SERVICE BULLETIN

SB-18-009

Issue date: October 2003
Revised: February 20, 2012

Dust Control Chemicals & Corrosion

Warning! Dust control can be a leading contributor to corrosion. Today, many companies are using liquid chloride solutions to aid in dust control. The liquid chloride solutions are hygroscopic, meaning they attract moisture from the air and their surroundings. They also have high surface tension, low vapor pressure, and a strong moisture film; which, combined with their thirst for moisture, help to bind the aggregate particles together. Two commonly used chloride solutions are:

Calcium chloride Magnesium chloride

While both calcium chloride and magnesium chloride can be useful in controlling dust, they can be corrosive if they come in contact with metals, such as stainless steel, because of their ability to attract moisture and produce chloride ions.

The most common forms of corrosion caused by these chemicals are **galvanic corrosion** and **direct attack corrosion**.

Galvanic Corrosion: If you put two dissimilar metals or alloys in a common electrolyte (moisture), and connect them to a voltmeter, it will show an electric current flowing between the two (This is how the battery in your automobile works). When the current flows, material will be removed from one of the metals or alloys (the *anodic* one) and dissolve into the electrolyte. The other metal (the *cathodic* one) will be protected. Here is an example of how your dust control method can lead to galvanic corrosion: if you drive through an area that has been sprayed with magnesium chloride, the magnesium chloride finds its way between metals and begins to attract moisture (an electrolyte). The moisture (electrolyte) then allows one of the metals to dissolve (corrode) and can eventually lead to structural failure.

Direct Attack Corrosion: This occurs between metals and chemicals in the environments (such as, dust control chemicals). This type of attack occurs between a naturally occurring "passive film" on most metals and the chloride ions from the dust control chemicals. Stainless steel, for example, has a passive film created by the combination of the chrome in the stainless steel and oxygen from the air. This chrome oxide is resistant to further corrosion until it comes in contact with the chloride ion from the dust control chemical. Once the reaction between the passive film and the chloride ion occurs, the metal is left to corrode through normal oxidation (rust).

17295 E. Railroad St., City of Industry, CA 91748 • Phone: (800) 423-6591 • Fax: (626) 965-5660 • Online: www.utilitytrailer.com

In conclusion, be aware that dust control methods, using calcium chloride or magnesium chloride are leading contributors to corrosion.

Any other questions regarding this service bulletin should be directed to Utility's Field Service Department at 800-423-6591.

Field Service Department
UTILITY TRAILER MANUFACTURING COMPANY

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