



## CARUSOL® & CARUSOL® C LIQUID PERMANGANATE

### Cold Weather Advisory Technical Brief

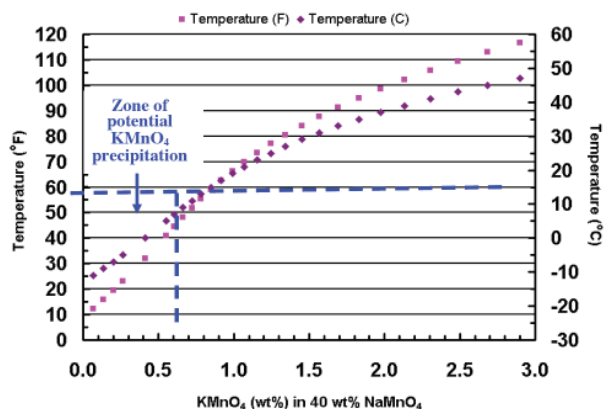
### SUMMARY

During the winter months, many regions of the United States, Canada, and Europe experience extended periods of cold days and nights. CARUSOL® liquid permanganate and CARUSOL® C liquid permanganate products may be exposed to days of cold temperatures during transportation and storage.

CARUSOL and CARUSOL C products are water solutions and may freeze when exposed to cold weather over many hours. These products are freeze/thaw stable, and their solution strengths can be recovered when warmed.

Carus reminds you that these products contain a small amount of residual potassium ion. When exposed to cold temperatures, small potassium permanganate (KMnO<sub>4</sub>) crystals may form. These crystals may precipitate out of solution and settle to the bottom of packages and storage containers due to a decrease in the solubility of potassium permanganate at lower temperatures.

The purple needle shaped KMnO<sub>4</sub> crystals can appear at the bottom of totes, drums, or pails in transit or during storage when temperatures are below 13°C or 55°F. The graph below illustrates the solubility of KMnO<sub>4</sub> in 40% sodium permanganate as a function of temperature.



### POTENTIAL SOLUTION

To prevent crystallization, CARUSOL and CARUSOL C shipping containers should be stored in a warm building. If bulk and semi-bulk storage tanks, metering pumps, and feed lines are located outside, these should be heat traced and insulated.

One way to limit the potential existence of permanganate crystals in the bottom of the totes or drums, is to mix the contents of the totes or drums briefly prior to transferring to mixing tanks to get the permanganate crystals back into solution.

If sodium permanganate has already been transferred to the mixing tank and there are crystals on the bottom of the tank, add water to the container to assist in solubilizing the crystals back into solution.

### CAUTION NOTICE

Exposure to temperatures < 38°F (3°C) may cause potassium permanganate crystals to form. Plugging of small diameter suction lines on metering pumps, particulate screens and check valves is possible.

At 21°F (-6°C) CARUSOL Liquid Permanganate may freeze. At 5°F (-15°C) CARUSOL C Liquid Permanganate may freeze.

CARUSOL and CARUSOL C Liquid Permanganates are freeze/thaw stable.

### SPECIAL NOTES

This information has been compiled through Quality Control analyses and field data reports and it is meant as a physical/chemical guideline for the use of our customers. It is current and accurate to the best of our knowledge. If you have additional questions or comments, please contact us at [salesmkt@carusllc.com](mailto:salesmkt@carusllc.com).



#### Carus Headquarters USA

315 Fifth Street | Peru, IL 61354 | Tel +1 (815) 223-1500 | 1(800) 435-6856 | Fax +1 (815) 224-6697  
[carusllc.com](http://carusllc.com) | [salesmkt@carusllc.com](mailto:salesmkt@carusllc.com)

#### Carus Europe

Calle Rosal 4, 1-B | Oviedo, Spain 33009 | Tel +34.985.785.513 | Fax +34.985.785.510

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change; and the conditions of handling, use or misuse of the product are beyond our control. Carus makes no warranty, either expressed or implied, including any warranties of merchantability and fitness for a particular purpose. Carus also disclaims all liability for reliance on the completeness or confirming accuracy of any information included herein. Users should satisfy themselves that they are aware of all current data relevant to their particular use(s).

Carus and Design is a registered service mark of Carus. CARUSOL® is a registered trademark of Carus. Responsible Care® is a registered service mark of the American Chemistry Council.



**RESPONSIBLE CARE™**  
 Driving Safety & Sustainability