

Comparison of IIF versus IIE Oxidation

Brent Shoffner 11/2/00

- Major differences between the IIE and IIF include:

	IIE	IIF
Fuel	Leaded	Unleaded
Oil Filter Temperature	149C	155C
Coolant Out Temperature	115C	122C
Engine Speed	3000 RPM	3600 RPM
Engine Power	67.5 HP	100 HP

- There may *not be a strong correlation* between the IIE and IIF for oxidation, but *there may be a “relationship”*.
- The following is an analysis of four oils run in the IIF Discrimination Matrix, which have both IIE and IIF oxidation results.

Sequence IIIF vs. IIIE Viscosity Increase Comparison Oil Data

From Figure 9 in the Sequence IIIF Research Report

Oil Code	Oil Quality	SAE Viscosity Grade	Base Oil Group	IIIE % Viscosity Increase	IIIE Hr to 375%	Expected IIIF Viscosity Performance	IIIF % Viscosity Increase
1006	SJ ¹	5W-30	I	314	65.9	Fail	4058
GPS1	GF-3	5W-30	II+	85	73	Pass	36
GPS8	PC-9/SL	15W-40	I	74	77.9	Pass	328
GPS12	GF-2	5W-30	II	94	76.4	Pass	153

¹ D5480 = 18.5 per 1999 ASTM Reference Oil Book.

Figure 9- SEQUENCE IIIF REDEVELOPMENT PROGRAM OXIDATION DISCRIMINATION OILS

Oil Code	Supplier	Oil Quality	SAE Viscosity Grade	Base Oil Group	Sequence IIIE Performance				Field Data	Sequence IIIF (Precision Matrix Configuration)				Expected IIIF Performance	
					% Viscosity Increase	Hr to 375%	Avg Wear	Max Wear		% Viscosity Increase	Hr to 100%	Avg Wear	Max Wear	Viscosity Increase	Wear
GPS1	A	GF-3	5W-30	II+	85	73	26	99	Low Vis Inc, Wear in Ext Drain Taxi Testing	65 ⁽²⁾	--	Low	Low	Pass	Pass
GPS2	A	GF-3	10W-30	I	--	--	--	--	--	80 ⁽²⁾	--	4	12	Pass	Pass
GPS3	A	GF-3	10W-30	II+	--	--	--	--	--	--	--	--	--	Pass	Pass
GPS4	B	SF	5W-30	II/II+	Fail ⁽³⁾	--	Pass	Pass	--	98	--	11	15	Fail	Pass
GPS5	B	<GF-2	5W-30	II/II+	32,000	--	11	51	--	46	--	3	6	Fail	Pass
GPS6	B	GF-3	5W-30	II/II+	14	--	4	5	Good Perf in Extended Drain Mixed Driving	Pass	--	--	--	Pass	Pass
GPS7	C	PC-9/SL	15W-40	I	B/L Fail ⁽³⁾ ⁽⁶⁾	--	--	--	--	--	--	--	--	B/L Fail	Pass
GPS8	C	PC-9/SL	15W-40	I	74	77.9	5.2	9	Running in several fleets.	--	--	--	--	Pass	Pass
GPS9	C	GF-3	5W-30	II+	B/L Fail ⁽³⁾ ⁽⁷⁾	--	--	--	--	--	--	--	--	B/L Fail	Pass
GPS10	C	GF-3	5W-30	II+	Robust Pass ⁽³⁾	--	--	--	See Note 5	62	--	96 ⁽⁴⁾	1066	Pass	Pass
GPS11	D	GF-2	5W-30	I	125 ⁽¹⁾	--	Pass	Pass	Low Vis Inc, Wear in Ext Drain Taxi Testing	785	--	Pass	Pass	Pass	Pass
GPS12	D	GF-2	5W-30	II	94	76.4	13	25	Low Vis Inc, Wear in Ext Drain Taxi Testing	--	--	--	--	Pass	Pass

⁽¹⁾ 80 to TVTM in 5 tests with same DI and different base oils

⁽²⁾ Earlier version of IIIF test

AO.

⁽³⁾ Predicted performance based on fundamental formulation expertise

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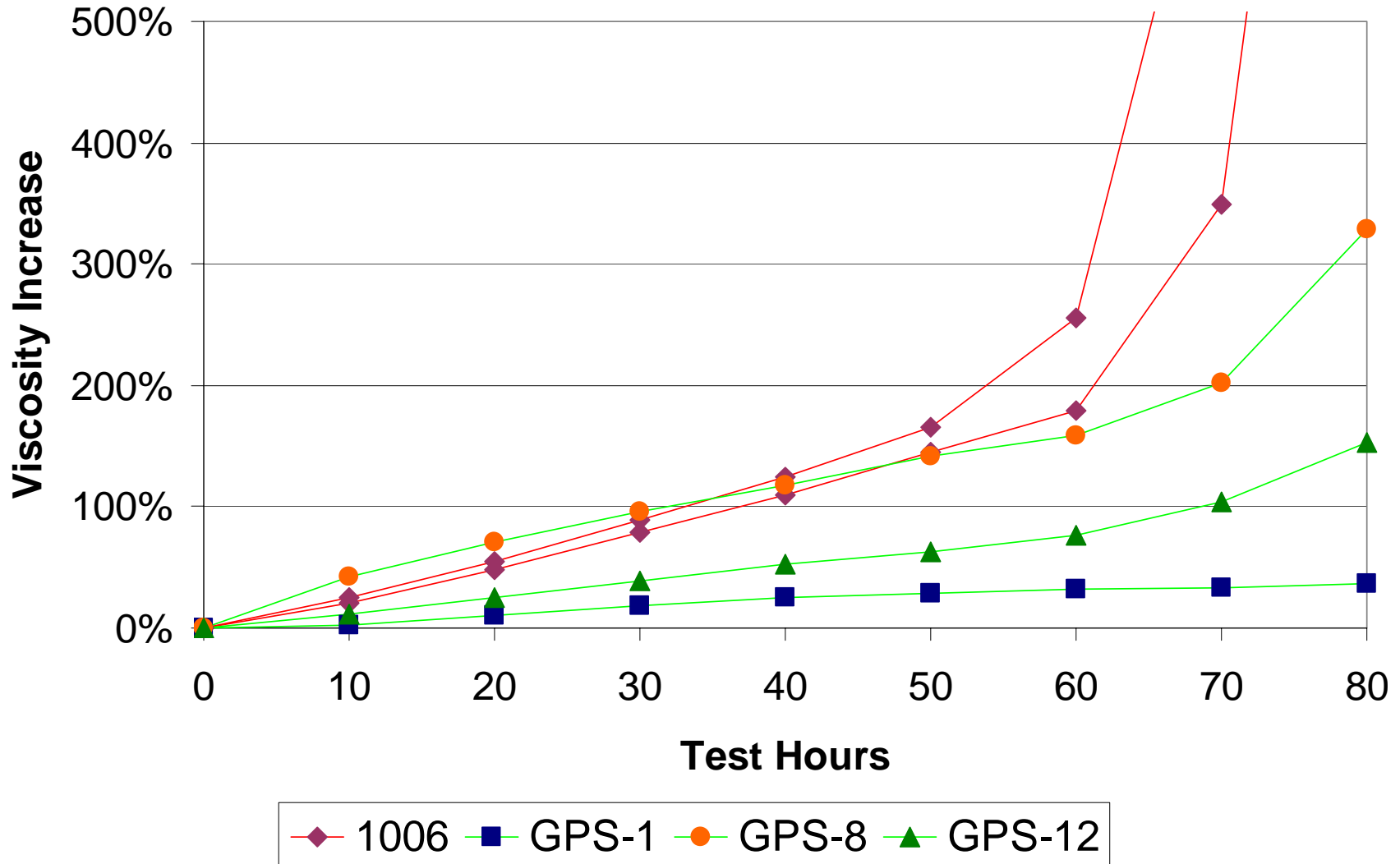
⁽⁴⁾ Single-point wear

⁽⁵⁾ Similar formulation styles tested in NYC taxis.

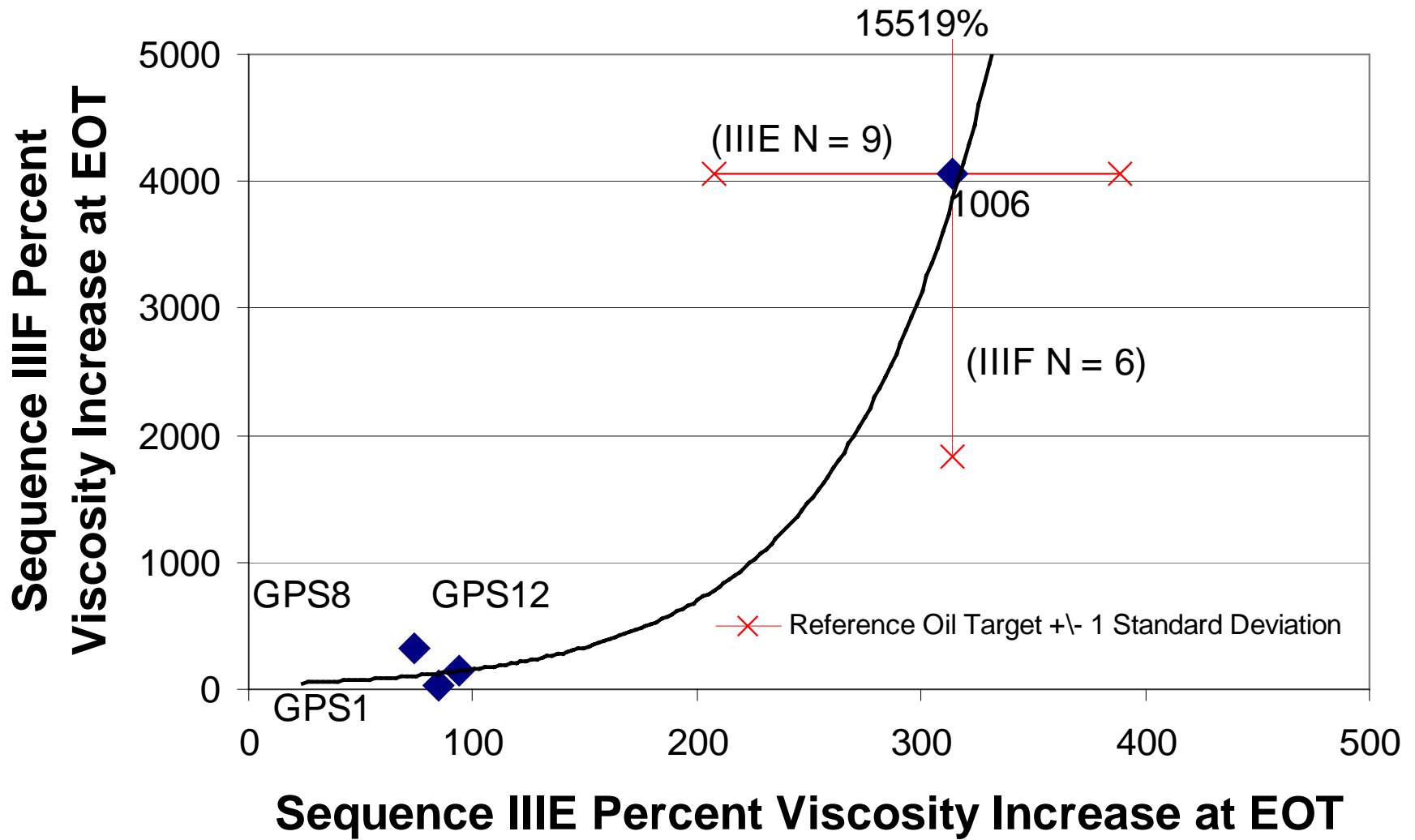
⁽⁶⁾ Same formulation as GPS8, with reduced amount of supplemental

⁽⁷⁾ Same formulation as GPS10, with reduced amount of supplemental

IIIF Discrimination Matrix Viscosity Increase



Sequence IIIF vs. IIIE Viscosity Increase



Sequence IIIF vs. IIIE Viscosity Increase

