

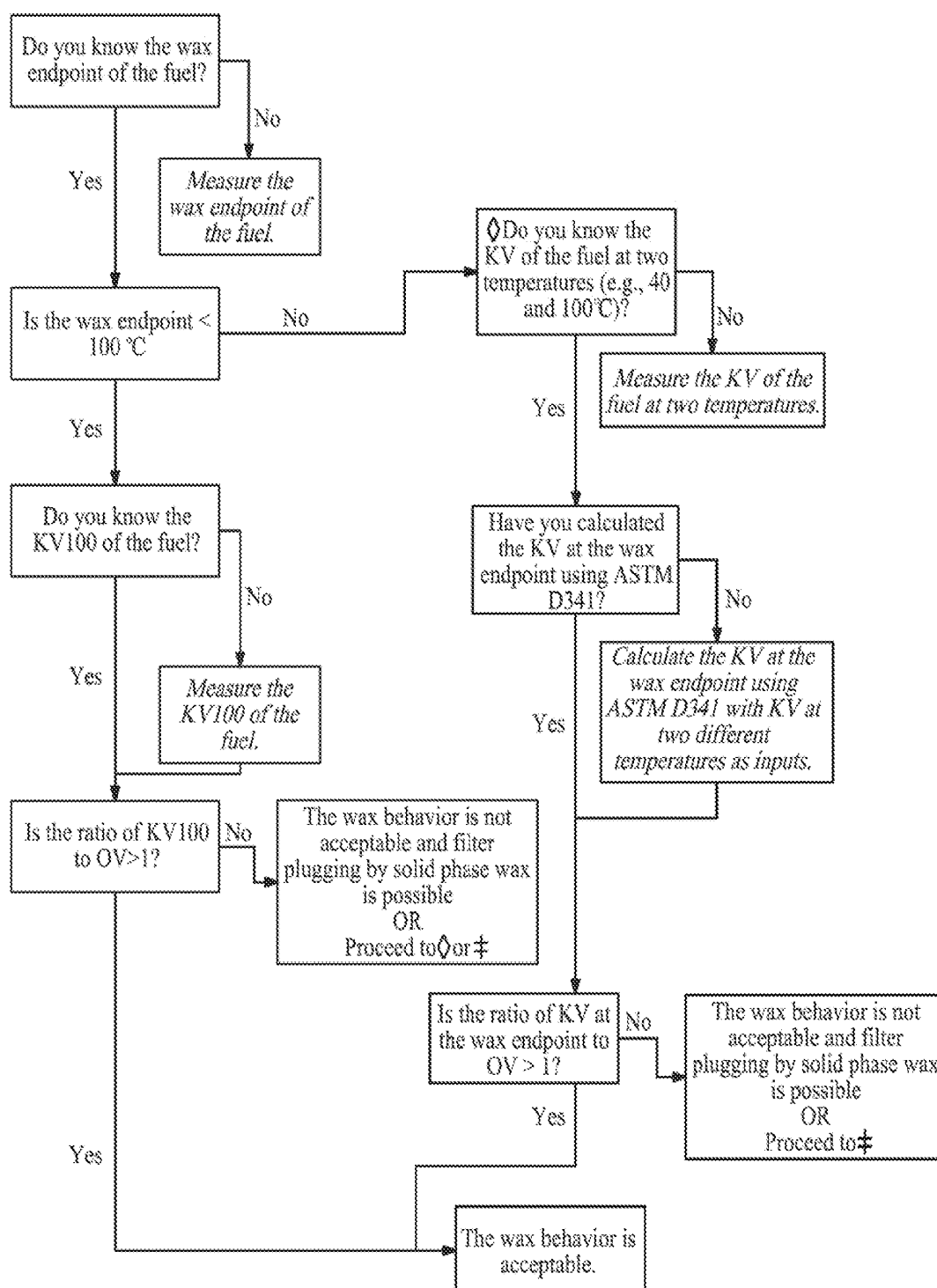
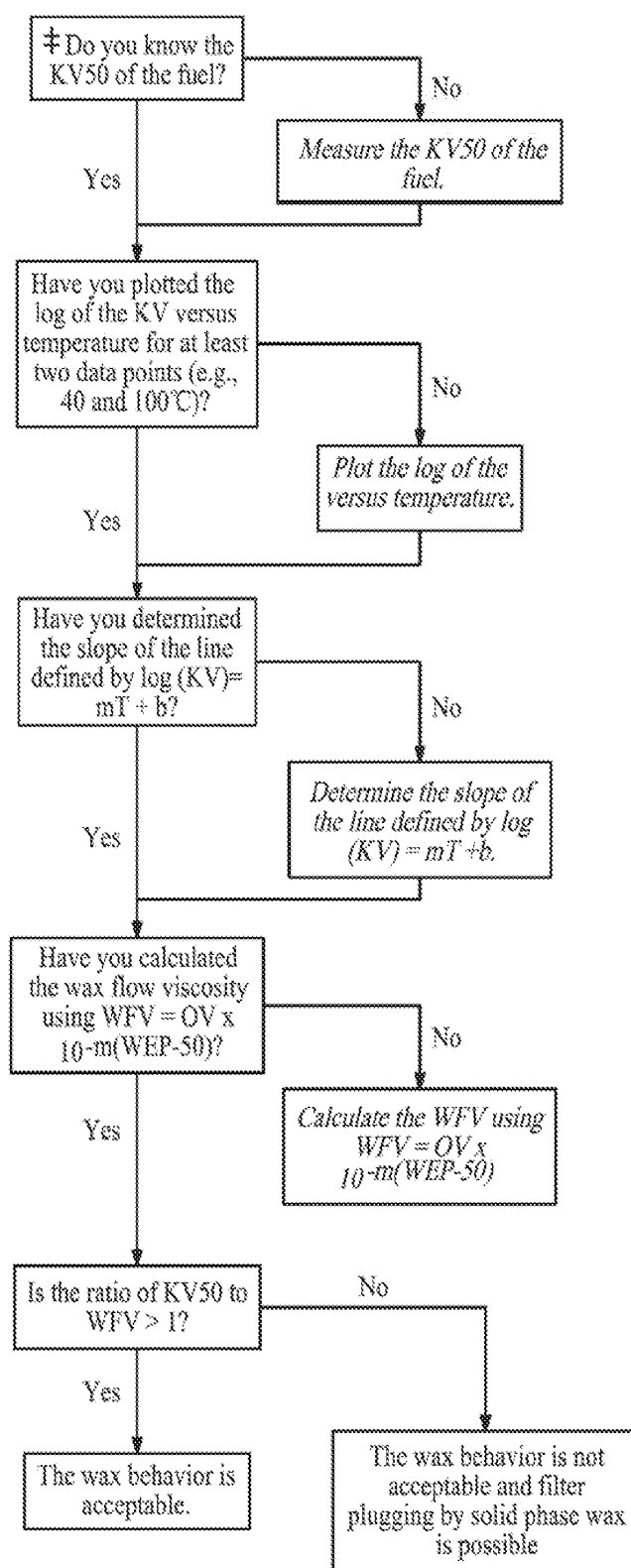
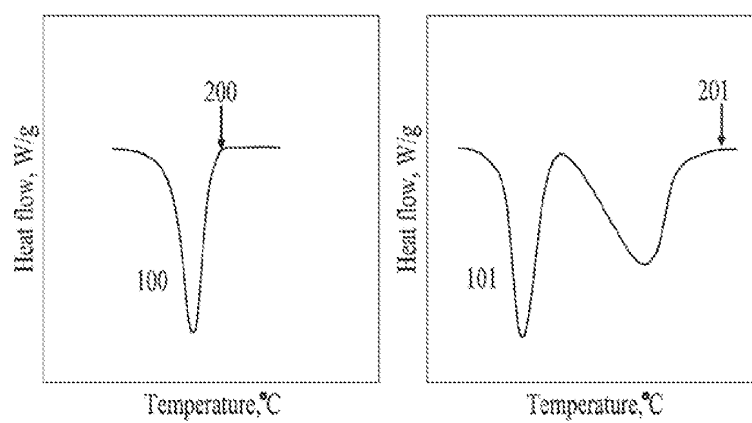
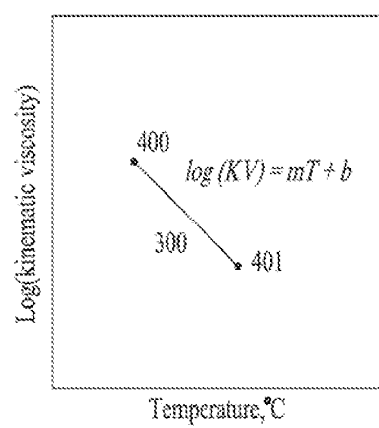


FIG. 1

**FIG. 2**

SUBSTITUTE SHEET (RULE 26)

**FIG. 3**

**FIG. 4**

Component	Density at 15°C, g/cm ³	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 50°C, cSt	Kinematic Viscosity at 100°C, cSt	Sulfur, wt%	Pour Point, °C	Carbon Residue, wt%	N-Heptane Insolubles, wt%	Wax Endpoint, °C
Heavy Fraction C1	0.9820	1362	638.7	51.98	1.67	9	12.6	3.5	88
Heavy Fraction C2	0.9781	-	652.0	44.75	1.56	9	11.2	-	88
Heavy Fraction C3	0.9766	-	410.5	48.47	1.30	0	12.6	-	87
Heavy Fraction C4	0.9732	-	593.7	48.17	1.34	18	11.3	-	89

FIG. 5

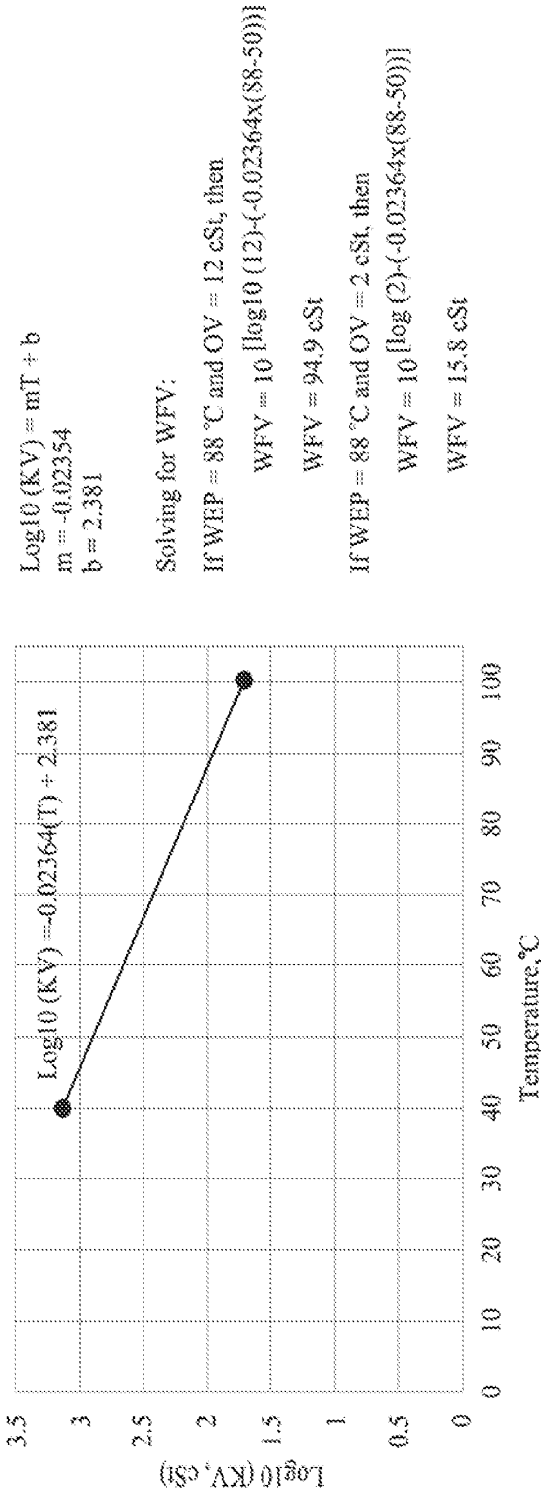


FIG. 6

	Heavy Fraction C1	Distillate Flux 1	Distillate Flux 2	Fuel A	Fuel B
Heavy Fraction C1 vol%	100	0	0	25	25
Distillate Flux 1 vol%	0	100	0	75	0
Distillate Flux 2 vol%	0	0	100	0	75
Density at 15°C, g/cm ³	0.9820	0.8514	0.8502	0.8855	0.8840†
Sulfur, wt%	1.67	0.0003	0.0006	0.46†	0.46†
Kinematic Viscosity at 40°C, cSt	1362	2.888	2.870	8.615	7.270
Kinematic Viscosity at 50°C, cSt	638.7	2.500	2.200	6.618	5.741
Kinematic Viscosity at 100°C, cSt	51.98	-	-	2.481	2.209
Pour Point, °C	9	-	-	-76	-73
Carbon Residue, wt%	12.6	0†	0†	3.5†	3.5†
N-Heptane Insolubles, wt%	3.5	0†	0†	0.97†	0.97†
CCAI	838	-	-	817	820
Wax Endpoint, °C	88	-	-	66	69

†Estimated or calculated value

FIG. 7

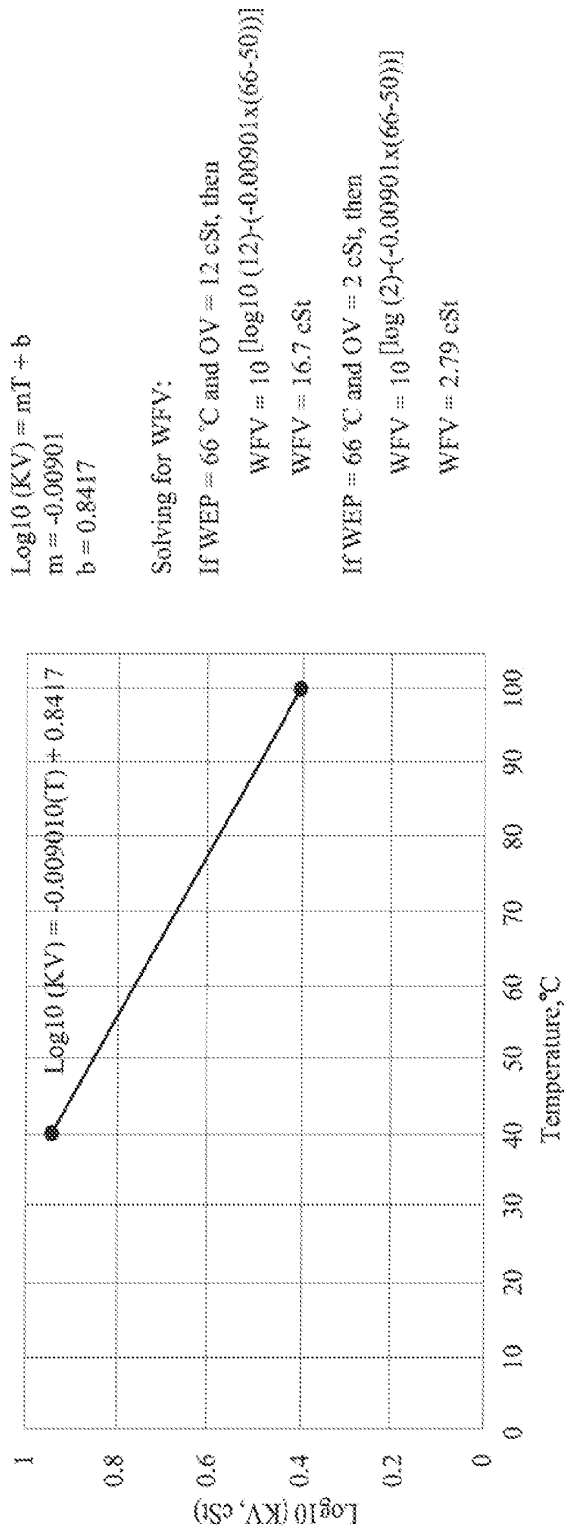


FIG. 8

$$\text{Log}_{10}(\text{KV}) = mT + b$$
$$m = -0.00901$$
$$b = 0.8417$$

Solving for WFFV:

If WEP = 66 °C and OV = 12 cSt, then

$$\text{WFFV} = 10 [\log_{10}(12) - (-0.00901 \times (66 - 50))]$$

$$\text{WFFV} = 16.7 \text{ cSt}$$

If WEP = 66 °C and OV = 2 cSt, then

$$\text{WFFV} = 10 [\log_{10}(2) - (-0.00901 \times (66 - 50))]$$

$$\text{WFFV} = 2.79 \text{ cSt}$$

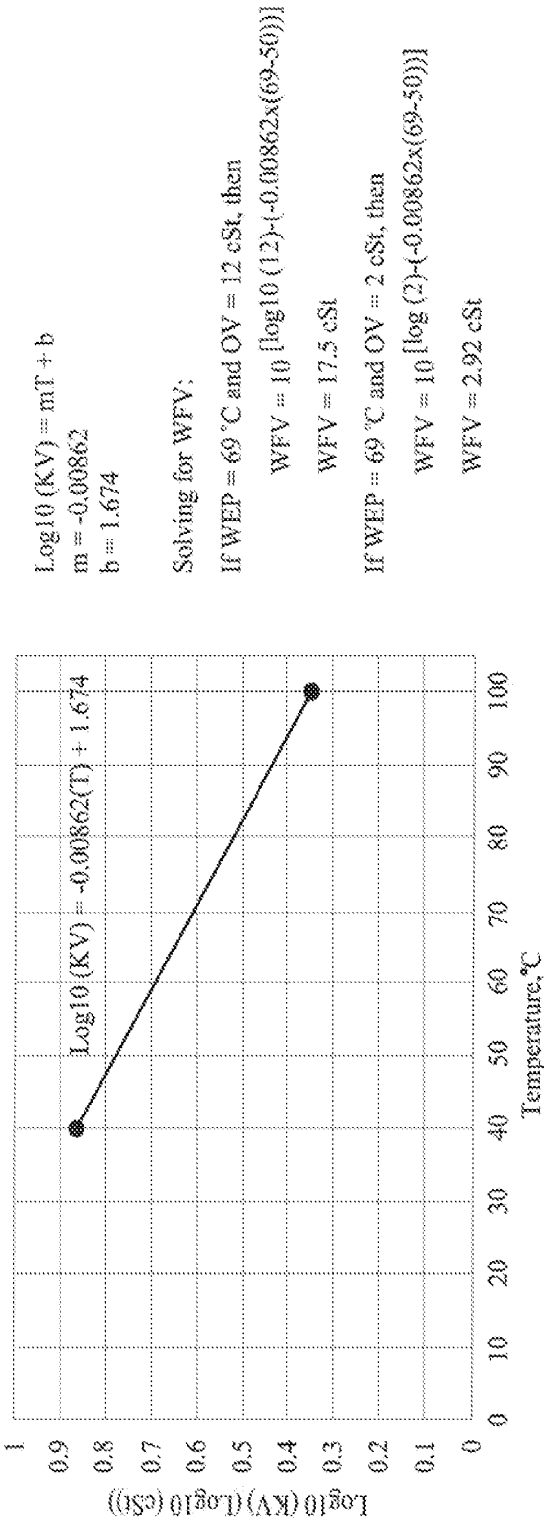


FIG. 9

$\text{Log}_{10}(\text{KV}) = mT + b$
 $m = -0.00862$
 $b = 1.674$

Solving for WFFV:

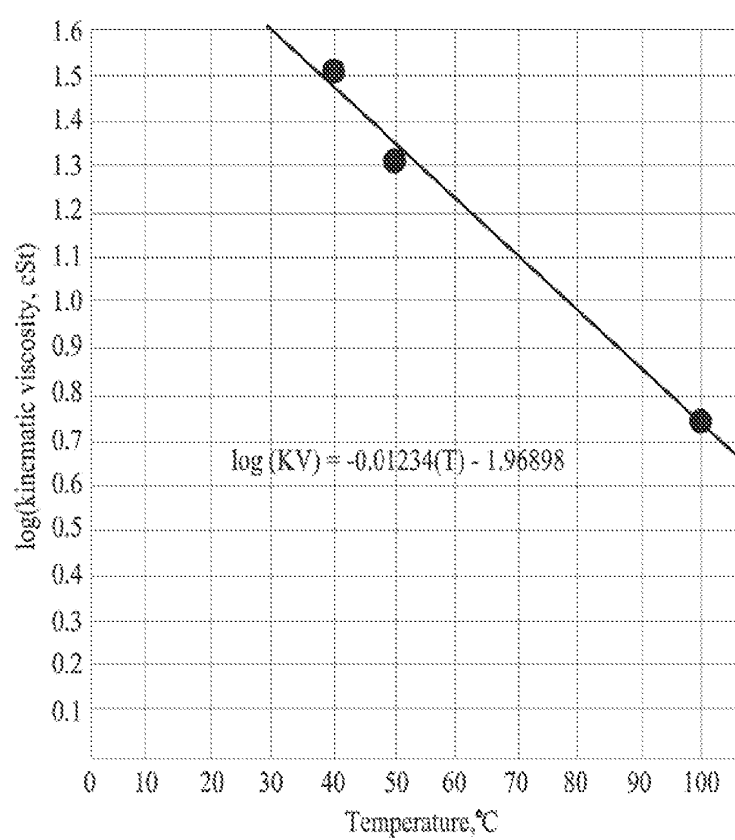
If WEP = 69 °C and OV = 12 cSt, then
 $\text{WFFV} = 10 [\log_{10} (12) - (-0.00862 \times (69 - 50))]$
 $\text{WFFV} = 17.5 \text{ cSt}$

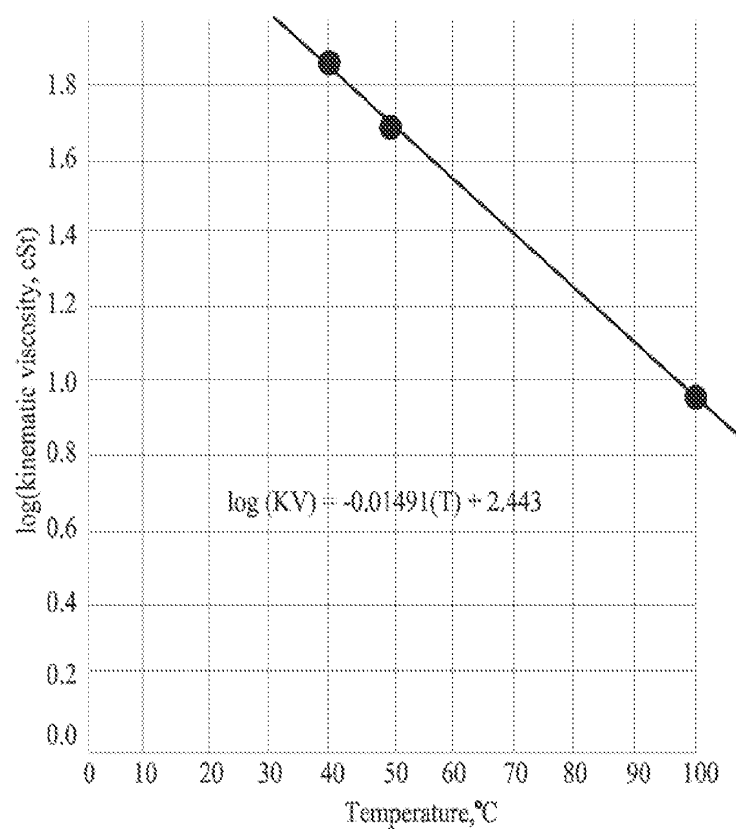
If WEP = 69 °C and OV = 2 cSt, then
 $\text{WFFV} = 10 [\log_{10} (2) - (-0.00862 \times (69 - 50))]$
 $\text{WFFV} = 2.92 \text{ cSt}$

	Heavy Fraction A1	Heavy Fraction B3	Distillate Flux B2	Distillate Flux C3	Fuel C	Fuel D
Heavy Fraction A1 vol%	100	0	0	0	25.8	39.6
Heavy Fraction B3 vol%	0	100	0	0	20	7
Distillate Flux B2 vol%	0	0	100	0	45.17	39.54
Distillate Flux C3 vol%	0	0	0	100	7.31	11.22
Density at 15°C, g/cm ³	1.0000	0.9924	0.8500	0.9393	0.9245	0.9344
Sulfur, wt%	1.2	1.7	0.004	0.77	-	-
Distillation Method	-	-	D2887	D2887	-	-
Distillation T10, °C	-	-	224.5	359.5	-	-
Distillation T50, °C	-	-	280.5	419	-	-
Distillation T90, °C	-	-	347.1	460.5	-	-
Kinematic Viscosity at 40°C, cSt	-	-	-	-	32.17	72.06
Kinematic Viscosity at 50°C, cSt	200000†	50.00	2.60	19.60	20.57	48.33
Kinematic Viscosity at 100°C, cSt	-	-	-	-	5.51	9.00
Pour Point, °C	-	-	-	-	-	-
Wax Endpoint, °C	-	62	20	50	81	81

†Estimated or calculated value

FIG. 10

**FIG. 11**

**FIG. 12**

Blend Component	Density, g/cm ³	Viscosity at 50 °C, cSt	Sulfur, wt. %	Distillation T10, °C	Distillation T50, °C	Distillation T90, °C	Distillation Method	Wax content (wt. %)	Wax Endpoint, °C	Wax Flow Viscosity, cSt
DF A1	0.8749	18.62	0.0005	306.2	376.2	399.9	D86		35	
DF A2	0.9236	48.2	0.3144	339	466	632	D7169		not tested	
DF A3	0.9068	64.3	0.2284	339	466	632	D7169	2.5	64	18.3
DF B1	0.8390	1.9	0.0053	201	250.8	324	D86		not tested	
DF B2	0.8500	2.60	0.004	224.5	280.5	347.1	D2887	10.5	20	5.3
DF B3	0.8548	4.27	0.0526	229	325	400	D86		not tested	
DF C1	0.9985	2.00	1.13	222	243	289	D86		not tested	
DF C2	0.9795	8.89	1.15	320.6	346.9	370.7	D86		not tested	
DF C3	0.9393	19.60	0.77	359.5	419	460.5	D2887	8.6	50	12
DF C4	0.8830	1.691	0.098	204	262.4	318.7	D86	1.65	1	3.4
HF A1	1.0000	200000	1.2	not tested	not tested	not tested			not tested	
HF A2	0.9732	593.70	1.34	326	582	727	D2887		89	
HF A3	0.9328	575	0.5109	324	610	731	D7169		not tested	
HF A4	0.9715	1878	0.71	not tested	not tested	not tested			not tested	
HF A5	0.9395	941	0.68	299	607	705	D6352		not tested	
HF A6	0.9779	3020	2.38	476	613	729	D2887		104	
HF A7	1.004	708432	0.81	569	659		D6352		not tested	
HF B1	0.9359	25.51	0.17	351	440		D86	13.5	49	11.6
HF B2	0.9227	25.68	0.14	350	424.5		D86	14.3	50	12
HF B3	0.9924	50.00	1.7	not tested	not tested	not tested		6.6	62	17.2

*Wax flow viscosity is calculated using operating viscosity equal to 12 cSt.

FIG. 13

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Fuel	Blend Recipe, vol %	Density @ 15 °C, g/cm ³	Sulfur, wt%	KV50, cSt	Asphaltenes, wt%	Pour Point, °C	MCR, wt%	Flash Point, °C	T10 (slm dis), °C	T50 (slm dis), °C	T90 (slm dis), °C	Wax content (wt%)	Wax Endpoint, °C	Wax Flow Viscosity, cSt	Ratio, KV50 to Wax Flow Viscosity	
Fuel 1	HF A4, 58 DF B1, 42	0.9019	0.4249	30.3		-9	5.03					1.8	80	29.6	1.02	
Fuel 2	HF A5, 68 DF B1, 32	0.9069	0.484	53.7	0.82	-50	5.65	83	209	539	679	2.3	83	34.5	1.56	
Fuel 3	HF A1, 41 DF B2, 30 DF C3, 22	0.9434	0.85	66.8	2.6	30	10	87	227	415	660		99	62	1.08	
Fuel 4	HF A6, 67.3 DF C1, 12	0.9492	1.8	72					227	583	n.d.		100	65	1.11	
Fuel 5	HF A2, 1.36 DF A1, 76 DF B3, 22 DF C2, 0.64	0.8745	0.0351	11.51									35	8	1.44	
Fuel 6	HF A2, 1.36 DF A1, 98 DF C2, 0.64	0.88	0.034	20.18									35	8	2.52	
Fuel 7	HF A2, 3.4 DF A1, 58 DF B3, 18 DF C2, 20.6	0.8973	0.339	11.61									35	8	1.45	
Fuel 8	DF A1, 100	0.8749	0.0005	18.62									35	8	2.33	
Fuel 9	HF A1, 37.2 HF B3, 14 DF B2, 35.78 DF C3, 19.54	0.9396		50.91	1.9	18						5.7	81	34.8	1.46	
Fuel 10	HF A1, 48 DF B2, 35.2 DF C3, 13.6	0.9425		88.15	3.8	18						5.54	89	53.1	1.66	
Fuel 11	HF A6, 75 DF B3, 25 DF B2, 5	0.9332	1.15	79.8									96	48	1.66	
Fuel 12	HF A7, 75 DF B3, 25	0.9410	0.445	212									100	65	3.26	
Fuel 13	HF A4, 80 DF A3, 20	0.9273	0.4618	352		3	5.9	100				3.3	80	52.6	6.69	

FIG. 14

Fuel 14	HF A4, 41 DF A3, 47 DF B1, 12	0.9083	0.3224	66.6		9	4	81				3.0	73	28.1	2.37
Fuel 15	HF A4, 28 DF A3, 65 DF B1, 7	0.9084	0.2914	67.1		12	3.19	95				1.9	71	26.3	2.55
Fuel 16	HF A1, 45.6 DF B2, 38.44 DF C3, 12.92	0.9376		66.68	3.5	15						4.2	89	49	1.36
Fuel 17	HF A2, 16.4 DF A2, 64.7 DF B1, 18.9	0.9154	0.4300	23.3		27	1.86	87				2.8	71	23.0	1.01

^aMax flow viscosity is calculated using operating viscosity equal to 12 cSt.

FIG. 14 CONTINUED

FUEL	Blend Recipe, vol %	Density @ 15 °C, g/cm ³	Sulfur, wt%	KV50, cSt	Asphaltene, wt%	Pour Point, °C	MCR, wt%	Flash Point, °C	T10 (sim dis), °C	T50 (sim dis), °C	T90 (sim dis), °C	Wax content (wt%)	Wax Endpoint, °C	Wax Flow Viscosity, cSt	Ratio, KV50 to Wax Flow Viscosity
Fuel 18	HF A6, 62 DF B3, 14 DF C1, 24	0.9599		61									98.5	61	1.00
Fuel 19	HF A1, 31.8 HF B3, 17 DF B2, 40.07 DF C3, 9.01	0.9328		33.43	1.9	15						4.8	85	36.1	0.926
Fuel 20	HF A1, 17 DF B2, 70 DF C3, 10	0.8901	0.38	7.84	1.2	9	4.52	76	210	314	618	24.2	87	40	0.196
Fuel 21	HF A1, 11 HF B3, 6 DF B2, 75 DF C3, 6	0.8844	0.3	6.097	1.0		3.27	81	211	308	357	22.7	87	40	0.152
Fuel 22	HF A2, 24 DF A1, 65 DF C2, 11	0.9095	0.507	46.9								4.4	95	53	0.885
Fuel 23	HF A6, 15.2 DF B3, 77.4 DF B2, 2.7	0.8944	0.769	12.4								18.1	78	29	0.428
Fuel 24	HF A6, 8.7 DF B3, 87 DF B2, 1.6	0.8767	0.28	8.885								19.3	72	24	0.370
Fuel 25	HF A1, 42.6 DF B2, 42.49 DF C3, 12.07	0.9307		43.89	3.0	9						4.4	89	44.4	0.989

FIG. 15