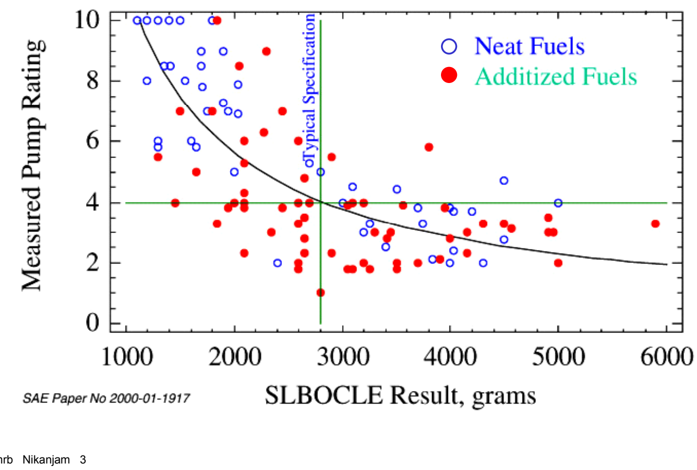
APPENDIX G

Diesel Fuel Lubricity: Pump Wear Data

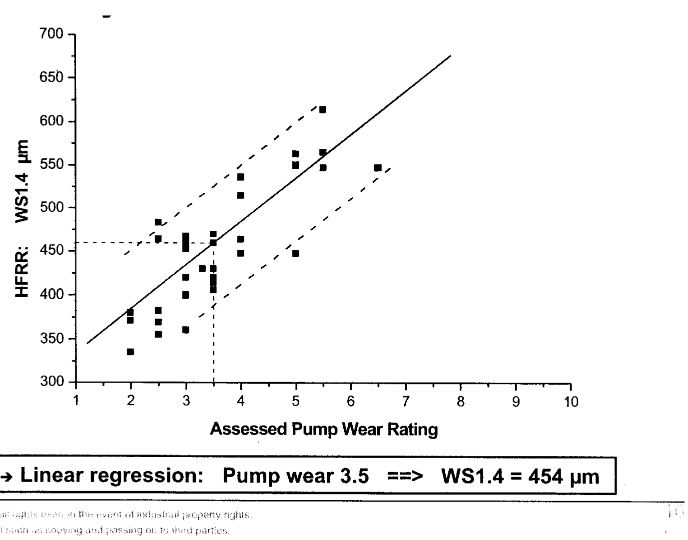
Pump wear data for conventional heavy-duty diesel engine fuel injection systems are shown in Figure 1 below as a function of diesel fuel lubricity level as indicated by the Scuffing Load Ball on Cylinder Lubricity Evaluator (SLBOCLE) test. An acceptable pump wear rating for these pumps is a pump wear rating or four or less. These data support a SLBOCLE scuffing load of 3100 grams or higher as being protective of conventional pumps.

Figure 1 Pump Wear Data for Conventional Pumps[1]



Pump wear data for advanced technology high pressure pumps are shown in Figure 2 below. The diesel fuel lubricity as measured by the High Frequency Reciprocating Rig (HFRR) test is shown as a function of measured Bosch wear rating. An acceptable wear rating for these pumps is a value of 3.5 or less. These data indicate that fuels that produce maximum wear scar diameters of approximately 460 microns or less result in acceptable wear ratings.

Figure 2 Pump Wear Data for Advanced Technology Pumps[a, 2]



[a] Used by permission from Bosch Corp, May 2003

[1] ASTM ballot, Sub Committee: D02.E0, Revision of D-975-01 Specification for Diesel Fuel Oils to include a lubricity specification, Background & Supporting Documents & References", Issue Date April 25, 2003.

[2] Meyer, Klaus and Livingston, Thomas C., Bosch Corporation, CARB Fuels Workshop Presentation, " Diesel Fuel Lubricity Requirements for Light Duty Fuel Injection Equipment", Sacramento, CA, Feb. 20, 2003.