

Evaluation of Castrol Syntillo 9930 Synthetic Cutting and Grinding Fluid vs. Cortec Metalworking Products

Background: Customer utilizes Castrol Syntillo 9930 for cutting and grinding ferrous alloys but is not satisfied with the corrosion protection it provides to the parts after machining. They would like to find an additive for the Castrol 9930 or possibly a Cortec metal working fluid that would provide better corrosion protection.

Purpose: Determine if M-435 is compatible with the Castrol Syntillo and compare this with the corrosion protection provided by Cortec metalworking fluids.

Materials: Castrol Syntillo 9930
M-435
VpCI-344
VpCI-345
Ecoline Cutting Fluid
1010 Carbon Steel Panels

Method: Standardized Compatibility Test
ASTM-D-1748 Humidity Test

Procedure: *Standardized Compatibility Test*

- 1) The following solutions were created for compatibility testing
 - a. Solution A was Castrol Syntillo 9930 as received.
 - b. Solution B was Castrol Syntillo 9930 mixed 1:1 with M-435
 - c. Solution C was 4% Castrol Syntillo 9930 mixed with water
 - d. Solution D was 4% Castrol Syntillo 9930 and 4% M-435 mixed with water
- 2) The solutions were placed in an 80°C oven.
- 3) After 16 hours the solutions were removed from the oven and inspected
- 4) Next the samples 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

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- 1) 1010 carbon steel panels were coated with the following solutions:
 - a. Panel A was left uncoated as a control
 - b. Panel B was coated with 2% solution of Castrol Syntillo 9930 in water.
 - c. Panel B was coated with 2% solution of Castrol Syntillo 9930 in water with 2% M-435
 - d. Panel D was coated with a 4% solution of VpCI-344 in water
 - e. Panel E was coated with a 4% solution of VpCI-345 in water
 - f. Panel E was coated with a 4% solution of Ecoline Cutting Fluid in water.
- 2) The panels were allowed to dry for 24 hours and then the panels were suspended in the ASTM-D-1748 humidity cabinet and periodically inspected
- 3) After 744 hours the panels removed from the ASTM-D-1748 humidity cabinet, inspected, photographed, and a report was written

Results:

Standardized Compatibility Test

Sample	0 hours	16	24	40	48	64	72
A5	FC	FC	FC	FC	FC	FC	FC
B5	FC	FC	FC	FC	FC	FC	FC
C5	FC	FC	FC	FC	FC	FC	FC
D5	FC	FC	FC	FC	FC	FC	FC
FC stands for Fully Compatible							

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Panel	Time to Failure (hours)
A5	less than 24
B5	336
C5	360
D5	660
E5	640
F5	DNF

Conclusion: Ecoline Cutting provided more than twice the corrosion protection of the Castrol Syntillo 9930 in the ASTM-D-1748 Humidity Test.











