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## *Evaluation of Cortec products for Cummins*

**Background:** Cummins currently utilizes Armor VCI bags and Castrol Kleen chemicals for the cleaning and rust prevention of some of the components they manufacture.

**Purpose:** Evaluate the effectiveness of Cortec VpCI film and surface preparation products in protecting the engine components from corrosion in an accelerated corrosion test.

**Materials:**

VpCI-126 Blue Film	
VpCI-418LM	
Castrol Kleen 3601,	provided by Cummins Inc.
Castrol Kleen 3653,	provided by Cummins Inc.
Armor VCI Film	provided by Cummins Inc.
Steel engine components	provided by Cummins Inc.
VpCI-422	
Methanol	

**Method:** ASTM-D-1748

**Procedure:** The following procedure was followed:

- 1) The components arrived from Cummins in poor condition and with corrosion on all of the components and most surfaces of those components.
- 2) VpCI-422 was utilized to remove the corrosion from the components by hand and they were then rinsed with DI water.
- 3) Next the components were neutralized with VpCI-418LM and allowed to fully dry.
- 4) Two of the components were rinsed with Methanol to remove any trace of VpCI-418LM and were then cleaned with Castrol Kleen 3601 and then rinsed with Castrol Kleen 3653; the solutions were utilized as received.
- 5) Components were allowed to sit on the counter for 72 hours to determine if the cleaners would provide flash rust corrosion protection
  - a. The components did not show any signs flash rust before packaging.



- 6) Next the components were packaged in VpCI-126 Blue film and Armor VCI film and labeled as follows:
  - a. Sample A31 was treated with Castrol Kleen 3601, rinsed with Castrol Kleen 3653, and packaged in the Armor VCI Film.
  - b. Sample B31 was treated with Castrol Kleen 3601, rinsed with Castrol Kleen 3653, and packaged in the VpCI-126 Blue Film.
  - c. Sample C31 was treated with VpCI-418LM and packaged in the Armor VCI Bag.
  - d. Sample D31 was treated with VpCI-418LM and packaged in VpCI-126 Blue film.
- 7) After 24 hours the components were placed in the Modified ASTM-D-1748 Humidity Cabinet and periodically inspected.
- 8) After 316 hours the components were removed from the chamber, inspected, photographed and a report was issued.

**Results:** The following results were found:

Sample	Time to Failure (hours)
A31	100
B31	Did not Fail
C31	131
D31	Did not Fail

**Conclusion:** VpCI-126 Blue film provided superior corrosion protection to the piston rods when compared to the Armor VCI blue bag. The VpCI-418LM easily cleaned the components and helped protect them from flash rust corrosion before packaging.

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