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Evaluating Implementation of VCI Papers for Universal Bearings, Inc.

Background: Since 1959, Universal Bearings, Inc. has been manufacturing needle roller bearings and related products. Cortec has performed two tests in the past few months for Universal, and more testing has been requested. Mark Sahlhoff of Universal Bearings sent 4 large bottles of bearings to Cortec. Universal would like to implement the use of VCI paper under the bottle lids, and they would like a comparison test performed.

Purpose: Compare the corrosion inhibiting abilities of Cortec VpCI paper and Daubert VCI paper when used under lids of bottles containing approximately 30 pounds of bearings.

Method: ASTM D 1748 Humidity Cabinet

Materials: 4 – 30 pound bottles of large roller bearings, provided by Universal Bearings, Inc.
Daubert VCI Paper
Cortec VpCI-146 Paper

Procedure: The following procedure was followed:

- 1) Four bearing bottles arrived from Universal Bearings, Inc.
- 2) Bottle lids were labeled as follows:
 - a. 'Daubert LL'
 - b. 'Daubert TL'
 - c. 'Cortec LL'
 - d. 'Cortec TL'
 - i. The bottles labeled 'TL' were to be put into the cabinet with a tight lid.
 - ii. Bottles labeled 'LL' were to be put into the cabinet with a loose lid. The lid was tightened and turned back one-quarter turn before being placed into the cabinet.
- 3) Before going into the cabinet, the bottles were opened and inspected.
 - a. Two lids contained a circle of Daubert VCI paper.
 - b. Two lids contained a circle of Cortec VpCI-146 paper.
- 4) After visual inspection, bottles were placed into humidity cabinet.
 - a. The bottles were checked periodically.
- 5) After 600 hours, all bottles were removed from ASTM D 1748 testing.
- 6) Lids were removed, and bearings were visually inspected.

Results: The following results were found:

- 1) Corrosion was first seen on 'Daubert LL' bottle after 192 hours.
- 2) Corrosion was first seen on 'Cortec LL' bottle after 312 hours.
- 3) Corrosion was first seen on 'Daubert TL' bottle after 336 hours.
- 4) Corrosion was first seen on 'Cortec TL' bottle after 480 hours.
- 5) After 600 hours, all bottles were inspected.



- a. Final corrosion percentage was determined to be the percentage of corroded bearings on the top layer of bearings in each bottle.

Bottle	Percent Corrosion After 600 Hours
Daubert LL	90%
Daubert TL	75%
Cortec LL	50%
Cortec TL	5%

Conclusion: Two conclusions can be made from this test. First, tightening the lid during shipment and storage provides extra protection from moisture and other elements. This was obvious not only in the amount of time needed for the first corrosion to show up, but also in the total corrosion percentage at the end of testing. Second, the Cortec paper provided superior corrosion protection to the Daubert paper. Even with the loose lid Cortec showed superior protection when compared to the Daubert paper under a tight lid.