



Brine Make-up & Storage Systems

Useful Sizing Information

Brine Production Rate (BPR)

Every salt has a BPR that ranges from 0.25 gpm - 0.5 gpm per sq' of tank surface area. Your salt supplier should be able to provide you with the BPR of their salt. When you know the BPR of the salt that will be used in your briner, you can calculate the rate at which your briner will convert salt and water into saturated brine.

To determine the BPR of your briner, use this calculation: $\pi \times r^2 \times \text{BPR}$

For a 12' Ø vessel and salt with a BPR of 0.5 gpm; $3.14 \times 36 \times 0.5 \text{ gpm} = 56.52 \text{ gpm} / 3,391 \text{ gph} / 81,384 \text{ gpd}$
(there must be sufficient salt and water to achieve this optimum daily production of saturated brine)

Once it is confirmed that a particular diameter briner has the ability to produce saturated brine at an acceptable rate, it is important to consider how many salt deliveries are required to meet your needs and what overall capacity will be ideal. Remember that incorporating a larger safety factor into your design will translate into fewer critical aspects of indication and controls during daily operations.

Brine Production Rates Based on Diameter and BPR

Tank Diameter	Salt with a BPR of 0.25 gpm	Salt with a BPR of 0.5 gpm
6'	7 gpm	14 gpm
8'	12.5 gpm	25 gpm
10'	19 gpm	38 gpm
12'	28 gpm	56 gpm
14'	38 gpm	76 gpm

Salt Has an Average Void Space of 42%

When calculating how much brine is available in a briner that is filled with salt, first calculate the per foot volume of the vessel and then multiply by 42%. This can be a helpful factoid when determining your water inlet "valve open" and "valve close" set points. The following table is based on a briner filled with salt (with a density of 70#/cu') and saturated brine.

Tank Diameter	Gallons / 12"	Brine / 12"	Volume / 12"	#'s of Salt / 12"
6'	211 gallons	88 gallons	28 cu'	1,960#
8'	376 gallons	157 gallons	50 cu'	3,500#
10'	587 gallons	246 gallons	78 cu'	5,460#
12'	846 gallons	355 gallons	113 cu'	7,910#
14'	1,151 gallons	483 gallons	153 cu'	10,710#