



Tuesday 27th September 2016

Bulletin 1111 - 09/16 – White Powder Deposits on Food Cargoes - Worldwide

The Association was recently advised of a number of incidents of white powder deposits being found on food cargoes carried in refrigerated containers.

The following advice has been received from consultants P.E.B. Commodities, Inc.

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White powder deposits (aluminium oxide/hydroxide) have been reported on food cargoes carried in refrigerated containers. The white powder has been a source of customer rejections, lost transportation revenues, claims and government mandated destruction of the food cargoes. Although no short term “fix” will completely solve the corrosion related problems, there are a number of actions that can be adopted that will help mitigate recurrence of the corrosion induced white powder.

Accordingly, the following actions are suggested to help prevent corrosion induced white powder deposits on food cargoes carried in refrigerated containers:

1. Establish, publish and implement operational guidelines and policies that:
 - a. Require all parties to wash (clean) the interior of refrigerated containers with heated fresh water with no corrosive cleaning agents that will damage the refrigerated containers or the environment. Cleaning methods have their own advantages and disadvantages that should be considered in the light of the circumstances of each case. With regard to corrosion, a neutral pH wash solution is suggested. One method of cleaning the interior surfaces of a refrigerated container would be with a heated fresh water broad spray pressurized system of 2000-2500 psi (steam cleaning) without a corrosive cleansing solution. Care must be taken not to damage evaporator coil fins, electrical connections and thermal tape with the pressurized water stream. During and after washing the container, the container should be parked so the rear (door end) of the container slopes downwards to completely drain the container. The interior of the container should be dry before the rear doors are closed. Moisture when mixed with some fumigants facilitates oxidation of the aluminium alloys. The four floor drains (two forward and two aft) should always be thoroughly cleaned of all debris prior to and after washing the container. Refer to company policies and equipment manufacturer’s guidelines for the cleaning methodologies and the intervals of cleaning. Company policy should specify maintenance cleaning guidelines and training requirements for personnel and/or agents who are accountable for properly cleaning refrigerated containers.
 - b. Rinse the interiors of containers with a heated fresh water broad spray nozzle pressurized system of 2000-2500 psi after sulphur dioxide (“SO₂”) treated cargoes have been shipped in them.
 - c. Discontinue in-container insect disinfestation with fumigants like methyl bromide.
 - d. Require suppliers and shippers to eliminate the practice of exogenously adding SO₂ gas into the interior cargo space of refrigerated containers at the time of loading table grapes and other cargoes.

Sulphur dioxide is an intermediate in the production of corrosive sulphuric acid. Sulphuric acid is a highly corrosive acid.

e. Consider not shipping cargoes like lychees and longans if the shipper insists on applying excessive amounts of sulphur dioxide.

f. Clean the stators and other corroded parts with a fully biodegradable and environmentally safe cleaning agent. In the December 2010 TECHLINE bulletin, Carrier recommends Tri-Pow'r® HD to assist in helping to remove the corrosive fumigation chemicals and dislodging of the corrosive elements.

g. Encourage shippers to specify at the time of booking that the fresh air exchange be opened to 25 cbm (15 cfm) for grape shipments using slow and fast release in-package SO₂ generators to suppress the growth of Botrytis mould. It should be noted that some exporters specify a closed fresh air exchange for table grapes at the time of booking.

2. When identifying a container for the movement of high-risk cargoes/shipments where outturn inspections may result in the rejection and possible mandated destruction of cargo, turn off the refrigeration unit and unplug the unit from its electric power source. After the unit is turned off, remove the exterior evaporator fan cover plates to determine if serious corrosion issues exist on aluminium alloy/metal components such as stators, fans, and the like. A corrosion problem, if present anywhere, should either be corrected or a different refrigerated container without serious corrosion issues could be deployed and dispatched.

3. Minimize the corrosion attack of existing units on aluminium alloy stators by using replacement housings fabricated from materials exhibiting better corrosion resistance or, as an alternative, treat existing stator housings with corrosion resistant coatings such as marine grade epoxy paints.

4. Conduct appropriate tests and inspections of the refrigeration units and container boxes to assure that adequate precautions have been taken to avoid galvanic corrosion when dissimilar metals come in contact.

5. Update and implement, as needed, new US Food and Drug Administration ("FDA") regulations such as "shipper" specified interior refrigerated container cleaning instructions and processes involving the Sanitary Food Transportation Act and the Food Safety Modernization Act. The new rules address, in part, risks to human or animal health associated with the transportation of food. With regard to refrigerated container sanitation and food safety, the central question is "how clean is clean" with respect to the refrigerated container and the refrigeration unit. Are the refrigerated containers physically clean, chemically clean and/or microbiologically clean?

6. For future refrigerated container acquisitions, it is recommended that refrigerated container design and performance specifications be published that take into full account the reality that the interior of refrigerated units and containers will most likely be subjected during the normal course of a refrigerated container's life to moisture and corrosive agents like cleaning solutions, fumigants such as methyl bromide and SO₂, i.e. in-package SO₂ generators, exogenous applications of SO₂) and sulphur compounds emitted from vessel and truck stack gases when the fresh air exchange is open). Refrigerated container designs could include safeguards that prevent or suppress corrosion such as coatings, corrosion resistant aluminium alloys and the like.

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Source of Information

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