

## IT BEGAN WITH A MARTINI SHAKER . . .

*The Mechanical Rocker Ice Melting Test calls for ice cubes and liquid deicer to be measured and poured into an insulated container before being placed on a rocking machine. After 15 minutes, the liquid volume is weighed to determine how much ice was melted.*

Katie Johnson | CTC & Associates | Chief Strategy Officer and Director of Communications | Lincoln, Nebraska

**The Mechanical Rocker Ice Melting Test is a low-cost and repeatable method for determining how well a liquid deicer will perform on a roadway, giving DOTs a valuable tool for objectively comparing products.**

When winter weather hits, a highway maintenance manager can't afford to wonder whether the liquid deicer they've purchased will melt ice and snow as expected. But with so many products on the market and limited resources, trying different chemicals on actual roadways to see what works best isn't feasible.

"Transportation agencies don't have extra time or money," says Jasmine Dondlinger, the highway chemical tests manager for the Nebraska Department of Transportation. "We need to know without a doubt that the product we've invested in will give us the results we want."

This is why a scientific test—one that measures the efficacy of deicers and allows for more cost-effective product comparison—has long been a top wishlist item for many in winter maintenance. Unfortunately, these types of tests have not historically produced repeatable or reliable results.

All that changed in 2011 when the Nebraska DOT launched a research study to evaluate the performance of different deicers.

"The research tried to estimate the effects of sunlight, color, and friction on deicers," Dondlinger says. "But it was missing the physical element simulating a vehicle's

tires moving over snow and ice. Mike Mattison, one of our maintenance engineers, had the great idea to just use a martini shaker to replicate this action.”

The idea was a revelation, and interest in the test and its potential spread quickly.

Subsequent research at the University of Nebraska, sponsored by Nebraska DOT, modified the process, which became known as the Mechanical Rocker Ice Melting Test, by identifying the need for equipment to standardize the shaker’s agitation and other improvements to remove variables.

But it was the support of the Clear Roads Pooled Fund that propelled the test to new heights.

### The Little Test Goes Big Time

In 2020, Clear Roads—a consortium of 39 states dedicated to advancing winter maintenance tools and technologies—funded a research study to evaluate the Mechanical Rocker Test and prove it could produce trustworthy results. As a chemical tester for Clear Roads and a passionate advocate for Nebraska’s test, Dondlinger was a natural choice to serve as the project’s champion.

“Before Clear Roads took on the project, we were just one state with a good idea,” Dondlinger says. “But it was Clear Roads’ backing that helped us broaden our reach. Suddenly, agencies across the country were aware of this test, and Nebraska’s laboratory gained a national reputation as a leader in chemical testing.”

While the Mechanical Rocker Test has been refined over the years thanks to Nebraska’s and Clear Roads’ research investments, the method has retained its approachability and simplicity. [More about the test can be found here: [www.clearroads.org/project/18-06/](http://www.clearroads.org/project/18-06/), and Nebraska’s DOT video can be found here: <https://bit.ly/3VyfkGc>].

The test calls for pouring 30 mL of liquid deicer into an insulated container. Next, 33 ice cubes, each measuring precisely 1.3 mL, are added, and the mixture is placed on the rocker to agitate for 15 minutes. All contents are poured through a sieve, and the remaining ice cubes are weighed to determine how much ice was melted. The test is repeated four more times, with the average results used to identify the deicer’s ice-melting capacity.

“In my opinion, one of the greatest benefits of this test is that it’s very inexpensive to get going,” Dondlinger

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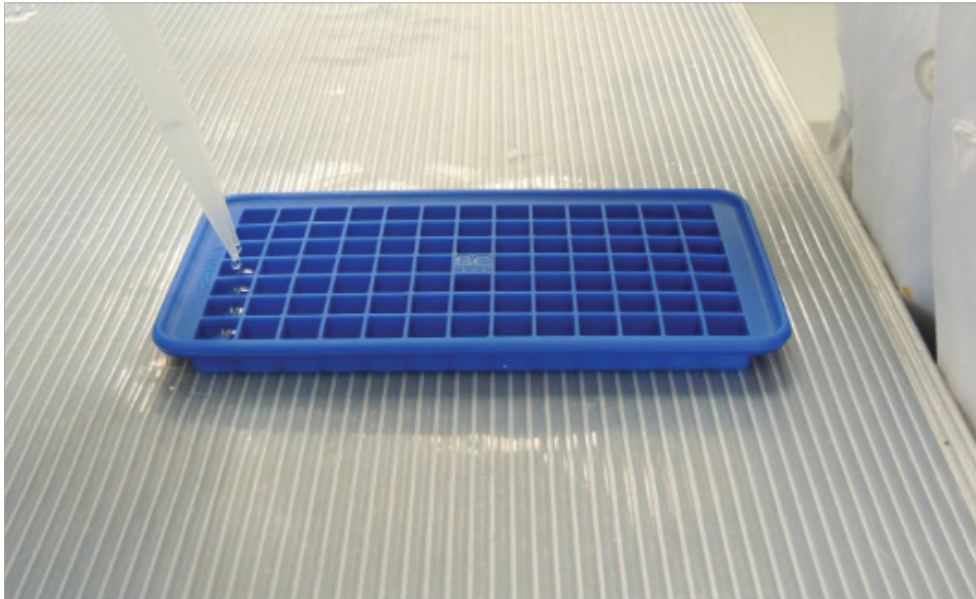
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The test requires exactly 33 ice cubes, each measuring exactly 1.3 mL.

says. “The biggest-ticket item is probably a chest freezer, which maintains a stable temperature better than other types of freezers. The next-largest expense is the rocker equipment, which costs about \$1,000. From there, you just need a sieve, thermoses, ice cube trays, and Styrofoam cups. It’s a very modest set-up and incredibly user-friendly.”

### A National Standard and Next Steps

Clear Roads representatives and other state DOT officials presented the Mechanical Rocker Ice Melting Test to the American Association of State Highway and Transportation Officials (AASHTO) in late 2022. The method was awarded provisional approval and was published as a national standard in summer 2025 in the AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing as method TP 148 Mechanical Rocker Ice Melting Capacity (IMC) (available at [transportation.org](https://www.transportation.org)).

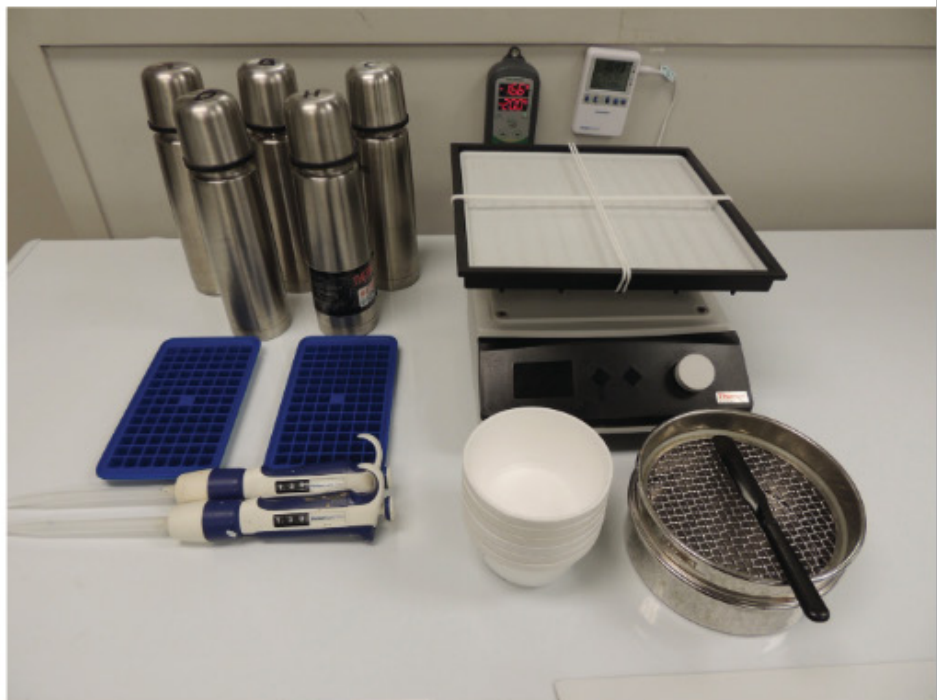
In the future, Dondlinger says she’d like to explore how the test can be integrated with Clear Roads’ Qualified Products List (available at [clearroads.org](https://clearroads.org)), which includes more than 100 different deicers and winter chemicals. She’d also like to see a similar test developed for solid

deicers, since the Mechanical Rocker Ice Melting Test has only been studied and approved for liquids.

In the meantime, Dondlinger is happy to promote the test far and wide. She and Mattison—whose inspiration to use a martini shaker revolutionized the ice melting test more than a decade ago—discussed the test’s journey on a 2024 episode of AASHTO’s *Talkin’ Winter Ops* podcast (available online), which boasts a broad and dedicated national audience of transportation professionals.

“I want people to know about this method because I’m really proud of it—it was developed in Nebraska and now it’s reached the national stage, all because it’s a great quality assurance tool that can give highway maintenance engineers greater confidence in their work.”

*Katie Johnson is the chief strategy office and director of communications at CTC & Associates, which provides management services for the Clear Roads Pooled Fund. She can be reached at [katie.johnson@ctcandassociates.com](mailto:katie.johnson@ctcandassociates.com).*



The test was developed by the University of Nebraska with guidance from Nebraska DOT.