

Supplementary material

Comparison of empirical models to predict viscosity of secondary vacuum gas oils

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Table S1. 42 data points for measured at different temperatures VGO viscosities and predicted by the empirical model developed in this work and by the model of Aboul-Seoud and Moharam [15]

Nr		Measured	Est. this work	Est. Aboul-Seoud and Moharam [15]	AD (this work)	AD (Aboul-Seoud and Moharam)	%AD (this work)	%AD(Aboul-Seoud and Moharam))	SE (This work)	SE (Aboul-Seoud Aboul-Seoud and Moharam)
1	HAGO-5	29.6	22.1	24.3	7.6	5.3	25.6	17.9	654	319
2	HAGO-5	18.7	17.4	17.0	1.4	1.7	7.3	9.2	53	84
3	HAGO-5	15.0	14.0	12.4	1.1	2.6	7.0	17.4	49	303
4	HAGO-5	13.0	11.5	9.4	1.5	3.6	11.5	27.6	132	761
5	HAGO-5	11.3	9.6	7.3	1.8	4.0	15.6	35.5	243	1260
6	LVGO-5	30.8	22.5	26.8	8.3	4.0	27.0	13.0	728	169
7	LVGO-5	18.5	17.4	18.6	1.1	0.0	6.1	0.2	37	0
8	LVGO-5	14.8	13.8	13.4	1.0	1.4	7.0	9.3	49	86
9	LVGO-5	13.0	11.2	10.1	1.8	2.9	14.0	22.1	195	490
10	LVGO-5	11.7	9.2	7.8	2.5	3.9	21.5	33.2	460	1103
11	HVGO-5	118.6	127.1	116.0	8.5	2.6	7.2	2.2	51	5
12	HVGO-5	95.6	79.9	70.5	15.7	25.1	16.4	26.3	270	690
13	HVGO-5	57.5	53.0	45.5	4.5	12.0	7.8	20.8	62	432
14	HVGO-5	46.3	36.8	31.0	9.5	15.3	20.5	33.1	422	1093
15	HVGO-5	24.4	26.6	22.0	2.2	2.4	8.9	9.7	79	94
16	FCC SLO-12	109.3	119.3	132.3	10.0	23.0	9.2	21.0	84	442
17	FCC SLO-12	53.7	66.7	78.2	12.9	24.5	24.1	45.5	581	2072
18	FCC SLO-12	31.5	40.4	49.4	8.9	17.9	28.3	56.9	799	3235
19	FCC SLO-12	22.2	26.2	33.0	3.9	10.8	17.7	48.5	313	2357
20	FCC SLO-12	17.3	17.9	23.1	0.6	5.9	3.7	34.0	14	1156
21	VBGO-1	46.1	43.9	33.8	2.2	12.3	4.7	26.7	22	713
22	VBGO -2	39.5	40.1	31.1	0.6	8.4	1.6	21.1	2	447
23	VBGO-1	14.7	14.6	12.0	0.1	2.7	0.4	18.2	0	332
24	VBGO -2	13.5	13.7	11.3	0.2	2.2	1.3	16.3	2	266
25	FCC SLO-13	107.8	47.7	56.4	60.1	51.4	55.8	47.7	3109	2273
26	FCC SLO-13	46.3	31.6	35.9	14.7	10.4	31.8	22.5	1009	508
27	FCC SLO-13	29.8	22.0	24.2	7.8	5.6	26.1	18.9	683	357
28	FCC SLO-13	20.0	16.0	17.1	4.0	2.9	20.1	14.6	404	214
29	FCC SLO-13	14.5	12.0	12.6	2.5	1.9	17.2	13.4	295	180

30	FCC SLO-14	194.0	113.1	133.0	80.9	61.0	41.7	31.5	1737	989
31	FCC SLO-14	85.1	65.2	77.3	19.9	7.8	23.4	9.2	547	84
32	FCC SLO-14	44.8	40.5	48.3	4.3	3.4	9.6	7.7	93	59
33	FCC SLO-14	25.6	26.8	32.0	1.1	6.4	4.4	24.8	20	615
34	FCC SLO-14	16.2	18.6	22.3	2.4	6.1	15.0	37.5	224	1407
35	HTVGO-1	28.8	29.3	18.3	0.5	10.5	1.8	36.5	3	1331
36	HTVGO-1	19.6	20.2	13.1	0.6	6.4	2.9	32.9	9	1080
37	HTVGO-1	14.1	14.5	9.8	0.4	4.3	3.0	30.3	9	917
38	HTVGO-1	10.4	10.8	7.6	0.4	2.8	3.9	27.4	15	749
39	HTVGO-2	25.6	27.7	16.8	2.1	8.8	8.3	34.3	68	1174
40	HTVGO-2	17.7	19.1	12.2	1.5	5.5	8.3	31.1	68	970
41	HTVGO-2	13.5	13.8	9.1	0.3	4.4	2.3	32.3	5	1043
42	HTVGO-2	9.6	10.4	7.1	0.8	2.5	8.2	25.9	68	672
Average deviation					7.4	9.4	13.8	24.9		
Standard error									18.5	28.5