



## Plas-Tanks INDUSTRIES, INC.



ANSI/ISO/ASQ Q9001-2000  
REGISTERED

Fabrication to:



Certified to  
ANSI/NFPA 61

Available

## Bryneer™

Bulk Salt  
Storage/Brinemakers

Dependable, low-maintenance salt storage and saturated sodium chloride brine production systems serviced by pneumatic truck delivery of dry salt.





# Bryneer™

Circulation Diagram



The Bryneer™ bulk storage brinemaker is the first brining system that is totally designed and manufactured by a fiberglass reinforced plastic (FRP) fabricator. With a single source for all components, customers are offered economy, dependability, and flexibility. As a large fabricator of FRP vessels for a variety of applications, Plas-Tanks Industries, Inc., established in 1976, has the capability to customize systems to fit particular requirements for a given installation. Bryneer™ tanks are manufactured to current ASTM standard, using USDA-approved resins and are conditioned to meet food grade sanitary guidelines. Plas-Tanks quality standards and experience are backed by an exclusive **Two Year Warranty**.

#### Bryneer™ Design/Operating Features

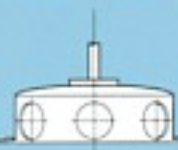
- **Shell Construction.** Tough damage-resistant fiberglass-reinforced polyester capable of many years of maintenance-free service.
- **Downflow Brinemaking.** The downflow brining principle ensures consistent brine saturation. As influent water rises, higher density brine sinks. Sludge from rock and solar salt is concentrated at the bottom of the brine where it can be periodically removed.
- **Water Inlet Distributor.** In many commercial brinemakers, inlet water is not distributed evenly. Eventually, this results in the formation of salt pillars in the tank, which can collapse and damage the vessel. This problem is eliminated in the Bryneer™ by use of a schedule 80 PVC ring induction header around the inside circumference of the tank. The ring is installed at a three-foot height to spray water evenly around the base of the salt mass, resulting in the desirable plug or mass flow.

Brine Collector

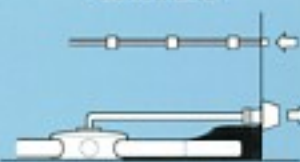


- **Brine Collector.** A collector on the bottom of the tank collects brine evenly over the entire surface area of the vessel by infiltration through 6" ID slotted PVC pipe feeding a center mounted FRP plenum. It filters undissolved salt crystals and insolubles from effluent saturated brine. A 2" ID schedule 80 PVC pipe draws brine from the plenum through a flanged and gusseted nozzle in the vessel wall. When coarse rock salt is used, a residual bed of salt and calcium sulfate sludge aids filtration. When fine vacuum granulated salt or solar salt is used, the collectors are covered with a quartz rock filter bed to ensure that fine salt crystals do not pass through the slotted PVC pipes. Replacement of such

Brine Plenum



Schematic



a filter bed should never be necessary due to the insignificant insolubles content of vacuum salt (see chart).

- **Salt Inlet/Air Venting System.** A pneumatic loading and air venting system is designed for rapid loading, easy maintenance and minimum dust emissions. The 4" ID fill pipe is fabricated from 304 stainless steel and mounted for center fill using a long radius turn to minimize particle attrition and dust. The pipe is fitted with an aluminum camlock coupling and cap that adapts to a P/D truck hose connection. A threaded nipple on the pipe may be fitted with a water hose to inject up to 5 GPM of water during truck unloading to wet the conveyed salt, resulting in virtually no dust emission.

Conveying air is exhausted through an 8" gooseneck vent at the top of the vessel. A PVC extension mounted to the tank wall, with a salt dust bag at a serviceable height, facilitates cleaning. Should the bag become plugged during filling, a 24" spring loaded manway on the top will open to relieve pressure and prevent tank damage.

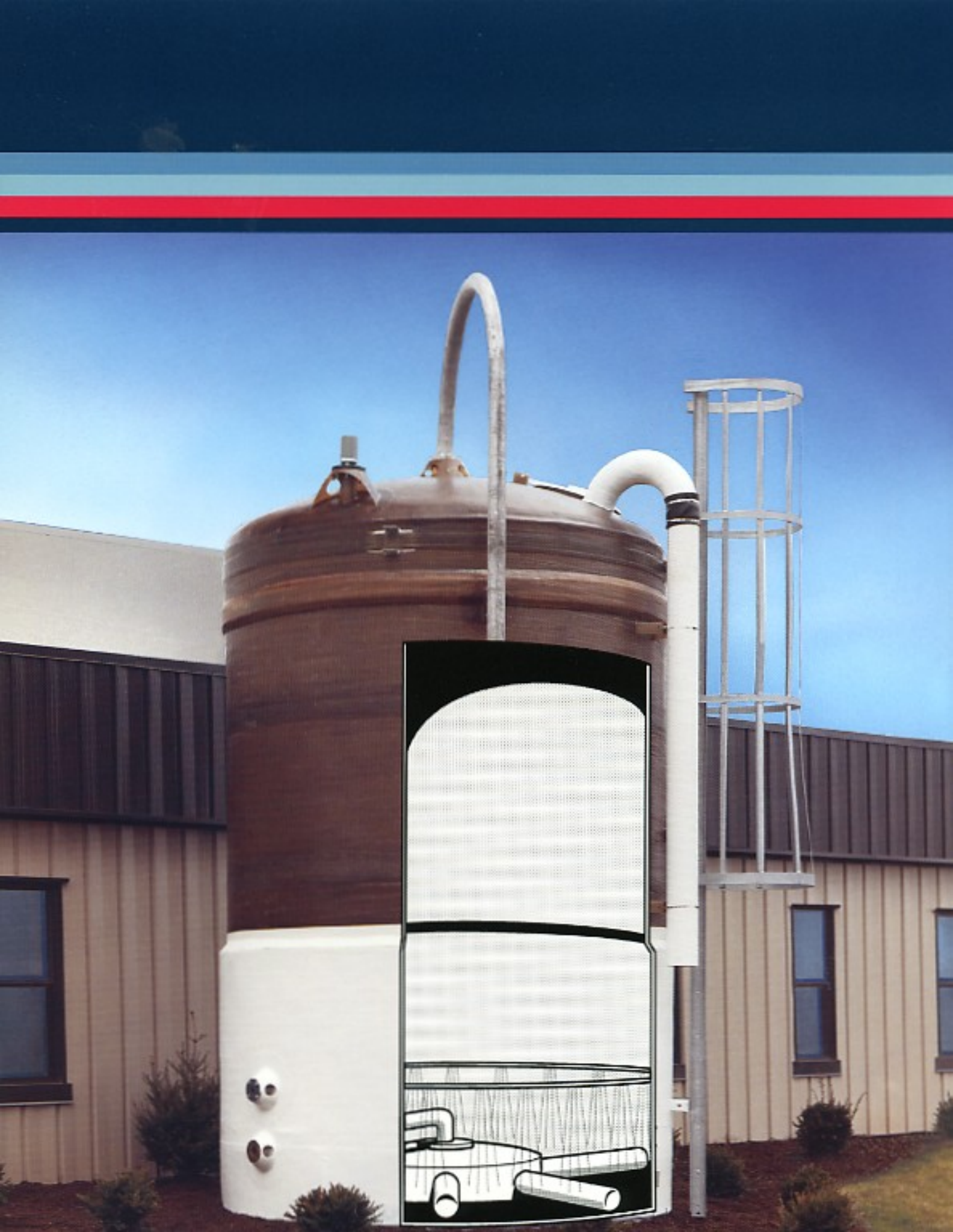
- **Clean-Out.** All tanks are fitted with a 24" diameter side-mounted, leak-proof manway near the base for convenient clean-out access. This port should be used for periodic sludge clean-outs required when rock and solar salt are used (see sludge accumulation chart). All collection and outlet internal piping is removable through the manway for cleaning or repairing, but removal is usually not necessary for a clean-out. Clean-out procedures are described in the Installation/Operating Manual.

- **Liquid Level Control.** Bryneer™ incorporates a unique brine level control system to open and close a valve in the water inlet line.

The level control can be set for any desired liquid level. Normally, a "fully wet" mode of 8' - 9' is desirable for vacuum granulated or solar salt. For rock salt, a fully wet level may be used to reduce sludge accumulation and clean-out frequency, or a "semi-wet" level of 3' - 4' may be selected to produce higher purity, lower hardness brine (see brine purity and sludge charts).

The digital level control is contained in a corrosion resistant waterproof box. The unit comes complete with a digital display revealing the brine solution level. An optional output signal for high-low level alarms capable of sending signals to a PLC (Programmable Logic Controller) is also available from Plas-Tanks.





## BRYNEER SPECIFICATIONS

Model	8-15	10-15	12-15	12-20
Diameter	8' 0"	10' 0"	12' 0"	12' 0"
Straight Shell Height	15' 0"	15' 0"	15' 0"	20' 0"
Overall Height Not Including Salt Pipe	17' 0"	17' 6"	17' 10"	22' 10"
Empty Weight (lbs)	2,200	3,000	3,500	4,200
Max. Gross (filled) Weight (lbs)	54,900	85,500	112,500	170,000
Usable Dry Salt Storage (tons)	23	36	47	72
Recommended Max. Delivery (tons)	15	25	36	61
Dry Salt/Foot of Vertical Rise (tons approx.)	1.8	2.9	4.2	4.2
Max. Continuous Brine Draw (GPM) Granulated Salt	30	30	40	40
Rock & Solar Salt	20	20	25	25
Quartz Rock for Filter Bed 1/8" x 1/4" (ft <sup>3</sup> )	21	33	47	47
1/4" x 1/2" (ft <sup>3</sup> )	29	46	66	66
Lbs of Quartz Rock	5,000	7,800	11,300	11,300
Liquid Capacity (gal)	5,638	8,520	12,683	16,911

### Optional Thermal Retention System

Outside installations exposed to long periods of freezing temperatures below 30° F require exterior insulation for the lower six feet of the vessel to maintain functional brining operation and prevent expansion damage to internal pipes and other components.

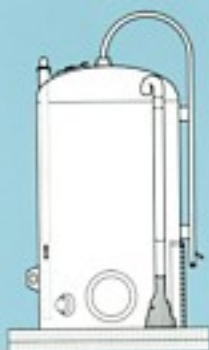
For ultimate protection and maximum brining efficiency, additional Plasta-Therm® heating elements sealed in the side wall bottom of the vessel, when combined with the exterior insulation will maintain brine temperatures at near 60° F. When sealed in FRP, Plasta-Therm elements are virtually damage-free.

*For more information on Plasta-Therm see our #1578 free color brochure.*

### Other Options

- Flow meter and gauges
- Access ladder with cage enclosure and/or roof turn
- Built-in sump for flushing sludge
- Brine holding and day tanks
- Drain nozzle
- Top mounted handrail
- Level control output signals to your PLC
- Salt level monitoring system
- Pumps

Elevation View





## BRINE - The Ideal Salt Handling Method

Saturated sodium chloride brine, continuously produced in an automated FRP bulk storage brinemaker, is ideal for distributing salt in industrial processes. A consistent NaCl brine concentration over a wide temperature range permits accurate volume metering. In-plant pumping of brine through plastic pipes almost totally eliminates corrosion hazards. Brinemaking technique and filtration eliminates undesirable impurities. Most importantly, capital costs for brine systems are 20-30% of those for dry salt storage and conveying systems, with appreciably lower operating costs.

Typical Chemical Analysis of Brining Grades of Salt

	Vacuum Granulated		Southern Coarse Solar	
	Purified	Common	Rock	Solar
	(%)			
Sodium Chloride	99.97	99.8	98.9	99.6
Calcium Sulfate	—	0.15	1.0	0.22
Calcium Carbonate	0.01	—	—	—
Sodium Sulfate	0.02	—	0.01	—
Other Salts	—	0.03	0.02	0.15
Insolubles	0.001	0.01	0.08	0.03

Hardness Of Industrial Salt Brines (1)

Salt Grade	Down Flow Dissolving		
	Fully Wet	Semi-Wet	Voidance
	(ppm Ca/Mg as Calcium)		
High Purity Vacuum (2)	2-15	—	—
Common Vacuum (3)	75-300	—	—
Coarse Solar	100-600	100-400	—
Southern Coarse Rock	400-1300	250-800	100-400

(1) excluding hardness contributed by water

(2) Morton Culinox 999 Salt

(3) Morton Purex Salt

Saturated Sodium Chloride Brine, Density and Solubility At Various Temperatures

F	C	Specific Gravity	Sodium Chloride		Brine (lbs./gal)
			(Wt %)	(lbs./gal)	
32	0	1.2093	26.34	2.652	10.07
50	10	1.2044	26.35	2.644	10.03
59	15	1.2040	26.40	2.647	10.03
68	20	1.1999	26.43	2.643	10.00
77	25	1.1978	26.48	2.642	9.98
86	30	1.1957	26.56	2.645	9.96
104	40	1.1914	26.71	2.651	9.92

Physical Properties of Brining Salt Grades

	Vacuum Granulated	Coarse Rock	Coarse Solar
	Particle Size Range (inch)	0.01-0.03	0.125-0.500
Bulk Density (loose) lbs/ft <sup>3</sup>	75	70	68
ft <sup>3</sup> /ton	26.7	28.5	29.4
Angle of Repose	32 - 35		
Liquid Void Area Under Brine			
Percent	40	44	46
Brine, gal/ft <sup>3</sup> salt	3	3.3	3.33
Brine, gal/ton salt	75	82.5	83.3

Brinemaking Sludge Accumulation

Salt Grade	Fully Wet	Down Flow Dissolving	
		Semi-Wet	Voidance*
	lbs./tons Salt Dissolved		
Vacuum Granulated	Nil	—	—
Coarse Solar	1-3	—	—
Southern Coarse Rock	5-10	10-20	20-35

\*Rapid Brining to avoid dissolution of anhydrous CaSO impurity

For technical information on salt brinemaking technology contact:

Morton Salt  
100 North Riverside Plaza  
Chicago, Illinois 60606  
Technical Service (312) 807-2562

Morton maintains a nationwide staff of field technical service engineers who are well trained in the application of various grades of salt, in all types of brinemaking and materials handling systems.



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