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Evaluation of Cortec additives for KOYO Bearing

Background: Koyo Bearing designs and manufactures all types, from miniature bearings one millimeter in diameter to bearings over seven meters in diameter. They are experiencing corrosion on their materials after machining and would like to determine if the addition of a Cortec additive to their fluids will improve time to the onset of corrosion in their operations.

Purpose: Evaluate Cortec additives with the metal working fluid currently utilized at Koyo to determine if they are compatible and if they will increase the length time to the onset of corrosion.

Materials: Cimcool Cimtech 500, Synthetic Metalworking Fluid
 M-435
 M-370
 Ecoline Cutting Fluid
 1010 Cold Rolled Carbon Steel Panels

Method: Standardized Compatibility Test
 ASTM-D-1748

Procedure: *Standardized Compatibility Test*

- 1) The solutions (with percent by weight) listed below were created for compatibility testing.

Sample	Cimcool 500	M-435	M-370	Water
A34	5			95
B34	5	2		93
C34	5		2	93

- 2) The samples were placed in an 80°C oven.
- 3) After 16 hours the samples were removed and inspected.
- 4) Next the solutions were placed in a 0°C refrigerator.
- 5) After 8 hours the samples were removed and inspected.
- 6) This is considered one test cycle and the samples were subjected to three test cycles.
 - a. Elevated temperatures and additive concentrations that will never occur in use are utilized during testing to ensure the solutions are compatible.



ASTM-D-1748 Humidity Cabinet

- 1) 1010 carbon steel panels were coated with solutions (with percent by weight) listed below.

Panel	Cimcool 500	M-435	M-370	Ecoline Cutting Fluid	Water
A34	5	---	---	---	95
B34	5	2	---	---	93
C34	5	---	2	---	93
D34	---	---	---	5	95
E34	Control				

- 2) After being allowed to fully dry, the panels were suspended in the ASTM-D-1748 Humidity cabinet and were periodically inspected.
- 3) After 384 hours the panels were removed from the ASTM-D-1748 Humidity cabinet, inspected, photographed, and a report was written.

Results:

Standardized Compatibility Test

Sample	0 hours	8	24	32	48	56	72
A34	FC	FC	FC	FC	FC	FC	FC
B34	FC	FC	FC	FC	FC	FC	FC
C34	FC	FC	FC	FC	FC	FC	FC

FC = Fully Compatible

ASTM-D-1748 Humidity Cabinet

Panel	Time to Failure (hours)
A34	210
B34	300
C34	Did not Fail
D34	Did not Fail
E34	72

Conclusion: M-370 doubled the length of time before the onset of corrosion when added to the metalworking fluid utilized by Koyo Bearing, Cimtech Cimcool 500. EcoLine Cutting Fluid provides superior protection in comparison to the Cimcool Metalworking Fluid.





