

**Testing conducted at Southwest Research Institute
U.S Army TARDEC
Fuels and Lubricants Research (Tribology)**

The resistance to abrasion of four fluids was investigated using the Ball on Cylinder Lubricity Evaluator (BOCLE) (ASTM D 5001). The ball on cylinder lubricity evaluator assesses the wear aspects of the boundary lubrication properties of a fluid. The fluid under test is placed in a test reservoir in which atmospheric air is maintained at 10% relative humidity. A non-rotating steel ball is held in a vertically mounted chuck and forced against an axially mounted steel ring with an applied load. The test cylinder is rotated at a fixed speed while being partially immersed in the fluid reservoir. This maintains the cylinder in a wet condition and continuously transports the test fluid to the ball/cylinder interface. The wear scar generated on the test ball is a measure of the fluid lubricating quality.

The first fluid tested was 100 wt% of a 150 solvent refined paraffinic base oil. The second fluid tested was a combination of 98.0 wt% of a 150 solvent refined paraffinic base oil and 2.0 wt% of 10 wt% Boron Nitride/150 solvent refined paraffinic base oil dispersion. The Boron Nitride dispersion used was JB33018 (Acheson Colloids). The resulting second fluid included 0.2 wt% Boron Nitride and 98.8 wt% 150 solvent refined paraffinic base oil. The third fluid was a stabilized dispersion of PTFE (SLA1612, Acheson Colloids). The stabilized PTFE dispersion included 95.0 wt% of 150 solvent refined paraffinic base oil and 5.0 wt% of a 20 wt% of PTFE in 150 solvent refined paraffinic base oil. The resulting third fluid included 1.0 wt% PTFE and 99 wt% 150 solvent refined paraffinic base oil. The fourth fluid consisted of a mixture including 93.0 wt% of a 150 solvent refined paraffinic base oil, 5.0 wt% of the PTFE dispersion and 2.0 wt% Boron Nitride dispersion to give a fourth fluid including 1.0 wt% of PTFE, 0.2% wt% Boron Nitride and 98.8% wt% 150 solvent refined paraffinic base oil carrier.

The results of the BOCLE tests follow:

<u>Composition No.</u>		<u>Scuff Depth (mm)</u>
1) 150 solvent refined paraffinic base oil	100%	0.72
2) 150 solvent refined paraffinic base oil	98%	0.635
JB33018 Boron Nitride	2%	
3) 150 solvent refined paraffinic base oil	95%	0.585
PTFE (SLA1612)	5%	
4) 150 solvent refined paraffinic base oil	93%	0.53
PTFE (SLA1612)	5%	
JB33018 Boron Nitride	2%	