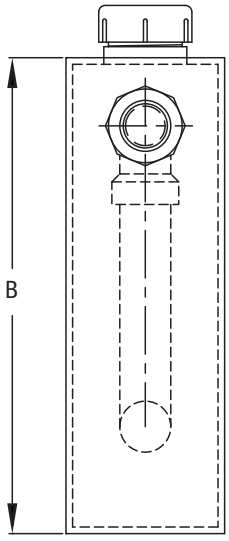
T13 Dilution (3 & 5 USG)

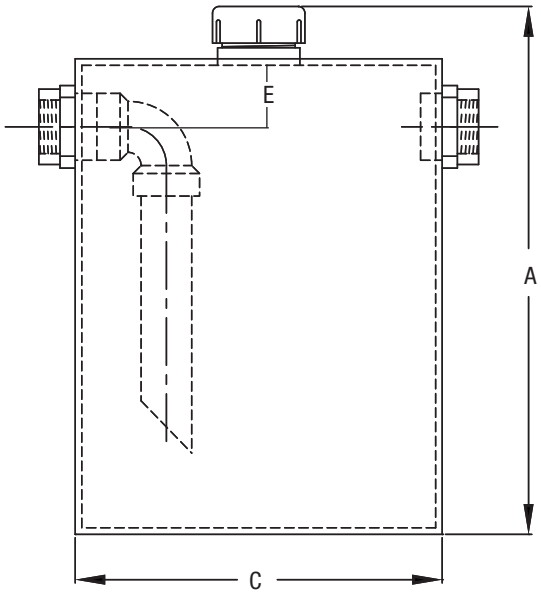
Orion T13 POU Bookshelf Tank shall be rectangular seamless, stress and defect free, rotationally molded construction to uniform wall thickness from virgin PE resins conforming to ASTM D 1248, with single FIP inlet with dip tube, single FIP outlet, and single 3" top threaded cleanout with cap. Available in 3 and 5 gallon sizes.

When used without limestone chips, the tank serves as a dilution basin.

Gallons	A	B	C	D	E
	In.	In.	In.	In.	In.
3	14.20	12.00	12.00	5.63	3.00
5	20.20	18.00	14.00	6.00	3.00







Limestone Neutralization Tanks

When pH cannot be altered enough by dilution alone, it is necessary to affect pH by some other means - either by introducing calcium carbonate into the liquid flow, or by dosing chemicals into the flow.

The most common and cost effective method of neutralization is the process where acidic chemical waste is brought into contact with calcium carbonate in the form of limestone chips. The calcium carbonate undergoes a chemical reaction with the acidic waste flow which is then discharged into the sewer at acceptable pH levels. Water is added to the tanks to initiate the dilution process. A by-product of the chemical reaction is carbon dioxide gas, hence all limestone tanks should be vented. This method of neutralization is only effective with acidic flow.

Limestone Specifications

The limestone supplied by Orion is certified as having a calcium carbonate content in excess of 90%. This high purity is essential to the successful neutralization of the acidic waste and to minimize sludge build up in the tank. The limestone chips are 1" - 3" in size and of irregular pattern to facilitate liquid percolation throughout the limestone bed.

Sizing: Neutralization & Dilution Tanks

Selecting the proper tank size is done by relating the number of sinks and drains that are being discharged into the system to the capacity of the tank. According to ASPE, tanks are to be sized to provide a “dwell time” of 2-1/2 to 3 hours. Based on this dwell time, ASPE has developed a sizing table which has been summarized below. Tanks should not be sized based on the number of sinks or drains alone. The amount of flow through the system piping can also affect the tank size. In addition, certain types of waste may not fall within the standard sink to tank ratio requirements. A qualified engineer should make the final determination of tank size.

Number of Lab Stations	Tank Size (USG)	Limestone (Lbs.)
2	5	50
4	15	150
8	30	250
16	55	500
25	100	1000
42	150	1700
55	180	2000
65	200	2500
80	275	3600
110	360	4500
150	500	6000
200	600	7500
350	1200	14500
700	2400	30000

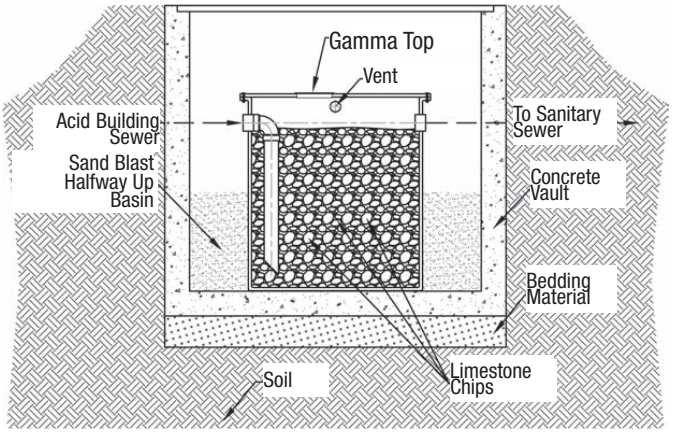
Buried Tank Installation

Tanks must be fully supported on the base by either an appropriate concrete pad that allows no overhang or a compacted stone-free sand bed. When buried, tanks must be filled with water prior to backfilling. Standard tank tops are non-load bearing and should have a trap door or access cover over them supported by a foundation or by the ground. They cannot be supported by the top of the tank.

The backfill material must be free of stones and foreign matter and be capable of passing a No.10 screen. The depth of the backfill should be 6" to 8" thick around the tank and then normal backfill material may be used. Mechanical tamping is not recommended. For tanks with extensions, the above procedure should be followed up to, or slightly above, the water level. From that point on up to ground level it is recommended that a 4" thick concrete sleeve be poured around the tank in multiple lifts. If this is not feasible, then the normal backfill procedure may be used, up to 36" height above water level, bearing in mind that backfilling will produce inward pressures on the empty portion of the tank. Care must be exercised during this operation to prevent inward buckling. A concrete vault must be used or a 4" thick concrete sleeve poured around the tank in multiple lifts in areas with high water tables or poor soil conditions. If the tank is to be used as a pump-out holding tank, or similar type of operation, or the tank will be left empty, or partially full, then a vault is required. Orion recommends that tanks that are going to be direct-buried should be fiberglass (FRP), wrapped. Tanks may be placed in concrete vaults as illustrated. Once again, the vault base must be flat, uniform and free of sharp or irregular objects.

Testing

Orion's neutralization tanks must not be pressure tested. Test tank by filling with water prior to use and inspect for any leaks.



Limestone Neutralization Tank

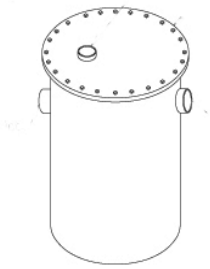
Maintenance of Tanks

The limestone chips supplied by Orion are 1-3" in size and have a calcium carbonate content certified to be in excess of 90%. Waste is added to the tank to help facilitate dilution. A maintenance schedule should be established to observe and maintain proper limestone levels in the tank. Limestone replacement should be performed at regular intervals, typically, once every one to three months is sufficient. However, these intervals can be increased or decreased based upon application needs and performance. Factors affecting limestone replacement are related to waste flow, chemical composition and operating temperatures. If the limestone chips are too small they may clog the tank and prevent both effective neutralization and proper liquid flow. If the chips are too large there may not be enough surface area to react effectively with the acidic waste. If the limestone purity is low, the particles inert to chemical reaction will fall out and create a sludge within the tank. This may also prevent future chemical reaction and restrict liquid flow. Solids in the waste stream can plug the tank and should be avoided.

Note: **There are many variables that affect neutralization and dilution of chemicals discharged through a system. Professional assistance should be employed in analyzing the effluent and the necessary maintenance service.**

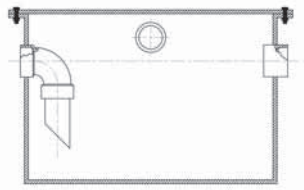
T5 (5 to 1200 USG)

Orion T5 tanks are manufactured in 5 to 1200 gallon sizes. The T5 tank is complete with a removable, bolted, circular top. When used with limestone chips the tank serves as a neutralization basin.



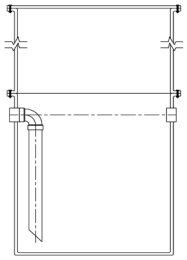
T6 Rectangular Tanks (1 to 670 USG)

Ideal for constricted areas, Orion T6 tanks are manufactured in 1 to 670 gallon sizes. The T6 is complete with a removable, bolted, rectangular top. When used with limestone chips the tank serves as a neutralization basin.



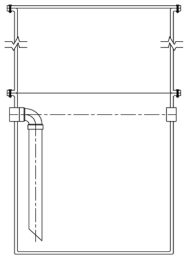
Tank Extensions - Integral

Orion Tank Extensions can be fabricated for any size T5 & T6 tank; maximum tank extension is a double-lift extension.



Tank Extensions - Retro

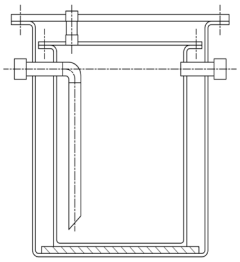
Orion Tank Extensions can be fabricated for any size T5 & T6 tank; maximum tank extension is a double-lift extension.



T14 Double Wall Tanks

Orion can fabricate a variety of T14 double wall tanks. These are custom designed in conjunction with the engineer. The T14 tank is complete with a removable, bolted, circular top. When used with limestone chips the tank serves as a neutralization basin.

Note: **For dimensional data, see submittal sheets available at www.OrionFittings.com**



T8 POU Neutralization Tank (1-1/2 USG)

Orion T8 tanks are designed for point of use applications. These tanks have a 1-1/2 gallon capacity. With limestone, these tanks serve as a neutralization tank; approximately 14 lbs. of limestone chips required. A 3" clean out is installed on the top of the tank to provide access.

1-1/2" or 2" inlets/outlets can be provided. Tanks are held in stock.

Note: **For dimensional data see p. 11.**

T9 POU Neutralization Tank (5 USG)

Orion T9 tanks are designed for use in applications that require a five gallon holding tank at point of use. The tank can serve as a neutralization tank when used with limestone chips. The 6" cleanout installed offset center top of the tank provides access.

1-1/2" or 2" inlets/outlets can be provided. Tanks are held in stock.

Note: **For dimensional data see p. 12.**

T10 POU Neutralization Tank (1-1/2 USG)

Orion T10 tanks are designed for under-sink use where a moderate flow is anticipated. When used with limestone chips the tank serves as a neutralization basin/trap; approximately 14 lbs. of limestone chips required. The tanks may be ordered as opaque allowing liquid levels to be visually ascertained.

The tanks are compact in design allowing for easy fitting. Standard connections are 1-1/2" or 2" female threaded inlet, 2" male threaded outlet. A 2" cleanout is mounted on the tank top to facilitate inspection and maintenance.

Single or dual inlets can be provided. Tanks are available in white or black and are held in stock.

Note: **For dimensional data see p.13.**

T12 Neutralization Tank (6 USG)

Orion T12 tanks are specifically designed for under-sink use where large flows are anticipated.

When used with limestone chips, the tank serves as a neutralization basin. The tanks have a quick start thread cover for easy access and maintenance.

The standard tank configuration is shown and held in stock; 1-1/2" & 2" inlets & outlets available.

T13 Neutralization Tank (3 & 5 USG)

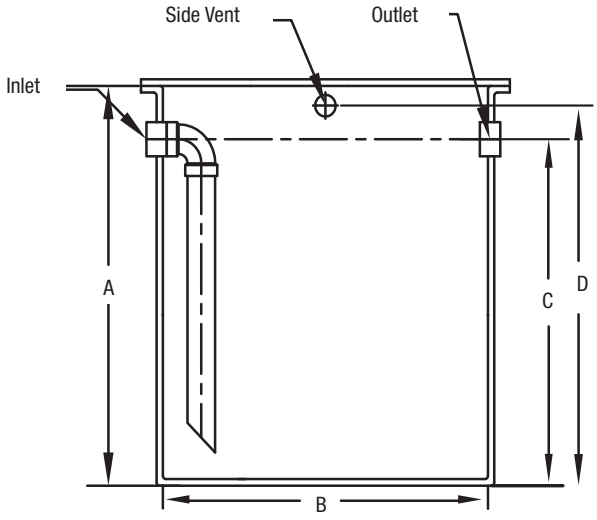
Orion T13 POU Bookshelf Tank shall be rectangular seamless, stress and defect free, rotationally molded construction to uniform wall thickness from virgin PE resins conforming to ASTM D 1248, with single FIP inlet with dip tube, single FIP outlet, and single 3" top threaded cleanout with cap. Available in 3 and 5 gallon sizes.

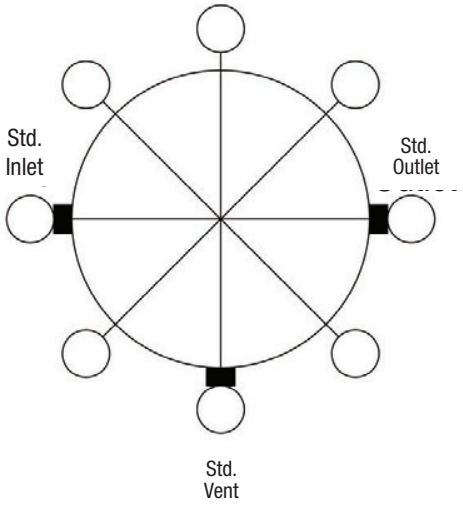
When used with limestone chips, the tank serves as a neutralization basin.

T5 Cylindrical Tanks - Standard Dimensions

Capacity USG Empty/Effective	A (in.) Ht.	B (in.) Dia.**	Cover Dia.	C (in.) Std.	D (in.) Std.	Std. In/Out/Vent Size (in.)*	Weight (lbs.)
5/2	16	11	14	12	13	2/2/2	9
15/5	15.25	17.5	20.5	11.25	12.25	3/3/2	12
30/10	29.5	18	20.5	25.5	26.5	3/3/2	18
55/18	33	22	26	29	30	3/3/2	37
100/33	48	23.75	27.25	44	45	4/4/3	50
150/50	48.5	30	34.5	44.5	45.5	4/4/3	70
180/60	42.5	36.5	40	38.5	39.5	4/4/3	75
200/66	53.25	37.25	41.25	49.25	50.25	4/4/3	86
275/90	47	41.75	44.75	43	44	4/4/3	100
360/120	47.75	47.5	51.75	43.75	44.75	4/4/3	172
500/165	60	52	57	56	57	4/4/3	207
600/200	84	48	53	80	81	4/4/3	248
1200/400	84	69	74	80	81	4/4/3	268

*All tanks come standard with FIP threaded connections.
**Allow additional 5" for flange clearance on diameter of tank.

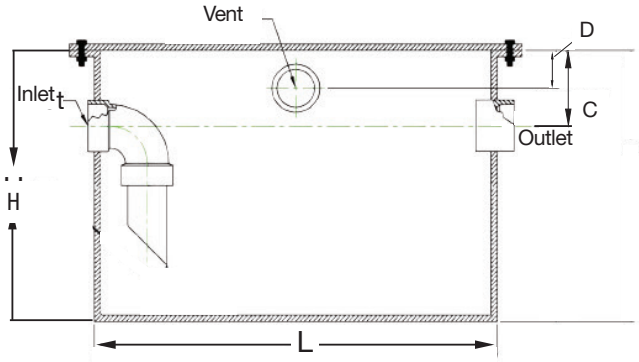


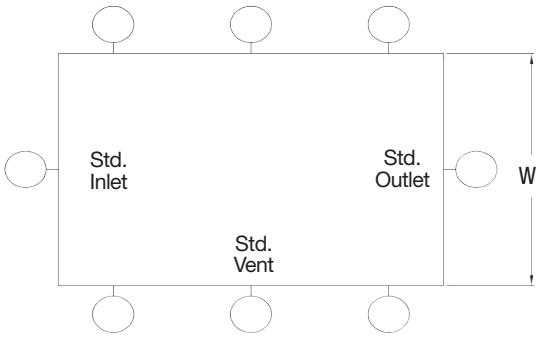


Note:
Tanks up to 360/120G supplied in black. Tanks 500/165G and above supplied in white.
All tanks are free standing and self supporting except 1200/400G, which require support braces or FRP.

T6 Rectangular Tanks - Standard Dimensions

Capacity USG Empty/Effective	L (in.)	W (in.)	H (in.)	C (in.)	D (in.)	Std. In/Out/Vent Size (in.)	Weight (lbs.)
1/.3	12	6	6	3	2	2/2/2	3.70
2/.75	8	8	8	4	3	2/2/2	3.70
5/2	16	10	8	4	3	2/2/2	6.75
15/5	24	12	12	8	3	3/3/2	12.55
30/10	24	12	24	20	3	3/3/2	20.00
55/18	30	24	18	14	3	3/3/2	34.00
115/38	30	30	30	26	3	4/4/3	60.00
150/50	48	24	30	26	3	4/4/3	75.00
215/72	36	36	42	38	3	4/4/3	105.00
265/88	72	36	24	20	3	4/4/3	122.00
540/180	72	36	48	44	3	4/4/3	185.00
670/223	72	36	60	56	3	4/4/3	242.00



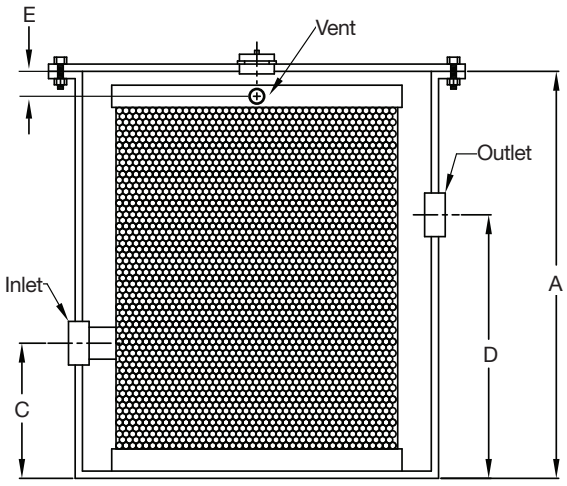


Orion's rectangular tanks have the same cover, connection and access options as our T5 tanks. Rectangular tanks are custom built to meet engineer's specifications with a wide range of tank sizes (1 gallon to 670 gallons).

T17 Solids Interceptor

Capacity USG	Tank Ht. (A)	Inside Dia.	Inlet (C)	Outlet (D)	Vent (E)	Std. I/O/V	Weight (lbs.)
5	16	11	6	11	4	3	11
15	15	17	6	11	4	3	15
55	44	23	8	24	4	3	40

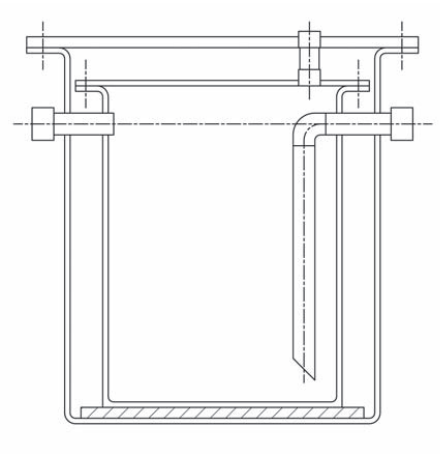
Orion's T17 solids interceptors come with a removable polyethylene basket made from 1/8" diameter perforated mesh with handle. Standard non-load bearing cover, gasketed and bolted to tank.



Note:
Rectangular tanks with heights over 18" require external support (supplied by others) to prevent bowing of the tank walls when filled. Allow an extra 4" from both L and W dimensions for cover size.

T14 Double Wall Tanks

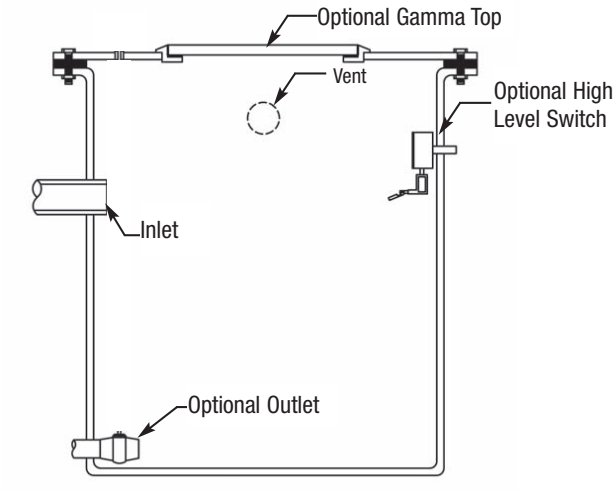
Extreme applications may require a double wall tank. Orion offers a variety of double wall tank options with carrier tank sizes from 5 USG to 600 USG. They can be supplied with the same options as T5 tanks.



Tank Size (USG)		Tank Size (USG)	
Carrier	Containment	Carrier	Containment
5	30	180	360
15	55	200	500
30	55	275	600
55	150	360	1200
100	200	500	1200
150	200	600	1200

T15 Decontamination Tanks

Decontamination tanks are typically used in applications where there is a need to contain potentially hazardous waste that cannot be sufficiently neutralized or diluted by standard methods. Orion's decontamination tanks offer a safe and economical solution to contain hazardous waste until the waste can be removed and disposed of properly. Orion supplies a full range of decontamination tanks to meet your specific needs (150 USG to 1,200 USG). T15 decontamination tanks can be equipped with a Single Station - High Level Alarm (see monitoring section) allowing the user to be automatically notified when removal of hazardous waste is required. This alarm has dry contacts to facilitate wiring the alarm into the central building management system.



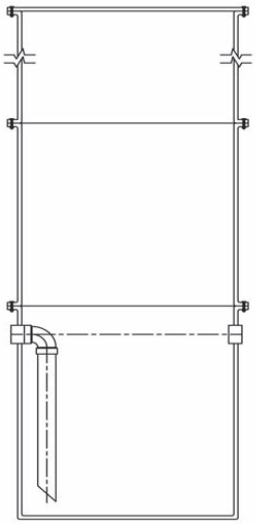
Capacity USG	A (in.) Ht.	B (in.) Dia.**	Cover Dia.	C (in.) Std.	D (in.) Std.	Std. In/Vent Size (in.)*	Weight (lbs.)
150	48.5	30	34.5	44.5	45.5	4/3	70
180	42.5	36.5	40	38.5	39.5	4/3	75
200	53.25	37.25	41.25	49.25	50.25	4/3	86
275	47	41.75	44.75	43	44	4/3	100
360	47.75	47.5	51.75	43.75	44.75	4/3	172
500	60	52	57	56	57	4/3	207
600	84	48	53	80	81	4/3	248
1200	84	69	74	80	81	4/3	268

Note: **For T14 & T15 dimensional data see T5, p. 21.**

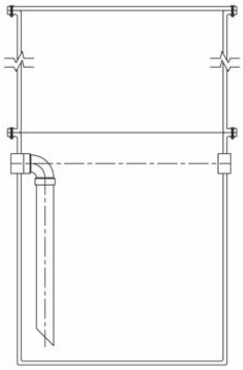
Tank Extensions

Certain applications require tanks to be extended to the finished grade level. Orion tanks can typically be fitted with extensions up to a maximum of a double lift extension (see chart below). T5 & T6 tank extensions are offered in both retro (bolt-on) and integral (welded).They can be supplied with the same options as T5 & T6 tanks.

Tanks with extensions that are going to be direct-buried should be placed in a vault or pipe sleeve.



T5 Double Lift Extension



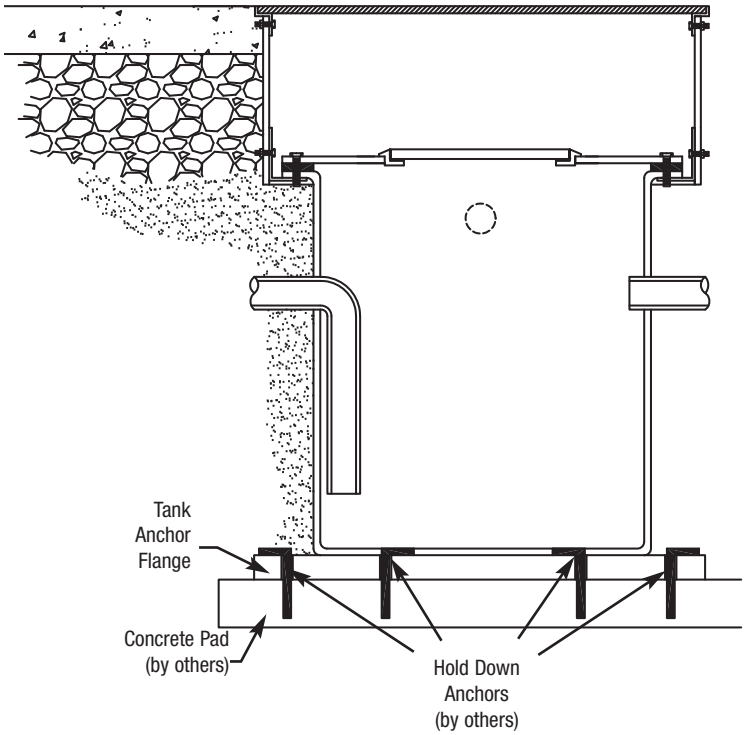
T5 Single Lift Extension

USG	T5 Tank Ht.	Extension		T5 SLE Height	T5 DLE Height
		Min.	Max.	Max.	Max.
5	16.00	4.00	13.00	29.00	42.00
15	15.25	4.00	12.25	27.50	39.75
30	29.50	4.00	25.50	55.00	80.50
55	33.00	4.00	29.00	62.00	91.00
100	48.00	4.00	44.00	92.00	136.00
150	48.50	4.00	44.50	93.00	137.50
180	42.50	4.00	34.50	77.00	111.50
200	53.25	4.00	45.25	98.50	143.75
275	47.00	4.00	39.00	86.00	125.00
360	47.75	4.00	39.75	87.50	127.25
500	60.00	4.00	48.00	108.00	156.00
600	84.00	4.00	58.00	142.00	200.00
1200	84.00	4.00	36.00	120.00	156.00

USG	T6 Tank Ht.	Extension		T6 SLE Height	T6 DLE Height
		Min.	Max.	Max.	Max.
1	6.00	N/A	N/A	N/A	N/A
2	8.00	4.00	5.00	13.00	18.00
5	8.00	4.00	5.00	13.00	18.00
15	12.00	4.00	9.00	21.00	30.00
30	24.00	4.00	20.00	44.00	64.00
55	18.00	4.00	14.00	32.00	46.00
115	30.00	4.00	26.00	56.00	82.00
150	30.00	4.00	26.00	56.00	82.00
215	42.00	4.00	34.00	76.00	110.00
265	24.00	4.00	16.00	40.00	56.00
540	48.00	4.00	34.00	82.00	116.00
670	60.00	4.00	34.00	94.00	128.00

Note: All dimensions referenced in above charts are in inches.

Neutralization Tank Options

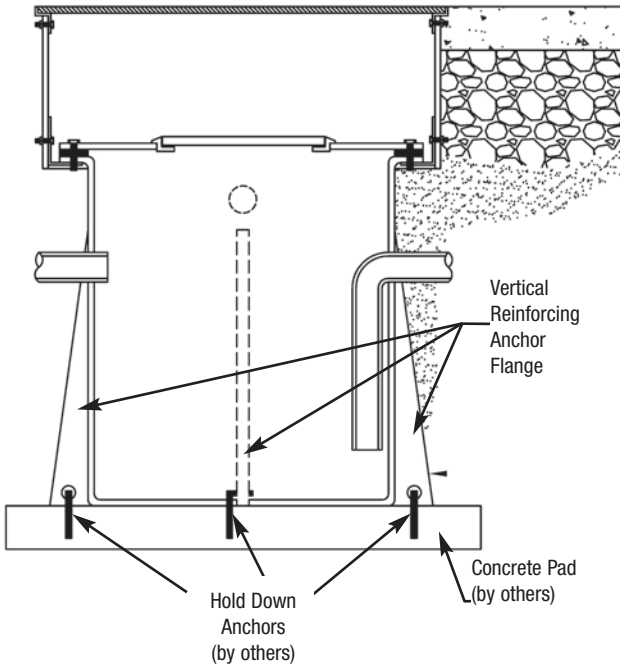


Tank Anchor Flange

Tank Anchor Flanges are welded to the tank bottom. Holes are to be drilled on-site in the TAF and used in conjunction with hold down anchors (supplied by others) to attach the tank to a concrete pad. TAF's are recommended for securing the tank to the ground in partially full or high water table tank applications.

Reinforcing Anchor Flanges

Reinforcing Anchor Flanges are vertical ribs welded to the outside of the tank. Holes are to be drilled on-site in the RAF bottom and used in conjunction with hold down anchors (supplied by others) to attach the tank to a concrete pad. RAF's are typically used to structurally reinforce the tank for partially full tank applications.

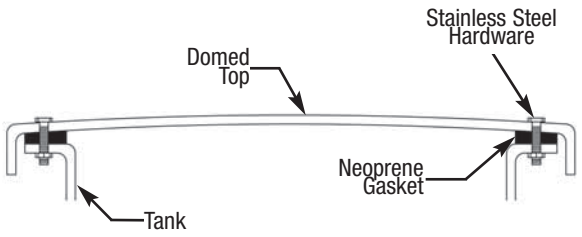


Neutralization Tank Options

Bolted Cover Options

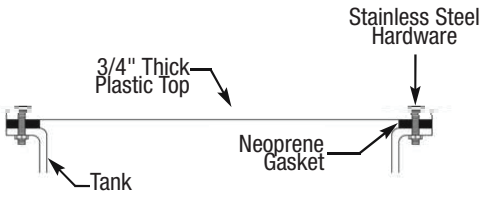
No Load

Standard Bolted Cover



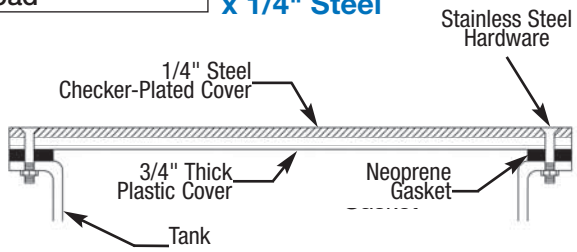
Light Load

Flat Top 3/4" Thick Plastic Cover



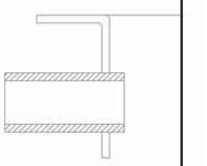
Heavy Pedestrian Load

Composite Cover 3/4"Plastic x 1/4" Steel



Connection Options

Plain End



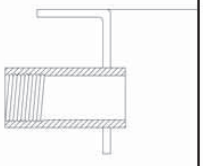
Connects to:
Mechanical Joints
Socket Ends

Sizes:
1 1/2", 2", 3, 4", 6"

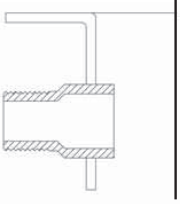
Female Thread

Connects to:
Standard Male
Pipe Thread

Sizes:
1 1/2", 2", 3, 4", 6"



Male Thread



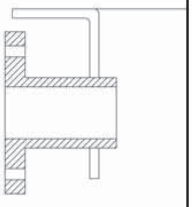
Connects to:
Standard Female
Pipe Thread

Sizes:
1 1/2", 2", 3, 4", 6"

Flanged

Connects to:
ANSI 150 lb.
Bolt Pattern

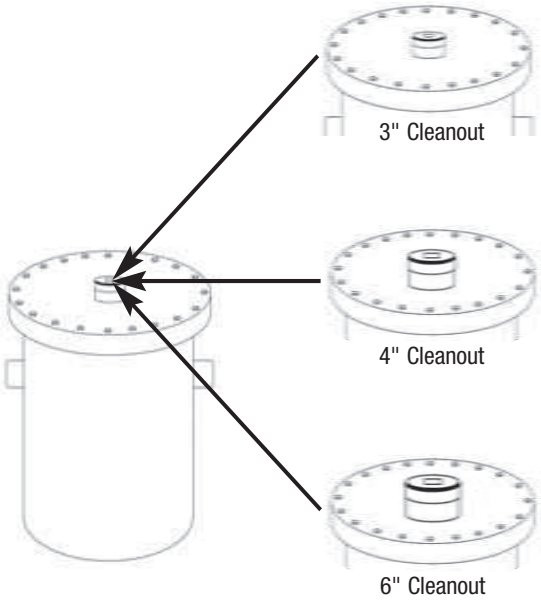
Sizes:
1 1/2", 2", 3, 4", 6"



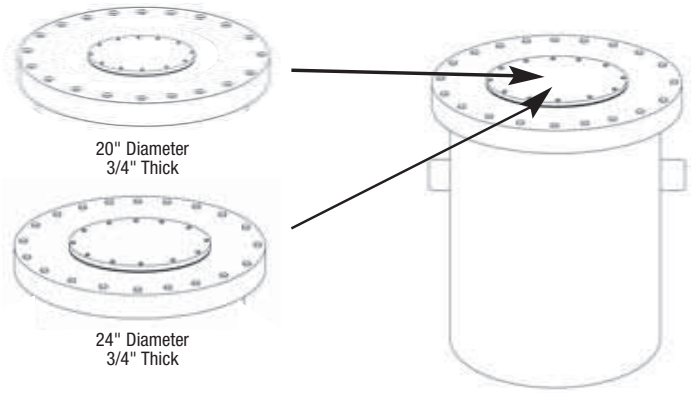
Neutralization Tank Options

Inspection Ports

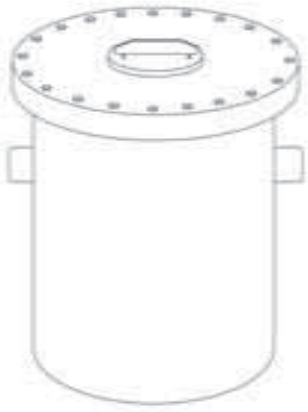
3, 4 or 6" Clean-out



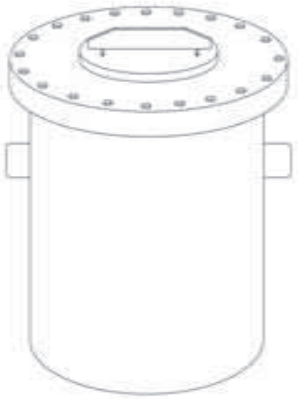
20" or 24" Bolted Manway



Gamma Top 12" Easy Threaded Access



Gamma Plus 16" Easy Threaded Access



Note:
Access options are not to be used in conjunction with steel covers.
Access options are always centered on the tank covers; only one per tank.

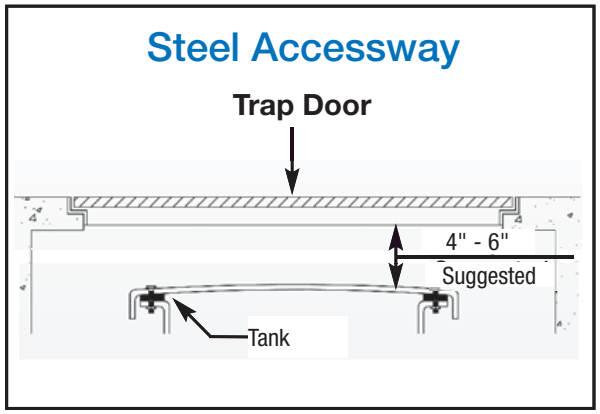
Suggested Trap Door Sizes for Orion Standard Tanks

Tank Size (Gal.)	Trap Door Size
5, 15, 30	24" x 24"
55, 100	36" x 36"
150, 180, 200	48 x 48"
275, 360, 500, 1200	60" x 60"

Type J: 300 PSF Hinged Cover

Model		
AL	Steel	Dimensions
J1AL	J1	24" x 24"
J4AL	J4	36" x 36"
JD2AL	JD2	48" x 48"
JD4AL	JD4	60"x 60"

"D" represents a double door version.



Type K / Type Q: 150 PSF Hinged Cover

Model		
AL	Steel	Dimensions
K1	Q1	24" x 24"
K4	Q4	36" x 36"
KD2	QD2	48" x 48"
KD4	N/A	60"x 60"

"D" represents a double door version.

Type JH20: H-20 Wheel Loading

Model	
Steel	Dimensions
J1H20	24" x 24"
J4H20	36" x 36"
JD2H20	48" x 48"
JD4H20	60"x 60"

"D" represents a double door version.

NeutraGuard Monitoring/Alarms

pH Monitoring

Orion offers a variety of pH NeutraGuard systems for a range of applications. Orion's NeutraGuard systems are state-of-the-art, easily installed, user friendly and completely digital.

Control Panel and Display

- All digital controls and displays
- Standard size control panel for all systems
- UL listed control panel and components
- NEMA 4X panel
- Impact and corrosion resistant.
- Pre-installed cable penetrations & cable fasteners
- 5" Lower profile than previous monitor units

Standard Equipment

- Factory calibrated electronically - No need to field calibrate for temperature or pH. Install and use
- High & low pH level alarms - audible & visual
- Probe cable offered in 4 lengths from 33 to 260 ft

User Customizable

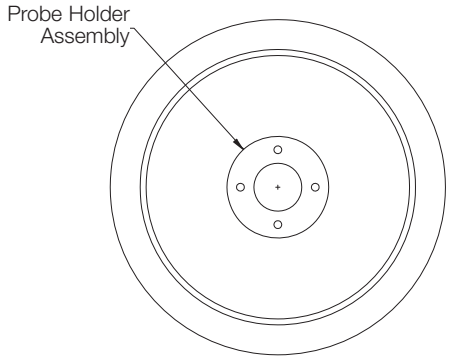
- Calibration menu for pH
- Adjustment of pH high & low level settings
- Adjustment of data logging rate
- Dry contact wiring for remote external alarms - audible & visual
- Optional second pH monitor probe into the same control panel

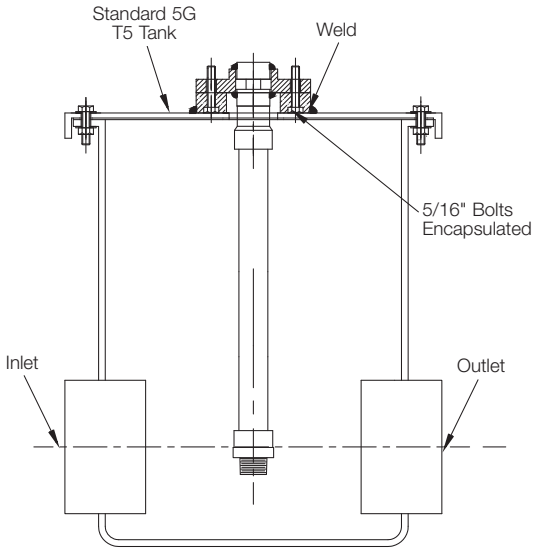
Data Logging

- Digital data logging
- 57,000 standard data points giving 39 days of data at a 1 minute logging rate
- Electronic data retrieval via:
  - Laptop local 9 pin serial port
  - Remote access through ethernet LAN connection (optional)
- Data viewing software supplied for easy download
- Data displayed as tabulated or graphical
- Data logging easily expandable by plug in 64mb SD-RAM memory giving up to 123 years of data at a 1 minute logging rate

T16 Bolted Top Sampling Tank (5 USG)

Orion T16 sampling tank has a 5 USG capacity 11" diameter and 16.25" height. Tank is supplied with a single FIP inlet and outlet sizes 2, 3, 4, & 6" standard. All penetrations are heat fused to tank wall. Non-load bearing flat cover is bolted and gasketed to tank and has a centrally located NeutraGuard pH probe insertion assembly.





Standard Features

NeutraGuard III Monitor

- Continuous pH monitoring
- All digital operations
- High/Low pH alarm - audio & visual
- Contacts for wiring of external alarms or to Building Management System

Options

- Second pH probe assembly & display

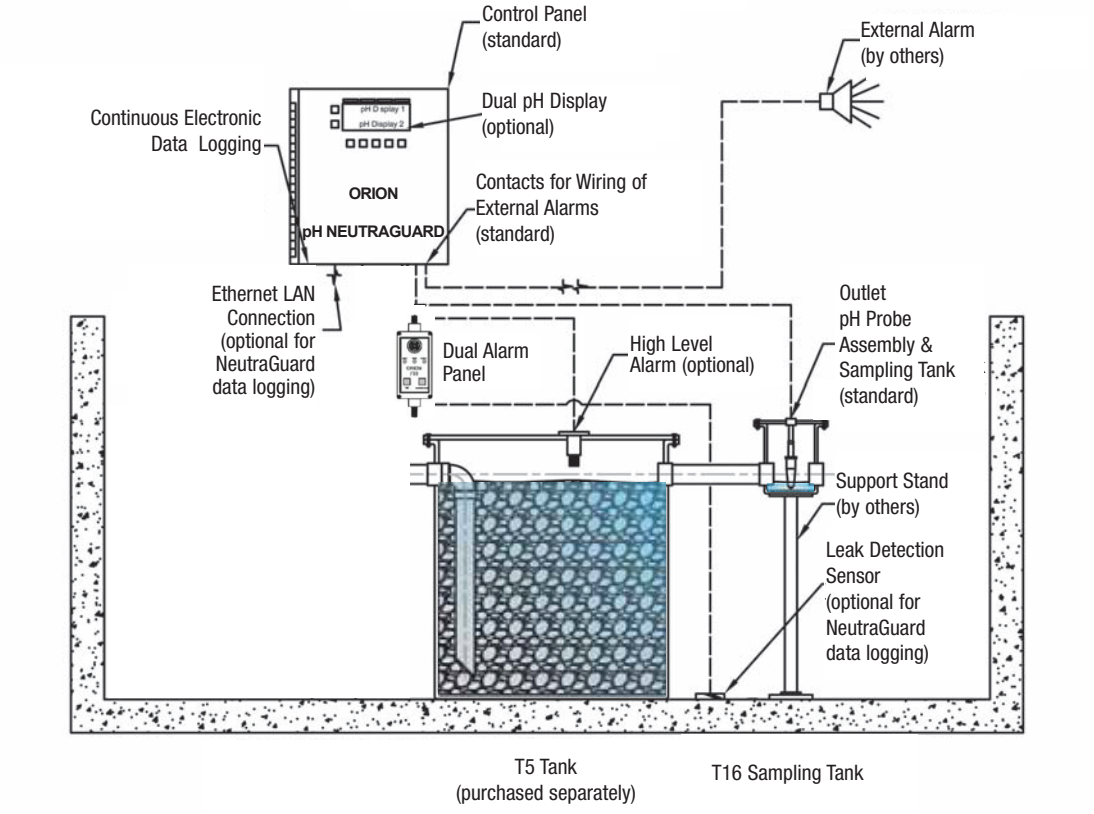
NeutraGuard III Data Logging

- Continuous pH monitoring
- All digital operations
- High/Low pH alarm - audio & visual
- Contacts for wiring of external alarms or to Building Management System

Options

- Expandable SD-RAM memory up to 123 years
- Second pH probe assembly & display
- Ethernet LAN connection
- Memory expansion modual

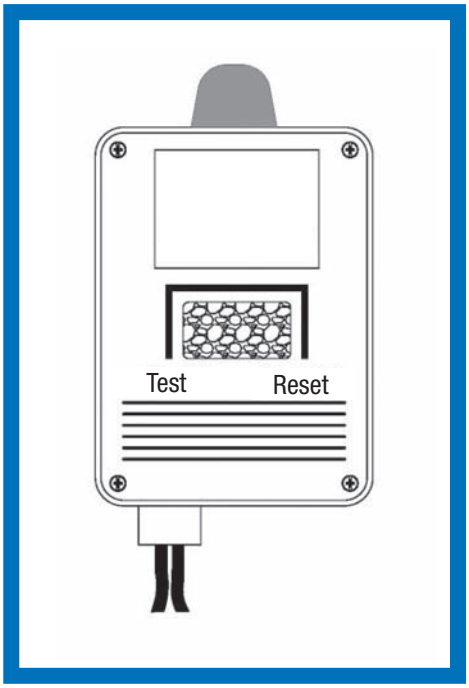
NeutraGuard III Basic / Data Logging

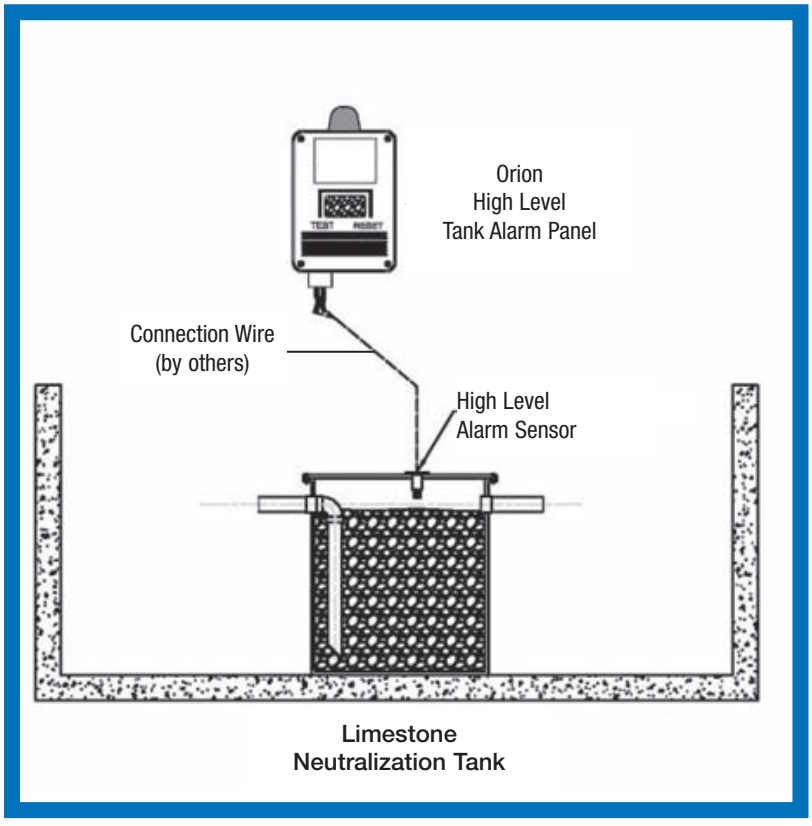


High Level Alarm

- Automatic alarm reset, horn silence switch and alarm test switch
- Voltage: 120 VAC; 7W max.
- Indicator: Flashing light meets type 3R standards; 3 watt max.
- Audible Alarm: 82 db @ 10 ft., meets type 3R water tight standard
- Enclosure: Nema 4x indoor/outdoor; uv stabilized, weatherproof, thermoplastic 6.25"h x 4.5"w x 3.0"d
- Test/silence switch certified to IP66 and IP68 standards
- UL / CUL LISTED
- Float sensor: normally open; LFP-VE-P2 solid polypropylene 0.71" diameter exposed float, 194 operating temperature 0.5A
- 6 ft. power cord

Note:
Monitor options are not to be used in conjunction with steel covers.



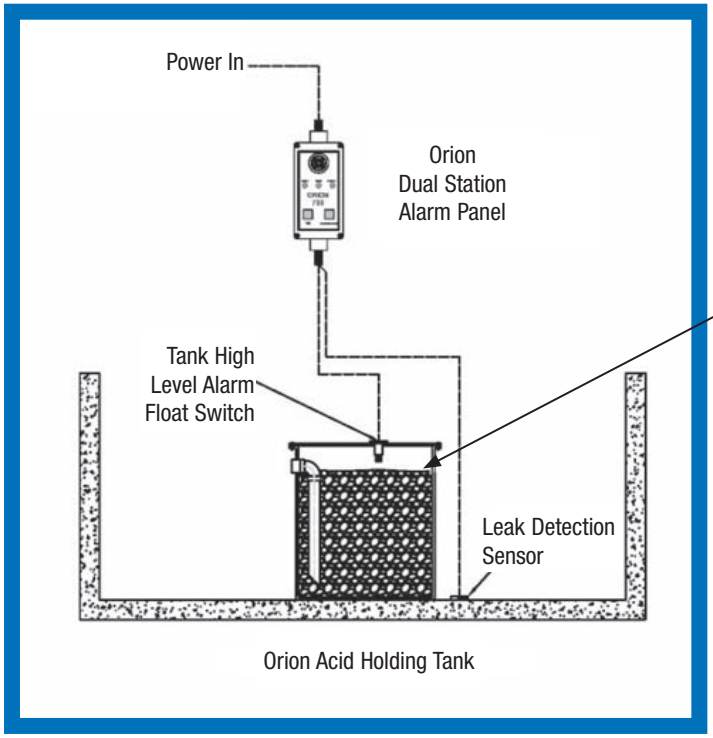


High / Level Alarms & Tank Leak Detection

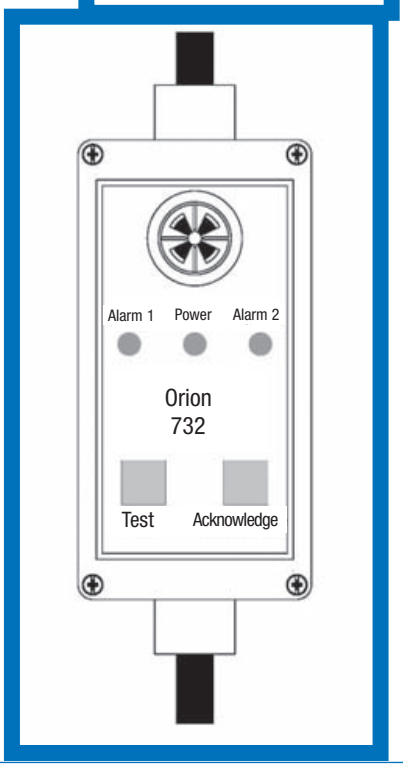
High Level & Leak Detection Alarms:

- Supply Voltage: 120 VAC + 10%, -15%, 6.6 VA max
- Indicators: 3 solid state LED's
- Audible Alarm: Field adjustable from 77 to 97 dB @ 2 ft. by rotating shutter
- Enclosure: Nema 3R polycarbonate; 6.25"H x 3.25"W x 3.5"D
- Sensor voltage / current: 12VDC, .248mA current
- Terminals: size 6 panhead screws with captivated wire clamping plate
- Operating Temperature: -22F tp 150F ambient
- Sensitivity: 0-26K ohm max specific resistance
- UL LISTED
- Conduit connection: Sensor -3/4" NPT, PVC; Power - 1/2" NPT Metal
- Float sensor: normally open; LS3 solid polypropylene 1" diameter exposed float with 1/8" NPT connection
- Flat leak detection sensor, LS10; HDPE

Note:
Monitor options are not to be used in conjunction with steel covers.



High Level Alarm Sensor



Leak Detection Sensor

Sinks

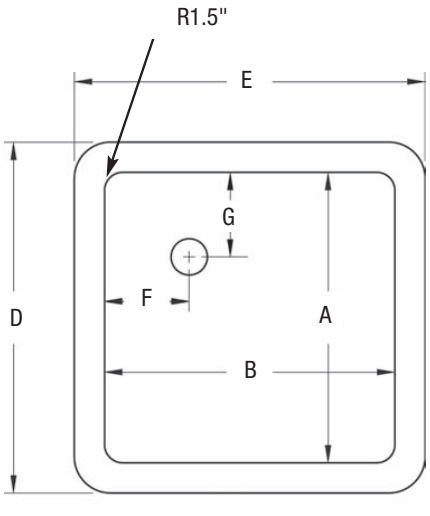
Corrosion Resistant Sinks

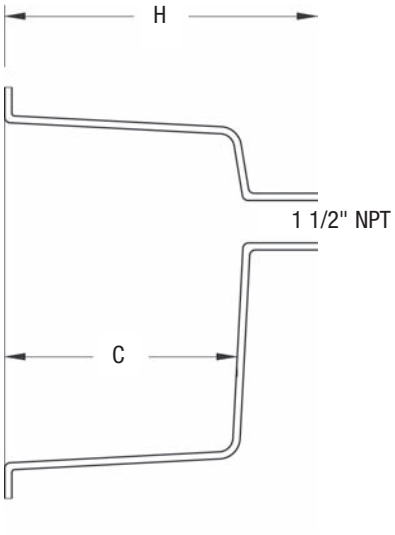
Orion's sinks are molded from durable polyethylene. They are easy-to-install and are designed to provide years of tough service. Several models of ADA compliant sinks are included in the line. Laboratory sinks are designed for intense chemical environments and are produced from virgin polyolefins with an integral 1 1/2" national pipe thread outlet. The corner drain location allows for the maximum use of the sink bowl. An integral flange permits either flush above the counter mounting, using a stainless steel flush mounting rim, or traditional below the counter mounting. Flush stainless steel or undercounter steel mounting rims are available for all sinks and are recommended by Orion for installation.

ARLS-ADA

ARLS-CDB

ARLS-(Standard)





Style ARLS	A	B	C	D	E	F	G	H	Wt. Oz.
ARLS 11	12	12	8	14.5	14.5	3.5	3.5	11	72
ARLS 12	16	8	7	18.5	10.5	4	4	9.25	75
ARLS 13	16	16	8	18.5	18.5	3.5	3.5	11	106
ARLS 14	18	12	8	20.75	14.75	3	3	10.25	106
ARLS 15	18	15	12	20.5	17.5	4	4	15	165
ARLS 16	21	18	10	23.5	20.5	3.5	3.5	12	165
ARLS 17	23	18	12	25.5	20.5	4	4	14.25	185
ARLS 18	25	15	10	27.5	17.5	4	4	13	168
Style ARLS/ADA	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Wt. Oz.**
ARLS-13-ADA	16	16	6	18.5	18.5	3.5	3.5	11	98
ARLS-14-ADA	18	12	6	20.75	14.75	3	3	10.25	101
ARLS-15-ADA	18	15	6	20.25	17.5	4	4	15	158

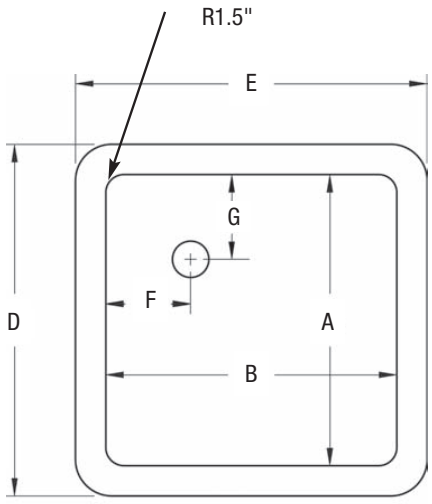
Laboratory Sinks Compliant with the American Disabilities Act (ADA)

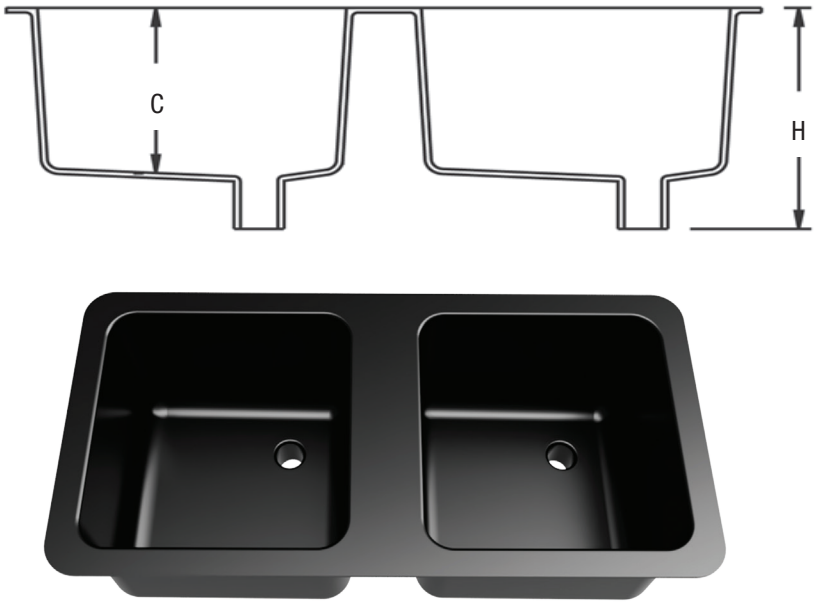
Orion's ADA laboratory sinks meet the standards set forth by the Americans with Disabilities Act. These ADA sinks have a depth of 6" to allow proper clearance of wheel chairs, and have the sink outlet in the rear right-hand corner, so piping does not interfere with wheelchairs.

Recommended Specification

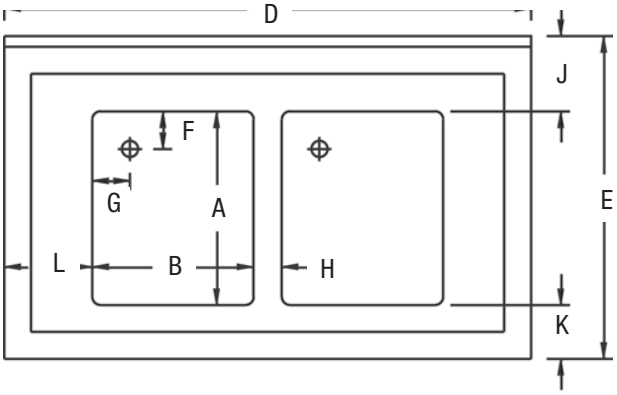
Corrosion resistant lab sink shall be manufactured from virgin high density polyethylene conforming to ASTM D 1248 with integral national pipe thread outlet. The waste assembly shall be located in the rear corner of the sink.

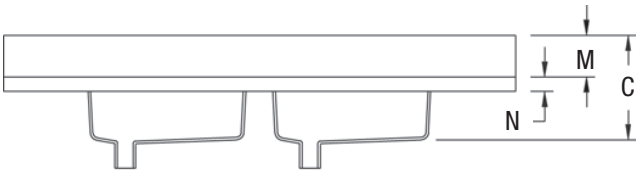
***Note: Sinks often ship dimensional weight. Consult freight carrier for details on dimensional weight.**





Style	A	B	C	D	E	F	G	H	Wt. Oz.
ARLS-DB-1	12	12	8	30.25	14.50	3.50	3.50	11	176
ARLS-DB-2	15	18	10	41.25	17.50	3.50	3.50	13	330

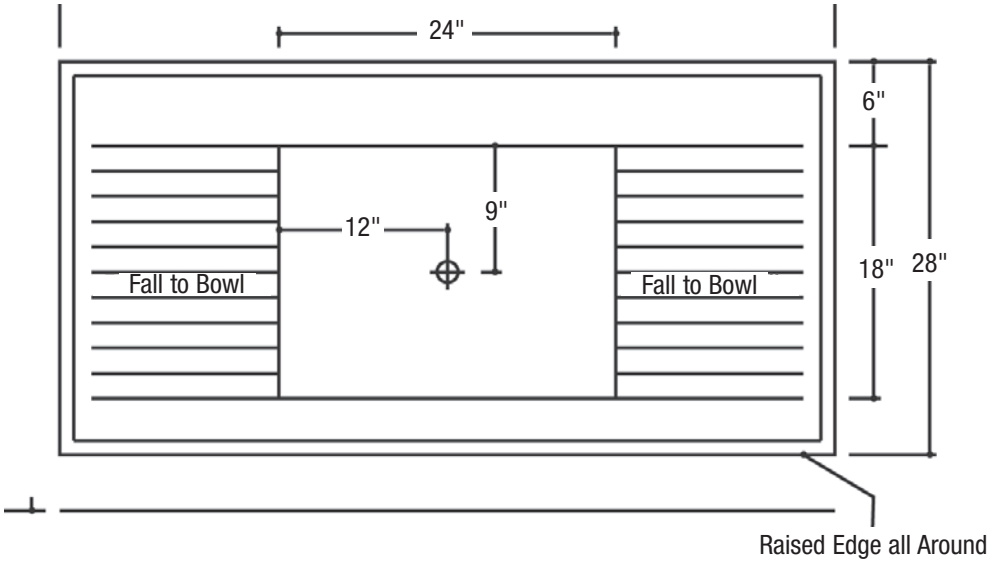


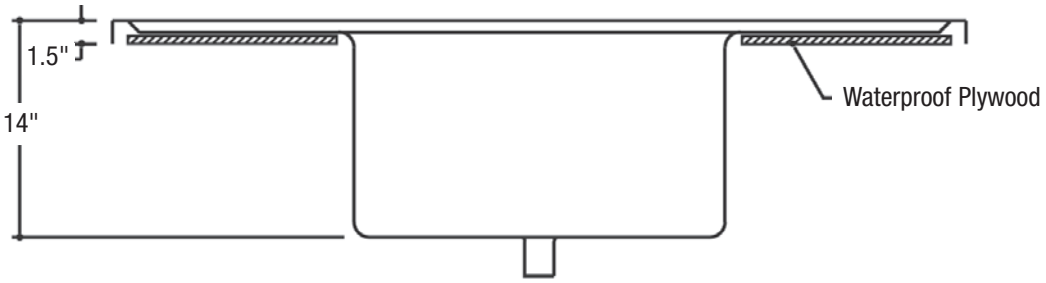


Style	A	B	C	D	E	F	G	H	J	K	L	M	N	Wt. Oz.
ARLS-CDB	18	15	10	49	30	3	2.69	2.63	7	5	8.19	4	1.38	824

Sink CTU-1

One piece molded sink (with integral molded 1 1/2" threaded outlet) countertop unit with pitched ribbed drainboards. Rear deck allows for mounting of water fixtures. Mounted on marine plywood base for ease of installation. Material is black polyethylene. Weight 49 lbs.





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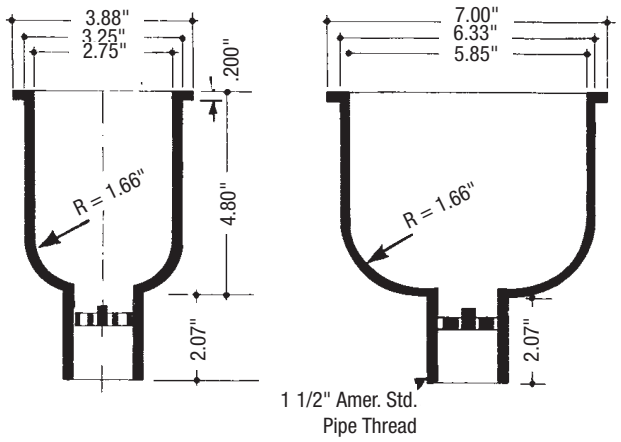
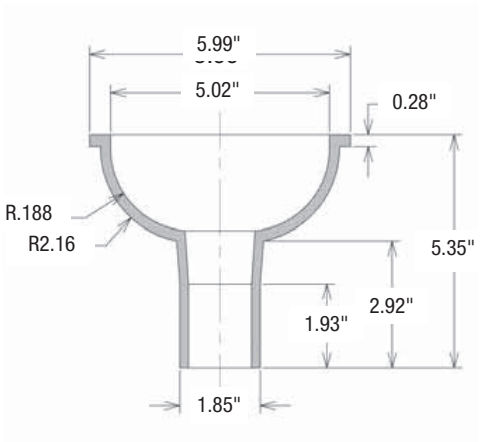
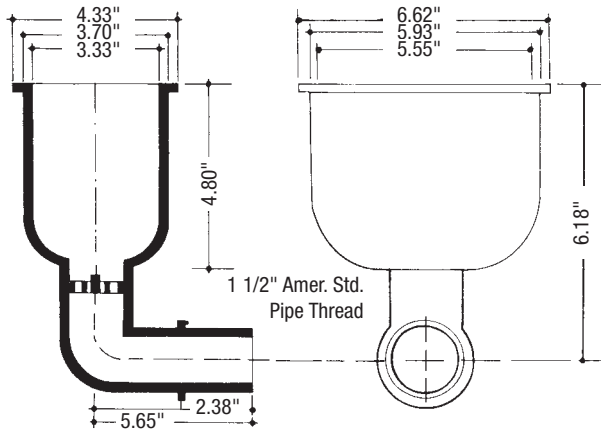
CS1



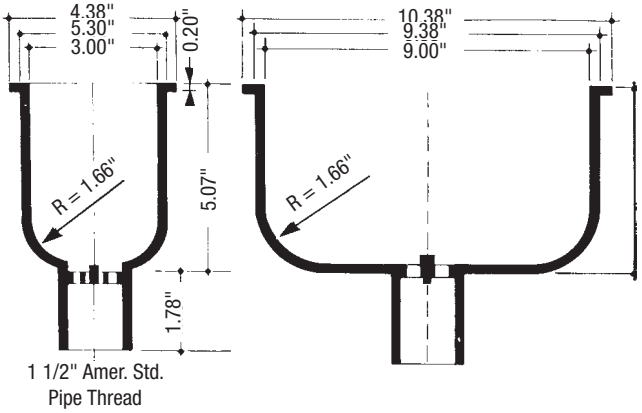
CS3



CS2

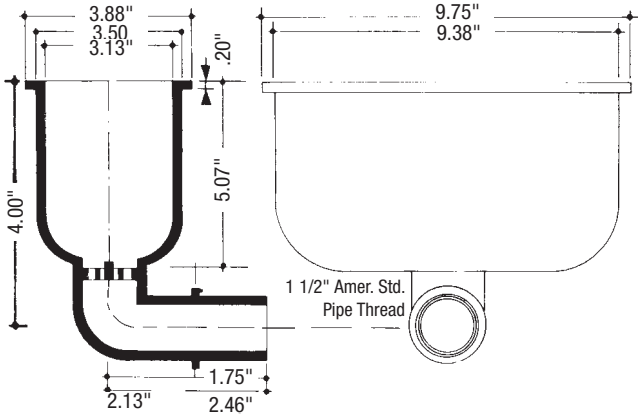


CS5

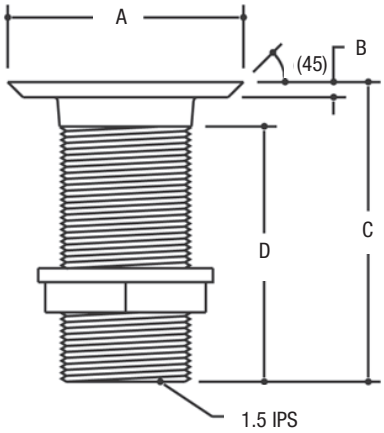


*Note:
All dimensions are ± .03".
All sinks supplied with stopper.

CS6

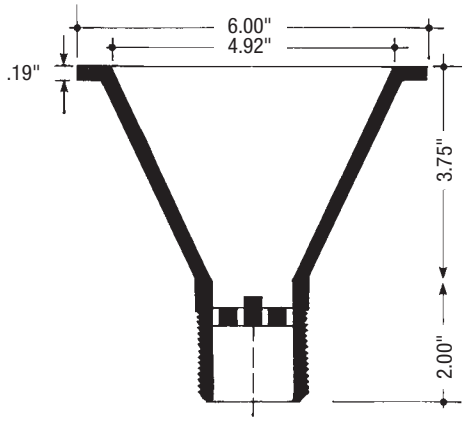


Waste Assembly

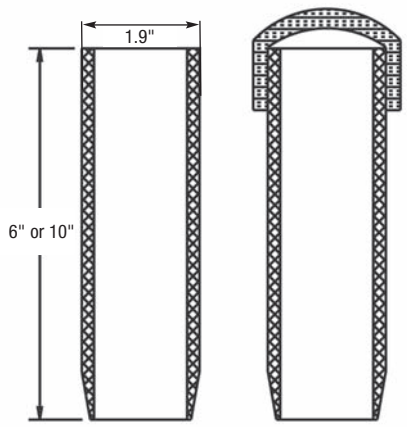


Model	A	B	C	D
WA-1	2.48	.23	4.24	3.62
WA-2	3.24	.20	4.21	3.60
WA-3	4.14	.20	4.28	2.90
WA-4	3.3	0.27	3.77	3.01
WA-5	3.38	0.13	2.25	1.66

CS7



Standing Waste Assembly



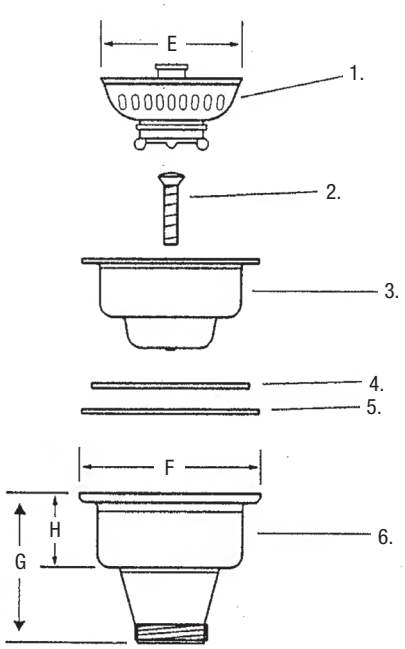
Basket Strainer

A. Place Strainer body (3) in sink opening with smaller dry fixing, washer (4) underneath as shown.

B. Position larger sponge washer (5) on plastic underbody (6) and secure to strainer body by hand tightening stainless steel pin (2).

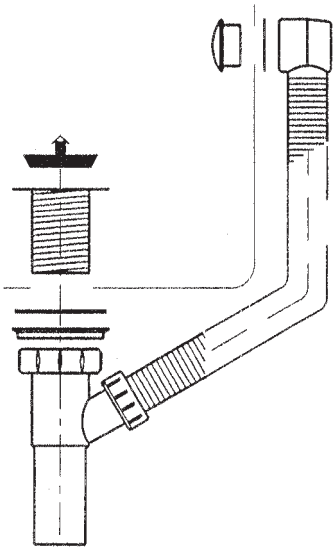
C. Position strainer top (1) in strainer body.

D. Press down on black handle of strainer top to retain water in sink bowl and pull gently to release for normal discharge

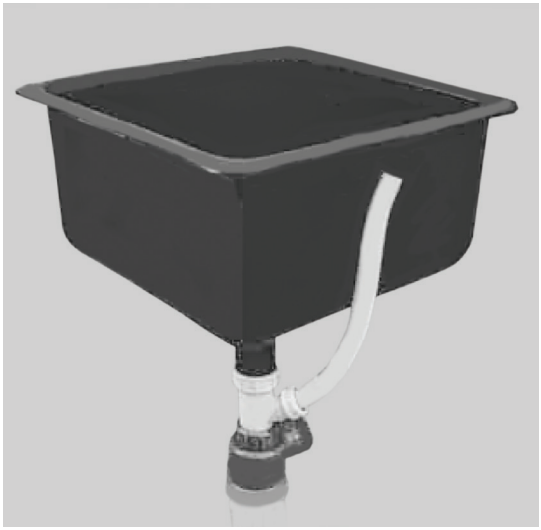


Item No.	E	F	G	H
737513	3 1/8"	4 1/2"	3 1/4"	1 3/4"

Overflow Assembly



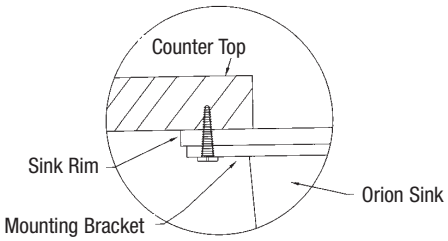
Item No.
737500



Overflow Assembly with 18" of tubing is sold separately from sink. On site installation by others.

Under Counter Sink Mounting Procedure

1. Determine cutout size in top: measure the inside dimensions of sink bowl and subtract 1" from the cutout size. (18" x 15" sink size would then be 17" x 14") Be sure to check approved drawings as some plans may use other overhang dimensions.
2. Cut opening in top: after layout, check to be sure that you have left enough space to allow for sink installation. A minimum of two (2") inches from opening for the complete perimeter is ideal both above and below countertop.
3. Position sink & drill holes: if possible, turn countertop over and lay sink in position upside down in cutout. Place universal mounting ring on sink rim so that it is tight to the underside of the sink lip. After checking position, drill holes through sink and countertop using pre-drilled holes in rim as a guide. Be sure to use all the pre-drilled holes in rim. Screws should be of type and style recommended by top material manufacturer for the sink load anticipated. Be sure to use anchors in top if recommended by top manufacturer. If it is not possible to turn counterotp over, follow same procedure but with top in place.
4. Mounting Sink: Place suitable caulking material [Hypalon caulk (by others) or as recommended by architect] on top of sink lip. Reposition sink and screw into place. Install top as recommended by top manuafacturer

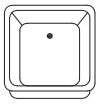
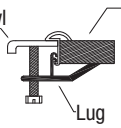
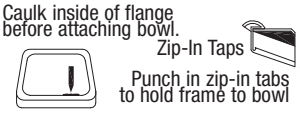
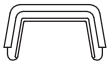


Under Counter Sink Installation Detail

Flush Rim Mounting Procedure

1. Order flush rims by sink number.
2. Use vertical leg of frame to mark cut out.
3. Cut hole in cabinet and/or top, try to have 2" minimum space from cut out edge to any obstacles underneath top.
4. Apply caulk to under inside surface of frame top flange.
5. Place frame, topside down on flat surface. Place sink upside down within the frame and push installation tabs over lip of sink.
6. Caulk under outside of flange, turn sink and frame upright and insert into cutout. Apply lugs to underside at 6"-8" intervals. Always place tow lugs as close as possible to each corner.

Important! Read These Instructions Before Cutting Opening!

1. First Check Fit of Frame to Bowl	4. Set Bowl (Frame Attached) Into Counter Top
 Double check for correct size by placing the frame over the bowl to make sure it fits perfectly.	 Position frame and bowl into openings.
2. Do Not Use Bowl as Template-Scree Around Frame	5. Attach Lugs and Tighten
 Position frame face up on counter top. Scribe the four corners using a straight edge. Saw out the opening. Scribe against the "J" hook, not top of rim.	 Bowl Counter Top Attach lugs first to the four corners, as close as possible. Attach lugs two inches from the weld on sink frame. Lug
3. Caulk & Attach Installation Using Zip-In Tabs	6. How to Measure Sink Frames
Caulk inside of flange before attaching bowl. Zip-In Taps  Punch in zip-in tabs to hold frame to bowl	 Measure distance between hooks on leg of frame. This measurement can be no smaller than the fixture over which the frame must slip for application

Terms & Conditions

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FREIGHT CONDITIONS:

All orders are shipped F.O.B. Once the material leaves our dock, it becomes the property and responsibility of the consignee. If freight is lost or damaged, all freight claims must be filed with the freight company. When shipping to a job site, freight will be third party billed.

FULL FREIGHT ALLOWANCE:

To meet the full freight allowance, orders must be for immediate complete shipment to one location within the contiguous United States. Shipments to Alaska, Puerto Rico, Hawaii or for export are not freight allowed. For shipments to Alaska, Puerto Rico, Hawaii or for export, the freight allowances shown below, for qualified items, are good for shipment to East Coast, West Coast, Gulf Coast, or Great Lakes ports only.

1. **Single Wall PP and PVDF Products:** $7,000 Net on single wall pipe and fitting products, EXCLUDING Sinks, Tanks and related accessories, Chemical Treatment Systems, 8”-12” (inclusive) Pipe and Fittings.

PAYMENT TERMS:

The invoices are due and payable 30 days from the date of invoice.

ORDER ACCEPTANCE AND PURCHASE ORDER FORMS:

All orders are subject to acceptance by us at our facility. Prices and discounts contained in any of our catalogs, price lists or other literature are subject to change without notice. Your order, when shipped by us, shall be subject to these terms and conditions. Orders submitted on your own purchase order forms will be accepted only with the express understanding that no statements, clauses, or conditions contained in said order form will be binding on us if they are inconsistent with or in any way modify our own terms and conditions of sales.

MINIMUM ORDER CHARGE:

A minimum billing charge of $50 Net applies to all shipments F.O.B. factory. Customers are encouraged to order sufficient product to avoid this charge which is necessitated by increased costs of processing small orders.

SPECIAL PRODUCTS:

Orders for special or modified products are non-cancelable. In the event that the customer cancels an order for such products, we shall charge the customer an amount equal to our costs and expenses incurred in performing the purchase order prior to receipt of notice of cancellation.

LIMITED WARRANTY:

We (the “Company”) warrant each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, we will, at our option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights.

SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.

SHIPPING DATES-DELAYS-SHORTAGE CLAIMS:

All shipping dates given are best estimate only and, therefore, cannot be guaranteed. We will not be liable for any delay in delivery. Any claims for shipping errors, shortages or defects must be made to us within 24 hours of receipt of the goods. The customer shall be required to make timely payment to us of any amount which is undisputed or not subject to such claims.

RETURNED GOODS POLICY:

1. Permission to return goods must be requested in written form to us via email, fax or mail. The request must identify original shipment of material by invoice number and date of invoice and list all goods to be returned by Orion part number / MFG number and description. Total value of requested return must meet minimum $250 Net value to qualify for return authorization due to increased costs of processing small returns.
2. The following are non-cancelable and non-returnable and no credit will be issued on their return: all pipe; all non-standard, special order, or made to order products; all obsolete products; all sinks, tanks and related accessories, sediment interceptors, monitoring equipment, and related accessories; all Standardline products; all 8", 10", 12" fittings; all tools and accessories.
3. Goods must be returned within one year after purchase in order to receive credit.
4. Only 10% of any invoice total (not including the pricing for pipe) may be returned for credit, subject to minimum $250 Net value as stated above.
5. All goods must be returned “prepaid”. For any goods purchased on an FFA basis, outgoing freight charges will be deducted from total credit amount.
6. All goods returned must be in pristine and resalable condition. All returns are subject to our inspection. Any product that is, in our sole judgement, determined not to be in a resalable condition will be either disposed of by us or returned freight collect to the purchaser. In either event, no credit will be given.
7. A restocking charge of 25% will be charged against all returned goods except Whiteline materials for which the charge will be 35%. If goods are returned in a non-pristine condition and need special cleaning to allow them to be resold, a 40% restocking charge will apply to the entire returned shipment.
8. All goods returned must have Orion’s return authorization number clearly indicated on all boxes or cartons and must be freight prepaid. If not, they will be refused at our dock.
9. All credit memos issued may be applied to current account balances or to future purchases. No cash refunds will be issued.

NOTE:

Prices and terms are subject to change without notice and supersede all previous quotations. The right is reserved to change or modify product design or construction without prior notice and without incurring any obligation to make such changes and modifications on products previously or subsequently sold.

Notes

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