

City of Knoxville's Public Service Department Salt Brine System

WHAT IS BRINE?

Brine is defined as any water which is saturated with or contains large amounts of a salt. Today, it is used as a supplement to the traditional street clearing method of spreading rock salt.

HOW BRINE WORKS

Brine is applied to road surfaces several days in advance of a predicted snow event. Ideally, pre-applications are done during dry weather, allowing the brine to dry completely and embed into the asphalt before freezing precipitation (snow/ice) arrives. When snow hits the asphalt the brine activates and immediately lowers the freezing point of water. The melting process does not happen immediately. Streets may appear snow covered, but don't be deceived. The objective of brine is to prevent the bond of ice or snow to the roadway, not to melt it; therefore allowing smooth, easy plowing during the weather event. An additional positive is that brine will stay bound to the asphalt even after plowing the surface. When a rock salt treated street is plowed, most of the salt is pushed off the road surface along with the snow.

The perfect solution of Brine is a 20 to 23.3% concentration of salt which will withstand freezing temps to -6 degrees and can be spread with temperatures as low as 10 degrees.



City of Knoxville Brine Facts

- The brine is mixed at the Loraine Street Public Works Complex. The operation consists of a hopper (holds 500 gallons) and four holding tanks (20,000 gallons total).
- Public Service strives for a 23% concentrate of brine solution. The concentration level is adjusted depending on the outside temperature.
- When needed, brine is transferred to seven 1,000 gallon truck or trailer mounted tanks.
- Brine is applied (gravity fed) at a flow rate of approximately 40 gallons per lane mile.
- Public Service pre-treats approximately 700 lane miles for the city's priority I and II streets.
- Below is a example of resources used for both methods to treat all level I & II streets one time:

Traditional Salt Methods

New Brine Methods

<ul style="list-style-type: none"> • Uses 308 tons of salt to treat level 1 & 2 streets \$71.14/ton (current price of salt), this totals \$21,911 per application material costs only 	<ul style="list-style-type: none"> • Uses 23 tons of salt (28,000 gallons of brine) to treat level 1 & 2 streets \$71.14/ton (current price of salt), this totals \$1,636 per application material costs only
<ul style="list-style-type: none"> • Requires 21 trucks and 42 employees 	<ul style="list-style-type: none"> • Requires 7 trucks and 14 employees
<ul style="list-style-type: none"> • Takes average of 3 hours to complete 	<ul style="list-style-type: none"> • Takes average of 10 hours to complete

USES IN 2010:

- January 5: 6,000 gallons in opening trial run; 150 lane miles
- January 6 & 7: Used 28,000 gallons to treat all level I & II streets; 700 lane miles
- January 8 & 9: Used 30,600 gallons to treat all level I & II streets; 765 lane miles
- January 11 & 12: Used 21,900 gallons to treat certain level I & II streets; 548 lane miles

BOTTOM LINE: This system is easier and more efficient to apply, safer for our operators, cost effective and better on the environment.