



4119 White Bear Parkway, St. Paul, MN 55110 USA
Phone (651) 429-1100, Fax (651) 429-1122
Toll Free (800) 4-CORTEC, E-mail info@cortecvci.com
Internet <http://www.cortecvci.com>

Evaluation of Multan F5002

Background: Hutchinson Technology uses Multan F5002 in stamping applications. They are looking for an additive or replacement product that can meet all of the same requirements this product meets.

Purpose: To find an additive or replacement product for Multan F5002.

Materials: Multan F5002
M-370
EcoLine Cutting Fluid
EcoLine All Purpose Lubricant
Zahn cup #1

Method: ASTM D-1748
Viscosity (zahn)
Coefficient of friction

Procedure: The following procedure was followed:

- 1) Using the samples to be tested, coat each of the solutions on carbon steel panels.
- 2) Hang the panels to dry for a minimum of 2 hours.
- 3) Place the panels in the humidity cabinet and inspect them for corrosion on a regular basis.
- 4) Record the number of hours for the panels to fail. Failure is determined by observing one spec of corrosion that is 1-3mm in diameter, or three specs of corrosion at least 1mm in diameter.
- 5) After 215 hours the panels were removed from the humidity cabinet, hung to dry, and then photographed.

The following procedure was followed for measuring the viscosity:

- 1) Fill up the zahn cup #1 with the solution to be tested.
- 2) Measure the amount of seconds it takes to drain the solution

Coefficient of friction for concentrates and diluted products was tested in an independent laboratory (Lubrizol).



Results: The following results were found from ASTM D-1748:

Sample Description	Time to Failure
Multan F5002 (control)	20 hours
20% Multan F5002 (recommended by manufacturer)	1 hour
EcoLine Cutting Fluid	400 hours
20% EcoLine Cutting Fluid	90 hours
EcoLine All Purpose Lubricant	> 125 hours
Multan F5002 + 5% M-370	210 hours

The following results were found for measuring viscosity using Zahn cup #1:

Sample Description	# of seconds to drain
Multan F5002	82 seconds
EcoLine All Purpose Lubricant	47 seconds
EcoLine Cutting Fluid	36 seconds

The coefficients of friction are presented on the graphs and pictures attached.

EcoLine Cutting Fluid and EcoLine All Purpose Lubricant have the same or better level of lubricity as Multan F5002.

Conclusion: Based on the above results, EcoLine Cutting Fluid and All Purpose Lubricants would be a good product to replace the Multan F5002:

1. Significantly better corrosion protection
2. Same or better level of lubricity

Project #: 06-219-1125

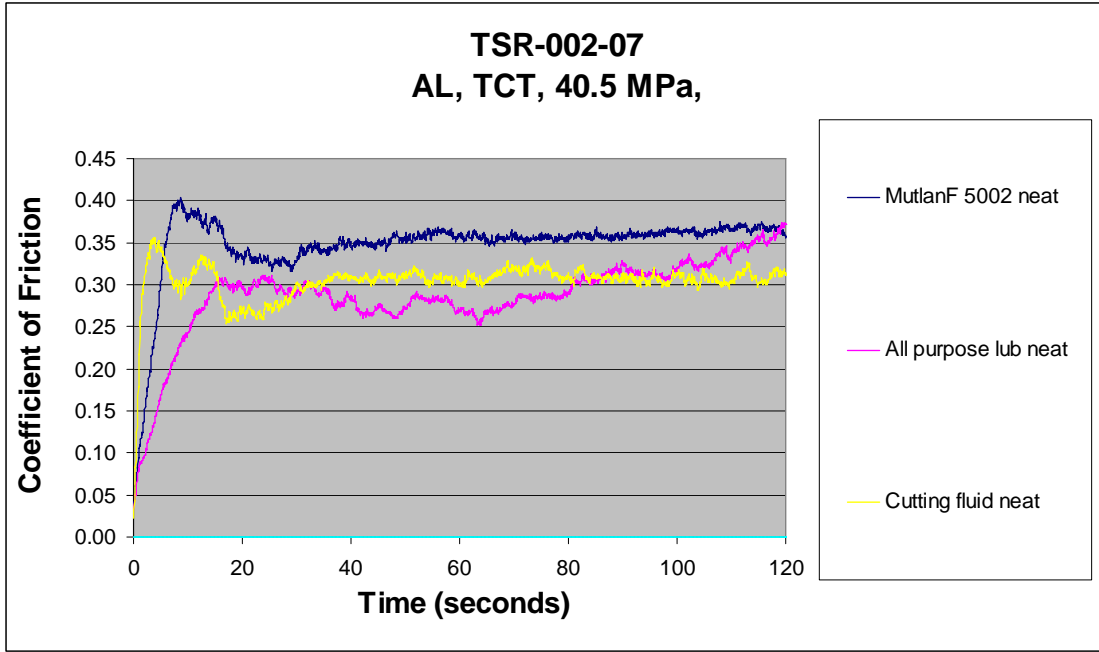
Picture after 215 hours



Multan F5002 (control)

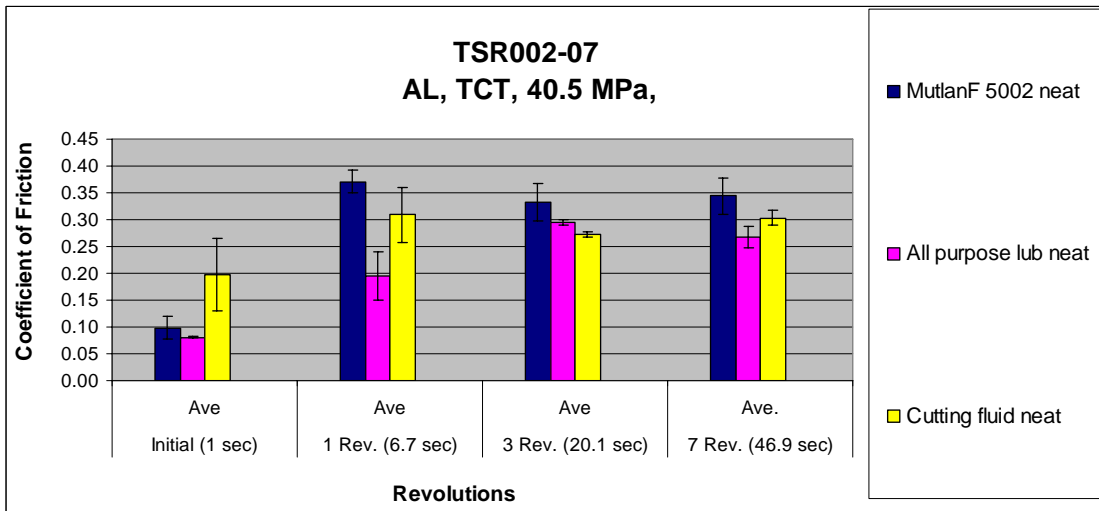


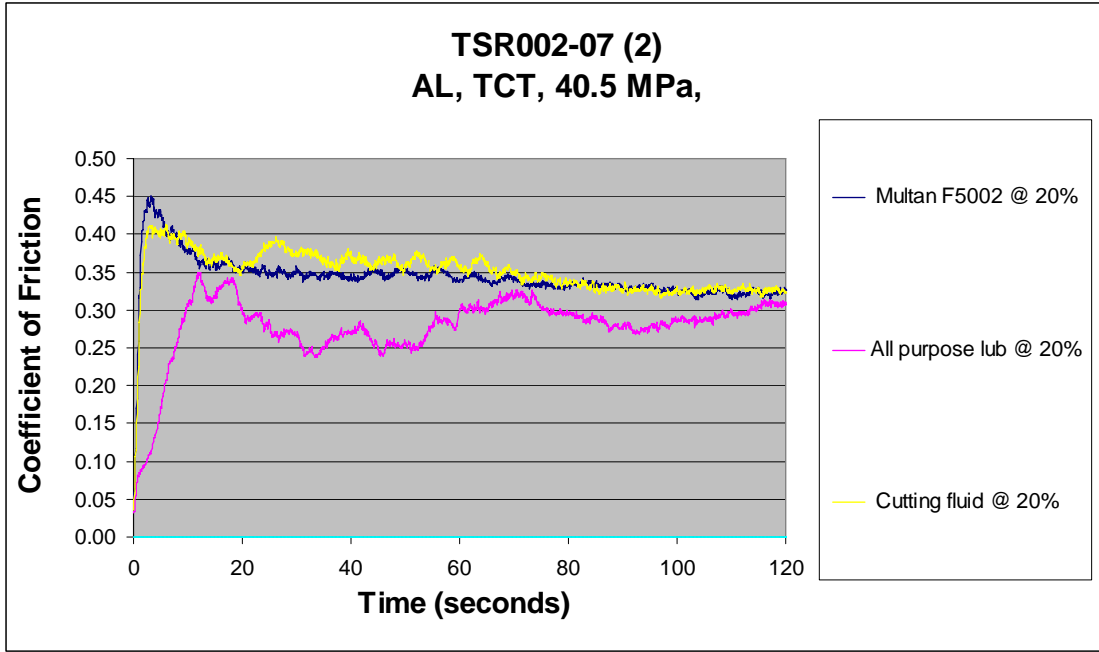
Multan F5002 + 5% M-370



COEFFICIENT OF FRICTION

	Initial (1 sec)		1 Rev. (6.7 sec)		3 Rev. (20.1 sec)		7 Rev. (46.9 sec)	
	Ave	St. Dev.	Ave	St. Dev.	Ave	St. Dev.	Ave.	St. Dev.
MutlanF 5002 neat	0.0986	0.0208	0.3712	0.0206	0.3323	0.0354	0.3449	0.0337
All purpose lub neat	0.0807	0.0008	0.1961	0.0450	0.2956	0.0049	0.2675	0.0206
Cutting fluid neat	0.1976	0.0681	0.3088	0.0522	0.2721	0.0056	0.3032	0.0139





COEFFICIENT OF FRICTION

	Initial (1 sec)		1 Rev. (6.7 sec)		3 Rev. (20.1 sec)		7 Rev. (46.9 sec)	
	Ave	St. Dev.	Ave	St. Dev.	Ave	St. Dev.	Ave.	St. Dev.
Multan F5002 @ 20%	0.2921	0.0223	0.3988	0.0103	0.3502	0.0033	0.3405	0.0112
All purpose lub @ 20%	0.0813	0.0075	0.2315	0.0159	0.2950	0.0123	0.2588	0.0102
Cutting fluid @ 20%	0.2676	0.0083	0.3918	0.0371	0.3567	0.0232	0.3657	0.0414

