

Appendix j: Yield stresses results (oscillatory test)

Table 1: Yield stress data for Abu attifel oil untreated and treated with various additives at frequency of 0.5 Hz and at cooling rate of 1°C/min.

Sample	Abu untreated				Abu+ROA 500 PPM				Abu+ROA 1000 PPM			
Temp.°C	30	35	40	45	30	35	40	45	30	35	40	45
τ_e	627	194	17.7	0.07	115	21.83	0.82	vis	301	21.83	0.4	vis
τ_s	1139	579	81.48	1.87	415	104	4.64	G''>G'	687	122	3.85	
τ_f	1368	677	116.7	2.20	455	122	6.31		789	142	5.04	

Table 2: Yield stress data for Abu attifel oil untreated and treated with various additives at frequency of 0.5 Hz and at cooling rate of 0.5 °C/min.

Sample	Abu untreated				Abu+ROA 500 PPM				Abu+ROA 1000 PPM			
Temp.°C	30	35	40	45	30	35	40	45	30	35	40	45
τ_e	361.5	82.27	17.7	0.07	362	40.75	1	vis	173.5	40.75	1	Vis
τ_s	948	424	98	2.22	905.4	131.4	6.99	G''>G'	498	166	6.03	
τ_f	1088	536	117	2.53	992.4	166.1	9.50		547	194	7.21	

Table 3: Yield stress data for Abu attifel oil untreated and treated with various additives at frequency of 0.5 Hz and at cooling rate of 1°C/min.

Sample	Abu untreated				Abu+PPD 1000 PPM				Abu+PPD 2000 PPM				Abu+Sertica oil			
Temp.°C	30	35	40	45	30	35	40	45	30	35	40	45	30	35	40	45
τ_e	627	194	17.7	0.065	943	138	6.66	0.961	630	126	8.22	1	362	47.64	2.24	vis
τ_s	1139	579	81.48	1.870	1778	476	26.19	5.66	2385	502	35.92	6.02	865	210	12.36	G''>G'
τ_f	1368	677	116.7	2.20	1864	522	32.33	6.84	2614	596	44.34	6.99	948	245	16.18	

Table 4: Yield stress data for Abu attifel oil untreated and treated with various additives at frequency of 0.5 Hz and at cooling rate of 0.5 °C/min.

Sample	Abu untreated				Abu+PPD 1000 PPM				Abu+PPD 2000 PPM				Abu+Sertica oil			
Temp.°C	30	35	40	45	30	35	40	45	30	35	40	45	30	35	40	45
τ_e	361.5	82.27	17.7	0.865	713	158.3	6.66	0.543	547	133	49.27	1.81	287	29.82	2.94	VIS
τ_s	905.4	423.8	97.5	2.22	1530	522	54.74	2.33	1507	669	114	13.74	415	166	19.36	G''>G'
τ_f	1088	536	116.7	2.53	1616	547	67.58	2.82	1652	796	141	17.21	455	194	23.18	