` **Appendix C: Static Cooling controlled shear stress rheometry**

**C0 statistical analysis for Abu-attifel crude oil (T=30°C&cooling rate=1°C/min & SLR=100Pa/min(**

| Shear stress, Pa | Shear rate, s-1 | | | mean | SDEV | %difference |
|---|---|---|---|---|---|---|
| | R1 | R2 | R3 | | | |
| 14.94 | 4.64E-05 | 3.82E-05 | 2.59E-05 | 0.00003679 | 1E-05 | 28.04416 |
| 24.93 | 8E-05 | 4.07E-05 | 2.38E-05 | 4.81767E-05 | 3E-05 | 59.86757 |
| 34.93 | 7.02E-05 | 6.16E-05 | 6.05E-05 | 6.40767E-05 | 5E-06 | 8.251535 |
| 44.99 | 8.31E-05 | 4.35E-05 | 2.67E-05 | 0.00005109 | 3E-05 | 56.65751 |
| 54.99 | 9.11E-05 | 5.44E-05 | 7.03E-05 | 0.00007194 | 2E-05 | 25.52637 |
| 64.99 | 9.26E-05 | 4.18E-05 | 6.78E-05 | 6.73833E-05 | 3E-05 | 37.7129 |
| 74.96 | 0.000145 | 7.85E-05 | 9.86E-05 | 0.00010731 | 3E-05 | 31.75318 |
| 84.94 | 0.000126 | 4.24E-05 | 5.08E-05 | 7.31033E-05 | 5E-05 | 63.0447 |
| 94.91 | 0.000148 | 9.19E-05 | 9.35E-05 | 0.000111067 | 3E-05 | 28.65131 |
| 105 | 0.000208 | 6.87E-05 | 0.000136 | 0.000137393 | 7E-05 | 50.71519 |
| 115 | 0.000283 | 5.83E-05 | 0.000104 | 0.000148473 | 1E-04 | 79.86637 |
| 125 | 0.000378 | 0.000112 | 0.000143 | 0.0002106 | 1E-04 | 69.0667 |
| 135 | 0.000421 | 9.88E-05 | 9.97E-05 | 0.000206397 | 2E-04 | 89.92039 |
| 144.9 | 0.00053 | 0.000132 | 0.000168 | 0.000276767 | 2E-04 | 79.50375 |
| 154.9 | 0.000636 | 0.000114 | 0.000204 | 0.0003181 | 3E-04 | 87.70932 |
| 164.9 | 0.000916 | 0.000165 | 0.000223 | 0.000434633 | 4E-04 | 96.08652 |
| 174.9 | 0.001528 | 0.000184 | 0.000349 | 0.000687267 | 7E-04 | 106.6188 |
| 185.1 | 0.003355 | 0.000201 | 0.00044 | 0.001331833 | 2E-03 | 131.8619 |
| 194.8 | 461.4 | 0.000279 | 0.000522 | 153.8002669 | 3E+02 | 173.2046 |
| 205 | 2735 | 0.000333 | 0.000966 | 911.6670998 | 2E+03 | 173.205 |
| 215 | 3393 | 0.000569 | 0.001305 | 1131.000625 | 2E+03 | 173.2049 |
| 225 | 3770 | 0.000803 | 0.001783 | 1256.667529 | 2E+03 | 173.2049 |
| 234.8 | 4096 | 0.001022 | 0.1878 | 1365.396274 | 2E+03 | 173.1931 |
| 245 | 4405 | 0.001589 | 1.645 | 1468.882196 | 3E+03 | 173.108 |
| 255 | 4670 | 0.01104 | 3.808 | 1557.93968 | 3E+03 | 172.9928 |
| 265 | 4941 | 565.2 | 38.26 | 1848.153333 | 3E+03 | 145.627 |
| 274.8 | 5213 | 2586 | 787.8 | 2862.266667 | 2E+03 | 77.75299 |
| 284.9 | 5481 | 3035 | 3103 | 3873 | 1E+03 | 35.96653 |
| 294.8 | 5725 | 3321 | 3954 | 4333.333333 | 1E+03 | 28.75578 |
| 304.9 | 5980 | 3354 | 4444 | 4592.666667 | 1E+03 | 28.72617 |
| 314.8 | 6189 | 3369 | 4769 | 4775.666667 | 1E+03 | 29.52492 |
| 324.8 | 6397 | 3619 | 5051 | 5022.333333 | 1E+03 | 27.66088 |
| 334.9 | 6608 | 3842 | 5342 | 5264 | 1E+03 | 26.30412 |
| 344.9 | 6839 | 4111 | 5620 | 5523.333333 | 1E+03 | 24.7417 |
| 354.9 | 7050 | 4357 | 5899 | 5768.666667 | 1E+03 | 23.42348 |
| 364.9 | 7290 | 4323 | 6168 | 5927 | 1E+03 | 25.27602 |
| 374.8 | 7544 | 4577 | 6442 | 6187.666667 | 1E+03 | 24.23793 |
| 385 | 7825 | 4816 | 6718 | 6453 | 2E+03 | 23.58443 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 395 | 8109 | 5092 | 6969 | 6723.333333 | 2E+03 | 22.65884 |
| 405 | 8378 | 5342 | 7222 | 6980.666667 | 2E+03 | 21.95092 |
| 415 | 8640 | 5581 | 7485 | 7235.333333 | 2E+03 | 21.3495 |
| 425 | 8852 | 5804 | 7741 | 7465.666667 | 2E+03 | 20.6618 |
| 434.9 | 9086 | 6038 | 8004 | 7709.333333 | 2E+03 | 20.04347 |
| 444.9 | 9312 | 6266 | 8283 | 7953.666667 | 2E+03 | 19.48127 |
| 454.9 | 9576 | 6452 | 8546 | 8191.333333 | 2E+03 | 19.43411 |
| 464.9 | 9842 | 6681 | 8814 | 8445.666667 | 2E+03 | 19.09107 |
| 474.9 | 10100 | 6897 | 9093 | 8696.666667 | 2E+03 | 18.83329 |
| 484.9 | 10370 | 7094 | 9357 | 8940.333333 | 2E+03 | 18.76077 |
| 494.9 | 10640 | 7313 | 9626 | 9193 | 2E+03 | 18.54935 |
| 504.9 | 10900 | 7490 | 9885 | 9425 | 2E+03 | 18.57741 |
| 514.8 | 11160 | 7693 | 10150 | 9667.666667 | 2E+03 | 18.44413 |
| 525 | 11440 | 7906 | 10420 | 9922 | 2E+03 | 18.3317 |
| 534.8 | 11690 | 8113 | 10710 | 10171 | 2E+03 | 18.17335 |
| 545 | 11960 | 8340 | 10980 | 10426.66667 | 2E+03 | 17.95742 |
| 555 | 12220 | 8565 | 11240 | 10675 | 2E+03 | 17.72244 |
| 565 | 12510 | 8780 | 11530 | 10940 | 2E+03 | 17.67575 |
| 575 | 12790 | 9005 | 11830 | 11208.33333 | 2E+03 | 17.5547 |
| 585 | 13030 | 9019 | 12040 | 11363 | 2E+03 | 18.38814 |

**C1 (Cooling rate=1C/min&SLR=25Pa/min)**

**C1.1 (T=30°C)**

**C1.1.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 16.02 | 30 | 6.807 | 1.54E-06 | 4.43E+06 | 0.007856 |
| 1, 2 | 48.07 | 30 | 19.95 | 4.87E-06 | 4.10E+06 | 0.007856 |
| 1, 3 | 80.07 | 30 | 33.24 | 6.20E-06 | 5.36E+06 | 0.008123 |
| 1, 4 | 112 | 30 | 46.52 | 3.48E-06 | 1.34E+07 | 0.008389 |
| 1, 5 | 144.1 | 30 | 59.78 | 7.61E-06 | 7.85E+06 | 0.008522 |
| 1, 6 | 176.1 | 30 | 73.34 | 6.08E-06 | 1.21E+07 | 0.008788 |
| 1, 7 | 208 | 30 | 86.62 | 5.24E-06 | 1.65E+07 | 0.008922 |
| 1, 8 | 240.1 | 30 | 99.88 | 6.47E-06 | 1.54E+07 | 0.009321 |
| 1, 9 | 272.1 | 30 | 113.1 | 6.34E-06 | 1.78E+07 | 0.009454 |
| 1, 10 | 304 | 30 | 126.7 | 7.91E-06 | 1.60E+07 | 0.009853 |
| 1, 11 | 336.1 | 30 | 140 | 1.01E-05 | 1.39E+07 | 0.009987 |
| 1, 12 | 368.1 | 30 | 153.2 | 7.96E-06 | 1.92E+07 | 0.01039 |
| 1, 13 | 400 | 30 | 166.5 | 9.00E-06 | 1.85E+07 | 0.01065 |
| 1, 14 | 432.1 | 30 | 180 | 1.09E-05 | 1.65E+07 | 0.01119 |
| 1, 15 | 464.1 | 30 | 193.3 | 1.04E-05 | 1.87E+07 | 0.01119 |
| 1, 16 | 496 | 30 | 206.6 | 1.29E-05 | 1.61E+07 | 0.01158 |
| 1, 17 | 528.1 | 30 | 219.8 | 9.92E-06 | 2.22E+07 | 0.01198 |
| 1, 18 | 560.1 | 30 | 233.4 | 8.69E-06 | 2.68E+07 | 0.01225 |
| 1, 19 | 592 | 30 | 246.6 | 9.56E-06 | 2.58E+07 | 0.01265 |
| 1, 20 | 624.1 | 30 | 259.9 | 1.28E-05 | 2.03E+07 | 0.01292 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 21 | 656.1 | 30 | 273.2 | 1.21E-05 | 2.27E+07 | 0.01318 |
| 1, 22 | 688 | 30 | 286.4 | 1.26E-05 | 2.28E+07 | 0.01332 |
| 1, 23 | 720.1 | 30 | 300 | 1.42E-05 | 2.11E+07 | 0.01385 |
| 1, 24 | 752.1 | 30 | 313.3 | 1.48E-05 | 2.12E+07 | 0.01451 |
| 1, 25 | 784 | 30 | 326.5 | 1.23E-05 | 2.65E+07 | 0.01491 |
| 1, 26 | 816.1 | 30 | 339.8 | 1.71E-05 | 1.98E+07 | 0.01518 |
| 1, 27 | 848.1 | 30 | 353.3 | 1.46E-05 | 2.41E+07 | 0.01585 |
| 1, 28 | 880 | 30 | 366.6 | 2.13E-05 | 1.72E+07 | 0.01624 |
| 1, 29 | 912.1 | 30 | 380.1 | 1.97E-05 | 1.93E+07 | 0.01704 |
| 1, 30 | 944.1 | 30 | 393.3 | 1.93E-05 | 2.04E+07 | 0.01758 |
| 1, 31 | 976 | 30 | 406.6 | 2.43E-05 | 1.67E+07 | 0.01824 |
| 1, 32 | 1008 | 30 | 419.8 | 2.78E-05 | 1.51E+07 | 0.01918 |
| 1, 33 | 1040 | 30 | 433.4 | 3.07E-05 | 1.41E+07 | 0.02024 |
| 1, 34 | 1072 | 30 | 446.6 | 3.48E-05 | 1.28E+07 | 0.02144 |
| 1, 35 | 1104 | 30 | 459.9 | 4.75E-05 | 9.68E+06 | 0.02304 |
| 1, 36 | 1136 | 30 | 473.2 | 7.40E-05 | 6.39E+06 | 0.02543 |
| 1, 37 | 1168 | 30 | 486.4 | 0.000135 | 3.61E+06 | 0.02956 |
| 1, 38 | 1200 | 30 | 500 | 0.000482 | 1.04E+06 | 0.04714 |
| 1, 39 | 1232 | 30 | 513.2 | 1542 | 0.3328 | 8.40E+04 |
| 1, 40 | 1264 | 30 | 526.5 | 1.64E+04 | 0.03218 | 6.06E+05 |
| 1, 41 | 1296 | 30 | 540 | 1.86E+04 | 0.02905 | 1.20E+06 |
| 1, 42 | 1328 | 30 | 553.3 | 1.94E+04 | 0.02858 | 1.82E+06 |
| 1, 43 | 1360 | 30 | 566.5 | 1.95E+04 | 0.0291 | 2.44E+06 |
| 1, 44 | 1392 | 30 | 579.8 | 1.96E+04 | 0.02957 | 3.07E+06 |
| 1, 45 | 1424 | 30 | 593.3 | 1.92E+04 | 0.03098 | 3.69E+06 |
| 1, 46 | 1456 | 30 | 606.6 | 1.91E+04 | 0.0317 | 4.30E+06 |
| 1, 47 | 1488 | 30 | 619.9 | 1.91E+04 | 0.03247 | 4.91E+06 |
| 1, 48 | 1520 | 30 | 633.4 | 1.85E+04 | 0.03429 | 5.50E+06 |
| 1, 49 | 1552 | 30 | 646.6 | 1.78E+04 | 0.03642 | 6.07E+06 |
| 1, 50 | 1584 | 30 | 659.9 | 1.77E+04 | 0.03719 | 6.63E+06 |
| 1, 51 | 1616 | 30 | 673.2 | 1.76E+04 | 0.03826 | 7.20E+06 |
| 1, 52 | 1648 | 30 | 686.7 | 1.75E+04 | 0.03923 | 7.76E+06 |
| 1, 53 | 1680 | 30 | 699.9 | 1.70E+04 | 0.04129 | 8.30E+06 |
| 1, 54 | 1712 | 30 | 713.2 | 1.71E+04 | 0.04163 | 8.85E+06 |
| 1, 55 | 1744 | 30 | 726.5 | 1.75E+04 | 0.04154 | 9.41E+06 |
| 1, 56 | 1776 | 30 | 739.8 | 1.79E+04 | 0.04136 | 9.98E+06 |
| 1, 57 | 1808 | 30 | 753.4 | 1.82E+04 | 0.04131 | 1.06E+07 |
| 1, 58 | 1840 | 30 | 766.6 | 1.85E+04 | 0.04139 | 1.12E+07 |
| 1, 59 | 1872 | 30 | 779.9 | 1.89E+04 | 0.04134 | 1.18E+07 |
| 1, 60 | 1904 | 30 | 793.1 | 1.92E+04 | 0.04136 | 1.24E+07 |
| 1, 61 | 1936 | 30 | 793.3 | 1.91E+04 | 0.04154 | 1.30E+07 |
| 1, 62 | 1968 | 30 | 780 | 1.84E+04 | 0.04239 | 1.36E+07 |
| 1, 63 | 2000 | 30 | 766.7 | 1.77E+04 | 0.04332 | 1.41E+07 |
| 1, 64 | 2032 | 30 | 753.2 | 1.71E+04 | 0.04411 | 1.47E+07 |
| 1, 65 | 2064 | 30 | 740 | 1.64E+04 | 0.04518 | 1.52E+07 |
| 1, 66 | 2096 | 30 | 726.7 | 1.57E+04 | 0.04616 | 1.57E+07 |
| 1, 67 | 2128 | 30 | 713.4 | 1.52E+04 | 0.0471 | 1.62E+07 |
| 1, 68 | 2160 | 30 | 699.9 | 1.46E+04 | 0.04812 | 1.67E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 69 | 2192 | 30 | 686.6 | 1.40E+04 | 0.04912 | 1.71E+07 |
| 1, 70 | 2224 | 30 | 673.4 | 1.34E+04 | 0.05023 | 1.75E+07 |
| 1, 71 | 2256 | 30 | 660.1 | 1.28E+04 | 0.05168 | 1.80E+07 |
| 1, 72 | 2288 | 30 | 646.8 | 1.22E+04 | 0.05305 | 1.83E+07 |
| 1, 73 | 2320 | 30 | 633.2 | 1.16E+04 | 0.0547 | 1.87E+07 |
| 1, 74 | 2352 | 30 | 620 | 1.10E+04 | 0.0565 | 1.91E+07 |
| 1, 75 | 2384 | 30 | 606.7 | 1.04E+04 | 0.05831 | 1.94E+07 |
| 1, 76 | 2416 | 30 | 593.4 | 9843 | 0.06029 | 1.97E+07 |
| 1, 77 | 2448 | 30 | 579.9 | 9247 | 0.06272 | 2.00E+07 |
| 1, 78 | 2480 | 30 | 566.7 | 8624 | 0.06571 | 2.03E+07 |
| 1, 79 | 2512 | 30 | 553.4 | 7939 | 0.06971 | 2.05E+07 |
| 1, 80 | 2544 | 30 | 539.9 | 7205 | 0.07493 | 2.08E+07 |
| 1, 81 | 2576 | 30 | 526.6 | 6607 | 0.07971 | 2.10E+07 |
| 1, 82 | 2608 | 30 | 513.3 | 6204 | 0.08275 | 2.12E+07 |
| 1, 83 | 2640 | 30 | 500.1 | 5882 | 0.08502 | 2.14E+07 |
| 1, 84 | 2672 | 30 | 486.8 | 5577 | 0.08729 | 2.15E+07 |
| 1, 85 | 2704 | 30 | 473.2 | 5304 | 0.08922 | 2.17E+07 |
| 1, 86 | 2736 | 30 | 460 | 5027 | 0.0915 | 2.19E+07 |
| 1, 87 | 2768 | 30 | 446.7 | 4765 | 0.09376 | 2.20E+07 |
| 1, 88 | 2800 | 30 | 433.5 | 4522 | 0.09587 | 2.22E+07 |
| 1, 89 | 2832 | 30 | 419.9 | 4274 | 0.09824 | 2.23E+07 |
| 1, 90 | 2864 | 30 | 406.6 | 4040 | 0.1006 | 2.24E+07 |
| 1, 91 | 2896 | 30 | 393.4 | 3819 | 0.103 | 2.26E+07 |
| 1, 92 | 2928 | 30 | 380.1 | 3605 | 0.1054 | 2.27E+07 |
| 1, 93 | 2960 | 30 | 366.6 | 3392 | 0.1081 | 2.28E+07 |
| 1, 94 | 2992 | 30 | 353.3 | 3188 | 0.1108 | 2.29E+07 |
| 1, 95 | 3024 | 30 | 340 | 2986 | 0.1139 | 2.30E+07 |
| 1, 96 | 3056 | 30 | 326.8 | 2797 | 0.1168 | 2.31E+07 |
| 1, 97 | 3088 | 30 | 313.2 | 2608 | 0.1201 | 2.32E+07 |
| 1, 98 | 3120 | 30 | 300 | 2426 | 0.1236 | 2.32E+07 |
| 1, 99 | 3152 | 30 | 286.7 | 2256 | 0.1271 | 2.33E+07 |
| 1, 100 | 3184 | 30 | 273.4 | 2087 | 0.131 | 2.34E+07 |
| 1, 101 | 3216 | 30 | 259.9 | 1916 | 0.1356 | 2.34E+07 |
| 1, 102 | 3248 | 30 | 246.6 | 1751 | 0.1409 | 2.35E+07 |
| 1, 103 | 3280 | 30 | 233.3 | 1586 | 0.1472 | 2.35E+07 |
| 1, 104 | 3312 | 30 | 220.1 | 1425 | 0.1545 | 2.36E+07 |
| 1, 105 | 3344 | 30 | 206.8 | 1268 | 0.1631 | 2.36E+07 |
| 1, 106 | 3376 | 30 | 193.2 | 1104 | 0.175 | 2.37E+07 |
| 1, 107 | 3408 | 30 | 180 | 946.5 | 0.1901 | 2.37E+07 |
| 1, 108 | 3440 | 30 | 166.7 | 790.5 | 0.2109 | 2.37E+07 |
| 1, 109 | 3472 | 30 | 153.4 | 634.6 | 0.2417 | 2.37E+07 |
| 1, 110 | 3504 | 30 | 139.9 | 481.3 | 0.2906 | 2.38E+07 |
| 1, 111 | 3536 | 30 | 126.6 | 347.2 | 0.3647 | 2.38E+07 |
| 1, 112 | 3568 | 30 | 113.3 | 239.9 | 0.4724 | 2.38E+07 |
| 1, 113 | 3600 | 30 | 100.1 | 172.8 | 0.5791 | 2.38E+07 |
| 1, 114 | 3632 | 30 | 86.8 | 123.3 | 0.7037 | 2.38E+07 |
| 1, 115 | 3664 | 30 | 73.23 | 86.33 | 0.8484 | 2.38E+07 |
| 1, 116 | 3696 | 30 | 59.94 | 54.54 | 1.099 | 2.38E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 117 | 3728 | 30 | 46.65 | 30.1 | 1.55 | 2.38E+07 |
| 1, 118 | 3760 | 30 | 33.36 | 8.667 | 3.849 | 2.38E+07 |
| 1, 119 | 3792 | 30 | 20.06 | 4.28 | 4.687 | 2.38E+07 |
| 1, 120 | 3824 | 30 | 6.755 | 0.2858 | 23.63 | 2.38E+07 |

**C1.1.2 Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 16.02 | 30 | 6.788 | 8.21E-06 | 826600 | -0.00786 |
| 2 | 48.08 | 30 | 19.95 | 6.75E-06 | 2956000 | -0.00759 |
| 3 | 80.08 | 30 | 33.24 | 1.02E-05 | 3256000 | -0.00719 |
| 4 | 112 | 30 | 46.52 | 8.86E-06 | 5251000 | -0.00692 |
| 5 | 144.1 | 30 | 59.8 | 1.02E-05 | 5874000 | -0.00679 |
| 6 | 176.1 | 30 | 73.36 | 8.94E-06 | 8210000 | -0.00639 |
| 7 | 208 | 30 | 86.64 | 5.32E-06 | 16280000 | -0.00626 |
| 8 | 240.1 | 30 | 99.91 | 1.13E-05 | 8812000 | -0.00573 |
| 9 | 272.1 | 30 | 113.2 | 1.29E-05 | 8805000 | -0.00559 |
| 10 | 304 | 30 | 126.7 | 8.15E-06 | 15550000 | -0.00519 |
| 11 | 336.1 | 30 | 139.9 | 7.22E-06 | 19400000 | -0.00506 |
| 12 | 368.1 | 30 | 153.2 | 7.38E-06 | 20780000 | -0.00453 |
| 13 | 400 | 30 | 166.5 | 1.16E-05 | 14370000 | -0.00386 |
| 14 | 432.1 | 30 | 180 | 1.15E-05 | 15600000 | -0.00373 |
| 15 | 464.1 | 30 | 193.3 | 1.54E-05 | 12540000 | -0.00333 |
| 16 | 496 | 30 | 206.6 | 1.32E-05 | 15690000 | -0.00306 |
| 17 | 528.1 | 30 | 219.8 | 1.4E-05 | 15660000 | -0.00253 |
| 18 | 560.1 | 30 | 233.1 | 1.49E-05 | 15640000 | -0.002 |
| 19 | 592 | 30 | 246.4 | 7.35E-06 | 33510000 | -0.0016 |
| 20 | 624.1 | 30 | 260 | 1.26E-05 | 20630000 | -0.0012 |
| 21 | 656.1 | 29.9 | 273.3 | 1.44E-05 | 19000000 | -0.0004 |
| 22 | 688 | 30 | 286.6 | 1.61E-05 | 17760000 | -0.00013 |
| 23 | 720.1 | 30 | 299.9 | 2.11E-05 | 14200000 | 0.0004 |
| 24 | 752.1 | 30 | 313.1 | 1.41E-05 | 22180000 | 0.000799 |
| 25 | 784 | 30 | 326.4 | 1.54E-05 | 21260000 | 0.001332 |
| 26 | 816 | 30 | 340 | 2.01E-05 | 16930000 | 0.001864 |
| 27 | 848.1 | 30 | 353.3 | 2.06E-05 | 17190000 | 0.002663 |
| 28 | 880 | 30 | 366.6 | 2.03E-05 | 18090000 | 0.003063 |
| 29 | 912.1 | 30 | 379.8 | 1.95E-05 | 19490000 | 0.003862 |
| 30 | 944.1 | 30 | 393.4 | 2.06E-05 | 19100000 | 0.00466 |
| 31 | 976 | 30 | 406.6 | 2.23E-05 | 18270000 | 0.00506 |
| 32 | 1008 | 30 | 419.9 | 2.31E-05 | 18150000 | 0.005726 |
| 33 | 1040 | 30 | 433.1 | 2.29E-05 | 18930000 | 0.006525 |
| 34 | 1072 | 30 | 446.6 | 0.000025 | 17860000 | 0.007457 |
| 35 | 1104 | 30 | 459.9 | 0.000027 | 17030000 | 0.008389 |
| 36 | 1136 | 30 | 473.2 | 2.71E-05 | 17450000 | 0.009321 |
| 37 | 1168 | 30 | 486.5 | 3.01E-05 | 16140000 | 0.01025 |
| 38 | 1200 | 30 | 500 | 3.17E-05 | 15750000 | 0.01119 |
| 39 | 1232 | 30 | 513.2 | 3.05E-05 | 16860000 | 0.01225 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 40 | 1264 | 30 | 526.5 | 3.69E-05 | 14270000 | 0.01345 |
| 41 | 1296 | 30 | 539.8 | 3.84E-05 | 14050000 | 0.01465 |
| 42 | 1328 | 30 | 553.4 | 4.5E-05 | 12290000 | 0.01598 |
| 43 | 1360 | 30 | 566.6 | 5.05E-05 | 11230000 | 0.01784 |
| 44 | 1392 | 30 | 579.9 | 5.69E-05 | 10200000 | 0.01944 |
| 45 | 1424 | 30 | 593.1 | 5.84E-05 | 10170000 | 0.02144 |
| 46 | 1456 | 30 | 606.7 | 6.26E-05 | 9690000 | 0.02304 |
| 47 | 1488 | 30 | 620 | 7.09E-05 | 8745000 | 0.0249 |
| 48 | 1520 | 30 | 633.2 | 8.29E-05 | 7638000 | 0.02783 |
| 49 | 1552 | 30 | 646.5 | 0.000101 | 6431000 | 0.03089 |
| 50 | 1584 | 30 | 660 | 0.000112 | 5905000 | 0.03475 |
| 51 | 1616 | 30 | 673.2 | 0.000142 | 4758000 | 0.03928 |
| 52 | 1648 | 30 | 686.5 | 0.000191 | 3587000 | 0.04554 |
| 53 | 1680 | 30 | 700 | 0.000279 | 2511000 | 0.05459 |
| 54 | 1712 | 30 | 713.2 | 0.000552 | 1292000 | 0.07337 |
| 55 | 1744 | 30 | 726.5 | 5157 | 0.1409 | 178800 |
| 56 | 1776 | 30 | 740 | 13070 | 0.05664 | 595300 |
| 57 | 1808 | 30 | 753.3 | 13660 | 0.05516 | 1034000 |
| 58 | 1840 | 30 | 766.5 | 13950 | 0.05494 | 1479000 |
| 59 | 1872 | 30 | 779.8 | 14240 | 0.05476 | 1935000 |
| 60 | 1904 | 30 | 793.4 | 14520 | 0.05463 | 2401000 |
| 61 | 1936 | 30 | 793.4 | 14500 | 0.05471 | 2866000 |
| 62 | 1968 | 30 | 780.1 | 14090 | 0.05537 | 3318000 |
| 63 | 2000 | 30 | 766.8 | 13660 | 0.05614 | 3754000 |
| 64 | 2032 | 30 | 753.2 | 13220 | 0.05696 | 4177000 |
| 65 | 2064 | 30 | 739.9 | 12800 | 0.0578 | 4587000 |
| 66 | 2096 | 30 | 726.7 | 12410 | 0.05857 | 4983000 |
| 67 | 2128 | 30 | 713.4 | 12020 | 0.05936 | 5367000 |
| 68 | 2160 | 30 | 700.1 | 11610 | 0.06032 | 5739000 |
| 69 | 2192 | 30 | 686.8 | 11220 | 0.06123 | 6097000 |
| 70 | 2224 | 30 | 673.3 | 10850 | 0.06203 | 6445000 |
| 71 | 2256 | 30 | 660 | 10520 | 0.06277 | 6781000 |
| 72 | 2288 | 30 | 646.8 | 10170 | 0.06359 | 7106000 |
| 73 | 2320 | 30 | 633.2 | 9828 | 0.06443 | 7421000 |
| 74 | 2352 | 30 | 620 | 9526 | 0.06508 | 7725000 |
| 75 | 2384 | 30 | 606.7 | 9228 | 0.06574 | 8020000 |
| 76 | 2416 | 30 | 593.4 | 8906 | 0.06663 | 8305000 |
| 77 | 2448 | 30 | 579.9 | 8574 | 0.06763 | 8580000 |
| 78 | 2480 | 30 | 566.6 | 8248 | 0.0687 | 8843000 |
| 79 | 2512 | 30 | 553.3 | 7953 | 0.06958 | 9098000 |
| 80 | 2544 | 30 | 540.1 | 7664 | 0.07047 | 9343000 |
| 81 | 2576 | 30 | 526.6 | 7346 | 0.07169 | 9578000 |
| 82 | 2608 | 30 | 513.3 | 7053 | 0.07278 | 9804000 |
| 83 | 2640 | 30 | 500.1 | 6774 | 0.07382 | 10020000 |
| 84 | 2672 | 30 | 486.8 | 6480 | 0.07512 | 10230000 |
| 85 | 2704 | 30 | 473.3 | 6191 | 0.07645 | 10430000 |
| 86 | 2736 | 30 | 460 | 5904 | 0.07792 | 10610000 |
| 87 | 2768 | 30 | 446.8 | 5617 | 0.07954 | 10790000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 88 | 2800 | 30 | 433.2 | 5342 | 0.08111 | 10970000 |
| 89 | 2832 | 30 | 419.9 | 5098 | 0.08238 | 11130000 |
| 90 | 2864 | 30 | 406.7 | 4886 | 0.08323 | 11280000 |
| 91 | 2896 | 30 | 393.4 | 4678 | 0.0841 | 11430000 |
| 92 | 2928 | 30 | 380.1 | 4478 | 0.0849 | 11580000 |
| 93 | 2960 | 30 | 366.6 | 4288 | 0.0855 | 11710000 |
| 94 | 2992 | 30 | 353.3 | 4106 | 0.08605 | 11850000 |
| 95 | 3024 | 30 | 340 | 3926 | 0.08662 | 11970000 |
| 96 | 3056 | 30 | 326.8 | 3743 | 0.0873 | 12090000 |
| 97 | 3088 | 30 | 313.5 | 3568 | 0.08786 | 12210000 |
| 98 | 3120 | 30 | 300 | 3396 | 0.08834 | 12310000 |
| 99 | 3152 | 30 | 286.7 | 3225 | 0.08889 | 12420000 |
| 100 | 3184 | 30 | 273.4 | 3056 | 0.08945 | 12510000 |
| 101 | 3216 | 30 | 260.1 | 2888 | 0.09007 | 12610000 |
| 102 | 3248 | 30 | 246.6 | 2718 | 0.09073 | 12690000 |
| 103 | 3280 | 30 | 233.3 | 2557 | 0.09126 | 12780000 |
| 104 | 3312 | 30 | 220.1 | 2398 | 0.09176 | 12850000 |
| 105 | 3344 | 30 | 206.5 | 2234 | 0.09243 | 12920000 |
| 106 | 3376 | 30 | 193.3 | 2079 | 0.09298 | 12990000 |
| 107 | 3408 | 30 | 180 | 1920 | 0.09373 | 13050000 |
| 108 | 3440 | 30 | 166.7 | 1759 | 0.09479 | 13110000 |
| 109 | 3472 | 30 | 153.4 | 1602 | 0.09579 | 13160000 |
| 110 | 3504 | 30 | 139.9 | 1448 | 0.09664 | 13210000 |
| 111 | 3536 | 30 | 126.6 | 1298 | 0.09757 | 13250000 |
| 112 | 3568 | 30 | 113.3 | 1144 | 0.09907 | 13280000 |
| 113 | 3600 | 30 | 100.1 | 989.1 | 0.1012 | 13320000 |
| 114 | 3632 | 30 | 86.81 | 836 | 0.1038 | 13340000 |
| 115 | 3664 | 30 | 73.23 | 678.4 | 0.108 | 13360000 |
| 116 | 3696 | 30 | 59.94 | 520 | 0.1153 | 13380000 |
| 117 | 3728 | 30 | 46.69 | 358.9 | 0.1301 | 13390000 |
| 118 | 3760 | 30 | 33.42 | 195.9 | 0.1706 | 13400000 |
| 119 | 3792 | 30 | 20.12 | 42.52 | 0.4732 | 13400000 |
| 120 | 3824 | 30 | 6.539 | 0.2833 | 23.08 | 13400000 |

### C1.1.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 16.02 | 30 | 6.676 | 1.01E-05 | 664200 | -0.00972 |
| 2 | 48.03 | 30 | 20 | 1.13E-05 | 1763000 | -0.00932 |
| 3 | 80.05 | 30 | 33.29 | 1.06E-05 | 3155000 | -0.00906 |
| 4 | 112.1 | 30 | 46.56 | 1.64E-05 | 2835000 | -0.00839 |
| 5 | 144.1 | 29.9 | 59.82 | 1.23E-05 | 4859000 | -0.00799 |
| 6 | 176 | 30 | 73.37 | 1.36E-05 | 5383000 | -0.00746 |
| 7 | 208.1 | 30 | 86.66 | 2.02E-05 | 4295000 | -0.00692 |
| 8 | 240.1 | 30 | 99.92 | 1.49E-05 | 6688000 | -0.00679 |
| 9 | 272 | 30 | 113.2 | 1.35E-05 | 8383000 | -0.00639 |
| 10 | 304.1 | 30 | 126.7 | 1.76E-05 | 7183000 | -0.00573 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | 336.1 | 30 | 140 | 2.4E-05 | 5840000 | -0.00506 |
| 12 | 368 | 30 | 153.3 | 2.2E-05 | 6983000 | -0.00439 |
| 13 | 400.1 | 30 | 166.6 | 0.000022 | 7570000 | -0.00413 |
| 14 | 432.1 | 30 | 179.8 | 2.2E-05 | 8163000 | -0.00306 |
| 15 | 464 | 30 | 193.4 | 2.26E-05 | 8560000 | -0.0024 |
| 16 | 496.1 | 30 | 206.6 | 2.18E-05 | 9487000 | -0.00133 |
| 17 | 528.1 | 30 | 219.9 | 2.36E-05 | 9311000 | -0.00093 |
| 18 | 560 | 30 | 233.2 | 2.4E-05 | 9699000 | -0.00013 |
| 19 | 592.1 | 30 | 246.7 | 4.09E-05 | 6029000 | 0.001065 |
| 20 | 624.1 | 30 | 260 | 4.27E-05 | 6088000 | 0.003063 |
| 21 | 656 | 30 | 273.2 | 5.26E-05 | 5191000 | 0.004927 |
| 22 | 688.1 | 30 | 286.5 | 0.000757 | 378300 | 0.02863 |
| 23 | 720.1 | 30 | 299.8 | 0.000817 | 366900 | 0.0538 |
| 24 | 752 | 30 | 313.4 | 0.000705 | 444500 | 0.0767 |
| 25 | 784.1 | 30 | 326.6 | 0.000716 | 456200 | 0.09974 |
| 26 | 816.1 | 30 | 339.9 | 0.000834 | 407300 | 0.1272 |
| 27 | 848 | 30 | 353.1 | 0.001036 | 340900 | 0.1605 |
| 28 | 880.1 | 30 | 366.7 | 0.001447 | 253400 | 0.2072 |
| 29 | 912.1 | 30 | 379.9 | 0.002546 | 149300 | 0.29 |
| 30 | 944 | 30 | 393.2 | 944.3 | 0.4164 | 48560 |
| 31 | 976.1 | 30 | 406.7 | 6767 | 0.0601 | 265000 |
| 32 | 1008 | 30 | 419.9 | 8038 | 0.05224 | 521500 |
| 33 | 1040 | 30 | 433.2 | 8596 | 0.05039 | 796000 |
| 34 | 1072 | 30 | 446.4 | 8760 | 0.05096 | 1077000 |
| 35 | 1104 | 30 | 460 | 9053 | 0.05081 | 1366000 |
| 36 | 1136 | 30 | 473.3 | 9306 | 0.05085 | 1664000 |
| 37 | 1168 | 30 | 486.6 | 9582 | 0.05078 | 1971000 |
| 38 | 1200 | 30 | 499.8 | 9844 | 0.05077 | 2286000 |
| 39 | 1232 | 30 | 513.4 | 10080 | 0.05095 | 2608000 |
| 40 | 1264 | 30 | 526.6 | 10330 | 0.05098 | 2939000 |
| 41 | 1296 | 30 | 539.9 | 10570 | 0.05107 | 3277000 |
| 42 | 1328 | 30 | 553.1 | 10840 | 0.05105 | 3624000 |
| 43 | 1360 | 30 | 566.7 | 11130 | 0.0509 | 3981000 |
| 44 | 1392 | 30 | 579.9 | 11440 | 0.05068 | 4347000 |
| 45 | 1424 | 30 | 593.2 | 11750 | 0.05047 | 4723000 |
| 46 | 1456 | 30 | 606.7 | 12070 | 0.05028 | 5109000 |
| 47 | 1488 | 30 | 619.9 | 12370 | 0.05012 | 5506000 |
| 48 | 1520 | 30 | 633.2 | 12680 | 0.04996 | 5910000 |
| 49 | 1552 | 30 | 646.7 | 12990 | 0.04977 | 6326000 |
| 50 | 1584 | 30 | 660 | 13310 | 0.0496 | 6753000 |
| 51 | 1616 | 30 | 673.2 | 13650 | 0.04931 | 7189000 |
| 52 | 1648 | 30 | 686.5 | 14000 | 0.04902 | 7638000 |
| 53 | 1680 | 30 | 700 | 14340 | 0.04881 | 8098000 |
| 54 | 1712 | 30 | 713.3 | 14720 | 0.04845 | 8567000 |
| 55 | 1744 | 30 | 726.5 | 15130 | 0.04801 | 9052000 |
| 56 | 1776 | 30 | 740.1 | 15560 | 0.04756 | 9551000 |
| 57 | 1808 | 30 | 753.3 | 15980 | 0.04715 | 10060000 |
| 58 | 1840 | 30 | 766.6 | 16320 | 0.04698 | 10580000 |

| 59 | 1872 | 30 | 779.9 | 16710 | 0.04667 | 11120000 |
|---|---|---|---|---|---|---|
| 60 | 1904 | 30 | 793.1 | 17160 | 0.04622 | 11670000 |
| 61 | 1936 | 30 | 793.3 | 17240 | 0.04602 | 12220000 |
| 62 | 1968 | 30 | 780 | 16790 | 0.04646 | 12760000 |
| 63 | 2000 | 30 | 766.8 | 16290 | 0.04709 | 13280000 |
| 64 | 2032 | 30 | 753.5 | 15830 | 0.04761 | 13790000 |
| 65 | 2064 | 30 | 739.9 | 15340 | 0.04822 | 14280000 |
| 66 | 2096 | 30 | 726.6 | 14900 | 0.04875 | 14750000 |
| 67 | 2128 | 30 | 713.4 | 14470 | 0.0493 | 15220000 |
| 68 | 2160 | 30 | 700.1 | 14050 | 0.04984 | 15670000 |
| 69 | 2192 | 30 | 686.6 | 13640 | 0.05033 | 16100000 |
| 70 | 2224 | 30 | 673.3 | 13230 | 0.05089 | 16520000 |
| 71 | 2256 | 30 | 660.1 | 12840 | 0.05142 | 16940000 |
| 72 | 2288 | 30 | 646.8 | 12440 | 0.05198 | 17330000 |
| 73 | 2320 | 30 | 633.3 | 12020 | 0.05268 | 17720000 |
| 74 | 2352 | 30 | 620 | 11630 | 0.05334 | 18090000 |
| 75 | 2384 | 30 | 606.8 | 11260 | 0.05389 | 18450000 |
| 76 | 2416 | 30 | 593.3 | 10870 | 0.0546 | 18800000 |
| 77 | 2448 | 30 | 580 | 10490 | 0.05529 | 19130000 |
| 78 | 2480 | 30 | 566.8 | 10110 | 0.05604 | 19460000 |
| 79 | 2512 | 30 | 553.2 | 9733 | 0.05684 | 19770000 |
| 80 | 2544 | 30 | 540 | 9347 | 0.05777 | 20070000 |
| 81 | 2576 | 30 | 526.7 | 8960 | 0.05878 | 20350000 |
| 82 | 2608 | 30 | 513.4 | 8583 | 0.05982 | 20630000 |
| 83 | 2640 | 30 | 500.1 | 8226 | 0.0608 | 20890000 |
| 84 | 2672 | 30 | 486.6 | 7857 | 0.06193 | 21140000 |
| 85 | 2704 | 30 | 473.3 | 7520 | 0.06294 | 21380000 |
| 86 | 2736 | 30 | 460.1 | 7208 | 0.06383 | 21610000 |
| 87 | 2768 | 30 | 446.8 | 6909 | 0.06467 | 21830000 |
| 88 | 2800 | 30 | 433.3 | 6619 | 0.06546 | 22050000 |
| 89 | 2832 | 30 | 420 | 6327 | 0.06638 | 22250000 |
| 90 | 2864 | 30 | 406.7 | 6054 | 0.06719 | 22440000 |
| 91 | 2896 | 30 | 393.5 | 5793 | 0.06792 | 22630000 |
| 92 | 2928 | 30 | 379.9 | 5536 | 0.06863 | 22800000 |
| 93 | 2960 | 30 | 366.7 | 5294 | 0.06926 | 22970000 |
| 94 | 2992 | 30 | 353.4 | 5064 | 0.06979 | 23140000 |
| 95 | 3024 | 30 | 340.1 | 4838 | 0.07031 | 23290000 |
| 96 | 3056 | 30 | 326.6 | 4614 | 0.07079 | 23440000 |
| 97 | 3088 | 30 | 313.3 | 4389 | 0.07139 | 23580000 |
| 98 | 3120 | 30 | 300 | 4165 | 0.07204 | 23710000 |
| 99 | 3152 | 30 | 286.8 | 3945 | 0.0727 | 23840000 |
| 100 | 3184 | 30 | 273.2 | 3731 | 0.07323 | 23960000 |
| 101 | 3216 | 30 | 260.2 | 3530 | 0.07372 | 24070000 |
| 102 | 3248 | 30 | 246.6 | 3322 | 0.07426 | 24180000 |
| 103 | 3280 | 30 | 233.4 | 3116 | 0.07489 | 24280000 |
| 104 | 3312 | 30 | 220.1 | 2910 | 0.07564 | 24370000 |
| 105 | 3344 | 30 | 206.6 | 2711 | 0.0762 | 24460000 |
| 106 | 3376 | 30 | 193.3 | 2518 | 0.07677 | 24540000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 107 | 3408 | 30 | 180 | 2323 | 0.07752 | 24610000 |
| 108 | 3440 | 30 | 166.8 | 2130 | 0.07828 | 24680000 |
| 109 | 3472 | 30 | 153.2 | 1940 | 0.07901 | 24740000 |
| 110 | 3504 | 30 | 140 | 1751 | 0.07992 | 24800000 |
| 111 | 3536 | 30 | 126.7 | 1566 | 0.08092 | 24850000 |
| 112 | 3568 | 30 | 113.4 | 1382 | 0.08204 | 24890000 |
| 113 | 3600 | 30 | 100.1 | 1196 | 0.08374 | 24930000 |
| 114 | 3632 | 30 | 86.61 | 1005 | 0.08623 | 24960000 |
| 115 | 3664 | 30 | 73.33 | 818.8 | 0.08956 | 24990000 |
| 116 | 3696 | 30 | 60.02 | 625.7 | 0.09593 | 25010000 |
| 117 | 3728 | 30 | 46.74 | 426.9 | 0.1095 | 25020000 |
| 118 | 3760 | 30 | 33.44 | 236.7 | 0.1412 | 25030000 |
| 119 | 3792 | 30 | 20.15 | 67.78 | 0.2972 | 25030000 |
| 120 | 3824 | 30 | 6.827 | 0.7847 | 8.7 | 25030000 |

### C1.1.4 Abu treated with 1000PPM PPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 30.03 | 30 | 1013 | 0.000204 | 4.97E+06 | 0.01318 |
| 2 | 90.05 | 30 | 1037 | 0.000101 | 1.02E+07 | 0.01931 |
| 3 | 150 | 30 | 1062 | 7.90E-05 | 1.35E+07 | 0.02383 |
| 4 | 210 | 29.9 | 1087 | 6.86E-05 | 1.59E+07 | 0.0277 |
| 5 | 270 | 30 | 1112 | 6.78E-05 | 1.64E+07 | 0.03289 |
| 6 | 330 | 30 | 1138 | 6.58E-05 | 1.73E+07 | 0.03662 |
| 7 | 390 | 30 | 1163 | 7.02E-05 | 1.66E+07 | 0.04075 |
| 8 | 450 | 30 | 1188 | 7.54E-05 | 1.58E+07 | 0.04527 |
| 9 | 510 | 30 | 1213 | 8.35E-05 | 1.45E+07 | 0.05033 |
| 10 | 570 | 30 | 1237 | 9.55E-05 | 1.30E+07 | 0.05606 |
| 11 | 630 | 30 | 1263 | 0.000103 | 1.23E+07 | 0.06205 |
| 12 | 690 | 30 | 1288 | 0.000123 | 1.05E+07 | 0.06911 |
| 13 | 750 | 30 | 1312 | 0.000139 | 9.44E+06 | 0.07816 |
| 14 | 810 | 30 | 1337 | 0.000175 | 7.64E+06 | 0.08841 |
| 15 | 870 | 30 | 1363 | 0.000217 | 6.27E+06 | 0.1013 |
| 16 | 930 | 30 | 1387 | 0.000268 | 5.17E+06 | 0.1174 |
| 17 | 990 | 30 | 1413 | 0.00039 | 3.62E+06 | 0.1414 |
| 18 | 1050 | 30 | 1437 | 0.000673 | 2.14E+06 | 0.1832 |
| 19 | 1110 | 30 | 1462 | 3802 | 0.3846 | 4.74E+05 |
| 20 | 1140 | 30 | 1482 | 5.29E+04 | 0.02804 | 3.10E+06 |

### C1.1.5 Abu treated with 2000 PPMPPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 44.02 | 30 | 818.5 | 0.00015 | 5.47E+06 | 0.03302 |
| 2 | 132.1 | 30 | 855 | 8.59E-05 | 9.95E+06 | 0.04061 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 220.1 | 30 | 891.8 | 8.19E-05 | 1.09E+07 | 0.0478 |
| 4 | 308 | 30 | 927.9 | 8.64E-05 | 1.07E+07 | 0.05606 |
| 5 | 396 | 30 | 964.7 | 0.000102 | 9.44E+06 | 0.06458 |
| 6 | 484 | 30 | 1002 | 0.000134 | 7.47E+06 | 0.07657 |
| 7 | 572.1 | 30 | 1038 | 0.000233 | 4.46E+06 | 0.098 |
| 8 | 660.1 | 30 | 1075 | 4272 | 0.2517 | 5.00E+05 |
| 9 | 748.1 | 30 | 1111 | 2.02E+04 | 0.05495 | 2.28E+06 |
| 10 | 836.1 | 30 | 1148 | 2.07E+04 | 0.05549 | 4.10E+06 |
| 11 | 924.1 | 30 | 1185 | 2.13E+04 | 0.05572 | 5.97E+06 |
| 12 | 1012 | 30 | 1222 | 2.20E+04 | 0.05547 | 7.91E+06 |
| 13 | 1100 | 30 | 1259 | 2.31E+04 | 0.05461 | 9.94E+06 |
| 14 | 1188 | 30 | 1295 | 2.41E+04 | 0.05384 | 1.21E+07 |
| 15 | 1276 | 30 | 1331 | 2.52E+04 | 0.05291 | 1.43E+07 |
| 16 | 1364 | 30 | 1368 | 2.65E+04 | 0.05171 | 1.66E+07 |
| 17 | 1452 | 30 | 1405 | 2.77E+04 | 0.05079 | 1.90E+07 |
| 18 | 1540 | 30 | 1441 | 2.89E+04 | 0.0499 | 2.16E+07 |
| 19 | 1628 | 30 | 1478 | 3.03E+04 | 0.04886 | 2.42E+07 |
| 20 | 1716 | 30 | 1515 | 3.15E+04 | 0.04815 | 2.70E+07 |
| 21 | 1804 | 30 | 1552 | 3.28E+04 | 0.04729 | 2.99E+07 |
| 22 | 1892 | 30 | 1589 | 3.42E+04 | 0.04639 | 3.29E+07 |
| 23 | 1980 | 30 | 1625 | 3.55E+04 | 0.04583 | 3.60E+07 |
| 24 | 2068 | 30 | 1661 | 3.68E+04 | 0.04514 | 3.93E+07 |
| 25 | 2156 | 30 | 1698 | 3.83E+04 | 0.04437 | 4.26E+07 |
| 26 | 2244 | 30 | 1735 | 3.93E+04 | 0.04413 | 4.61E+07 |
| 27 | 2332 | 30 | 1772 | 4.06E+04 | 0.04362 | 4.97E+07 |
| 28 | 2420 | 30 | 1809 | 4.21E+04 | 0.04299 | 5.34E+07 |
| 29 | 2508 | 30 | 1845 | 4.33E+04 | 0.04264 | 5.72E+07 |
| 30 | 2596 | 30 | 1881 | 4.47E+04 | 0.04211 | 6.11E+07 |
| 31 | 2684 | 30 | 1918 | 4.63E+04 | 0.04146 | 6.52E+07 |
| 32 | 2772 | 30 | 1955 | 4.77E+04 | 0.04099 | 6.94E+07 |
| 33 | 2860 | 30 | 1992 | 4.85E+04 | 0.04109 | 7.36E+07 |
| 34 | 2948 | 30 | 2028 | 4.95E+04 | 0.04094 | 7.80E+07 |
| 35 | 3036 | 30 | 2065 | 5.14E+04 | 0.04015 | 8.25E+07 |
| 36 | 3124 | 30 | 2102 | 5.22E+04 | 0.04029 | 8.71E+07 |
| 37 | 3168 | 30 | 2114 | 5.25E+04 | 0.04026 | 8.87E+07 |

**C1.1.6 Abu untreated with 20% Sertica**

| Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|
| 20.01 | 30 | 8.347 | 3.64E-06 | 2.30E+06 | 0.000533 |
| 60.03 | 30 | 24.7 | 3.96E-06 | 6.25E+06 | 0.000666 |
| 100 | 30 | 41.37 | 3.90E-06 | 1.06E+07 | 0.000799 |
| 140 | 30 | 58.07 | 3.23E-06 | 1.80E+07 | 0.001065 |
| 180 | 30 | 74.73 | 5.76E-06 | 1.30E+07 | 0.001198 |
| 220 | 30 | 91.37 | 3.57E-06 | 2.56E+07 | 0.001332 |
| 260.1 | 30 | 108 | 5.90E-06 | 1.83E+07 | 0.001598 |
| 300.1 | 30 | 125 | 5.02E-06 | 2.49E+07 | 0.001864 |

| | | | | | |
|---|---|---|---|---|---|
| 340.1 | 30 | 141.7 | 7.53E-06 | 1.88E+07 | 0.002131 |
| 380 | 30 | 158.3 | 7.60E-06 | 2.08E+07 | 0.002397 |
| 420.1 | 30 | 175 | 4.44E-06 | 3.94E+07 | 0.00253 |
| 460.1 | 30 | 191.3 | 5.42E-06 | 3.53E+07 | 0.002796 |
| 500 | 30 | 208 | 5.77E-06 | 3.61E+07 | 0.003196 |
| 540.1 | 30 | 224.8 | 7.62E-06 | 2.95E+07 | 0.003595 |
| 580.1 | 30 | 241.4 | 7.37E-06 | 3.28E+07 | 0.003595 |
| 620 | 30 | 258.1 | 1.15E-05 | 2.25E+07 | 0.004261 |
| 660.1 | 30 | 274.8 | 9.53E-06 | 2.89E+07 | 0.00466 |
| 700.1 | 30 | 291.5 | 1.38E-05 | 2.11E+07 | 0.00506 |
| 740 | 30 | 308.2 | 1.18E-05 | 2.61E+07 | 0.005726 |
| 780.1 | 30 | 324.8 | 1.23E-05 | 2.65E+07 | 0.005859 |
| 820.1 | 30 | 341.5 | 1.52E-05 | 2.24E+07 | 0.006392 |
| 860 | 30 | 358.2 | 1.39E-05 | 2.58E+07 | 0.00719 |
| 900.1 | 30 | 374.9 | 1.97E-05 | 1.90E+07 | 0.007856 |
| 940.1 | 30 | 391.5 | 2.50E-05 | 1.57E+07 | 0.009188 |
| 980 | 30 | 408.2 | 2.98E-05 | 1.37E+07 | 0.01039 |
| 1020 | 30 | 424.9 | 4.19E-05 | 1.02E+07 | 0.01185 |
| 1060 | 30 | 441.5 | 5.26E-05 | 8.40E+06 | 0.01385 |
| 1100 | 30 | 458.2 | 8.19E-05 | 5.59E+06 | 0.01718 |
| 1140 | 30 | 474.9 | 0.00014 | 3.40E+06 | 0.0225 |
| 1180 | 30 | 491.5 | 0.000489 | 1.01E+06 | 0.04181 |
| 1220 | 30 | 508.2 | 0.000418 | 1.22E+06 | 0.05832 |
| 1260 | 30 | 524.9 | 0.000454 | 1.16E+06 | 0.07683 |
| 1300 | 30 | 541.5 | 0.000742 | 7.30E+05 | 0.1069 |
| 1340 | 30 | 558.2 | 3628 | 0.1539 | 1.96E+05 |
| 1380 | 30 | 574.9 | 2.04E+04 | 0.02819 | 1.01E+06 |
| 1420 | 30 | 591.6 | 2.37E+04 | 0.02502 | 1.95E+06 |
| 1460 | 30 | 608.3 | 2.47E+04 | 0.02463 | 2.94E+06 |
| 1500 | 30 | 625 | 2.54E+04 | 0.02461 | 3.96E+06 |
| 1540 | 30 | 641.6 | 2.60E+04 | 0.02471 | 5.00E+06 |
| 1580 | 30 | 658.2 | 2.67E+04 | 0.02469 | 6.06E+06 |
| 1620 | 30 | 674.9 | 2.72E+04 | 0.02479 | 7.15E+06 |
| 1660 | 30 | 691.6 | 2.77E+04 | 0.02494 | 8.26E+06 |
| 1700 | 30 | 708.3 | 2.83E+04 | 0.02504 | 9.39E+06 |
| 1740 | 30 | 724.9 | 2.88E+04 | 0.02515 | 1.06E+07 |
| 1780 | 30 | 741.6 | 2.94E+04 | 0.02527 | 1.17E+07 |
| 1820 | 30 | 758.3 | 2.99E+04 | 0.02533 | 1.29E+07 |
| 1860 | 30 | 774.9 | 3.05E+04 | 0.02539 | 1.41E+07 |
| 1900 | 30 | 791.6 | 3.12E+04 | 0.0254 | 1.54E+07 |
| 1940 | 30 | 808.3 | 3.18E+04 | 0.0254 | 1.67E+07 |
| 1980 | 30 | 825 | 3.25E+04 | 0.02541 | 1.80E+07 |
| 2020 | 30 | 841.6 | 3.32E+04 | 0.02538 | 1.93E+07 |
| 2060 | 30 | 858.3 | 3.39E+04 | 0.02529 | 2.06E+07 |
| 2100 | 30 | 874.7 | 3.47E+04 | 0.02523 | 2.20E+07 |
| 2140 | 30 | 891.4 | 3.53E+04 | 0.02523 | 2.34E+07 |
| 2180 | 30 | 908 | 3.62E+04 | 0.02512 | 2.49E+07 |
| 2220 | 30 | 924.7 | 3.70E+04 | 0.02497 | 2.64E+07 |

| | | | | | |
|---|---|---|---|---|---|
| 2260 | 30 | 941.4 | 3.79E+04 | 0.02483 | 2.79E+07 |
| 2300 | 30 | 958.1 | 3.89E+04 | 0.02463 | 2.95E+07 |
| 2340 | 30 | 974.7 | 3.97E+04 | 0.02454 | 3.10E+07 |
| 2380 | 30 | 991.4 | 4.08E+04 | 0.02432 | 3.27E+07 |
| 2420 | 30 | 991.9 | 4.11E+04 | 0.02412 | 3.43E+07 |
| 2460 | 30 | 975.2 | 4.02E+04 | 0.02425 | 3.59E+07 |
| 2500 | 30 | 958.5 | 3.91E+04 | 0.02453 | 3.75E+07 |
| 2540 | 30 | 941.9 | 3.78E+04 | 0.02489 | 3.90E+07 |
| 2580 | 30 | 925.2 | 3.66E+04 | 0.02529 | 4.05E+07 |
| 2620 | 30 | 908.5 | 3.53E+04 | 0.02574 | 4.19E+07 |
| 2660 | 30 | 891.8 | 3.42E+04 | 0.02607 | 4.32E+07 |
| 2700 | 30 | 875.1 | 3.29E+04 | 0.02658 | 4.46E+07 |
| 2740 | 30 | 858.5 | 3.17E+04 | 0.02706 | 4.58E+07 |
| 2780 | 30 | 841.8 | 3.07E+04 | 0.02746 | 4.71E+07 |
| 2820 | 30 | 825.2 | 2.97E+04 | 0.02777 | 4.82E+07 |
| 2860 | 30 | 808.5 | 2.88E+04 | 0.02812 | 4.94E+07 |
| 2900 | 30 | 791.8 | 2.78E+04 | 0.02847 | 5.05E+07 |
| 2940 | 30 | 775.1 | 2.69E+04 | 0.02884 | 5.16E+07 |
| 2980 | 30 | 758.4 | 2.60E+04 | 0.02922 | 5.26E+07 |
| 3020 | 30 | 741.7 | 2.51E+04 | 0.02954 | 5.36E+07 |
| 3060 | 30 | 725.1 | 2.43E+04 | 0.02986 | 5.46E+07 |
| 3100 | 30 | 708.4 | 2.35E+04 | 0.03012 | 5.55E+07 |
| 3140 | 30 | 691.7 | 2.28E+04 | 0.03031 | 5.64E+07 |
| 3180 | 30 | 675 | 2.21E+04 | 0.0306 | 5.73E+07 |
| 3220 | 30 | 658.4 | 2.13E+04 | 0.03093 | 5.82E+07 |
| 3260 | 30 | 641.7 | 2.05E+04 | 0.03125 | 5.90E+07 |
| 3300 | 30 | 625.1 | 1.98E+04 | 0.03161 | 5.98E+07 |
| 3340 | 30 | 608.4 | 1.91E+04 | 0.03193 | 6.05E+07 |
| 3380 | 30 | 591.8 | 1.83E+04 | 0.03228 | 6.13E+07 |
| 3420 | 30.1 | 575.1 | 1.76E+04 | 0.03262 | 6.20E+07 |
| 3460 | 30 | 558.4 | 1.71E+04 | 0.03268 | 6.27E+07 |
| 3500 | 30 | 541.7 | 1.64E+04 | 0.03294 | 6.33E+07 |
| 3540 | 30 | 525.1 | 1.58E+04 | 0.03327 | 6.40E+07 |
| 3580 | 30 | 508.4 | 1.51E+04 | 0.03358 | 6.46E+07 |
| 3620 | 30 | 491.7 | 1.45E+04 | 0.03391 | 6.51E+07 |
| 3660 | 30 | 475.1 | 1.38E+04 | 0.03431 | 6.57E+07 |
| 3700 | 30 | 458.4 | 1.32E+04 | 0.03469 | 6.62E+07 |
| 3740 | 30 | 441.7 | 1.26E+04 | 0.03512 | 6.67E+07 |
| 3780 | 30 | 425 | 1.20E+04 | 0.03553 | 6.72E+07 |
| 3820 | 30 | 408.4 | 1.14E+04 | 0.0359 | 6.77E+07 |
| 3860 | 30 | 391.7 | 1.08E+04 | 0.03618 | 6.81E+07 |
| 3900 | 30 | 375.1 | 1.02E+04 | 0.03662 | 6.85E+07 |
| 3940 | 30 | 358.4 | 9676 | 0.03704 | 6.89E+07 |
| 3980 | 30 | 341.8 | 9125 | 0.03746 | 6.93E+07 |
| 4020 | 30 | 325.1 | 8557 | 0.03799 | 6.96E+07 |
| 4060 | 30 | 308.4 | 8003 | 0.03854 | 6.99E+07 |
| 4100 | 30 | 291.8 | 7449 | 0.03917 | 7.02E+07 |
| 4140 | 30 | 275.1 | 6898 | 0.03988 | 7.05E+07 |

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|---|---|---|---|---|---|
| 4180 | 30 | 258.4 | 6361 | 0.04062 | 7.07E+07 |
| 4220 | 30 | 241.7 | 5839 | 0.04139 | 7.10E+07 |
| 4260 | 30 | 225 | 5299 | 0.04246 | 7.12E+07 |
| 4300 | 30 | 208.3 | 4775 | 0.04362 | 7.14E+07 |
| 4340 | 30 | 191.9 | 4263 | 0.04502 | 7.16E+07 |
| 4380 | 30 | 175.2 | 3734 | 0.04692 | 7.17E+07 |
| 4420 | 30 | 158.5 | 3192 | 0.04965 | 7.18E+07 |
| 4460 | 30 | 141.8 | 2668 | 0.05314 | 7.19E+07 |
| 4500 | 30 | 125.1 | 2200 | 0.05686 | 7.20E+07 |
| 4540 | 30 | 108.4 | 1809 | 0.05994 | 7.21E+07 |
| 4580 | 30 | 91.77 | 1465 | 0.06266 | 7.22E+07 |
| 4620 | 30 | 75.1 | 1146 | 0.06555 | 7.22E+07 |
| 4660 | 30 | 58.38 | 843.7 | 0.0692 | 7.22E+07 |
| 4700 | 30 | 41.68 | 549.1 | 0.07591 | 7.23E+07 |
| 4740 | 30 | 24.98 | 263 | 0.09501 | 7.23E+07 |
| 4780 | 30 | 8.596 | 28.85 | 0.298 | 7.23E+07 |

**C1.2 (T=35°C)**

**C1.2.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 8.017 | 35 | 3.402 | 2.06E-05 | 1.65E+05 | 0.01158 |
| 1, 2 | 24.07 | 35 | 10.01 | 8.66E-06 | 1.16E+06 | 0.01145 |
| 1, 3 | 40.09 | 35 | 16.68 | 2.28E-05 | 7.30E+05 | 0.01212 |
| 1, 4 | 56.05 | 35 | 23.34 | 9.20E-06 | 2.54E+06 | 0.01238 |
| 1, 5 | 72.07 | 35 | 29.99 | 1.32E-05 | 2.28E+06 | 0.01252 |
| 1, 6 | 88.08 | 34.9 | 36.67 | 1.43E-05 | 2.56E+06 | 0.01252 |
| 1, 7 | 104 | 35 | 43.2 | 9.25E-06 | 4.67E+06 | 0.01265 |
| 1, 8 | 120.1 | 35 | 50.01 | 3.04E-05 | 1.65E+06 | 0.01385 |
| 1, 9 | 136.1 | 35 | 56.54 | 2.33E-05 | 2.42E+06 | 0.01318 |
| 1, 10 | 152.1 | 35 | 63.2 | 1.12E-05 | 5.64E+06 | 0.01358 |
| 1, 11 | 168.1 | 35 | 70.02 | 2.54E-05 | 2.76E+06 | 0.01412 |
| 1, 12 | 184.1 | 35 | 76.56 | 3.69E-05 | 2.08E+06 | 0.01478 |
| 1, 13 | 200.1 | 35 | 83.23 | 4.61E-05 | 1.81E+06 | 0.01545 |
| 1, 14 | 216.1 | 35 | 89.89 | 2.79E-05 | 3.23E+06 | 0.01585 |
| 1, 15 | 232.1 | 35 | 96.56 | 4.77E-05 | 2.03E+06 | 0.01758 |
| 1, 16 | 248 | 35 | 103.2 | 3.38E-05 | 3.06E+06 | 0.01838 |
| 1, 17 | 264.1 | 35 | 110 | 6.78E-05 | 1.62E+06 | 0.01891 |
| 1, 18 | 280.1 | 35 | 116.7 | 5.09E-05 | 2.29E+06 | 0.01984 |
| 1, 19 | 296 | 35 | 123.3 | 7.49E-05 | 1.65E+06 | 0.02104 |
| 1, 20 | 312.1 | 35 | 129.9 | 8.49E-05 | 1.53E+06 | 0.0225 |
| 1, 21 | 328.1 | 35 | 136.6 | 8.28E-05 | 1.65E+06 | 0.0233 |
| 1, 22 | 344 | 35 | 143.2 | 0.000108 | 1.33E+06 | 0.02477 |
| 1, 23 | 360.1 | 35 | 150 | 0.00013 | 1.16E+06 | 0.02743 |
| 1, 24 | 376.1 | 35 | 156.7 | 0.000135 | 1.16E+06 | 0.02903 |
| 1, 25 | 392 | 35 | 163.3 | 0.000158 | 1.03E+06 | 0.03169 |
| 1, 26 | 408.1 | 35 | 170 | 0.000165 | 1.03E+06 | 0.03409 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 27 | 424.1 | 35 | 176.6 | 0.000193 | 9.13E+05 | 0.03782 |
| 1, 28 | 440 | 35 | 183.3 | 0.000216 | 8.50E+05 | 0.04128 |
| 1, 29 | 456.1 | 35 | 189.9 | 0.000257 | 7.38E+05 | 0.04487 |
| 1, 30 | 472.1 | 35 | 196.6 | 0.000322 | 6.10E+05 | 0.05033 |
| 1, 31 | 488 | 35 | 203.3 | 0.000402 | 5.05E+05 | 0.05699 |
| 1, 32 | 504.1 | 35 | 209.9 | 0.000681 | 3.08E+05 | 0.06818 |
| 1, 33 | 520.1 | 35 | 216.6 | 0.00158 | 1.37E+05 | 0.09388 |
| 1, 34 | 536 | 35 | 223.3 | 189.3 | 1.179 | 7647 |
| 1, 35 | 552.1 | 35 | 229.9 | 5488 | 0.0419 | 9.58E+04 |
| 1, 36 | 568.1 | 35 | 236.6 | 6922 | 0.03418 | 2.06E+05 |
| 1, 37 | 584 | 35 | 243.3 | 7654 | 0.03179 | 3.29E+05 |
| 1, 38 | 600.1 | 35 | 249.9 | 8022 | 0.03116 | 4.58E+05 |
| 1, 39 | 616.1 | 35 | 256.6 | 8465 | 0.03031 | 5.93E+05 |
| 1, 40 | 632 | 35 | 263.3 | 8925 | 0.0295 | 7.36E+05 |
| 1, 41 | 648.1 | 35 | 269.9 | 9357 | 0.02885 | 8.86E+05 |
| 1, 42 | 664.1 | 35 | 276.6 | 9695 | 0.02853 | 1.04E+06 |
| 1, 43 | 680 | 35 | 283.2 | 9984 | 0.02837 | 1.20E+06 |
| 1, 44 | 696.1 | 35 | 289.9 | 1.02E+04 | 0.02831 | 1.37E+06 |
| 1, 45 | 712.1 | 35 | 296.6 | 1.03E+04 | 0.02869 | 1.53E+06 |
| 1, 46 | 728 | 35 | 303.2 | 1.06E+04 | 0.02867 | 1.70E+06 |
| 1, 47 | 744.1 | 35 | 309.9 | 1.09E+04 | 0.02834 | 1.88E+06 |
| 1, 48 | 760.1 | 35 | 316.6 | 1.13E+04 | 0.02809 | 2.06E+06 |
| 1, 49 | 776 | 35 | 323.3 | 1.16E+04 | 0.02789 | 2.24E+06 |
| 1, 50 | 792.1 | 35 | 329.9 | 1.19E+04 | 0.02771 | 2.43E+06 |
| 1, 51 | 808.1 | 35 | 336.6 | 1.22E+04 | 0.02754 | 2.63E+06 |
| 1, 52 | 824 | 35 | 343.2 | 1.26E+04 | 0.02735 | 2.83E+06 |
| 1, 53 | 840.1 | 35 | 350 | 1.29E+04 | 0.02714 | 3.04E+06 |
| 1, 54 | 856.1 | 35 | 356.7 | 1.32E+04 | 0.02703 | 3.25E+06 |
| 1, 55 | 872 | 35 | 363.3 | 1.35E+04 | 0.02687 | 3.46E+06 |
| 1, 56 | 888.1 | 35 | 370 | 1.38E+04 | 0.02676 | 3.68E+06 |
| 1, 57 | 904.1 | 35 | 376.6 | 1.41E+04 | 0.02665 | 3.91E+06 |
| 1, 58 | 920 | 35 | 383.3 | 1.44E+04 | 0.02659 | 4.14E+06 |
| 1, 59 | 936.1 | 35 | 389.9 | 1.47E+04 | 0.02651 | 4.38E+06 |
| 1, 60 | 952.1 | 35 | 396.6 | 1.50E+04 | 0.02644 | 4.62E+06 |
| 1, 61 | 968.1 | 35 | 396.6 | 1.51E+04 | 0.0263 | 4.86E+06 |
| 1, 62 | 984.2 | 35 | 390.1 | 1.47E+04 | 0.02648 | 5.09E+06 |
| 1, 63 | 1000 | 35 | 383.4 | 1.43E+04 | 0.02676 | 5.32E+06 |
| 1, 64 | 1016 | 35 | 376.6 | 1.39E+04 | 0.02704 | 5.55E+06 |
| 1, 65 | 1032 | 35 | 370 | 1.36E+04 | 0.02731 | 5.76E+06 |
| 1, 66 | 1048 | 35 | 363.3 | 1.32E+04 | 0.02758 | 5.97E+06 |
| 1, 67 | 1064 | 35 | 356.7 | 1.28E+04 | 0.02785 | 6.18E+06 |
| 1, 68 | 1080 | 35 | 350 | 1.25E+04 | 0.02809 | 6.38E+06 |
| 1, 69 | 1096 | 35 | 343.4 | 1.21E+04 | 0.02832 | 6.57E+06 |
| 1, 70 | 1112 | 35 | 336.7 | 1.18E+04 | 0.02858 | 6.76E+06 |
| 1, 71 | 1128 | 35 | 330 | 1.15E+04 | 0.0288 | 6.94E+06 |
| 1, 72 | 1144 | 35 | 323.4 | 1.11E+04 | 0.02906 | 7.12E+06 |
| 1, 73 | 1160 | 35 | 316.7 | 1.08E+04 | 0.02933 | 7.29E+06 |
| 1, 74 | 1176 | 35 | 310 | 1.05E+04 | 0.02958 | 7.46E+06 |

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|---|---|---|---|---|---|---|
| 1, 75 | 1192 | 35 | 303.3 | 1.02E+04 | 0.02987 | 7.62E+06 |
| 1, 76 | 1208 | 35 | 296.6 | 9835 | 0.03016 | 7.78E+06 |
| 1, 77 | 1224 | 35 | 290 | 9520 | 0.03046 | 7.93E+06 |
| 1, 78 | 1240 | 35 | 283.3 | 9213 | 0.03075 | 8.08E+06 |
| 1, 79 | 1256 | 35 | 276.6 | 8912 | 0.03104 | 8.22E+06 |
| 1, 80 | 1272 | 35 | 270 | 8610 | 0.03136 | 8.36E+06 |
| 1, 81 | 1288 | 35 | 263.3 | 8317 | 0.03166 | 8.49E+06 |
| 1, 82 | 1304 | 35 | 256.7 | 8026 | 0.03198 | 8.62E+06 |
| 1, 83 | 1320 | 35 | 250 | 7736 | 0.03232 | 8.75E+06 |
| 1, 84 | 1336 | 35 | 243.3 | 7458 | 0.03263 | 8.87E+06 |
| 1, 85 | 1352 | 35 | 236.7 | 7178 | 0.03297 | 8.98E+06 |
| 1, 86 | 1368 | 35 | 230 | 6912 | 0.03327 | 9.09E+06 |
| 1, 87 | 1384 | 35 | 223.3 | 6642 | 0.03362 | 9.20E+06 |
| 1, 88 | 1400 | 35 | 216.7 | 6383 | 0.03394 | 9.30E+06 |
| 1, 89 | 1416 | 35 | 210 | 6126 | 0.03427 | 9.40E+06 |
| 1, 90 | 1432 | 35 | 203.4 | 5874 | 0.03463 | 9.49E+06 |
| 1, 91 | 1448 | 35 | 196.7 | 5623 | 0.03499 | 9.58E+06 |
| 1, 92 | 1464 | 35 | 190.1 | 5372 | 0.03538 | 9.67E+06 |
| 1, 93 | 1480 | 35 | 183.4 | 5117 | 0.03583 | 9.75E+06 |
| 1, 94 | 1496 | 35 | 176.7 | 4866 | 0.03632 | 9.83E+06 |
| 1, 95 | 1512 | 35 | 170 | 4626 | 0.03676 | 9.90E+06 |
| 1, 96 | 1528 | 35 | 163.4 | 4379 | 0.03732 | 9.97E+06 |
| 1, 97 | 1544 | 35 | 156.7 | 4145 | 0.03781 | 1.00E+07 |
| 1, 98 | 1560 | 35 | 150.1 | 3912 | 0.03836 | 1.01E+07 |
| 1, 99 | 1576 | 35 | 143.3 | 3667 | 0.03907 | 1.02E+07 |
| 1, 100 | 1592 | 35 | 136.6 | 3434 | 0.03979 | 1.02E+07 |
| 1, 101 | 1608 | 35 | 130 | 3201 | 0.04061 | 1.03E+07 |
| 1, 102 | 1624 | 35 | 123.3 | 2959 | 0.04168 | 1.03E+07 |
| 1, 103 | 1640 | 35 | 116.7 | 2720 | 0.04288 | 1.04E+07 |
| 1, 104 | 1656 | 35 | 110 | 2489 | 0.04419 | 1.04E+07 |
| 1, 105 | 1672 | 35 | 103.3 | 2266 | 0.0456 | 1.04E+07 |
| 1, 106 | 1688 | 35 | 96.68 | 2064 | 0.04684 | 1.05E+07 |
| 1, 107 | 1704 | 35 | 90.01 | 1874 | 0.04802 | 1.05E+07 |
| 1, 108 | 1720 | 35 | 83.35 | 1691 | 0.04931 | 1.05E+07 |
| 1, 109 | 1736 | 35 | 76.7 | 1513 | 0.0507 | 1.05E+07 |
| 1, 110 | 1752 | 35 | 70.02 | 1344 | 0.0521 | 1.06E+07 |
| 1, 111 | 1768 | 35 | 63.34 | 1183 | 0.05354 | 1.06E+07 |
| 1, 112 | 1784 | 35 | 56.68 | 1032 | 0.05493 | 1.06E+07 |
| 1, 113 | 1800 | 35 | 50.01 | 882.2 | 0.05668 | 1.06E+07 |
| 1, 114 | 1816 | 35 | 43.33 | 735.6 | 0.05891 | 1.06E+07 |
| 1, 115 | 1832 | 35 | 36.66 | 592.2 | 0.06191 | 1.06E+07 |
| 1, 116 | 1848 | 35 | 30.01 | 453.5 | 0.06618 | 1.06E+07 |
| 1, 117 | 1864 | 35 | 23.35 | 317.9 | 0.07343 | 1.07E+07 |
| 1, 118 | 1880 | 35 | 16.68 | 187.5 | 0.08897 | 1.07E+07 |
| 1, 119 | 1896 | 35 | 9.998 | 69.71 | 0.1434 | 1.07E+07 |
| 1, 120 | 1912 | 35 | 3.308 | 2.827 | 1.17 | 1.07E+07 |

**C1.2.2 Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 8.058 | 35 | 3.391 | 6.53E-05 | 5.19E+04 | 0 |
| 2 | 24.07 | 35 | 9.991 | 6.52E-05 | 1.53E+05 | 0.000666 |
| 3 | 40.04 | 35 | 16.54 | 7.40E-05 | 2.24E+05 | 0.002131 |
| 4 | 56.07 | 35 | 23.37 | 9.06E-05 | 2.58E+05 | 0.003595 |
| 5 | 72.07 | 35 | 29.89 | 0.0001 | 2.99E+05 | 0.00506 |
| 6 | 88.04 | 35 | 36.56 | 0.000118 | 3.10E+05 | 0.006658 |
| 7 | 104.1 | 35 | 43.23 | 0.000136 | 3.19E+05 | 0.009321 |
| 8 | 120.1 | 35 | 49.9 | 0.000238 | 2.09E+05 | 0.01225 |
| 9 | 136 | 35 | 56.54 | 0.000173 | 3.27E+05 | 0.01531 |
| 10 | 152.1 | 35 | 63.35 | 0.000205 | 3.09E+05 | 0.01811 |
| 11 | 168.1 | 35 | 70 | 0.000248 | 2.82E+05 | 0.0225 |
| 12 | 184 | 35 | 76.65 | 0.000288 | 2.66E+05 | 0.0273 |
| 13 | 200.1 | 35 | 83.3 | 0.000423 | 1.97E+05 | 0.03369 |
| 14 | 216.1 | 35 | 89.94 | 0.000728 | 1.24E+05 | 0.0458 |
| 15 | 232 | 35 | 96.6 | 0.002974 | 3.25E+04 | 0.09934 |
| 16 | 248.1 | 35 | 103.3 | 0.01111 | 9295 | 0.3277 |
| 17 | 264.1 | 35 | 109.9 | 1752 | 0.06274 | 2.66E+04 |
| 18 | 280 | 35 | 116.6 | 2759 | 0.04227 | 7.07E+04 |
| 19 | 296.1 | 35 | 123.3 | 3067 | 0.04019 | 1.20E+05 |
| 20 | 312.1 | 35 | 129.9 | 3337 | 0.03894 | 1.73E+05 |
| 21 | 328 | 35 | 136.6 | 3598 | 0.03796 | 2.31E+05 |
| 22 | 344.1 | 35 | 143.4 | 3841 | 0.03733 | 2.93E+05 |
| 23 | 360.1 | 35 | 149.9 | 4070 | 0.03683 | 3.58E+05 |
| 24 | 376 | 35 | 156.6 | 4304 | 0.03638 | 4.27E+05 |
| 25 | 392.1 | 35 | 163.3 | 4537 | 0.03599 | 5.00E+05 |
| 26 | 408.1 | 35 | 169.9 | 4770 | 0.03562 | 5.76E+05 |
| 27 | 424 | 35 | 176.6 | 5004 | 0.03529 | 6.56E+05 |
| 28 | 440.1 | 35 | 183.3 | 5231 | 0.03503 | 7.40E+05 |
| 29 | 456.1 | 35 | 189.9 | 5460 | 0.03478 | 8.27E+05 |
| 30 | 472 | 35 | 196.6 | 5689 | 0.03455 | 9.18E+05 |
| 31 | 488.1 | 35 | 203.3 | 5919 | 0.03434 | 1.01E+06 |
| 32 | 504.1 | 35 | 209.9 | 6149 | 0.03414 | 1.11E+06 |
| 33 | 520 | 35 | 216.6 | 6388 | 0.03391 | 1.21E+06 |
| 34 | 536.1 | 35 | 223.3 | 6632 | 0.03366 | 1.32E+06 |
| 35 | 552.1 | 35 | 229.9 | 6871 | 0.03346 | 1.43E+06 |
| 36 | 568 | 35 | 236.6 | 7116 | 0.03325 | 1.54E+06 |
| 37 | 584.1 | 35 | 243.2 | 7372 | 0.03299 | 1.66E+06 |
| 38 | 600.1 | 35 | 249.9 | 7623 | 0.03278 | 1.78E+06 |
| 39 | 616 | 35 | 256.6 | 7883 | 0.03255 | 1.91E+06 |
| 40 | 632.1 | 35 | 263.3 | 8141 | 0.03234 | 2.04E+06 |
| 41 | 648.1 | 35 | 269.9 | 8410 | 0.0321 | 2.18E+06 |
| 42 | 664 | 35 | 276.6 | 8693 | 0.03182 | 2.31E+06 |
| 43 | 680.1 | 35 | 283.2 | 8967 | 0.03159 | 2.46E+06 |
| 44 | 696.1 | 35 | 289.9 | 9242 | 0.03137 | 2.61E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 45 | 712 | 35 | 296.6 | 9553 | 0.03105 | 2.76E+06 |
| 46 | 728 | 35 | 303.3 | 9834 | 0.03084 | 2.92E+06 |
| 47 | 744 | 35 | 309.9 | 1.01E+04 | 0.03064 | 3.08E+06 |
| 48 | 760 | 35 | 316.6 | 1.04E+04 | 0.03044 | 3.24E+06 |
| 49 | 776 | 35 | 323.2 | 1.07E+04 | 0.03025 | 3.42E+06 |
| 50 | 792 | 35 | 329.9 | 1.10E+04 | 0.03005 | 3.59E+06 |
| 51 | 808 | 35 | 336.6 | 1.13E+04 | 0.02984 | 3.77E+06 |
| 52 | 824.1 | 35 | 343.2 | 1.16E+04 | 0.02964 | 3.96E+06 |
| 53 | 840 | 35 | 349.9 | 1.19E+04 | 0.02946 | 4.15E+06 |
| 54 | 856 | 35 | 356.7 | 1.22E+04 | 0.02927 | 4.34E+06 |
| 55 | 872 | 35 | 363.3 | 1.25E+04 | 0.0291 | 4.54E+06 |
| 56 | 888 | 35 | 370 | 1.28E+04 | 0.02892 | 4.75E+06 |
| 57 | 904.1 | 35 | 376.6 | 1.31E+04 | 0.02876 | 4.96E+06 |
| 58 | 920.1 | 35 | 383.3 | 1.34E+04 | 0.0286 | 5.17E+06 |
| 59 | 936.1 | 35 | 390 | 1.37E+04 | 0.02843 | 5.39E+06 |
| 60 | 952 | 35 | 396.6 | 1.40E+04 | 0.02826 | 5.62E+06 |
| 61 | 968.1 | 35 | 396.7 | 1.41E+04 | 0.02807 | 5.84E+06 |
| 62 | 984.2 | 35 | 389.9 | 1.39E+04 | 0.02809 | 6.07E+06 |
| 63 | 1000 | 35 | 383.3 | 1.36E+04 | 0.0282 | 6.28E+06 |
| 64 | 1016 | 35 | 376.7 | 1.33E+04 | 0.0283 | 6.50E+06 |
| 65 | 1032 | 35 | 370 | 1.30E+04 | 0.02838 | 6.71E+06 |
| 66 | 1048 | 35 | 363.3 | 1.28E+04 | 0.02847 | 6.91E+06 |
| 67 | 1064 | 35 | 356.7 | 1.25E+04 | 0.02861 | 7.11E+06 |
| 68 | 1080 | 35 | 350 | 1.22E+04 | 0.02874 | 7.30E+06 |
| 69 | 1096 | 35 | 343.4 | 1.19E+04 | 0.02889 | 7.49E+06 |
| 70 | 1112 | 35 | 336.7 | 1.16E+04 | 0.02903 | 7.68E+06 |
| 71 | 1128 | 35 | 330.1 | 1.13E+04 | 0.02921 | 7.86E+06 |
| 72 | 1144 | 35 | 323.4 | 1.10E+04 | 0.02942 | 8.03E+06 |
| 73 | 1160 | 35 | 316.7 | 1.07E+04 | 0.02962 | 8.21E+06 |
| 74 | 1176 | 35 | 310 | 1.04E+04 | 0.02985 | 8.37E+06 |
| 75 | 1192 | 35 | 303.4 | 1.01E+04 | 0.03007 | 8.53E+06 |
| 76 | 1208 | 35 | 296.7 | 9800 | 0.03027 | 8.69E+06 |
| 77 | 1224 | 35 | 290 | 9509 | 0.0305 | 8.84E+06 |
| 78 | 1240 | 35 | 283.4 | 9227 | 0.03071 | 8.99E+06 |
| 79 | 1256 | 35 | 276.7 | 8933 | 0.03097 | 9.13E+06 |
| 80 | 1272 | 35 | 270 | 8637 | 0.03126 | 9.27E+06 |
| 81 | 1288 | 35 | 263.3 | 8349 | 0.03154 | 9.40E+06 |
| 82 | 1304 | 35 | 256.7 | 8060 | 0.03185 | 9.53E+06 |
| 83 | 1320 | 35 | 250 | 7775 | 0.03216 | 9.66E+06 |
| 84 | 1336 | 35 | 243.3 | 7500 | 0.03245 | 9.78E+06 |
| 85 | 1352 | 35 | 236.7 | 7229 | 0.03274 | 9.89E+06 |
| 86 | 1368 | 35 | 230 | 6960 | 0.03305 | 1.00E+07 |
| 87 | 1384 | 35 | 223.3 | 6695 | 0.03336 | 1.01E+07 |
| 88 | 1400 | 35 | 216.7 | 6427 | 0.03372 | 1.02E+07 |
| 89 | 1416 | 35 | 210 | 6166 | 0.03406 | 1.03E+07 |
| 90 | 1432 | 35 | 203.4 | 5907 | 0.03443 | 1.04E+07 |
| 91 | 1448 | 35 | 196.7 | 5651 | 0.03481 | 1.05E+07 |
| 92 | 1464 | 35 | 190 | 5398 | 0.0352 | 1.06E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 93 | 1480 | 35 | 183.4 | 5146 | 0.03563 | 1.07E+07 |
| 94 | 1496 | 35 | 176.7 | 4897 | 0.03608 | 1.07E+07 |
| 95 | 1512 | 35 | 170 | 4653 | 0.03655 | 1.08E+07 |
| 96 | 1528 | 35 | 163.4 | 4415 | 0.037 | 1.09E+07 |
| 97 | 1544 | 35 | 156.7 | 4185 | 0.03744 | 1.10E+07 |
| 98 | 1560 | 35 | 149.9 | 3961 | 0.03785 | 1.10E+07 |
| 99 | 1576 | 35 | 143.4 | 3749 | 0.03826 | 1.11E+07 |
| 100 | 1592 | 35 | 136.6 | 3524 | 0.03877 | 1.11E+07 |
| 101 | 1608 | 35 | 130 | 3308 | 0.03929 | 1.12E+07 |
| 102 | 1624 | 35 | 123.3 | 3095 | 0.03984 | 1.12E+07 |
| 103 | 1640 | 35 | 116.6 | 2885 | 0.04042 | 1.13E+07 |
| 104 | 1656 | 35 | 110 | 2679 | 0.04104 | 1.13E+07 |
| 105 | 1672 | 35 | 103.3 | 2477 | 0.0417 | 1.14E+07 |
| 106 | 1688 | 35 | 96.63 | 2279 | 0.0424 | 1.14E+07 |
| 107 | 1704 | 35 | 89.99 | 2084 | 0.04319 | 1.14E+07 |
| 108 | 1720 | 35 | 83.33 | 1891 | 0.04407 | 1.15E+07 |
| 109 | 1736 | 35 | 76.68 | 1703 | 0.04503 | 1.15E+07 |
| 110 | 1752 | 35 | 70.04 | 1522 | 0.04603 | 1.15E+07 |
| 111 | 1768 | 35 | 63.37 | 1345 | 0.04712 | 1.15E+07 |
| 112 | 1784 | 35 | 56.7 | 1173 | 0.04832 | 1.16E+07 |
| 113 | 1800 | 35 | 50.04 | 1008 | 0.04963 | 1.16E+07 |
| 114 | 1816 | 35 | 43.37 | 848.6 | 0.0511 | 1.16E+07 |
| 115 | 1832 | 35 | 36.72 | 693.7 | 0.05293 | 1.16E+07 |
| 116 | 1848 | 35 | 29.92 | 538.4 | 0.05557 | 1.16E+07 |
| 117 | 1864 | 35 | 23.39 | 390.8 | 0.05987 | 1.16E+07 |
| 118 | 1880 | 35 | 16.72 | 243.8 | 0.06859 | 1.16E+07 |
| 119 | 1896 | 35 | 10.05 | 104.7 | 0.09607 | 1.16E+07 |
| 120 | 1912 | 35 | 3.366 | 4.93 | 0.6828 | 1.16E+07 |

### C1.2.3 Abu treated with 1000PPM ROA

| | Time s | Temperature ° C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 8.018 | 35 | 3.398 | 0.0000 | 771400.000 | -0.00533 |
| 2 | 24.04 | 35 | 9.997 | 0.0001 | 77150.000 | -0.00346 |
| 3 | 40.06 | 35 | 16.66 | 0.0002 | 96220.000 | -0.00093 |
| 4 | 56.06 | 35 | 23.2 | 0.0002 | 100100.000 | 0.003595 |
| 5 | 72.03 | 35 | 29.88 | 0.0003 | 85640.000 | 0.008922 |
| 6 | 88.05 | 35 | 36.69 | 0.0009 | 40020.000 | 0.0261 |
| 7 | 104.1 | 35 | 43.2 | 0.0054 | 8046.000 | 0.1088 |
| 8 | 120 | 35 | 50.01 | 0.0065 | 7671.000 | 0.2153 |
| 9 | 136.1 | 35 | 56.66 | 0.0281 | 2013.000 | 0.9593 |
| 10 | 152.1 | 35 | 63.32 | 382.9000 | 0.165 | 7055 |
| 11 | 168 | 35 | 69.98 | 1473.0000 | 0.048 | 3.06E+04 |
| 12 | 184.1 | 35 | 76.65 | 1824.0000 | 0.042 | 5.99E+04 |
| 13 | 200.1 | 35 | 83.19 | 2069.0000 | 0.040 | 9.30E+0 |

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|---|---|---|---|---|---|---|
| | | | | | | 4 |
| 14 | 216.1 | 35 | 90 | 2291.0000 | 0.039 | 1.30E+05 |
| 15 | 232.1 | 35 | 96.65 | 2510.0000 | 0.039 | 1.70E+05 |
| 16 | 248.1 | 35 | 103.3 | 2743.0000 | 0.038 | 2.14E+05 |
| 17 | 264 | 35 | 110 | 2977.0000 | 0.037 | 2.61E+05 |
| 18 | 280.1 | 35 | 116.6 | 3214.0000 | 0.036 | 3.13E+05 |
| 19 | 296.1 | 35 | 123.3 | 3455.0000 | 0.036 | 3.68E+05 |
| 20 | 312.1 | 35 | 130 | 3692.0000 | 0.035 | 4.28E+05 |
| 21 | 328.1 | 35 | 136.6 | 3932.0000 | 0.035 | 4.90E+05 |
| 22 | 344.1 | 35 | 143.3 | 4197.0000 | 0.034 | 5.57E+05 |
| 23 | 360.1 | 35 | 149.9 | 4450.0000 | 0.034 | 6.29E+05 |
| 24 | 376.1 | 35 | 156.6 | 4710.0000 | 0.033 | 7.04E+05 |
| 25 | 392 | 35 | 163.3 | 4977.0000 | 0.033 | 7.84E+05 |
| 26 | 408.1 | 35 | 169.9 | 5243.0000 | 0.032 | 8.68E+05 |
| 27 | 424.1 | 35 | 176.6 | 5507.0000 | 0.032 | 9.56E+05 |
| 28 | 440.1 | 35 | 183.2 | 5772.0000 | 0.032 | 1.05E+06 |
| 29 | 456.1 | 35 | 189.9 | 6038.0000 | 0.031 | 1.15E+06 |
| 30 | 472.1 | 35 | 196.6 | 6323.0000 | 0.031 | 1.25E+06 |
| 31 | 488.1 | 35 | 203.3 | 6609.0000 | 0.031 | 1.35E+06 |
| 32 | 504.1 | 35 | 209.9 | 6898.0000 | 0.030 | 1.46E+06 |
| 33 | 520.1 | 35 | 216.6 | 7176.0000 | 0.030 | 1.58E+06 |
| 34 | 536 | 35 | 223.3 | 7452.0000 | 0.030 | 1.70E+06 |
| 35 | 552.1 | 35 | 229.9 | 7723.0000 | 0.030 | 1.82E+06 |
| 36 | 568.1 | 35 | 236.6 | 8034.0000 | 0.029 | 1.95E+06 |
| 37 | 584 | 35 | 243.2 | 8341.0000 | 0.029 | 2.08E+06 |

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|---|---|---|---|---|---|---|
| 38 | 600.1 | 35 | 249.9 | 8622.0000 | 0.029 | 2.22E+06 |
| 39 | 616.1 | 35 | 256.6 | 8897.0000 | 0.029 | 2.36E+06 |
| 40 | 632 | 35 | 263.3 | 9198.0000 | 0.029 | 2.51E+06 |
| 41 | 648.1 | 35 | 269.9 | 9477.0000 | 0.028 | 2.66E+06 |
| 42 | 664.1 | 35 | 276.6 | 9773.0000 | 0.028 | 2.82E+06 |
| 43 | 680 | 35 | 283.3 | 10070.0000 | 0.028 | 2.98E+06 |
| 44 | 696.1 | 35 | 289.9 | 10390.0000 | 0.028 | 3.15E+06 |
| 45 | 712.1 | 35 | 296.6 | 10690.0000 | 0.028 | 3.32E+06 |
| 46 | 728 | 35 | 303.3 | 10980.0000 | 0.028 | 3.49E+06 |
| 47 | 744.1 | 35 | 309.9 | 11300.0000 | 0.027 | 3.67E+06 |
| 48 | 760.1 | 35 | 316.6 | 11600.0000 | 0.027 | 3.86E+06 |
| 49 | 776 | 35 | 323.3 | 11930.0000 | 0.027 | 4.05E+06 |
| 50 | 792.1 | 35 | 329.9 | 12300.0000 | 0.027 | 4.25E+06 |
| 51 | 808.1 | 35 | 336.6 | 12650.0000 | 0.027 | 4.45E+06 |
| 52 | 824 | 35 | 343.3 | 13000.0000 | 0.026 | 4.66E+06 |
| 53 | 840.1 | 35 | 350 | 13350.0000 | 0.026 | 4.87E+06 |
| 54 | 856.1 | 35 | 356.6 | 13690.0000 | 0.026 | 5.09E+06 |
| 55 | 872 | 35 | 363.2 | 14030.0000 | 0.026 | 5.32E+06 |
| 56 | 888.1 | 35 | 370 | 14360.0000 | 0.026 | 5.55E+06 |
| 57 | 904.1 | 35 | 376.6 | 14680.0000 | 0.026 | 5.78E+06 |
| 58 | 920 | 35 | 383.3 | 15020.0000 | 0.026 | 6.02E+06 |
| 59 | 936.1 | 35 | 390 | 15340.0000 | 0.025 | 6.27E+06 |
| 60 | 952.1 | 35 | 396.6 | 15680.0000 | 0.025 | 6.52E+06 |
| 61 | 968.1 | 35 | 396.7 | 15820.0000 | 0.025 | 6.77E+06 |
| 62 | 984.2 | 35 | 390.1 | 15550.000 | 0.025 | 7.02E+0 |

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|---|---|---|---|---|---|---|
| | | | | 0 | | 6 |
| 63 | 1000 | 35 | 383.4 | 15210.0000 | 0.025 | 7.26E+06 |
| 64 | 1016 | 35 | 376.6 | 14850.0000 | 0.025 | 7.50E+06 |
| 65 | 1032 | 35 | 370.1 | 14540.0000 | 0.025 | 7.73E+06 |
| 66 | 1048 | 35 | 363.3 | 14190.0000 | 0.026 | 7.96E+06 |
| 67 | 1064 | 35 | 356.6 | 13840.0000 | 0.026 | 8.18E+06 |
| 68 | 1080 | 35 | 350 | 13510.0000 | 0.026 | 8.40E+06 |
| 69 | 1096 | 35 | 343.3 | 13170.0000 | 0.026 | 8.61E+06 |
| 70 | 1112 | 35 | 336.6 | 12810.0000 | 0.026 | 8.81E+06 |
| 71 | 1128 | 35 | 329.9 | 12480.0000 | 0.026 | 9.01E+06 |
| 72 | 1144 | 35 | 323.4 | 12160.0000 | 0.027 | 9.21E+06 |
| 73 | 1160 | 35 | 316.6 | 11820.0000 | 0.027 | 9.40E+06 |
| 74 | 1176 | 35 | 310.1 | 11490.0000 | 0.027 | 9.58E+06 |
| 75 | 1192 | 35 | 303.4 | 11160.0000 | 0.027 | 9.76E+06 |
| 76 | 1208 | 35 | 296.7 | 10840.0000 | 0.027 | 9.93E+06 |
| 77 | 1224 | 35 | 290 | 10510.0000 | 0.028 | 1.01E+07 |
| 78 | 1240 | 35 | 283.4 | 10180.0000 | 0.028 | 1.03E+07 |
| 79 | 1256 | 35 | 276.7 | 9860.0000 | 0.028 | 1.04E+07 |
| 80 | 1272 | 35 | 270 | 9542.0000 | 0.028 | 1.06E+07 |
| 81 | 1288 | 35 | 263.4 | 9210.0000 | 0.029 | 1.07E+07 |
| 82 | 1304 | 35 | 256.7 | 8893.0000 | 0.029 | 1.09E+07 |
| 83 | 1320 | 35 | 250 | 8585.0000 | 0.029 | 1.10E+07 |
| 84 | 1336 | 35 | 243.3 | 8288.0000 | 0.029 | 1.11E+07 |
| 85 | 1352 | 35 | 236.7 | 8000.0000 | 0.030 | 1.13E+07 |
| 86 | 1368 | 35 | 230 | 7716.0000 | 0.030 | 1.14E+07 |

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|---|---|---|---|---|---|---|
| 87 | 1384 | 35 | 223.3 | 7424.0000 | 0.030 | 1.15E+07 |
| 88 | 1400 | 35 | 216.6 | 7144.0000 | 0.030 | 1.16E+07 |
| 89 | 1416 | 35 | 210 | 6862.0000 | 0.031 | 1.17E+07 |
| 90 | 1432 | 35 | 203.3 | 6583.0000 | 0.031 | 1.18E+07 |
| 91 | 1448 | 35 | 196.6 | 6302.0000 | 0.031 | 1.19E+07 |
| 92 | 1464 | 35 | 190.1 | 6029.0000 | 0.032 | 1.20E+07 |
| 93 | 1480 | 35 | 183.3 | 5750.0000 | 0.032 | 1.21E+07 |
| 94 | 1496 | 35 | 176.6 | 5477.0000 | 0.032 | 1.22E+07 |
| 95 | 1512 | 35 | 170.1 | 5224.0000 | 0.033 | 1.23E+07 |
| 96 | 1528 | 35 | 163.3 | 4972.0000 | 0.033 | 1.24E+07 |
| 97 | 1544 | 35 | 156.6 | 4724.0000 | 0.033 | 1.25E+07 |
| 98 | 1560 | 35 | 150 | 4474.0000 | 0.034 | 1.25E+07 |
| 99 | 1576 | 35 | 143.4 | 4226.0000 | 0.034 | 1.26E+07 |
| 100 | 1592 | 35 | 136.7 | 3984.0000 | 0.034 | 1.27E+07 |
| 101 | 1608 | 35 | 130.1 | 3742.0000 | 0.035 | 1.27E+07 |
| 102 | 1624 | 35 | 123.3 | 3496.0000 | 0.035 | 1.28E+07 |
| 103 | 1640 | 35 | 116.7 | 3263.0000 | 0.036 | 1.28E+07 |
| 104 | 1656 | 35 | 110 | 3027.0000 | 0.036 | 1.29E+07 |
| 105 | 1672 | 35 | 103.4 | 2794.0000 | 0.037 | 1.29E+07 |
| 106 | 1688 | 35 | 96.73 | 2571.0000 | 0.038 | 1.30E+07 |
| 107 | 1704 | 35 | 90.06 | 2351.0000 | 0.038 | 1.30E+07 |
| 108 | 1720 | 35 | 83.4 | 2138.0000 | 0.039 | 1.30E+07 |
| 109 | 1736 | 35 | 76.72 | 1929.0000 | 0.040 | 1.31E+07 |
| 110 | 1752 | 35 | 70.05 | 1723.0000 | 0.041 | 1.31E+07 |
| 111 | 1768 | 35 | 63.25 | 1520.0000 | 0.042 | 1.31E+0 |

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|---|---|---|---|---|---|---|
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| 112 | 1784 | 35 | 56.73 | 1330.0000 | 0.043 | 1.31E+07 |
| 113 | 1800 | 35 | 50.06 | 1138.0000 | 0.044 | 1.32E+07 |
| 114 | 1816 | 35 | 43.26 | 947.1000 | 0.046 | 1.32E+07 |
| 115 | 1832 | 35 | 36.74 | 768.5000 | 0.048 | 1.32E+07 |
| 116 | 1848 | 35 | 30.08 | 592.1000 | 0.051 | 1.32E+07 |
| 117 | 1864 | 35 | 23.28 | 416.9000 | 0.056 | 1.32E+07 |
| 118 | 1880 | 35 | 16.75 | 254.7000 | 0.066 | 1.32E+07 |
| 119 | 1896 | 35 | 10.06 | 99.4500 | 0.101 | 1.32E+07 |
| 120 | 1912 | 35 | 3.361 | 3.1520 | 1.066 | 1.32E+07 |

**C1.2.4 Abu treated with 1000PPM PPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 16.01 | 35 | 6.775 | 6.75E-06 | 1.00E+06 | 0.009454 |
| 2 | 48.03 | 35 | 19.94 | 7.93E-06 | 2.52E+06 | 0.00972 |
| 3 | 80.04 | 35 | 33.25 | 1.13E-05 | 2.93E+06 | 0.009987 |
| 4 | 112.1 | 35 | 46.52 | 1.07E-05 | 4.36E+06 | 0.01065 |
| 5 | 144.1 | 35 | 59.78 | 7.21E-06 | 8.29E+06 | 0.01092 |
| 6 | 176 | 35 | 73.33 | 1.33E-05 | 5.51E+06 | 0.01145 |
| 7 | 208.1 | 35 | 86.62 | 1.47E-05 | 5.89E+06 | 0.01185 |
| 8 | 240.1 | 35 | 99.88 | 1.53E-05 | 6.54E+06 | 0.01252 |
| 9 | 272 | 35 | 113.1 | 1.63E-05 | 6.93E+06 | 0.01305 |
| 10 | 304.1 | 34.9 | 126.7 | 1.65E-05 | 7.69E+06 | 0.01358 |
| 11 | 336.1 | 35 | 139.9 | 1.90E-05 | 7.37E+06 | 0.01398 |
| 12 | 368 | 35 | 153.2 | 1.73E-05 | 8.84E+06 | 0.01451 |
| 13 | 400.1 | 35 | 166.5 | 2.00E-05 | 8.31E+06 | 0.01505 |
| 14 | 432.1 | 35 | 180 | 2.02E-05 | 8.90E+06 | 0.01585 |
| 15 | 464 | 35 | 193.3 | 2.18E-05 | 8.88E+06 | 0.01665 |
| 16 | 496.1 | 35 | 206.6 | 2.18E-05 | 9.49E+06 | 0.01731 |
| 17 | 528.1 | 35 | 219.9 | 2.54E-05 | 8.66E+06 | 0.01811 |
| 18 | 560 | 35 | 233.1 | 2.28E-05 | 1.02E+07 | 0.01864 |
| 19 | 592.1 | 35 | 246.7 | 2.19E-05 | 1.12E+07 | 0.01957 |
| 20 | 624.1 | 35 | 260 | 2.73E-05 | 9.54E+06 | 0.02011 |
| 21 | 656 | 35 | 273.3 | 2.69E-05 | 1.02E+07 | 0.02131 |
| 22 | 688.1 | 35 | 286.5 | 2.84E-05 | 1.01E+07 | 0.02197 |
| 23 | 720.1 | 35 | 299.8 | 3.47E-05 | 8.63E+06 | 0.02344 |
| 24 | 752 | 35 | 313.4 | 3.32E-05 | 9.44E+06 | 0.02463 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 25 | 784.1 | 35 | 326.6 | 3.06E-05 | 1.07E+07 | 0.0257 |
| 26 | 816.1 | 35 | 339.9 | 2.41E-05 | 1.41E+07 | 0.02663 |
| 27 | 848 | 35 | 353.2 | 4.55E-05 | 7.76E+06 | 0.02783 |
| 28 | 880 | 35 | 366.7 | 4.72E-05 | 7.77E+06 | 0.02929 |
| 29 | 912.1 | 35 | 379.9 | 5.15E-05 | 7.39E+06 | 0.03076 |
| 30 | 944 | 35 | 393.2 | 5.33E-05 | 7.37E+06 | 0.03249 |
| 31 | 976.1 | 35 | 406.5 | 7.04E-05 | 5.78E+06 | 0.03515 |
| 32 | 1008 | 35 | 420 | 9.21E-05 | 4.56E+06 | 0.03808 |
| 33 | 1040 | 35 | 433.3 | 0.000151 | 2.88E+06 | 0.04261 |
| 34 | 1072 | 35 | 446.5 | 0.000851 | 5.25E+05 | 0.06831 |
| 35 | 1104 | 35 | 459.8 | 0.00083 | 5.54E+05 | 0.09587 |
| 36 | 1136 | 35.1 | 473.3 | 0.000822 | 5.76E+05 | 0.1222 |
| 37 | 1168 | 35 | 486.6 | 0.000988 | 4.93E+05 | 0.1527 |
| 38 | 1200 | 35.1 | 499.8 | 0.001098 | 4.55E+05 | 0.1872 |
| 39 | 1232 | 35 | 513.4 | 0.001422 | 3.61E+05 | 0.2324 |
| 40 | 1264 | 35 | 526.6 | 0.002357 | 2.23E+05 | 0.31 |
| 41 | 1296 | 35 | 539.9 | 9666 | 0.05585 | 3.42E+05 |
| 42 | 1328 | 35 | 553.1 | 3.12E+04 | 0.01774 | 1.34E+06 |
| 43 | 1360 | 35 | 566.7 | 3.56E+04 | 0.01591 | 2.48E+06 |
| 44 | 1392 | 35 | 579.9 | 3.74E+04 | 0.0155 | 3.67E+06 |
| 45 | 1424 | 35 | 593.2 | 3.87E+04 | 0.01534 | 4.91E+06 |
| 46 | 1456 | 35 | 606.5 | 3.97E+04 | 0.01527 | 6.18E+06 |
| 47 | 1488 | 35 | 620 | 4.07E+04 | 0.01522 | 7.49E+06 |
| 48 | 1520 | 35 | 633.3 | 4.17E+04 | 0.0152 | 8.82E+06 |
| 49 | 1552 | 35 | 646.6 | 4.25E+04 | 0.01521 | 1.02E+07 |
| 50 | 1584 | 35 | 659.9 | 4.36E+04 | 0.01513 | 1.16E+07 |
| 51 | 1616 | 35 | 673.1 | 4.47E+04 | 0.01507 | 1.30E+07 |
| 52 | 1648 | 35 | 686.6 | 4.56E+04 | 0.01505 | 1.45E+07 |
| 53 | 1680 | 35 | 699.9 | 4.64E+04 | 0.01508 | 1.60E+07 |
| 54 | 1712 | 35 | 713.2 | 4.72E+04 | 0.0151 | 1.75E+07 |
| 55 | 1744 | 35 | 726.4 | 4.81E+04 | 0.0151 | 1.90E+07 |
| 56 | 1776 | 35 | 740 | 4.90E+04 | 0.01509 | 2.06E+07 |
| 57 | 1792 | 35 | 752.7 | 5.25E+04 | 0.01433 | 2.22E+07 |

### C1.2.5 Abu treated with 2000 PPMPPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 16.01 | 35 | 6.79 | 1.48E-06 | 4.60E+06 | 0.01119 |
| 2 | 48.03 | 35 | 19.93 | 6.15E-06 | 3.24E+06 | 0.01079 |
| 3 | 80.05 | 35 | 33.23 | 5.63E-06 | 5.90E+06 | 0.01132 |
| 4 | 112.1 | 35 | 46.51 | 5.10E-06 | 9.12E+06 | 0.01105 |
| 5 | 144 | 35 | 59.82 | 6.84E-06 | 8.74E+06 | 0.01172 |
| 6 | 176 | 35 | 73.1 | 9.63E-06 | 7.59E+06 | 0.01185 |
| 7 | 208.1 | 35 | 86.65 | 9.80E-06 | 8.84E+06 | 0.01225 |
| 8 | 240.1 | 35 | 99.92 | 1.18E-05 | 8.45E+06 | 0.01265 |
| 9 | 272 | 35 | 113.2 | 9.00E-06 | 1.26E+07 | 0.01252 |
| 10 | 304 | 35 | 126.5 | 9.75E-06 | 1.30E+07 | 0.01332 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | 336 | 35 | 140 | 1.15E-05 | 1.22E+07 | 0.01345 |
| 12 | 368 | 35 | 153.2 | 4.83E-06 | 3.17E+07 | 0.01385 |
| 13 | 400.1 | 35 | 166.5 | 9.72E-06 | 1.71E+07 | 0.01412 |
| 14 | 432.1 | 35 | 180 | 8.61E-06 | 2.09E+07 | 0.01451 |
| 15 | 464 | 35 | 193.3 | 9.56E-06 | 2.02E+07 | 0.01545 |
| 16 | 496.1 | 35 | 206.5 | 1.28E-05 | 1.61E+07 | 0.01545 |
| 17 | 528.1 | 35 | 219.8 | 1.25E-05 | 1.76E+07 | 0.01585 |
| 18 | 560 | 35 | 233.3 | 1.37E-05 | 1.70E+07 | 0.01638 |
| 19 | 592.1 | 35 | 246.6 | 1.09E-05 | 2.27E+07 | 0.01678 |
| 20 | 624.1 | 35 | 259.8 | 1.54E-05 | 1.69E+07 | 0.01731 |
| 21 | 656 | 35 | 273.1 | 1.48E-05 | 1.84E+07 | 0.01758 |
| 22 | 688.1 | 35 | 286.7 | 1.91E-05 | 1.50E+07 | 0.01851 |
| 23 | 720.1 | 35 | 300 | 1.42E-05 | 2.11E+07 | 0.01891 |
| 24 | 752 | 35 | 313.2 | 2.30E-05 | 1.36E+07 | 0.01904 |
| 25 | 784.1 | 35 | 326.5 | 1.38E-05 | 2.36E+07 | 0.01984 |
| 26 | 816.1 | 35 | 339.8 | 1.75E-05 | 1.94E+07 | 0.02037 |
| 27 | 848 | 35 | 353.1 | 2.33E-05 | 1.52E+07 | 0.02091 |
| 28 | 880.1 | 35 | 366.6 | 2.58E-05 | 1.42E+07 | 0.02157 |
| 29 | 912.1 | 35 | 379.9 | 2.41E-05 | 1.58E+07 | 0.02237 |
| 30 | 944 | 35 | 393.2 | 2.39E-05 | 1.64E+07 | 0.0233 |
| 31 | 976.1 | 35 | 406.7 | 2.56E-05 | 1.59E+07 | 0.02437 |
| 32 | 1008 | 35 | 420 | 3.06E-05 | 1.37E+07 | 0.02477 |
| 33 | 1040 | 35 | 433.2 | 3.29E-05 | 1.32E+07 | 0.0265 |
| 34 | 1072 | 35 | 446.7 | 3.46E-05 | 1.29E+07 | 0.0269 |
| 35 | 1104 | 35 | 460 | 3.54E-05 | 1.30E+07 | 0.0285 |
| 36 | 1136 | 35 | 473.2 | 4.68E-05 | 1.01E+07 | 0.02983 |
| 37 | 1168 | 35 | 486.7 | 5.27E-05 | 9.24E+06 | 0.03169 |
| 38 | 1200 | 35 | 500 | 5.74E-05 | 8.72E+06 | 0.03369 |
| 39 | 1232 | 35 | 513.3 | 8.34E-05 | 6.16E+06 | 0.03648 |
| 40 | 1264 | 35 | 526.6 | 0.000111 | 4.74E+06 | 0.03995 |
| 41 | 1296 | 35 | 539.8 | 0.000146 | 3.71E+06 | 0.04461 |
| 42 | 1328 | 35 | 553.4 | 0.000197 | 2.81E+06 | 0.05127 |
| 43 | 1360 | 35 | 566.6 | 0.000306 | 1.85E+06 | 0.06112 |
| 44 | 1392 | 35 | 579.8 | 0.000595 | 9.74E+05 | 0.07843 |
| 45 | 1424 | 35 | 593.3 | 0.000656 | 9.05E+05 | 0.0996 |
| 46 | 1456 | 35 | 606.6 | 0.000729 | 8.33E+05 | 0.1232 |
| 47 | 1488 | 35 | 619.9 | 0.000849 | 7.30E+05 | 0.1513 |
| 48 | 1520 | 35 | 633.1 | 0.00109 | 5.81E+05 | 0.1862 |
| 49 | 1552 | 35 | 646.6 | 0.001714 | 3.77E+05 | 0.2419 |
| 50 | 1584 | 35 | 659.9 | 2517 | 0.2622 | 1.61E+05 |
| 51 | 1616 | 35 | 673.2 | 3.84E+04 | 0.01753 | 1.39E+06 |
| 52 | 1648 | 35 | 686.5 | 4.78E+04 | 0.01435 | 2.92E+06 |
| 53 | 1680 | 35 | 700 | 5.11E+04 | 0.0137 | 4.55E+06 |
| 54 | 1712 | 35 | 713.3 | 5.24E+04 | 0.01362 | 6.23E+06 |
| 55 | 1728 | 35 | 714.4 | 5.25E+04 | 0.01361 | 6.37E+06 |

### C1.2.6 Abu untreated with 20% Sertica

| | Time s | Temperature °C | Shear | Shear | Instantaneous | Strain |
|---|---|---|---|---|---|---|

| | | | Stress Pa | Rate 1/s | Viscosity Pas | |
|---|---|---|---|---|---|---|
| 1 | 12.03 | 35 | 5.04 | 7.63E-05 | 6.61E+04 | -0.00719 |
| 2 | 36.07 | 35 | 15.01 | 8.92E-05 | 1.68E+05 | -0.00599 |
| 3 | 60.08 | 35 | 25.07 | 9.11E-05 | 2.75E+05 | -0.00346 |
| 4 | 84.08 | 35 | 34.95 | 0.0001 | 3.49E+05 | -0.00173 |
| 5 | 108.1 | 35 | 45.04 | 0.000115 | 3.91E+05 | 0.001332 |
| 6 | 132.1 | 34.9 | 54.91 | 0.000134 | 4.11E+05 | 0.004128 |
| 7 | 156.1 | 35 | 64.99 | 0.00012 | 5.43E+05 | 0.007457 |
| 8 | 180 | 35 | 74.87 | 0.000144 | 5.19E+05 | 0.01092 |
| 9 | 204 | 35 | 84.94 | 0.00017 | 5.00E+05 | 0.01438 |
| 10 | 228 | 35 | 95.02 | 0.000173 | 5.49E+05 | 0.01957 |
| 11 | 252 | 35 | 105.1 | 0.000197 | 5.34E+05 | 0.02304 |
| 12 | 276 | 35 | 114.9 | 0.000184 | 6.25E+05 | 0.02796 |
| 13 | 300 | 35 | 125 | 0.000247 | 5.06E+05 | 0.03302 |
| 14 | 324 | 35 | 135.1 | 0.000243 | 5.56E+05 | 0.03875 |
| 15 | 348.1 | 35 | 144.9 | 0.00028 | 5.17E+05 | 0.04621 |
| 16 | 372.1 | 35 | 155 | 0.000353 | 4.40E+05 | 0.05486 |
| 17 | 396 | 35 | 165 | 0.000408 | 4.04E+05 | 0.06418 |
| 18 | 420 | 35 | 174.9 | 0.00074 | 2.36E+05 | 0.08629 |
| 19 | 444 | 35 | 185 | 0.001071 | 1.73E+05 | 0.1125 |
| 20 | 468 | 35 | 195 | 0.001679 | 1.16E+05 | 0.1547 |
| 21 | 492 | 35 | 204.9 | 3019 | 0.06788 | 7.40E+04 |
| 22 | 516 | 35 | 215 | 7589 | 0.02833 | 2.56E+05 |
| 23 | 540 | 35 | 225.1 | 9791 | 0.02298 | 4.89E+05 |
| 24 | 564 | 35 | 234.9 | 1.12E+04 | 0.0209 | 7.60E+05 |
| 25 | 588.1 | 35 | 245 | 1.24E+04 | 0.01984 | 1.06E+06 |
| 26 | 612 | 35 | 255.1 | 1.33E+04 | 0.0192 | 1.37E+06 |
| 27 | 636 | 35 | 264.9 | 1.42E+04 | 0.01869 | 1.71E+06 |
| 28 | 660 | 35 | 275 | 1.50E+04 | 0.01831 | 2.08E+06 |
| 29 | 684 | 35 | 284.9 | 1.58E+04 | 0.01798 | 2.46E+06 |
| 30 | 708 | 35 | 294.9 | 1.67E+04 | 0.01768 | 2.86E+06 |
| 31 | 732 | 35 | 305.1 | 1.75E+04 | 0.01743 | 3.28E+06 |
| 32 | 756 | 35 | 314.9 | 1.83E+04 | 0.0172 | 3.72E+06 |
| 33 | 780 | 35 | 325 | 1.91E+04 | 0.01702 | 4.17E+06 |
| 34 | 804 | 35 | 334.9 | 1.99E+04 | 0.01681 | 4.65E+06 |
| 35 | 828 | 35 | 344.9 | 2.08E+04 | 0.01656 | 5.15E+06 |
| 36 | 852 | 35 | 355 | 2.21E+04 | 0.01604 | 5.68E+06 |
| 37 | 876 | 35 | 365.1 | 2.32E+04 | 0.01577 | 6.24E+06 |
| 38 | 900 | 35 | 374.9 | 2.40E+04 | 0.0156 | 6.82E+06 |
| 39 | 924 | 35 | 385 | 2.49E+04 | 0.01549 | 7.41E+06 |
| 40 | 948 | 35 | 395.1 | 2.57E+04 | 0.0154 | 8.03E+06 |
| 41 | 972 | 35 | 404.9 | 2.64E+04 | 0.01536 | 8.66E+06 |
| 42 | 996 | 35 | 415 | 2.72E+04 | 0.01527 | 9.31E+06 |
| 43 | 1020 | 35 | 424.9 | 2.80E+04 | 0.01517 | 9.99E+06 |
| 44 | 1044 | 35 | 434.9 | 2.88E+04 | 0.0151 | 1.07E+07 |
| 45 | 1068 | 35 | 445 | 2.96E+04 | 0.01504 | 1.14E+07 |
| 46 | 1092 | 35 | 455 | 3.04E+04 | 0.01499 | 1.21E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 47 | 1116 | 35 | 465.1 | 3.11E+04 | 0.01496 | 1.29E+07 |
| 48 | 1140 | 35 | 474.9 | 3.18E+04 | 0.01494 | 1.36E+07 |
| 49 | 1164 | 35 | 484.9 | 3.25E+04 | 0.0149 | 1.44E+07 |
| 50 | 1188 | 35 | 495 | 3.33E+04 | 0.01485 | 1.52E+07 |
| 51 | 1212 | 35 | 505 | 3.41E+04 | 0.0148 | 1.60E+07 |
| 52 | 1236 | 35 | 514.9 | 3.49E+04 | 0.01474 | 1.69E+07 |
| 53 | 1260 | 35 | 524.9 | 3.57E+04 | 0.01471 | 1.77E+07 |
| 54 | 1284 | 35 | 535 | 3.64E+04 | 0.01468 | 1.86E+07 |
| 55 | 1308 | 35 | 544.9 | 3.72E+04 | 0.01466 | 1.95E+07 |
| 56 | 1332 | 35 | 554.9 | 3.79E+04 | 0.01463 | 2.04E+07 |
| 57 | 1356 | 35 | 565 | 3.87E+04 | 0.0146 | 2.13E+07 |
| 58 | 1380 | 35 | 575 | 3.95E+04 | 0.01455 | 2.23E+07 |
| 59 | 1404 | 35 | 584.9 | 4.02E+04 | 0.01454 | 2.32E+07 |
| 60 | 1428 | 35 | 595 | 4.06E+04 | 0.01467 | 2.42E+07 |
| 61 | 1452 | 35 | 595 | 4.11E+04 | 0.01446 | 2.52E+07 |
| 62 | 1476 | 35 | 584.9 | 4.08E+04 | 0.01432 | 2.62E+07 |
| 63 | 1500 | 35 | 575 | 4.10E+04 | 0.01403 | 2.72E+07 |
| 64 | 1524 | 35 | 565 | 4.04E+04 | 0.014 | 2.81E+07 |
| 65 | 1548 | 35 | 554.9 | 3.95E+04 | 0.01405 | 2.91E+07 |
| 66 | 1572 | 35 | 545 | 3.86E+04 | 0.01413 | 3.00E+07 |
| 67 | 1596 | 35 | 535 | 3.77E+04 | 0.01419 | 3.09E+07 |
| 68 | 1620 | 35 | 524.9 | 3.68E+04 | 0.01426 | 3.18E+07 |
| 69 | 1644 | 35 | 514.9 | 3.60E+04 | 0.01432 | 3.27E+07 |
| 70 | 1668 | 35 | 505 | 3.51E+04 | 0.0144 | 3.35E+07 |
| 71 | 1692 | 35 | 494.9 | 3.43E+04 | 0.01444 | 3.43E+07 |
| 72 | 1716 | 35 | 484.9 | 3.33E+04 | 0.01455 | 3.51E+07 |
| 73 | 1740 | 35 | 475 | 3.25E+04 | 0.01461 | 3.59E+07 |
| 74 | 1764 | 35 | 465 | 3.16E+04 | 0.01471 | 3.67E+07 |
| 75 | 1788 | 35 | 454.9 | 3.07E+04 | 0.01483 | 3.74E+07 |
| 76 | 1812 | 35 | 445 | 2.98E+04 | 0.01494 | 3.81E+07 |
| 77 | 1836 | 35 | 435 | 2.89E+04 | 0.01507 | 3.88E+07 |
| 78 | 1860 | 35 | 424.9 | 2.79E+04 | 0.01522 | 3.95E+07 |
| 79 | 1884 | 35 | 414.9 | 2.70E+04 | 0.01537 | 4.01E+07 |
| 80 | 1908 | 35 | 405 | 2.61E+04 | 0.01554 | 4.08E+07 |
| 81 | 1932 | 35 | 394.9 | 2.51E+04 | 0.01573 | 4.14E+07 |
| 82 | 1956 | 35 | 385.1 | 2.41E+04 | 0.01596 | 4.19E+07 |
| 83 | 1980 | 35 | 375 | 2.32E+04 | 0.01615 | 4.25E+07 |
| 84 | 2004 | 35 | 364.9 | 2.23E+04 | 0.0164 | 4.30E+07 |
| 85 | 2028 | 35 | 355 | 2.13E+04 | 0.01667 | 4.35E+07 |
| 86 | 2052 | 35 | 344.9 | 2.03E+04 | 0.01698 | 4.40E+07 |
| 87 | 2076 | 35 | 334.9 | 1.93E+04 | 0.01734 | 4.45E+07 |
| 88 | 2100 | 35 | 325 | 1.84E+04 | 0.01768 | 4.49E+07 |
| 89 | 2124 | 35 | 314.9 | 1.75E+04 | 0.01805 | 4.53E+07 |
| 90 | 2148 | 35 | 305.1 | 1.66E+04 | 0.01843 | 4.57E+07 |
| 91 | 2172 | 35 | 295 | 1.57E+04 | 0.01881 | 4.61E+07 |
| 92 | 2196 | 35 | 284.9 | 1.48E+04 | 0.01921 | 4.65E+07 |
| 93 | 2220 | 35 | 275 | 1.40E+04 | 0.01965 | 4.68E+07 |
| 94 | 2244 | 35 | 264.9 | 1.31E+04 | 0.02017 | 4.71E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 95 | 2268 | 35 | 254.8 | 1.23E+04 | 0.02071 | 4.74E+07 |
| 96 | 2292 | 35 | 245 | 1.15E+04 | 0.0213 | 4.77E+07 |
| 97 | 2316 | 35 | 234.9 | 1.07E+04 | 0.02188 | 4.80E+07 |
| 98 | 2340 | 35 | 224.8 | 1.00E+04 | 0.02244 | 4.82E+07 |
| 99 | 2364 | 35 | 215 | 9354 | 0.02298 | 4.84E+07 |
| 100 | 2388 | 35 | 204.9 | 8711 | 0.02352 | 4.86E+07 |
| 101 | 2412 | 35 | 195 | 8130 | 0.02399 | 4.88E+07 |
| 102 | 2436 | 35 | 185 | 7552 | 0.02449 | 4.90E+07 |
| 103 | 2460 | 35 | 174.9 | 7004 | 0.02497 | 4.92E+07 |
| 104 | 2484 | 35 | 165 | 6494 | 0.02542 | 4.93E+07 |
| 105 | 2508 | 35 | 155 | 5982 | 0.02591 | 4.95E+07 |
| 106 | 2532 | 35 | 144.9 | 5489 | 0.0264 | 4.96E+07 |
| 107 | 2556 | 35 | 135 | 5031 | 0.02684 | 4.97E+07 |
| 108 | 2580 | 35 | 124.9 | 4580 | 0.02728 | 4.98E+07 |
| 109 | 2604 | 35 | 114.9 | 4135 | 0.02778 | 4.99E+07 |
| 110 | 2628 | 35 | 105 | 3715 | 0.02827 | 5.00E+07 |
| 111 | 2652 | 35 | 94.91 | 3289 | 0.02886 | 5.01E+07 |
| 112 | 2676 | 35 | 85.03 | 2873 | 0.0296 | 5.02E+07 |
| 113 | 2700 | 35 | 74.92 | 2439 | 0.03072 | 5.02E+07 |
| 114 | 2724 | 35 | 65.05 | 2005 | 0.03244 | 5.03E+07 |
| 115 | 2748 | 35 | 54.96 | 1567 | 0.03509 | 5.03E+07 |
| 116 | 2772 | 35 | 44.88 | 1170 | 0.03835 | 5.03E+07 |
| 117 | 2796 | 35 | 35.01 | 837.7 | 0.04179 | 5.04E+07 |
| 118 | 2820 | 35 | 24.91 | 527.7 | 0.0472 | 5.04E+07 |
| 119 | 2844 | 35 | 15.01 | 252.4 | 0.05947 | 5.04E+07 |
| 120 | 2868 | 35 | 5.107 | 36.9 | 0.1384 | 5.04E+07 |

**C1.3 (T=40°C)**

**C1.3.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.025 | 40 | 2.12 | 0.000475 | 4469.0000 | 0.004794 |
| 2 | 15.09 | 40 | 6.249 | 0.000634 | 9854.0000 | 0.01105 |
| 3 | 25.1 | 40 | 10.42 | 0.000753 | 13850.0000 | 0.01904 |
| 4 | 35.05 | 40 | 14.5 | 0.000883 | 16430.0000 | 0.0273 |
| 5 | 45.03 | 40 | 18.75 | 0.000981 | 19120.0000 | 0.03728 |
| 6 | 55.05 | 40 | 22.91 | 0.001146 | 20000.0000 | 0.04953 |
| 7 | 65.05 | 40 | 27.08 | 0.001417 | 19100.0000 | 0.06338 |
| 8 | 75.03 | 40 | 31.23 | 0.001654 | 18880.0000 | 0.08016 |
| 9 | 85.03 | 40 | 35.38 | 0.002018 | 17530.0000 | 0.1001 |
| 10 | 95.03 | 40 | 39.54 | 0.002877 | 13750.0000 | 0.1298 |
| 11 | 105 | 40 | 43.72 | 0.006934 | 6305.0000 | 0.2103 |
| 12 | 115 | 40 | 47.89 | 345.4 | 0.1387 | 3723 |
| 13 | 125 | 40 | 52.05 | 1619 | 0.0321 | 2.00E+04 |
| 14 | 135.1 | 40 | 56.23 | 2281 | 0.0247 | 4.32E+04 |
| 15 | 145.1 | 40 | 60.41 | 2811 | 0.0215 | 7.11E+04 |
| 16 | 155.1 | 40 | 64.59 | 3231 | 0.0200 | 1.03E+05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | 165.1 | 40 | 68.76 | 3582 | 0.0192 | 1.40E+05 |
| 18 | 175.1 | 40 | 72.84 | 3888 | 0.0187 | 1.78E+05 |
| 19 | 185.1 | 40 | 77.02 | 4189 | 0.0184 | 2.20E+05 |
| 20 | 195.1 | 40 | 81.26 | 4504 | 0.0180 | 2.66E+05 |
| 21 | 205.1 | 40 | 85.42 | 4828 | 0.0177 | 3.14E+05 |
| 22 | 215 | 40 | 89.5 | 5175 | 0.0173 | 3.65E+05 |
| 23 | 225.1 | 40 | 93.76 | 5551 | 0.0169 | 4.21E+05 |
| 24 | 235.1 | 40 | 97.91 | 5924 | 0.0165 | 4.80E+05 |
| 25 | 245 | 40 | 102.1 | 6307 | 0.0162 | 5.43E+05 |
| 26 | 255.1 | 40 | 106.3 | 6685 | 0.0159 | 6.11E+05 |
| 27 | 265.1 | 40 | 110.4 | 7058 | 0.0156 | 6.81E+05 |
| 28 | 275 | 40 | 114.6 | 7455 | 0.0154 | 7.55E+05 |
| 29 | 285.1 | 40 | 118.7 | 7835 | 0.0152 | 8.35E+05 |
| 30 | 295.1 | 40 | 122.9 | 8214 | 0.0150 | 9.16E+05 |
| 31 | 305 | 40 | 127 | 8586 | 0.0148 | 1.00E+06 |
| 32 | 315.1 | 40 | 131.3 | 8963 | 0.0147 | 1.09E+06 |
| 33 | 325.1 | 40 | 135.4 | 9330 | 0.0145 | 1.19E+06 |
| 34 | 335 | 40 | 139.5 | 9691 | 0.0144 | 1.28E+06 |
| 35 | 345.1 | 40 | 143.8 | 1.01E+04 | 0.0143 | 1.38E+06 |
| 36 | 355.1 | 40 | 147.9 | 1.04E+04 | 0.0142 | 1.49E+06 |
| 37 | 365 | 40 | 152.1 | 1.08E+04 | 0.0141 | 1.59E+06 |
| 38 | 375.1 | 40 | 156.2 | 1.11E+04 | 0.0140 | 1.71E+06 |
| 39 | 385.1 | 40 | 160.4 | 1.15E+04 | 0.0140 | 1.82E+06 |
| 40 | 395.1 | 40 | 164.6 | 1.18E+04 | 0.0139 | 1.94E+06 |
| 41 | 405.1 | 40 | 168.7 | 1.22E+04 | 0.0138 | 2.06E+06 |
| 42 | 415.1 | 40 | 172.8 | 1.25E+04 | 0.0138 | 2.19E+06 |
| 43 | 425 | 40 | 177 | 1.29E+04 | 0.0137 | 2.32E+06 |
| 44 | 435.1 | 40 | 181.3 | 1.32E+04 | 0.0137 | 2.45E+06 |
| 45 | 445.1 | 40 | 185.3 | 1.36E+04 | 0.0136 | 2.58E+06 |
| 46 | 455 | 40 | 189.5 | 1.39E+04 | 0.0136 | 2.72E+06 |
| 47 | 465.1 | 40 | 193.8 | 1.43E+04 | 0.0136 | 2.87E+06 |
| 48 | 475.1 | 40 | 197.9 | 1.46E+04 | 0.0135 | 3.01E+06 |
| 49 | 485 | 40 | 202 | 1.50E+04 | 0.0135 | 3.16E+06 |
| 50 | 495.1 | 40 | 206.3 | 1.53E+04 | 0.0135 | 3.32E+06 |
| 51 | 505.1 | 40 | 210.4 | 1.57E+04 | 0.0134 | 3.47E+06 |
| 52 | 515 | 40 | 214.5 | 1.60E+04 | 0.0134 | 3.63E+06 |
| 53 | 525.1 | 40 | 218.7 | 1.64E+04 | 0.0134 | 3.80E+06 |
| 54 | 535.1 | 40 | 222.9 | 1.67E+04 | 0.0134 | 3.96E+06 |
| 55 | 545 | 40 | 227 | 1.71E+04 | 0.0133 | 4.13E+06 |
| 56 | 555.1 | 40 | 231.3 | 1.74E+04 | 0.0133 | 4.31E+06 |
| 57 | 565.1 | 40 | 235.4 | 1.77E+04 | 0.0133 | 4.49E+06 |
| 58 | 575 | 40 | 239.5 | 1.81E+04 | 0.0133 | 4.67E+06 |
| 59 | 585.1 | 40 | 243.8 | 1.84E+04 | 0.0132 | 4.85E+06 |
| 60 | 595.1 | 40 | 247.8 | 1.87E+04 | 0.0132 | 5.04E+06 |
| 61 | 605.1 | 40 | 247.9 | 1.90E+04 | 0.0131 | 5.23E+06 |
| 62 | 615.2 | 40 | 243.7 | 1.88E+04 | 0.0130 | 5.42E+06 |
| 63 | 625.2 | 40 | 239.6 | 1.85E+04 | 0.0130 | 5.60E+06 |
| 64 | 635.2 | 40 | 235.4 | 1.81E+04 | 0.0130 | 5.78E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 65 | 645.2 | 40 | 231.2 | 1.78E+04 | 0.0130 | 5.96E+06 |
| 66 | 655.2 | 40 | 227.1 | 1.75E+04 | 0.0130 | 6.14E+06 |
| 67 | 665.2 | 40 | 222.9 | 1.71E+04 | 0.0130 | 6.31E+06 |
| 68 | 675.2 | 40 | 218.7 | 1.68E+04 | 0.0131 | 6.47E+06 |
| 69 | 685.2 | 40 | 214.6 | 1.64E+04 | 0.0131 | 6.64E+06 |
| 70 | 695.2 | 40 | 210.4 | 1.60E+04 | 0.0131 | 6.80E+06 |
| 71 | 705.2 | 40 | 206.2 | 1.57E+04 | 0.0132 | 6.96E+06 |
| 72 | 715.2 | 40 | 202 | 1.53E+04 | 0.0132 | 7.11E+06 |
| 73 | 725.2 | 40 | 197.9 | 1.50E+04 | 0.0132 | 7.26E+06 |
| 74 | 735.2 | 40 | 193.7 | 1.46E+04 | 0.0133 | 7.40E+06 |
| 75 | 745.2 | 40 | 189.5 | 1.42E+04 | 0.0133 | 7.55E+06 |
| 76 | 755.2 | 40 | 185.4 | 1.39E+04 | 0.0134 | 7.68E+06 |
| 77 | 765.2 | 40 | 181.3 | 1.35E+04 | 0.0134 | 7.82E+06 |
| 78 | 775.2 | 40 | 177 | 1.32E+04 | 0.0135 | 7.95E+06 |
| 79 | 785.2 | 40 | 172.9 | 1.28E+04 | 0.0135 | 8.08E+06 |
| 80 | 795.2 | 40 | 168.7 | 1.24E+04 | 0.0136 | 8.20E+06 |
| 81 | 805.2 | 40 | 164.5 | 1.21E+04 | 0.0136 | 8.32E+06 |
| 82 | 815.2 | 40 | 160.4 | 1.17E+04 | 0.0137 | 8.44E+06 |
| 83 | 825.2 | 40 | 156.2 | 1.13E+04 | 0.0138 | 8.55E+06 |
| 84 | 835.2 | 40 | 152 | 1.10E+04 | 0.0138 | 8.66E+06 |
| 85 | 845.2 | 40 | 147.9 | 1.06E+04 | 0.0139 | 8.77E+06 |
| 86 | 855.2 | 40 | 143.7 | 1.03E+04 | 0.0140 | 8.87E+06 |
| 87 | 865.2 | 40 | 139.5 | 9907 | 0.0141 | 8.97E+06 |
| 88 | 875.2 | 40 | 135.4 | 9542 | 0.0142 | 9.07E+06 |
| 89 | 885.2 | 40 | 131.2 | 9197 | 0.0143 | 9.16E+06 |
| 90 | 895.2 | 40 | 127.1 | 8848 | 0.0144 | 9.25E+06 |
| 91 | 905.2 | 40 | 122.9 | 8500 | 0.0145 | 9.33E+06 |
| 92 | 915.2 | 40 | 118.7 | 8149 | 0.0146 | 9.41E+06 |
| 93 | 925.2 | 40 | 114.5 | 7801 | 0.0147 | 9.49E+06 |
| 94 | 935.2 | 40 | 110.4 | 7450 | 0.0148 | 9.57E+06 |
| 95 | 945.2 | 40 | 106.2 | 7100 | 0.0150 | 9.64E+06 |
| 96 | 955.2 | 40 | 102 | 6752 | 0.0151 | 9.70E+06 |
| 97 | 965.2 | 40 | 97.87 | 6407 | 0.0153 | 9.77E+06 |
| 98 | 975.2 | 40 | 93.7 | 6060 | 0.0155 | 9.83E+06 |
| 99 | 985.2 | 40 | 89.54 | 5711 | 0.0157 | 9.89E+06 |
| 100 | 995.2 | 40 | 85.39 | 5361 | 0.0159 | 9.94E+06 |
| 101 | 1005 | 40 | 81.22 | 5008 | 0.0162 | 9.99E+06 |
| 102 | 1015 | 40 | 77.05 | 4653 | 0.0166 | 1.00E+07 |
| 103 | 1025 | 40 | 72.88 | 4298 | 0.0170 | 1.01E+07 |
| 104 | 1035 | 40 | 68.77 | 3957 | 0.0174 | 1.01E+07 |
| 105 | 1045 | 40 | 64.59 | 3616 | 0.0179 | 1.02E+07 |
| 106 | 1055 | 40 | 60.4 | 3282 | 0.0184 | 1.02E+07 |
| 107 | 1065 | 40 | 56.22 | 2958 | 0.0190 | 1.02E+07 |
| 108 | 1075 | 40 | 52.04 | 2648 | 0.0197 | 1.02E+07 |
| 109 | 1085 | 40 | 47.88 | 2350 | 0.0204 | 1.03E+07 |
| 110 | 1095 | 40 | 43.71 | 2067 | 0.0212 | 1.03E+07 |
| 111 | 1105 | 40 | 39.54 | 1799 | 0.0220 | 1.03E+07 |
| 112 | 1115 | 40 | 35.38 | 1545 | 0.0229 | 1.03E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 113 | 1125 | 40 | 31.28 | 1307 | 0.0239 | 1.03E+07 |
| 114 | 1135 | 40 | 27.09 | 1069 | 0.0253 | 1.03E+07 |
| 115 | 1145 | 40 | 22.92 | 831.5 | 0.0276 | 1.04E+07 |
| 116 | 1155 | 40 | 18.75 | 598.9 | 0.0313 | 1.04E+07 |
| 117 | 1165 | 40 | 14.57 | 391.5 | 0.0372 | 1.04E+07 |
| 118 | 1175 | 40 | 10.4 | 222.8 | 0.0467 | 1.04E+07 |
| 119 | 1185 | 40 | 6.225 | 87.83 | 0.0709 | 1.04E+07 |
| 120 | 1195 | 40 | 2.036 | 4.89 | 0.4164 | 1.04E+07 |

### C1.3.2 Abu treated with 500PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.038 | 40 | 2.117 | 19.9 | 0.1064 | 266 |
| 2 | 15.06 | 40 | 6.167 | 244.6 | 0.02521 | 2798 |
| 3 | 25.04 | 40 | 10.36 | 571.3 | 0.01813 | 8601 |
| 4 | 35.06 | 40 | 14.54 | 915.2 | 0.01589 | 1.78E+04 |
| 5 | 45.06 | 40 | 18.73 | 1256 | 0.01491 | 3.04E+04 |
| 6 | 55.04 | 40 | 22.91 | 1593 | 0.01438 | 4.64E+04 |
| 7 | 65.06 | 40 | 27.07 | 1925 | 0.01407 | 6.57E+04 |
| 8 | 75.06 | 40 | 31.25 | 2252 | 0.01388 | 8.83E+04 |
| 9 | 85.04 | 40 | 35.34 | 2572 | 0.01374 | 1.14E+05 |
| 10 | 95.05 | 40 | 39.52 | 2895 | 0.01365 | 1.43E+05 |
| 11 | 105.1 | 40 | 43.7 | 3216 | 0.01359 | 1.75E+05 |
| 12 | 115 | 40 | 47.87 | 3533 | 0.01355 | 2.11E+05 |
| 13 | 125.1 | 40 | 52.04 | 3842 | 0.01355 | 2.49E+05 |
| 14 | 135.1 | 40 | 56.21 | 4142 | 0.01357 | 2.91E+05 |
| 15 | 145.1 | 40 | 60.39 | 4446 | 0.01358 | 3.35E+05 |
| 16 | 155.1 | 40 | 64.56 | 4756 | 0.01358 | 3.83E+05 |
| 17 | 165 | 40 | 68.66 | 5067 | 0.01355 | 4.33E+05 |
| 18 | 175 | 40 | 72.84 | 5380 | 0.01354 | 4.87E+05 |
| 19 | 185 | 40 | 77.02 | 5699 | 0.01351 | 5.45E+05 |
| 20 | 195 | 40 | 81.19 | 6020 | 0.01349 | 6.05E+05 |
| 21 | 205 | 40 | 85.37 | 6350 | 0.01345 | 6.68E+05 |
| 22 | 215 | 40 | 89.55 | 6675 | 0.01342 | 7.35E+05 |
| 23 | 225.1 | 40 | 93.7 | 6997 | 0.01339 | 8.05E+05 |
| 24 | 235 | 40 | 97.87 | 7325 | 0.01336 | 8.78E+05 |
| 25 | 245.1 | 40 | 102 | 7658 | 0.01332 | 9.55E+05 |
| 26 | 255.1 | 40 | 106.2 | 7991 | 0.01329 | 1.04E+06 |
| 27 | 265.1 | 40 | 110.5 | 8327 | 0.01327 | 1.12E+06 |
| 28 | 275.1 | 40 | 114.5 | 8649 | 0.01324 | 1.21E+06 |
| 29 | 285 | 40 | 118.7 | 8976 | 0.01322 | 1.30E+06 |
| 30 | 295.1 | 40 | 122.9 | 9307 | 0.01321 | 1.39E+06 |
| 31 | 305.1 | 40 | 127 | 9636 | 0.01318 | 1.48E+06 |
| 32 | 315 | 40 | 131.2 | 9968 | 0.01316 | 1.58E+06 |
| 33 | 325.1 | 40 | 135.4 | 1.03E+04 | 0.01313 | 1.69E+06 |
| 34 | 335.1 | 40 | 139.6 | 1.06E+04 | 0.01312 | 1.79E+06 |
| 35 | 345 | 40 | 143.7 | 1.10E+04 | 0.0131 | 1.90E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 36 | 355.1 | 40 | 147.9 | 1.13E+04 | 0.01307 | 2.02E+06 |
| 37 | 365.1 | 40 | 152.1 | 1.17E+04 | 0.01306 | 2.13E+06 |
| 38 | 375 | 40 | 156.3 | 1.20E+04 | 0.01305 | 2.25E+06 |
| 39 | 385.1 | 40 | 160.4 | 1.23E+04 | 0.01303 | 2.38E+06 |
| 40 | 395.1 | 40 | 164.6 | 1.26E+04 | 0.01302 | 2.50E+06 |
| 41 | 405 | 40 | 168.7 | 1.30E+04 | 0.013 | 2.63E+06 |
| 42 | 415.1 | 40 | 172.9 | 1.33E+04 | 0.01299 | 2.77E+06 |
| 43 | 425.1 | 40 | 177.1 | 1.36E+04 | 0.01298 | 2.90E+06 |
| 44 | 435 | 40 | 181.2 | 1.40E+04 | 0.01296 | 3.04E+06 |
| 45 | 445.1 | 40 | 185.4 | 1.43E+04 | 0.01294 | 3.19E+06 |
| 46 | 455.1 | 40 | 189.5 | 1.47E+04 | 0.01293 | 3.33E+06 |
| 47 | 465 | 40 | 193.7 | 1.50E+04 | 0.01291 | 3.48E+06 |
| 48 | 475.1 | 40 | 197.9 | 1.53E+04 | 0.0129 | 3.64E+06 |
| 49 | 485.1 | 40 | 202 | 1.57E+04 | 0.01289 | 3.79E+06 |
| 50 | 495 | 40 | 206.2 | 1.60E+04 | 0.01289 | 3.95E+06 |
| 51 | 505.1 | 40 | 210.4 | 1.64E+04 | 0.01287 | 4.12E+06 |
| 52 | 515.1 | 40 | 214.5 | 1.67E+04 | 0.01286 | 4.28E+06 |
| 53 | 525 | 40 | 218.7 | 1.70E+04 | 0.01286 | 4.45E+06 |
| 54 | 535.1 | 40 | 222.9 | 1.73E+04 | 0.01286 | 4.63E+06 |
| 55 | 545.1 | 40 | 227 | 1.77E+04 | 0.01285 | 4.80E+06 |
| 56 | 555 | 40 | 231.2 | 1.80E+04 | 0.01284 | 4.98E+06 |
| 57 | 565.1 | 40 | 235.4 | 1.83E+04 | 0.01284 | 5.17E+06 |
| 58 | 575.1 | 40 | 239.5 | 1.87E+04 | 0.01283 | 5.35E+06 |
| 59 | 585 | 40 | 243.7 | 1.90E+04 | 0.01281 | 5.54E+06 |
| 60 | 595.1 | 40 | 247.9 | 1.94E+04 | 0.0128 | 5.74E+06 |
| 61 | 605.2 | 40 | 247.9 | 1.96E+04 | 0.01267 | 5.94E+06 |
| 62 | 615.3 | 40 | 243.7 | 1.94E+04 | 0.01258 | 6.13E+06 |
| 63 | 625.3 | 40 | 239.5 | 1.91E+04 | 0.01255 | 6.32E+06 |
| 64 | 635.3 | 40 | 235.3 | 1.88E+04 | 0.01255 | 6.51E+06 |
| 65 | 645.3 | 40 | 231.2 | 1.85E+04 | 0.01254 | 6.69E+06 |
| 66 | 655.3 | 40 | 227.1 | 1.81E+04 | 0.01252 | 6.87E+06 |
| 67 | 665.3 | 40 | 222.8 | 1.78E+04 | 0.01251 | 7.05E+06 |
| 68 | 675.3 | 40 | 218.7 | 1.75E+04 | 0.01251 | 7.23E+06 |
| 69 | 685.3 | 40 | 214.5 | 1.72E+04 | 0.01251 | 7.40E+06 |
| 70 | 695.3 | 40 | 210.3 | 1.68E+04 | 0.0125 | 7.57E+06 |
| 71 | 705.3 | 40 | 206.2 | 1.65E+04 | 0.01251 | 7.73E+06 |
| 72 | 715.3 | 40 | 202.1 | 1.62E+04 | 0.01251 | 7.89E+06 |
| 73 | 725.3 | 40 | 197.8 | 1.58E+04 | 0.01251 | 8.05E+06 |
| 74 | 735.3 | 40 | 193.7 | 1.55E+04 | 0.01251 | 8.21E+06 |
| 75 | 745.3 | 40 | 189.6 | 1.51E+04 | 0.01252 | 8.36E+06 |
| 76 | 755.3 | 40 | 185.3 | 1.48E+04 | 0.01253 | 8.51E+06 |
| 77 | 765.3 | 40 | 181.2 | 1.45E+04 | 0.01254 | 8.65E+06 |
| 78 | 775.2 | 40 | 177 | 1.41E+04 | 0.01257 | 8.79E+06 |
| 79 | 785.3 | 40 | 172.9 | 1.38E+04 | 0.01257 | 8.93E+06 |
| 80 | 795.3 | 40 | 168.7 | 1.34E+04 | 0.0126 | 9.06E+06 |
| 81 | 805.2 | 40 | 164.5 | 1.30E+04 | 0.01262 | 9.19E+06 |
| 82 | 815.3 | 40 | 160.3 | 1.27E+04 | 0.01263 | 9.32E+06 |
| 83 | 825.3 | 40 | 156.2 | 1.23E+04 | 0.01268 | 9.44E+06 |

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|---|---|---|---|---|---|---|
| 84 | 835.3 | 40 | 152 | 1.20E+04 | 0.01271 | 9.56E+06 |
| 85 | 845.3 | 40 | 147.8 | 1.16E+04 | 0.01273 | 9.68E+06 |
| 86 | 855.3 | 40 | 143.7 | 1.13E+04 | 0.01277 | 9.79E+06 |
| 87 | 865.2 | 40 | 139.6 | 1.09E+04 | 0.0128 | 9.90E+06 |
| 88 | 875.3 | 40 | 135.4 | 1.06E+04 | 0.01283 | 1.00E+07 |
| 89 | 885.3 | 40 | 131.2 | 1.02E+04 | 0.01288 | 1.01E+07 |
| 90 | 895.2 | 40 | 127 | 9828 | 0.01293 | 1.02E+07 |
| 91 | 905.3 | 40 | 122.9 | 9476 | 0.01297 | 1.03E+07 |
| 92 | 915.3 | 40 | 118.7 | 9110 | 0.01303 | 1.04E+07 |
| 93 | 925.2 | 40 | 114.5 | 8746 | 0.0131 | 1.05E+07 |
| 94 | 935.3 | 40 | 110.3 | 8386 | 0.01316 | 1.06E+07 |
| 95 | 945.3 | 40 | 106.2 | 8023 | 0.01324 | 1.06E+07 |
| 96 | 955.2 | 40 | 102 | 7667 | 0.01331 | 1.07E+07 |
| 97 | 965.3 | 40 | 97.85 | 7307 | 0.01339 | 1.08E+07 |
| 98 | 975.3 | 40 | 93.69 | 6943 | 0.01349 | 1.09E+07 |
| 99 | 985.2 | 40 | 89.51 | 6587 | 0.01359 | 1.09E+07 |
| 100 | 995.3 | 40 | 85.34 | 6228 | 0.0137 | 1.10E+07 |
| 101 | 1005 | 40 | 81.17 | 5871 | 0.01383 | 1.11E+07 |
| 102 | 1015 | 40 | 77.01 | 5514 | 0.01397 | 1.11E+07 |
| 103 | 1025 | 40 | 72.84 | 5163 | 0.01411 | 1.12E+07 |
| 104 | 1035 | 40 | 68.75 | 4822 | 0.01426 | 1.12E+07 |
| 105 | 1045 | 40 | 64.49 | 4470 | 0.01443 | 1.13E+07 |
| 106 | 1055 | 40 | 60.33 | 4129 | 0.01461 | 1.13E+07 |
| 107 | 1065 | 40 | 56.24 | 3795 | 0.01482 | 1.13E+07 |
| 108 | 1075 | 40 | 51.98 | 3451 | 0.01506 | 1.14E+07 |
| 109 | 1085 | 40 | 47.83 | 3119 | 0.01534 | 1.14E+07 |
| 110 | 1095 | 40 | 43.76 | 2794 | 0.01566 | 1.14E+07 |
| 111 | 1105 | 40 | 39.57 | 2466 | 0.01605 | 1.14E+07 |
| 112 | 1115 | 40 | 35.39 | 2144 | 0.0165 | 1.15E+07 |
| 113 | 1125 | 40 | 31.2 | 1827 | 0.01708 | 1.15E+07 |
| 114 | 1135 | 40 | 27.04 | 1517 | 0.01782 | 1.15E+07 |
| 115 | 1145 | 40 | 22.87 | 1218 | 0.01878 | 1.15E+07 |
| 116 | 1155 | 40 | 18.7 | 929.9 | 0.02011 | 1.15E+07 |
| 117 | 1165 | 40 | 14.53 | 657.5 | 0.02209 | 1.15E+07 |
| 118 | 1175 | 40 | 10.36 | 407.3 | 0.02542 | 1.15E+07 |
| 119 | 1185 | 40 | 6.256 | 194 | 0.03225 | 1.15E+07 |
| 120 | 1195 | 40 | 2.057 | 34.78 | 0.05912 | 1.15E+07 |

### C1.3.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.016 | 40 | 2.112 | 0.2957 | 7.143 | 5.259 |
| 1, 2 | 15.07 | 40 | 6.269 | 74.94 | 0.08365 | 834 |
| 1, 3 | 25.08 | 40 | 10.37 | 386.3 | 0.02685 | 4744 |
| 1, 4 | 35.05 | 40 | 14.55 | 718.2 | 0.02026 | 1.20E+04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 5 | 45.09 | 40 | 18.73 | 1028 | 0.01822 | 2.24E+04 |
| 1, 6 | 55.08 | 40 | 22.91 | 1324 | 0.01731 | 3.56E+04 |
| 1, 7 | 65.03 | 40 | 27.01 | 1607 | 0.01681 | 5.17E+04 |
| 1, 8 | 75.07 | 40 | 31.25 | 1900 | 0.01645 | 7.09E+04 |
| 1, 9 | 85.09 | 40 | 35.42 | 2188 | 0.01619 | 9.27E+04 |
| 1, 10 | 95.05 | 40 | 39.51 | 2467 | 0.01602 | 1.17E+05 |
| 1, 11 | 105.1 | 40 | 43.76 | 2751 | 0.01591 | 1.45E+05 |
| 1, 12 | 115.1 | 40 | 47.93 | 3035 | 0.01579 | 1.75E+05 |
| 1, 13 | 125 | 40 | 52.01 | 3316 | 0.01568 | 2.08E+05 |
| 1, 14 | 135.1 | 40 | 56.19 | 3603 | 0.01559 | 2.45E+05 |
| 1, 15 | 145.1 | 40 | 60.38 | 3890 | 0.01552 | 2.84E+05 |
| 1, 16 | 155 | 40 | 64.56 | 4172 | 0.01547 | 3.25E+05 |
| 1, 17 | 165.1 | 40 | 68.74 | 4454 | 0.01543 | 3.70E+05 |
| 1, 18 | 175.1 | 40 | 72.92 | 4739 | 0.01539 | 4.17E+05 |
| 1, 19 | 185 | 40 | 77.01 | 5015 | 0.01536 | 4.67E+05 |
| 1, 20 | 195.1 | 40 | 81.26 | 5309 | 0.01531 | 5.21E+05 |
| 1, 21 | 205.1 | 40 | 85.34 | 5594 | 0.01526 | 5.77E+05 |
| 1, 22 | 215.1 | 40 | 89.53 | 5890 | 0.0152 | 6.36E+05 |
| 1, 23 | 225.1 | 40 | 93.79 | 6193 | 0.01515 | 6.98E+05 |
| 1, 24 | 235.1 | 40 | 97.87 | 6495 | 0.01507 | 7.63E+05 |
| 1, 25 | 245 | 40 | 102 | 6796 | 0.01502 | 8.31E+05 |
| 1, 26 | 255.1 | 40 | 106.2 | 7103 | 0.01495 | 9.02E+05 |
| 1, 27 | 265.1 | 40 | 110.4 | 7411 | 0.01489 | 9.76E+05 |
| 1, 28 | 275 | 40 | 114.5 | 7715 | 0.01485 | 1.05E+06 |
| 1, 29 | 285.1 | 40 | 118.7 | 8021 | 0.0148 | 1.13E+06 |
| 1, 30 | 295.1 | 40 | 122.9 | 8323 | 0.01476 | 1.22E+06 |
| 1, 31 | 305 | 40 | 127 | 8623 | 0.01473 | 1.30E+06 |
| 1, 32 | 315.1 | 40 | 131.3 | 8939 | 0.01469 | 1.39E+06 |
| 1, 33 | 325.1 | 40 | 135.4 | 9258 | 0.01463 | 1.49E+06 |
| 1, 34 | 335 | 40 | 139.5 | 9568 | 0.01458 | 1.58E+06 |
| 1, 35 | 345.1 | 40 | 143.8 | 9880 | 0.01455 | 1.68E+06 |
| 1, 36 | 355.1 | 40 | 147.9 | 1.02E+04 | 0.01453 | 1.78E+06 |
| 1, 37 | 365 | 40 | 152 | 1.05E+04 | 0.0145 | 1.89E+06 |
| 1, 38 | 375.1 | 40 | 156.3 | 1.08E+04 | 0.01444 | 2.00E+06 |
| 1, 39 | 385.1 | 40 | 160.3 | 1.11E+04 | 0.01442 | 2.11E+06 |
| 1, 40 | 395 | 40 | 164.5 | 1.14E+04 | 0.01441 | 2.22E+06 |
| 1, 41 | 405.1 | 40 | 168.8 | 1.17E+04 | 0.01439 | 2.34E+06 |
| 1, 42 | 415.1 | 40 | 172.8 | 1.20E+04 | 0.01437 | 2.46E+06 |
| 1, 43 | 425 | 40 | 177 | 1.23E+04 | 0.01435 | 2.58E+06 |
| 1, 44 | 435.1 | 40 | 181.3 | 1.27E+04 | 0.01433 | 2.71E+06 |
| 1, 45 | 445.1 | 40 | 185.4 | 1.30E+04 | 0.0143 | 2.84E+06 |
| 1, 46 | 455 | 40 | 189.5 | 1.33E+04 | 0.01428 | 2.97E+06 |
| 1, 47 | 465.1 | 40 | 193.8 | 1.36E+04 | 0.01425 | 3.11E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.39E+04 | 0.01424 | 3.25E+06 |
| 1, 49 | 485 | 40 | 202 | 1.42E+04 | 0.01422 | 3.39E+06 |
| 1, 50 | 495.1 | 40 | 206.2 | 1.45E+04 | 0.01418 | 3.53E+06 |
| 1, 51 | 505.1 | 40 | 210.4 | 1.49E+04 | 0.01415 | 3.68E+06 |
| 1, 52 | 515 | 40 | 214.5 | 1.52E+04 | 0.01412 | 3.83E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 53 | 525.1 | 40 | 218.7 | 1.55E+04 | 0.0141 | 3.99E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.58E+04 | 0.01407 | 4.15E+06 |
| 1, 55 | 545 | 40 | 227.1 | 1.62E+04 | 0.01406 | 4.31E+06 |
| 1, 56 | 555.1 | 40 | 231.2 | 1.65E+04 | 0.01404 | 4.47E+06 |
| 1, 57 | 565.1 | 40 | 235.4 | 1.68E+04 | 0.01403 | 4.64E+06 |
| 1, 58 | 575 | 40 | 239.5 | 1.71E+04 | 0.01402 | 4.81E+06 |
| 1, 59 | 585.1 | 40 | 243.8 | 1.74E+04 | 0.01402 | 4.99E+06 |
| 1, 60 | 595.1 | 40 | 247.8 | 1.77E+04 | 0.01401 | 5.16E+06 |
| 1, 61 | 605.1 | 40 | 247.9 | 1.79E+04 | 0.01388 | 5.34E+06 |
| 1, 62 | 615.2 | 40 | 243.7 | 1.77E+04 | 0.01379 | 5.52E+06 |
| 1, 63 | 625.2 | 40 | 239.5 | 1.74E+04 | 0.01377 | 5.69E+06 |
| 1, 64 | 635.2 | 40 | 235.4 | 1.71E+04 | 0.01379 | 5.87E+06 |
| 1, 65 | 645.2 | 40 | 231.2 | 1.68E+04 | 0.01377 | 6.03E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.65E+04 | 0.01376 | 6.20E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.62E+04 | 0.01378 | 6.36E+06 |
| 1, 68 | 675.2 | 40 | 218.7 | 1.59E+04 | 0.01379 | 6.52E+06 |
| 1, 69 | 685.2 | 40 | 214.5 | 1.56E+04 | 0.0138 | 6.67E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.52E+04 | 0.01381 | 6.83E+06 |
| 1, 71 | 705.2 | 40 | 206.2 | 1.49E+04 | 0.01384 | 6.97E+06 |
| 1, 72 | 715.2 | 40 | 202 | 1.46E+04 | 0.01388 | 7.12E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.42E+04 | 0.0139 | 7.26E+06 |
| 1, 74 | 735.2 | 40 | 193.7 | 1.39E+04 | 0.01393 | 7.40E+06 |
| 1, 75 | 745.2 | 40 | 189.6 | 1.36E+04 | 0.01396 | 7.54E+06 |
| 1, 76 | 755.2 | 40 | 185.4 | 1.33E+04 | 0.01398 | 7.67E+06 |
| 1, 77 | 765.2 | 40 | 181.2 | 1.29E+04 | 0.01402 | 7.80E+06 |
| 1, 78 | 775.2 | 40 | 177 | 1.26E+04 | 0.01406 | 7.93E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 1.23E+04 | 0.01412 | 8.05E+06 |
| 1, 80 | 795.2 | 40 | 168.7 | 1.19E+04 | 0.01416 | 8.17E+06 |
| 1, 81 | 805.2 | 40 | 164.5 | 1.16E+04 | 0.01419 | 8.28E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.13E+04 | 0.01424 | 8.40E+06 |
| 1, 83 | 825.2 | 40 | 156.3 | 1.09E+04 | 0.01429 | 8.50E+06 |
| 1, 84 | 835.2 | 40 | 152 | 1.06E+04 | 0.01434 | 8.61E+06 |
| 1, 85 | 845.2 | 40 | 147.9 | 1.03E+04 | 0.0144 | 8.71E+06 |
| 1, 86 | 855.2 | 40 | 143.8 | 9935 | 0.01447 | 8.81E+06 |
| 1, 87 | 865.2 | 40 | 139.6 | 9603 | 0.01454 | 8.91E+06 |
| 1, 88 | 875.2 | 40 | 135.4 | 9266 | 0.01462 | 9.00E+06 |
| 1, 89 | 885.2 | 40 | 131.3 | 8930 | 0.0147 | 9.09E+06 |
| 1, 90 | 895.2 | 40 | 127 | 8588 | 0.01479 | 9.18E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 8251 | 0.01489 | 9.26E+06 |
| 1, 92 | 915.2 | 40 | 118.7 | 7916 | 0.01499 | 9.34E+06 |
| 1, 93 | 925.2 | 40 | 114.5 | 7590 | 0.01509 | 9.41E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 7262 | 0.0152 | 9.49E+06 |
| 1, 95 | 945.2 | 40 | 106.2 | 6935 | 0.01531 | 9.56E+06 |
| 1, 96 | 955.2 | 40 | 102 | 6606 | 0.01545 | 9.62E+06 |
| 1, 97 | 965.2 | 40 | 97.85 | 6279 | 0.01558 | 9.68E+06 |
| 1, 98 | 975.2 | 40 | 93.77 | 5959 | 0.01573 | 9.74E+06 |
| 1, 99 | 985.2 | 40 | 89.51 | 5625 | 0.01591 | 9.80E+06 |
| 1, 100 | 995.2 | 40 | 85.43 | 5309 | 0.01609 | 9.85E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 101 | 1005 | 40 | 81.26 | 4987 | 0.01629 | 9.90E+06 |
| 1, 102 | 1015 | 40 | 77.01 | 4663 | 0.01652 | 9.95E+06 |
| 1, 103 | 1025 | 40 | 72.92 | 4350 | 0.01676 | 9.99E+06 |
| 1, 104 | 1035 | 40 | 68.74 | 4037 | 0.01703 | 1.00E+07 |
| 1, 105 | 1045 | 40 | 64.56 | 3728 | 0.01732 | 1.01E+07 |
| 1, 106 | 1055 | 40 | 60.37 | 3427 | 0.01762 | 1.01E+07 |
| 1, 107 | 1065 | 40 | 56.27 | 3124 | 0.01801 | 1.01E+07 |
| 1, 108 | 1075 | 40 | 52.01 | 2815 | 0.01848 | 1.02E+07 |
| 1, 109 | 1085 | 40 | 47.92 | 2521 | 0.01901 | 1.02E+07 |
| 1, 110 | 1095 | 40 | 43.75 | 2225 | 0.01966 | 1.02E+07 |
| 1, 111 | 1105 | 40 | 39.58 | 1938 | 0.02042 | 1.02E+07 |
| 1, 112 | 1115 | 40 | 35.41 | 1664 | 0.02129 | 1.03E+07 |
| 1, 113 | 1125 | 40 | 31.24 | 1401 | 0.02231 | 1.03E+07 |
| 1, 114 | 1135 | 40 | 27.06 | 1149 | 0.02355 | 1.03E+07 |
| 1, 115 | 1145 | 40 | 22.88 | 910.4 | 0.02513 | 1.03E+07 |
| 1, 116 | 1155 | 40 | 18.78 | 688 | 0.02729 | 1.03E+07 |
| 1, 117 | 1165 | 40 | 14.51 | 472.4 | 0.03072 | 1.03E+07 |
| 1, 118 | 1175 | 40 | 10.42 | 285 | 0.03658 | 1.03E+07 |
| 1, 119 | 1185 | 40 | 6.242 | 122 | 0.05117 | 1.03E+07 |
| 1, 120 | 1195 | 40 | 2.031 | 11.56 | 0.1757 | 1.03E+07 |

### C1.3.4 Abu treated with 1000PPM PPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.023 | 40 | 2.11 | 0.00179 | 1179 | 0.02144 |
| 1, 2 | 15.07 | 40 | 6.262 | 0.003106 | 2016 | 0.05353 |
| 1, 3 | 25.07 | 40 | 10.35 | 0.005701 | 1816 | 0.1123 |
| 1, 4 | 35.04 | 40 | 14.54 | 0.01178 | 1234 | 0.2328 |
| 1, 5 | 45.07 | 40 | 18.72 | 0.03027 | 618.6 | 0.5719 |
| 1, 6 | 55.07 | 40 | 22.9 | 347.6 | 0.06587 | 3739 |
| 1, 7 | 65.04 | 40 | 27.07 | 1216 | 0.02226 | 1.59E+04 |
| 1, 8 | 75.08 | 40 | 31.24 | 1604 | 0.01947 | 3.21E+04 |
| 1, 9 | 85.08 | 40 | 35.41 | 1880 | 0.01884 | 5.08E+04 |
| 1, 10 | 95.04 | 40 | 39.59 | 2135 | 0.01854 | 7.22E+04 |
| 1, 11 | 105.1 | 40 | 43.75 | 2389 | 0.01831 | 9.63E+04 |
| 1, 12 | 115.1 | 40 | 47.84 | 2645 | 0.01809 | 1.23E+05 |
| 1, 13 | 125 | 40 | 52.02 | 2913 | 0.01786 | 1.52E+05 |
| 1, 14 | 135.1 | 40 | 56.27 | 3194 | 0.01762 | 1.84E+05 |
| 1, 15 | 145.1 | 40 | 60.36 | 3472 | 0.01738 | 2.19E+05 |
| 1, 16 | 155 | 40 | 64.54 | 3762 | 0.01716 | 2.56E+05 |
| 1, 17 | 165.1 | 40 | 68.71 | 4045 | 0.01699 | 2.97E+05 |
| 1, 18 | 175.1 | 40 | 72.87 | 4328 | 0.01684 | 3.40E+05 |
| 1, 19 | 185 | 40 | 77.06 | 4614 | 0.0167 | 3.86E+05 |
| 1, 20 | 195.1 | 40 | 81.23 | 4903 | 0.01657 | 4.36E+05 |
| 1, 21 | 205.1 | 40 | 85.39 | 5202 | 0.01642 | 4.87E+05 |

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|---|---|---|---|---|---|---|
| 1, 22 | 215 | 40 | 89.56 | 5504 | 0.01627 | 5.42E+05 |
| 1, 23 | 225.1 | 40 | 93.72 | 5818 | 0.01611 | 6.01E+05 |
| 1, 24 | 235.1 | 40 | 97.89 | 6142 | 0.01594 | 6.62E+05 |
| 1, 25 | 245 | 40 | 102 | 6463 | 0.01579 | 7.27E+05 |
| 1, 26 | 255.1 | 40 | 106.2 | 6783 | 0.01566 | 7.95E+05 |
| 1, 27 | 265.1 | 40 | 110.4 | 7112 | 0.01552 | 8.66E+05 |
| 1, 28 | 275 | 40 | 114.5 | 7438 | 0.0154 | 9.40E+05 |
| 1, 29 | 285.1 | 39.9 | 118.7 | 7774 | 0.01527 | 1.02E+06 |
| 1, 30 | 295.1 | 40 | 122.9 | 8111 | 0.01515 | 1.10E+06 |
| 1, 31 | 305 | 40 | 127 | 8466 | 0.015 | 1.18E+06 |
| 1, 32 | 315.1 | 40 | 131.3 | 8819 | 0.01489 | 1.27E+06 |
| 1, 33 | 325.1 | 40 | 135.3 | 9167 | 0.01477 | 1.36E+06 |
| 1, 34 | 335 | 40 | 139.5 | 9523 | 0.01465 | 1.46E+06 |
| 1, 35 | 345.1 | 40 | 143.8 | 9891 | 0.01454 | 1.56E+06 |
| 1, 36 | 355.1 | 40 | 147.8 | 1.02E+04 | 0.01444 | 1.66E+06 |
| 1, 37 | 365 | 40 | 152 | 1.06E+04 | 0.01433 | 1.77E+06 |
| 1, 38 | 375.1 | 40 | 156.3 | 1.10E+04 | 0.01423 | 1.88E+06 |
| 1, 39 | 385.1 | 40 | 160.4 | 1.13E+04 | 0.01415 | 1.99E+06 |
| 1, 40 | 395 | 40 | 164.5 | 1.17E+04 | 0.01407 | 2.11E+06 |
| 1, 41 | 405.1 | 40 | 168.7 | 1.21E+04 | 0.01399 | 2.23E+06 |
| 1, 42 | 415.1 | 40 | 172.9 | 1.24E+04 | 0.0139 | 2.35E+06 |
| 1, 43 | 425 | 40 | 177.1 | 1.28E+04 | 0.01382 | 2.48E+06 |
| 1, 44 | 435.1 | 40 | 181.2 | 1.32E+04 | 0.01375 | 2.61E+06 |
| 1, 45 | 445.1 | 40 | 185.4 | 1.36E+04 | 0.01368 | 2.75E+06 |
| 1, 46 | 455 | 40 | 189.5 | 1.39E+04 | 0.01363 | 2.89E+06 |
| 1, 47 | 465.1 | 40 | 193.7 | 1.43E+04 | 0.01357 | 3.03E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.46E+04 | 0.01352 | 3.18E+06 |
| 1, 49 | 485 | 40 | 202.1 | 1.50E+04 | 0.01347 | 3.33E+06 |
| 1, 50 | 495.1 | 40 | 206.2 | 1.54E+04 | 0.01343 | 3.48E+06 |
| 1, 51 | 505.1 | 40 | 210.4 | 1.57E+04 | 0.01339 | 3.64E+06 |
| 1, 52 | 515 | 40 | 214.5 | 1.61E+04 | 0.01335 | 3.80E+06 |
| 1, 53 | 525.1 | 40 | 218.7 | 1.64E+04 | 0.01332 | 3.96E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.68E+04 | 0.01329 | 4.13E+06 |
| 1, 55 | 545 | 40 | 227.1 | 1.71E+04 | 0.01325 | 4.30E+06 |
| 1, 56 | 555.1 | 40 | 231.2 | 1.74E+04 | 0.01326 | 4.48E+06 |
| 1, 57 | 565.1 | 40 | 235.4 | 1.78E+04 | 0.01323 | 4.65E+06 |
| 1, 58 | 575 | 40 | 239.6 | 1.81E+04 | 0.01322 | 4.84E+06 |
| 1, 59 | 585.1 | 40 | 243.7 | 1.85E+04 | 0.0132 | 5.02E+06 |
| 1, 60 | 595.1 | 40 | 247.9 | 1.88E+04 | 0.01319 | 5.21E+06 |
| 1, 61 | 605.1 | 40 | 247.8 | 1.90E+04 | 0.01306 | 5.40E+06 |
| 1, 62 | 615.2 | 40 | 243.7 | 1.88E+04 | 0.01298 | 5.59E+06 |
| 1, 63 | 625.1 | 40 | 239.5 | 1.85E+04 | 0.01294 | 5.77E+06 |
| 1, 64 | 635.2 | 40 | 235.4 | 1.82E+04 | 0.01291 | 5.96E+06 |
| 1, 65 | 645.2 | 40 | 231.2 | 1.79E+04 | 0.0129 | 6.13E+06 |
| 1, 66 | 655.1 | 40 | 227.1 | 1.76E+04 | 0.01289 | 6.31E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.73E+04 | 0.01289 | 6.48E+06 |
| 1, 68 | 675.2 | 40 | 218.8 | 1.70E+04 | 0.01287 | 6.65E+06 |
| 1, 69 | 685.2 | 40 | 214.6 | 1.67E+04 | 0.01286 | 6.82E+06 |

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|---|---|---|---|---|---|---|
| 1, 70 | 695.2 | 40 | 210.4 | 1.64E+04 | 0.01287 | 6.98E+06 |
| 1, 71 | 705.2 | 40 | 206.3 | 1.60E+04 | 0.01287 | 7.14E+06 |
| 1, 72 | 715.1 | 40 | 202.1 | 1.57E+04 | 0.01287 | 7.30E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.54E+04 | 0.01289 | 7.45E+06 |
| 1, 74 | 735.2 | 40 | 193.7 | 1.50E+04 | 0.0129 | 7.60E+06 |
| 1, 75 | 745.1 | 40 | 189.6 | 1.47E+04 | 0.0129 | 7.75E+06 |
| 1, 76 | 755.2 | 40 | 185.4 | 1.44E+04 | 0.01292 | 7.89E+06 |
| 1, 77 | 765.2 | 40 | 181.2 | 1.40E+04 | 0.01295 | 8.03E+06 |
| 1, 78 | 775.1 | 40 | 177.1 | 1.37E+04 | 0.01297 | 8.17E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 1.33E+04 | 0.01299 | 8.30E+06 |
| 1, 80 | 795.2 | 40 | 168.8 | 1.30E+04 | 0.01302 | 8.43E+06 |
| 1, 81 | 805.2 | 40 | 164.5 | 1.26E+04 | 0.01305 | 8.56E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.23E+04 | 0.01307 | 8.68E+06 |
| 1, 83 | 825.2 | 40 | 156.2 | 1.19E+04 | 0.0131 | 8.80E+06 |
| 1, 84 | 835.2 | 40 | 152.1 | 1.16E+04 | 0.01313 | 8.92E+06 |
| 1, 85 | 845.2 | 40 | 147.9 | 1.12E+04 | 0.01316 | 9.03E+06 |
| 1, 86 | 855.2 | 40 | 143.8 | 1.09E+04 | 0.01319 | 9.14E+06 |
| 1, 87 | 865.1 | 40 | 139.6 | 1.06E+04 | 0.01321 | 9.24E+06 |
| 1, 88 | 875.2 | 40 | 135.4 | 1.02E+04 | 0.01327 | 9.35E+06 |
| 1, 89 | 885.2 | 40 | 131.2 | 9861 | 0.01331 | 9.44E+06 |
| 1, 90 | 895.1 | 40 | 127 | 9509 | 0.01336 | 9.54E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 9165 | 0.01341 | 9.63E+06 |
| 1, 92 | 915.2 | 40 | 118.7 | 8809 | 0.01348 | 9.72E+06 |
| 1, 93 | 925.1 | 40 | 114.6 | 8469 | 0.01353 | 9.80E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 8115 | 0.0136 | 9.88E+06 |
| 1, 95 | 945.2 | 40 | 106.2 | 7751 | 0.0137 | 9.96E+06 |
| 1, 96 | 955.1 | 40 | 102 | 7397 | 0.0138 | 1.00E+07 |
| 1, 97 | 965.2 | 40 | 97.88 | 7045 | 0.01389 | 1.01E+07 |
| 1, 98 | 975.2 | 40 | 93.72 | 6702 | 0.01398 | 1.02E+07 |
| 1, 99 | 985.1 | 40 | 89.55 | 6353 | 0.0141 | 1.02E+07 |
| 1, 100 | 995.2 | 40 | 85.4 | 5999 | 0.01423 | 1.03E+07 |
| 1, 101 | 1005 | 40 | 81.25 | 5650 | 0.01438 | 1.04E+07 |
| 1, 102 | 1015 | 40 | 77.08 | 5297 | 0.01455 | 1.04E+07 |
| 1, 103 | 1025 | 40 | 72.91 | 4950 | 0.01473 | 1.05E+07 |
| 1, 104 | 1035 | 40 | 68.73 | 4604 | 0.01493 | 1.05E+07 |
| 1, 105 | 1045 | 40 | 64.56 | 4259 | 0.01516 | 1.05E+07 |
| 1, 106 | 1055 | 40 | 60.39 | 3919 | 0.01541 | 1.06E+07 |
| 1, 107 | 1065 | 40 | 56.22 | 3585 | 0.01568 | 1.06E+07 |
| 1, 108 | 1075 | 40 | 52.05 | 3253 | 0.016 | 1.07E+07 |
| 1, 109 | 1085 | 40 | 47.94 | 2930 | 0.01637 | 1.07E+07 |
| 1, 110 | 1095 | 40 | 43.77 | 2600 | 0.01684 | 1.07E+07 |
| 1, 111 | 1105 | 40 | 39.59 | 2277 | 0.01738 | 1.07E+07 |
| 1, 112 | 1115 | 40 | 35.4 | 1966 | 0.01801 | 1.08E+07 |
| 1, 113 | 1125 | 40 | 31.23 | 1665 | 0.01876 | 1.08E+07 |
| 1, 114 | 1135 | 40 | 27.05 | 1376 | 0.01966 | 1.08E+07 |
| 1, 115 | 1145 | 40 | 22.88 | 1100 | 0.0208 | 1.08E+07 |
| 1, 116 | 1155 | 40 | 18.78 | 842.4 | 0.0223 | 1.08E+07 |
| 1, 117 | 1165 | 40 | 14.52 | 589.4 | 0.02463 | 1.08E+07 |

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|---|---|---|---|---|---|---|
| 1, 118 | 1175 | 40 | 10.42 | 365.9 | 0.02849 | 1.08E+07 |
| 1, 119 | 1185 | 40 | 6.249 | 167.9 | 0.03722 | 1.08E+07 |
| 1, 120 | 1195 | 40 | 2.05 | 21.62 | 0.09478 | 1.08E+07 |

**C1.3.5 Abu treated with 2000 PPMPPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.02 | 40 | 2.117 | 0.000332 | 6382 | -0.01212 |
| 2 | 15.03 | 40 | 6.173 | 0.000326 | 1.89E+04 | -0.00812 |
| 3 | 25.08 | 40 | 10.44 | 0.000398 | 2.62E+04 | -0.00506 |
| 4 | 35.08 | 40 | 14.52 | 0.000448 | 3.24E+04 | -0.00013 |
| 5 | 45.03 | 40 | 18.67 | 0.000469 | 3.98E+04 | 0.003063 |
| 6 | 55.08 | 40 | 22.92 | 0.000439 | 5.23E+04 | 0.009587 |
| 7 | 65.08 | 40 | 27.09 | 0.000572 | 4.73E+04 | 0.01598 |
| 8 | 75.04 | 40 | 31.25 | 0.000627 | 4.99E+04 | 0.02117 |
| 9 | 85.07 | 40 | 35.43 | 0.00071 | 4.99E+04 | 0.03063 |
| 10 | 95.07 | 40 | 39.51 | 0.000841 | 4.70E+04 | 0.03755 |
| 11 | 105 | 40 | 43.68 | 0.000852 | 5.13E+04 | 0.04621 |
| 12 | 115.1 | 40 | 47.91 | 0.000918 | 5.22E+04 | 0.05766 |
| 13 | 125.1 | 39.9 | 52.07 | 0.001058 | 4.92E+04 | 0.06645 |
| 14 | 135 | 40 | 56.22 | 0.001094 | 5.14E+04 | 0.0775 |
| 15 | 145.1 | 40 | 60.38 | 0.001326 | 4.55E+04 | 0.09201 |
| 16 | 155.1 | 40 | 64.56 | 0.001468 | 4.40E+04 | 0.1056 |
| 17 | 165 | 39.9 | 68.73 | 0.00162 | 4.24E+04 | 0.122 |
| 18 | 175.1 | 40 | 72.88 | 0.001891 | 3.86E+04 | 0.1417 |
| 19 | 185.1 | 40 | 77.05 | 0.002244 | 3.43E+04 | 0.1633 |
| 20 | 195 | 40 | 81.19 | 0.003155 | 2.57E+04 | 0.1959 |
| 21 | 205.1 | 40 | 85.45 | 0.007326 | 1.17E+04 | 0.2802 |
| 22 | 215.1 | 40 | 89.54 | 1419 | 0.06312 | 1.47E+04 |
| 23 | 225 | 40 | 93.71 | 3726 | 0.02515 | 5.20E+04 |
| 24 | 235.1 | 40 | 97.88 | 4556 | 0.02148 | 9.79E+04 |
| 25 | 245.1 | 40 | 102 | 5131 | 0.01989 | 1.49E+05 |
| 26 | 255 | 40 | 106.2 | 5645 | 0.01882 | 2.06E+05 |
| 27 | 265.1 | 40 | 110.4 | 6134 | 0.018 | 2.67E+05 |
| 28 | 275.1 | 40 | 114.5 | 6610 | 0.01733 | 3.33E+05 |
| 29 | 285 | 40 | 118.7 | 7071 | 0.01679 | 4.04E+05 |
| 30 | 295.1 | 40 | 123 | 7545 | 0.0163 | 4.80E+05 |
| 31 | 305.1 | 40 | 127 | 8001 | 0.01588 | 5.59E+05 |
| 32 | 315 | 40 | 131.2 | 8451 | 0.01552 | 6.44E+05 |
| 33 | 325.1 | 40 | 135.3 | 8904 | 0.0152 | 7.34E+05 |
| 34 | 335.1 | 40 | 139.6 | 9379 | 0.01488 | 8.27E+05 |
| 35 | 345 | 40 | 143.8 | 9838 | 0.01461 | 9.25E+05 |
| 36 | 355.1 | 40 | 147.9 | 1.03E+04 | 0.01437 | 1.03E+06 |
| 37 | 365.1 | 40 | 152 | 1.08E+04 | 0.01414 | 1.14E+06 |
| 38 | 375 | 40 | 156.2 | 1.12E+04 | 0.01393 | 1.25E+06 |
| 39 | 385.1 | 40 | 160.4 | 1.17E+04 | 0.01375 | 1.37E+06 |
| 40 | 395.1 | 40 | 164.5 | 1.21E+04 | 0.01359 | 1.49E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 41 | 405 | 40 | 168.7 | 1.26E+04 | 0.01344 | 1.61E+06 |
| 42 | 415.1 | 40 | 172.9 | 1.30E+04 | 0.0133 | 1.74E+06 |
| 43 | 425.1 | 40 | 177 | 1.35E+04 | 0.01317 | 1.88E+06 |
| 44 | 435 | 40 | 181.2 | 1.39E+04 | 0.01306 | 2.02E+06 |
| 45 | 445.1 | 40 | 185.4 | 1.43E+04 | 0.01297 | 2.16E+06 |
| 46 | 455.1 | 40 | 189.5 | 1.47E+04 | 0.01287 | 2.31E+06 |
| 47 | 465 | 40 | 193.7 | 1.52E+04 | 0.01279 | 2.46E+06 |
| 48 | 475.1 | 40 | 197.9 | 1.56E+04 | 0.01272 | 2.61E+06 |
| 49 | 485.1 | 40 | 202.1 | 1.60E+04 | 0.01265 | 2.77E+06 |
| 50 | 495 | 40 | 206.2 | 1.64E+04 | 0.01259 | 2.94E+06 |
| 51 | 505.1 | 40 | 210.4 | 1.68E+04 | 0.01255 | 3.11E+06 |
| 52 | 515.1 | 40 | 214.6 | 1.72E+04 | 0.01249 | 3.28E+06 |
| 53 | 525 | 40 | 218.7 | 1.76E+04 | 0.01245 | 3.45E+06 |
| 54 | 535.1 | 40 | 222.9 | 1.80E+04 | 0.0124 | 3.63E+06 |
| 55 | 545.1 | 40 | 227.1 | 1.84E+04 | 0.01235 | 3.82E+06 |
| 56 | 555 | 40 | 231.2 | 1.88E+04 | 0.01229 | 4.00E+06 |
| 57 | 565.1 | 40 | 235.4 | 1.92E+04 | 0.01225 | 4.20E+06 |
| 58 | 575.1 | 40 | 239.6 | 1.96E+04 | 0.01221 | 4.39E+06 |
| 59 | 585 | 40 | 243.7 | 2.00E+04 | 0.01217 | 4.59E+06 |
| 60 | 595.1 | 40 | 247.9 | 2.04E+04 | 0.01214 | 4.80E+06 |
| 61 | 605.2 | 40 | 247.8 | 2.07E+04 | 0.012 | 5.01E+06 |
| 62 | 615.2 | 40 | 243.7 | 2.05E+04 | 0.01187 | 5.21E+06 |
| 63 | 625.2 | 40 | 239.6 | 2.03E+04 | 0.01182 | 5.42E+06 |
| 64 | 635.2 | 40 | 235.4 | 2.00E+04 | 0.01179 | 5.62E+06 |
| 65 | 645.2 | 40 | 231.2 | 1.96E+04 | 0.01177 | 5.81E+06 |
| 66 | 655.2 | 40 | 227 | 1.93E+04 | 0.01176 | 6.00E+06 |
| 67 | 665.2 | 40 | 222.9 | 1.90E+04 | 0.01176 | 6.20E+06 |
| 68 | 675.2 | 40 | 218.7 | 1.86E+04 | 0.01176 | 6.38E+06 |
| 69 | 685.2 | 40 | 214.5 | 1.83E+04 | 0.01175 | 6.56E+06 |
| 70 | 695.2 | 40 | 210.4 | 1.79E+04 | 0.01176 | 6.74E+06 |
| 71 | 705.2 | 40 | 206.2 | 1.75E+04 | 0.01178 | 6.92E+06 |
| 72 | 715.2 | 40 | 202 | 1.71E+04 | 0.01179 | 7.09E+06 |
| 73 | 725.2 | 40 | 197.8 | 1.67E+04 | 0.01182 | 7.26E+06 |
| 74 | 735.2 | 40 | 193.7 | 1.64E+04 | 0.01184 | 7.42E+06 |
| 75 | 745.2 | 40 | 189.6 | 1.60E+04 | 0.01186 | 7.58E+06 |
| 76 | 755.2 | 40 | 185.4 | 1.56E+04 | 0.01187 | 7.73E+06 |
| 77 | 765.2 | 40 | 181.2 | 1.52E+04 | 0.0119 | 7.89E+06 |
| 78 | 775.2 | 40 | 177.1 | 1.48E+04 | 0.01193 | 8.03E+06 |
| 79 | 785.2 | 40 | 172.9 | 1.45E+04 | 0.01195 | 8.18E+06 |
| 80 | 795.2 | 40 | 168.7 | 1.41E+04 | 0.01198 | 8.32E+06 |
| 81 | 805.2 | 40 | 164.5 | 1.37E+04 | 0.01202 | 8.46E+06 |
| 82 | 815.2 | 40 | 160.4 | 1.33E+04 | 0.01206 | 8.59E+06 |
| 83 | 825.2 | 40 | 156.2 | 1.29E+04 | 0.0121 | 8.72E+06 |
| 84 | 835.2 | 40 | 152 | 1.25E+04 | 0.01214 | 8.84E+06 |
| 85 | 845.2 | 40 | 147.9 | 1.21E+04 | 0.01218 | 8.97E+06 |
| 86 | 855.2 | 40 | 143.7 | 1.18E+04 | 0.01223 | 9.08E+06 |
| 87 | 865.2 | 40 | 139.6 | 1.14E+04 | 0.01227 | 9.20E+06 |
| 88 | 875.2 | 40 | 135.4 | 1.10E+04 | 0.01231 | 9.31E+06 |

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|---|---|---|---|---|---|---|
| 89 | 885.2 | 40 | 131.2 | 1.06E+04 | 0.01237 | 9.41E+06 |
| 90 | 895.2 | 40 | 127.1 | 1.02E+04 | 0.01242 | 9.51E+06 |
| 91 | 905.2 | 40 | 122.9 | 9846 | 0.01248 | 9.61E+06 |
| 92 | 915.2 | 40 | 118.7 | 9461 | 0.01255 | 9.71E+06 |
| 93 | 925.2 | 40 | 114.6 | 9074 | 0.01263 | 9.80E+06 |
| 94 | 935.2 | 40 | 110.4 | 8689 | 0.01271 | 9.89E+06 |
| 95 | 945.2 | 40 | 106.2 | 8301 | 0.0128 | 9.97E+06 |
| 96 | 955.2 | 40 | 102.1 | 7922 | 0.01289 | 1.01E+07 |
| 97 | 965.2 | 40 | 97.82 | 7527 | 0.013 | 1.01E+07 |
| 98 | 975.2 | 40 | 93.73 | 7150 | 0.01311 | 1.02E+07 |
| 99 | 985.2 | 40 | 89.56 | 6773 | 0.01322 | 1.03E+07 |
| 100 | 995.2 | 40 | 85.4 | 6384 | 0.01338 | 1.03E+07 |
| 101 | 1005 | 40 | 81.23 | 6015 | 0.0135 | 1.04E+07 |
| 102 | 1015 | 40 | 77.06 | 5635 | 0.01367 | 1.04E+07 |
| 103 | 1025 | 40 | 72.88 | 5258 | 0.01386 | 1.05E+07 |
| 104 | 1035 | 40 | 68.73 | 4883 | 0.01408 | 1.05E+07 |
| 105 | 1045 | 40 | 64.56 | 4507 | 0.01432 | 1.06E+07 |
| 106 | 1055 | 40 | 60.38 | 4136 | 0.0146 | 1.06E+07 |
| 107 | 1065 | 40 | 56.21 | 3773 | 0.0149 | 1.07E+07 |
| 108 | 1075 | 40 | 52.03 | 3411 | 0.01525 | 1.07E+07 |
| 109 | 1085 | 40 | 47.87 | 3056 | 0.01566 | 1.07E+07 |
| 110 | 1095 | 40 | 43.71 | 2707 | 0.01615 | 1.08E+07 |
| 111 | 1105 | 40 | 39.55 | 2367 | 0.01671 | 1.08E+07 |
| 112 | 1115 | 40 | 35.37 | 2037 | 0.01737 | 1.08E+07 |
| 113 | 1125 | 40 | 31.22 | 1716 | 0.01819 | 1.08E+07 |
| 114 | 1135 | 40 | 27.04 | 1404 | 0.01926 | 1.08E+07 |
| 115 | 1145 | 40 | 22.88 | 1103 | 0.02074 | 1.08E+07 |
| 116 | 1155 | 40 | 18.71 | 816.1 | 0.02292 | 1.09E+07 |
| 117 | 1165 | 40 | 14.52 | 550.4 | 0.02639 | 1.09E+07 |
| 118 | 1175 | 40 | 10.35 | 322.3 | 0.03211 | 1.09E+07 |
| 119 | 1185 | 40 | 6.251 | 142.6 | 0.04382 | 1.09E+07 |
| 120 | 1195 | 40 | 2.071 | 15.76 | 0.1314 | 1.09E+07 |

### C1.3.6 Abu untreated with 20% Sertica

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.017 | 40 | 2.11 | 0.00129 | 1635 | 0.007723 |
| 1, 2 | 15.03 | 40 | 6.17 | 0.002072 | 2977 | 0.02929 |
| 1, 3 | 25.06 | 40 | 10.43 | 0.003297 | 3162 | 0.06218 |
| 1, 4 | 35.06 | 40 | 14.58 | 0.005058 | 2882 | 0.1133 |
| 1, 5 | 45.08 | 40 | 18.75 | 0.01107 | 1694 | 0.2286 |
| 1, 6 | 55.1 | 40 | 22.85 | 0.05303 | 430.9 | 4.437 |
| 1, 7 | 65.06 | 40 | 27.02 | 430.1 | 0.06282 | 4481 |
| 1, 8 | 75.08 | 40 | 31.27 | 1112 | 0.02813 | 1.57E+04 |
| 1, 9 | 85.09 | 40 | 35.37 | 1521 | 0.02326 | 3.09E+04 |
| 1, 10 | 95.05 | 40 | 39.55 | 1867 | 0.02119 | 4.96E+04 |
| 1, 11 | 105.1 | 40 | 43.73 | 2204 | 0.01984 | 7.19E+04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 12 | 115.1 | 40 | 47.9 | 2548 | 0.0188 | 9.72E+04 |
| 1, 13 | 125 | 40 | 52.07 | 2890 | 0.01802 | 1.26E+05 |
| 1, 14 | 135 | 40 | 56.24 | 3232 | 0.0174 | 1.58E+05 |
| 1, 15 | 145.1 | 40 | 60.43 | 3567 | 0.01694 | 1.94E+05 |
| 1, 16 | 155.1 | 40 | 64.52 | 3918 | 0.01647 | 2.33E+05 |
| 1, 17 | 165 | 40 | 68.69 | 4263 | 0.01611 | 2.76E+05 |
| 1, 18 | 175 | 40 | 72.87 | 4617 | 0.01578 | 3.23E+05 |
| 1, 19 | 185.1 | 40 | 77.05 | 4980 | 0.01547 | 3.72E+05 |
| 1, 20 | 195.1 | 40 | 81.29 | 5347 | 0.0152 | 4.26E+05 |
| 1, 21 | 205.1 | 40 | 85.38 | 5693 | 0.015 | 4.83E+05 |
| 1, 22 | 215.1 | 40 | 89.56 | 6049 | 0.01481 | 5.43E+05 |
| 1, 23 | 225.1 | 40 | 93.74 | 6417 | 0.01461 | 6.08E+05 |
| 1, 24 | 235.1 | 40 | 97.89 | 6774 | 0.01445 | 6.75E+05 |
| 1, 25 | 245.1 | 40 | 102 | 7117 | 0.01434 | 7.47E+05 |
| 1, 26 | 255.1 | 40 | 106.2 | 7458 | 0.01424 | 8.22E+05 |
| 1, 27 | 265.1 | 40 | 110.4 | 7803 | 0.01415 | 8.99E+05 |
| 1, 28 | 275 | 40 | 114.6 | 8142 | 0.01407 | 9.81E+05 |
| 1, 29 | 285.1 | 40 | 118.7 | 8479 | 0.014 | 1.07E+06 |
| 1, 30 | 295.1 | 40 | 122.9 | 8804 | 0.01396 | 1.15E+06 |
| 1, 31 | 305 | 39.9 | 127 | 9141 | 0.0139 | 1.25E+06 |
| 1, 32 | 315.1 | 40 | 131.3 | 9487 | 0.01384 | 1.34E+06 |
| 1, 33 | 325.1 | 40 | 135.4 | 9818 | 0.01379 | 1.44E+06 |
| 1, 34 | 335 | 40 | 139.5 | 1.02E+04 | 0.01374 | 1.54E+06 |
| 1, 35 | 345.1 | 40 | 143.8 | 1.05E+04 | 0.01367 | 1.65E+06 |
| 1, 36 | 355.1 | 40 | 147.9 | 1.09E+04 | 0.0136 | 1.75E+06 |
| 1, 37 | 365 | 40 | 152 | 1.12E+04 | 0.01358 | 1.87E+06 |
| 1, 38 | 375.1 | 40 | 156.2 | 1.15E+04 | 0.01353 | 1.98E+06 |
| 1, 39 | 385.1 | 40 | 160.4 | 1.19E+04 | 0.01346 | 2.10E+06 |
| 1, 40 | 395 | 40 | 164.5 | 1.23E+04 | 0.0134 | 2.22E+06 |
| 1, 41 | 405.1 | 40 | 168.8 | 1.26E+04 | 0.01335 | 2.35E+06 |
| 1, 42 | 415.1 | 40 | 172.9 | 1.30E+04 | 0.01332 | 2.48E+06 |
| 1, 43 | 425 | 40 | 177 | 1.33E+04 | 0.0133 | 2.61E+06 |
| 1, 44 | 435.1 | 40 | 181.3 | 1.37E+04 | 0.01327 | 2.75E+06 |
| 1, 45 | 445.1 | 40 | 185.3 | 1.40E+04 | 0.01326 | 2.89E+06 |
| 1, 46 | 455 | 40 | 189.6 | 1.43E+04 | 0.01324 | 3.03E+06 |
| 1, 47 | 465.1 | 40 | 193.8 | 1.47E+04 | 0.01321 | 3.18E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.50E+04 | 0.0132 | 3.33E+06 |
| 1, 49 | 485.1 | 40 | 202 | 1.53E+04 | 0.0132 | 3.48E+06 |
| 1, 50 | 495.1 | 40 | 206.3 | 1.57E+04 | 0.01316 | 3.64E+06 |
| 1, 51 | 505.1 | 40 | 210.4 | 1.60E+04 | 0.01312 | 3.80E+06 |
| 1, 52 | 515 | 40 | 214.5 | 1.64E+04 | 0.0131 | 3.96E+06 |
| 1, 53 | 525.1 | 40 | 218.8 | 1.68E+04 | 0.01306 | 4.13E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.71E+04 | 0.01304 | 4.30E+06 |
| 1, 55 | 545 | 40 | 227 | 1.74E+04 | 0.01303 | 4.48E+06 |
| 1, 56 | 555.1 | 40 | 231.3 | 1.78E+04 | 0.01299 | 4.66E+06 |
| 1, 57 | 565.1 | 40 | 235.4 | 1.82E+04 | 0.01296 | 4.84E+06 |
| 1, 58 | 575 | 40 | 239.6 | 1.85E+04 | 0.01294 | 5.02E+06 |
| 1, 59 | 585.1 | 40 | 243.7 | 1.89E+04 | 0.01292 | 5.21E+06 |

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|---|---|---|---|---|---|---|
| 1, 60 | 595.1 | 40 | 247.9 | 1.92E+04 | 0.0129 | 5.40E+06 |
| 1, 61 | 605.1 | 40 | 247.9 | 1.94E+04 | 0.01275 | 5.60E+06 |
| 1, 62 | 615.2 | 40 | 243.7 | 1.93E+04 | 0.01261 | 5.79E+06 |
| 1, 63 | 625.2 | 40 | 239.6 | 1.91E+04 | 0.01256 | 5.98E+06 |
| 1, 64 | 635.2 | 40 | 235.4 | 1.88E+04 | 0.01252 | 6.17E+06 |
| 1, 65 | 645.2 | 40 | 231.2 | 1.85E+04 | 0.01249 | 6.36E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.82E+04 | 0.01246 | 6.54E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.79E+04 | 0.01245 | 6.72E+06 |
| 1, 68 | 675.2 | 40 | 218.7 | 1.76E+04 | 0.01245 | 6.89E+06 |
| 1, 69 | 685.2 | 40 | 214.6 | 1.73E+04 | 0.01243 | 7.06E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.69E+04 | 0.01243 | 7.24E+06 |
| 1, 71 | 705.2 | 40 | 206.2 | 1.66E+04 | 0.01243 | 7.40E+06 |
| 1, 72 | 715.2 | 40 | 202.1 | 1.63E+04 | 0.01241 | 7.56E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.60E+04 | 0.0124 | 7.72E+06 |
| 1, 74 | 735.2 | 40 | 193.7 | 1.56E+04 | 0.01239 | 7.88E+06 |
| 1, 75 | 745.1 | 40 | 189.5 | 1.53E+04 | 0.01239 | 8.03E+06 |
| 1, 76 | 755.2 | 40 | 185.4 | 1.49E+04 | 0.01241 | 8.18E+06 |
| 1, 77 | 765.2 | 40 | 181.2 | 1.46E+04 | 0.01244 | 8.33E+06 |
| 1, 78 | 775.2 | 40 | 177.1 | 1.42E+04 | 0.01246 | 8.47E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 1.39E+04 | 0.01246 | 8.61E+06 |
| 1, 80 | 795.2 | 40 | 168.7 | 1.35E+04 | 0.01247 | 8.74E+06 |
| 1, 81 | 805.2 | 40 | 164.6 | 1.32E+04 | 0.01248 | 8.87E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.29E+04 | 0.01248 | 9.00E+06 |
| 1, 83 | 825.2 | 40 | 156.3 | 1.25E+04 | 0.01249 | 9.13E+06 |
| 1, 84 | 835.2 | 40 | 152.1 | 1.22E+04 | 0.01249 | 9.25E+06 |
| 1, 85 | 845.2 | 40 | 147.9 | 1.18E+04 | 0.0125 | 9.37E+06 |
| 1, 86 | 855.2 | 40 | 143.8 | 1.15E+04 | 0.01252 | 9.48E+06 |
| 1, 87 | 865.2 | 40 | 139.6 | 1.11E+04 | 0.01253 | 9.59E+06 |
| 1, 88 | 875.2 | 40 | 135.3 | 1.08E+04 | 0.01254 | 9.70E+06 |
| 1, 89 | 885.2 | 40 | 131.3 | 1.05E+04 | 0.01256 | 9.81E+06 |
| 1, 90 | 895.2 | 40 | 127.1 | 1.01E+04 | 0.01258 | 9.91E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 9758 | 0.0126 | 1.00E+07 |
| 1, 92 | 915.2 | 40 | 118.7 | 9396 | 0.01264 | 1.01E+07 |
| 1, 93 | 925.1 | 40 | 114.6 | 9040 | 0.01268 | 1.02E+07 |
| 1, 94 | 935.2 | 40 | 110.4 | 8680 | 0.01272 | 1.03E+07 |
| 1, 95 | 945.2 | 40 | 106.2 | 8326 | 0.01276 | 1.04E+07 |
| 1, 96 | 955.2 | 40 | 102.1 | 7978 | 0.0128 | 1.04E+07 |
| 1, 97 | 965.2 | 40 | 97.86 | 7615 | 0.01285 | 1.05E+07 |
| 1, 98 | 975.2 | 40 | 93.71 | 7265 | 0.0129 | 1.06E+07 |
| 1, 99 | 985.1 | 40 | 89.56 | 6909 | 0.01296 | 1.07E+07 |
| 1, 100 | 995.2 | 40 | 85.4 | 6556 | 0.01303 | 1.07E+07 |
| 1, 101 | 1005 | 40 | 81.23 | 6201 | 0.0131 | 1.08E+07 |
| 1, 102 | 1015 | 40 | 77.06 | 5848 | 0.01318 | 1.08E+07 |
| 1, 103 | 1025 | 40 | 72.88 | 5492 | 0.01327 | 1.09E+07 |
| 1, 104 | 1035 | 40 | 68.78 | 5146 | 0.01337 | 1.10E+07 |
| 1, 105 | 1045 | 40 | 64.53 | 4788 | 0.01348 | 1.10E+07 |
| 1, 106 | 1055 | 40 | 60.36 | 4436 | 0.01361 | 1.10E+07 |
| 1, 107 | 1065 | 40 | 56.27 | 4097 | 0.01373 | 1.11E+07 |

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|---|---|---|---|---|---|---|
| 1, 108 | 1075 | 40 | 52.1 | 3751 | 0.01389 | 1.11E+07 |
| 1, 109 | 1085 | 40 | 47.85 | 3399 | 0.01408 | 1.12E+07 |
| 1, 110 | 1095 | 40 | 43.75 | 3064 | 0.01428 | 1.12E+07 |
| 1, 111 | 1105 | 40 | 39.57 | 2719 | 0.01456 | 1.12E+07 |
| 1, 112 | 1115 | 40 | 35.39 | 2376 | 0.01489 | 1.12E+07 |
| 1, 113 | 1125 | 40 | 31.22 | 2045 | 0.01527 | 1.13E+07 |
| 1, 114 | 1135 | 40 | 27.04 | 1702 | 0.01589 | 1.13E+07 |
| 1, 115 | 1145 | 40 | 22.88 | 1372 | 0.01667 | 1.13E+07 |
| 1, 116 | 1155 | 40 | 18.71 | 1052 | 0.01778 | 1.13E+07 |
| 1, 117 | 1165 | 40 | 14.62 | 751.8 | 0.01945 | 1.13E+07 |
| 1, 118 | 1175 | 40 | 10.44 | 466.1 | 0.02241 | 1.13E+07 |
| 1, 119 | 1185 | 40 | 6.267 | 209.8 | 0.02987 | 1.13E+07 |
| 1, 120 | 1195 | 40 | 2.088 | 25.18 | 0.08292 | 1.13E+07 |

**C2 (Cooling rate=1C/min&SLR=100Pa/min)**

**C2.1 (T=30°C)**

**C2.1.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.018 | 30 | 8.328 | -0.0001 | 8.32E+04 | 0.007856 |
| 2 | 15.05 | 30 | 24.7 | 3.34E-05 | 7.40E+05 | 0.008123 |
| 3 | 25.05 | 30 | 41.43 | 2.77E-05 | 1.50E+06 | 0.008522 |
| 4 | 35.04 | 30 | 58.1 | 2.23E-05 | 2.61E+06 | 0.008922 |
| 5 | 45.06 | 30 | 75.11 | 3.19E-05 | 2.35E+06 | 0.008788 |
| 6 | 55.06 | 30 | 91.4 | 2.95E-05 | 3.10E+06 | 0.009321 |
| 7 | 65.04 | 30 | 108.1 | 4.01E-05 | 2.70E+06 | 0.00972 |
| 8 | 75.06 | 29.9 | 125.1 | 4.26E-05 | 2.94E+06 | 0.01025 |
| 9 | 85.06 | 30 | 141.7 | 3.55E-05 | 3.99E+06 | 0.01079 |
| 10 | 95.03 | 30 | 158.3 | 4.45E-05 | 3.56E+06 | 0.01092 |
| 11 | 105 | 30 | 175 | 3.18E-05 | 5.50E+06 | 0.01105 |
| 12 | 115 | 30 | 191.7 | 5.14E-05 | 3.73E+06 | 0.01172 |
| 13 | 125 | 30 | 208 | 5.13E-05 | 4.06E+06 | 0.01225 |
| 14 | 135.1 | 30 | 224.7 | 4.90E-05 | 4.59E+06 | 0.01252 |
| 15 | 145.1 | 30 | 241.4 | 4.03E-05 | 5.99E+06 | 0.01318 |
| 16 | 155 | 30 | 258.1 | 4.29E-05 | 6.02E+06 | 0.01345 |
| 17 | 165.1 | 30 | 274.8 | 5.09E-05 | 5.40E+06 | 0.01465 |
| 18 | 175 | 30 | 291.4 | 4.72E-05 | 6.18E+06 | 0.01518 |
| 19 | 185 | 30 | 308.1 | 6.91E-05 | 4.46E+06 | 0.01571 |
| 20 | 195 | 30 | 325 | 6.22E-05 | 5.23E+06 | 0.01611 |
| 21 | 205.1 | 30 | 341.4 | 7.20E-05 | 4.74E+06 | 0.01638 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22 | 215 | 30 | 358.1 | 7.25E-05 | 4.94E+06 | 0.01704 |
| 23 | 225 | 30 | 375.1 | 7.16E-05 | 5.24E+06 | 0.01838 |
| 24 | 235.1 | 30 | 391.7 | 8.29E-05 | 4.72E+06 | 0.01864 |
| 25 | 245 | 30 | 408 | 6.46E-05 | 6.32E+06 | 0.01957 |
| 26 | 255.1 | 30 | 425 | 6.53E-05 | 6.50E+06 | 0.02051 |
| 27 | 265 | 30 | 441.6 | 9.03E-05 | 4.89E+06 | 0.02131 |
| 28 | 275.1 | 30 | 458.2 | 7.57E-05 | 6.05E+06 | 0.02197 |
| 29 | 285.1 | 30 | 474.9 | 9.41E-05 | 5.05E+06 | 0.02317 |
| 30 | 295 | 30 | 491.5 | 9.44E-05 | 5.21E+06 | 0.02357 |
| 31 | 305 | 30 | 508.2 | 9.94E-05 | 5.12E+06 | 0.02463 |
| 32 | 315 | 30 | 524.8 | 0.000121 | 4.36E+06 | 0.02663 |
| 33 | 325 | 30 | 541.4 | 9.15E-05 | 5.92E+06 | 0.02783 |
| 34 | 335.1 | 30 | 558.4 | 0.000127 | 4.40E+06 | 0.02836 |
| 35 | 345.1 | 30 | 574.7 | 0.000141 | 4.07E+06 | 0.02956 |
| 36 | 355.1 | 30 | 591.4 | 0.000177 | 3.35E+06 | 0.03143 |
| 37 | 365.1 | 30 | 608.4 | 0.000227 | 2.68E+06 | 0.03409 |
| 38 | 375.1 | 30 | 625.1 | 0.00027 | 2.32E+06 | 0.03622 |
| 39 | 385 | 30 | 641.4 | 0.000284 | 2.26E+06 | 0.03968 |
| 40 | 395.1 | 30 | 658.3 | 0.000706 | 9.32E+05 | 0.04674 |
| 41 | 405.1 | 30 | 675 | 0.001523 | 4.43E+05 | 0.06112 |
| 42 | 415 | 30 | 691.6 | 0.1607 | 4303 | 2.519 |
| 43 | 425.1 | 30 | 708.3 | 5254 | 0.1348 | 6.34E+04 |
| 44 | 435.1 | 30 | 724.9 | 2.32E+04 | 0.03129 | 2.93E+05 |
| 45 | 445 | 30 | 741.6 | 2.84E+04 | 0.02611 | 5.77E+05 |
| 46 | 455.1 | 30 | 758.3 | 3.09E+04 | 0.02454 | 8.90E+05 |
| 47 | 465.1 | 30 | 774.9 | 3.37E+04 | 0.02302 | 1.22E+06 |
| 48 | 475 | 30 | 791.6 | 3.58E+04 | 0.02213 | 1.58E+06 |
| 49 | 485.1 | 30 | 808.2 | 3.77E+04 | 0.02146 | 1.96E+06 |
| 50 | 495.1 | 30 | 824.9 | 3.89E+04 | 0.02121 | 2.35E+06 |
| 51 | 505 | 30 | 841.6 | 4.00E+04 | 0.02104 | 2.75E+06 |
| 52 | 515.1 | 30 | 858.3 | 4.09E+04 | 0.02097 | 3.16E+06 |
| 53 | 525.1 | 30 | 874.7 | 4.17E+04 | 0.021 | 3.57E+06 |
| 54 | 535 | 30 | 891.4 | 4.24E+04 | 0.02101 | 4.00E+06 |
| 55 | 545.1 | 30 | 908.4 | 4.32E+04 | 0.02101 | 4.44E+06 |
| 56 | 555.1 | 30 | 924.7 | 4.40E+04 | 0.021 | 4.87E+06 |
| 57 | 565 | 30 | 941.4 | 4.49E+04 | 0.02096 | 5.32E+06 |
| 58 | 575.1 | 30 | 958.5 | 4.58E+04 | 0.02093 | 5.78E+06 |
| 59 | 585.1 | 30 | 974.8 | 4.66E+04 | 0.02091 | 6.25E+06 |
| 60 | 595 | 30 | 991.4 | 4.90E+04 | 0.02024 | 6.74E+06 |
| 61 | 605.1 | 30 | 991.5 | 5.06E+04 | 0.01961 | 7.25E+06 |
| 62 | 615.2 | 30 | 974.8 | 5.03E+04 | 0.01937 | 7.75E+06 |
| 63 | 625.2 | 30 | 958.1 | 4.97E+04 | 0.01927 | 8.25E+06 |
| 64 | 635.2 | 30 | 941.8 | 4.90E+04 | 0.0192 | 8.74E+06 |
| 65 | 645.2 | 30 | 925.1 | 4.86E+04 | 0.01902 | 9.22E+06 |
| 66 | 655.2 | 30 | 908 | 4.80E+04 | 0.0189 | 9.71E+06 |
| 67 | 665.2 | 30 | 891.7 | 4.39E+04 | 0.02034 | 1.01E+07 |
| 68 | 675.2 | 30 | 875 | 3.98E+04 | 0.02198 | 1.05E+07 |
| 69 | 685.2 | 30 | 858 | 3.86E+04 | 0.02223 | 1.09E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 70 | 695.2 | 30 | 841.7 | 3.75E+04 | 0.02243 | 1.13E+07 |
| 71 | 705.2 | 30 | 825.1 | 3.65E+04 | 0.02259 | 1.17E+07 |
| 72 | 715.2 | 30 | 808.3 | 3.55E+04 | 0.02276 | 1.20E+07 |
| 73 | 725.2 | 30 | 791.6 | 3.46E+04 | 0.02289 | 1.24E+07 |
| 74 | 735.2 | 30 | 775 | 3.35E+04 | 0.02313 | 1.27E+07 |
| 75 | 745.2 | 30 | 758.3 | 3.24E+04 | 0.02342 | 1.30E+07 |
| 76 | 755.2 | 30 | 741.6 | 3.13E+04 | 0.02368 | 1.33E+07 |
| 77 | 765.2 | 30 | 725 | 3.02E+04 | 0.02398 | 1.36E+07 |
| 78 | 775.2 | 30 | 708.3 | 2.94E+04 | 0.02412 | 1.39E+07 |
| 79 | 785.2 | 30 | 691.6 | 2.87E+04 | 0.02412 | 1.42E+07 |
| 80 | 795.2 | 30 | 674.9 | 2.78E+04 | 0.02425 | 1.45E+07 |
| 81 | 805.2 | 30 | 658.3 | 2.71E+04 | 0.02431 | 1.48E+07 |
| 82 | 815.2 | 30 | 641.6 | 2.63E+04 | 0.02438 | 1.50E+07 |
| 83 | 825.2 | 30 | 625 | 2.57E+04 | 0.02428 | 1.53E+07 |
| 84 | 835.2 | 30 | 608 | 2.50E+04 | 0.02435 | 1.55E+07 |
| 85 | 845.2 | 30 | 591.6 | 2.42E+04 | 0.0244 | 1.58E+07 |
| 86 | 855.2 | 30 | 575 | 2.30E+04 | 0.02502 | 1.60E+07 |
| 87 | 865.2 | 30 | 558 | 2.21E+04 | 0.02524 | 1.62E+07 |
| 88 | 875.2 | 30 | 541.7 | 2.14E+04 | 0.0253 | 1.64E+07 |
| 89 | 885.2 | 30 | 525 | 2.01E+04 | 0.02607 | 1.66E+07 |
| 90 | 895.2 | 30 | 508.3 | 1.94E+04 | 0.02626 | 1.68E+07 |
| 91 | 905.2 | 30 | 491.7 | 1.82E+04 | 0.02709 | 1.70E+07 |
| 92 | 915.2 | 30 | 475 | 1.73E+04 | 0.02751 | 1.72E+07 |
| 93 | 925.2 | 30 | 458.3 | 1.66E+04 | 0.02764 | 1.74E+07 |
| 94 | 935.2 | 30 | 441.7 | 1.57E+04 | 0.02817 | 1.75E+07 |
| 95 | 945.2 | 30 | 425.1 | 1.48E+04 | 0.02865 | 1.77E+07 |
| 96 | 955.2 | 30 | 408.1 | 1.40E+04 | 0.02908 | 1.78E+07 |
| 97 | 965.2 | 30 | 391.5 | 1.33E+04 | 0.02936 | 1.79E+07 |
| 98 | 975.2 | 30 | 374.8 | 1.26E+04 | 0.02968 | 1.81E+07 |
| 99 | 985.2 | 30 | 358.1 | 1.21E+04 | 0.0295 | 1.82E+07 |
| 100 | 995.2 | 30 | 341.4 | 1.14E+04 | 0.02998 | 1.83E+07 |
| 101 | 1005 | 30 | 324.8 | 1.07E+04 | 0.03034 | 1.84E+07 |
| 102 | 1015 | 30 | 308.2 | 9952 | 0.03097 | 1.85E+07 |
| 103 | 1025 | 30 | 291.5 | 9321 | 0.03128 | 1.86E+07 |
| 104 | 1035 | 30 | 274.9 | 8651 | 0.03177 | 1.87E+07 |
| 105 | 1045 | 30 | 258.2 | 8090 | 0.03192 | 1.88E+07 |
| 106 | 1055 | 30 | 241.8 | 7436 | 0.03251 | 1.88E+07 |
| 107 | 1065 | 30 | 225.1 | 6804 | 0.03308 | 1.89E+07 |
| 108 | 1075 | 30 | 208 | 6207 | 0.03352 | 1.90E+07 |
| 109 | 1085 | 30 | 191.7 | 5665 | 0.03384 | 1.90E+07 |
| 110 | 1095 | 30 | 175 | 5090 | 0.03438 | 1.91E+07 |
| 111 | 1105 | 30 | 158.3 | 4511 | 0.03509 | 1.91E+07 |
| 112 | 1115 | 30 | 141.7 | 3942 | 0.03593 | 1.92E+07 |
| 113 | 1125 | 30 | 124.9 | 3367 | 0.03709 | 1.92E+07 |
| 114 | 1135 | 30 | 108.2 | 2796 | 0.03871 | 1.92E+07 |
| 115 | 1145 | 30 | 91.6 | 2250 | 0.04071 | 1.92E+07 |
| 116 | 1155 | 30 | 74.97 | 1732 | 0.0433 | 1.93E+07 |
| 117 | 1165 | 30 | 58.32 | 1257 | 0.04638 | 1.93E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 118 | 1175 | 30 | 41.63 | 849.4 | 0.04902 | 1.93E+07 |
| 119 | 1185 | 30 | 24.91 | 421.2 | 0.05915 | 1.93E+07 |
| 120 | 1195 | 30 | 8.206 | 65.99 | 0.1244 | 1.93E+07 |

**C2.1.2Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 4.016 | 30 | 6.76 | 4.31E-05 | 1.57E+05 | 0.000266 |
| 2 | 12.04 | 30 | 20.01 | 2.46E-05 | 8.15E+05 | 0.000266 |
| 3 | 20.09 | 30 | 33.4 | 2.27E-05 | 1.47E+06 | 0.000932 |
| 4 | 28.08 | 30 | 46.5 | 1.78E-05 | 2.61E+06 | 0.000799 |
| 5 | 36.04 | 30 | 59.84 | 3.00E-05 | 2.00E+06 | 0.000932 |
| 6 | 44.07 | 30 | 73.18 | 3.44E-05 | 2.13E+06 | 0.001198 |
| 7 | 52.06 | 30 | 86.58 | 2.78E-05 | 3.11E+06 | 0.001598 |
| 8 | 60.03 | 30 | 99.9 | 3.26E-05 | 3.07E+06 | 0.001731 |
| 9 | 68.08 | 30 | 113.2 | 3.19E-05 | 3.55E+06 | 0.002131 |
| 10 | 76.08 | 30 | 126.6 | 3.67E-05 | 3.45E+06 | 0.002264 |
| 11 | 84.05 | 30 | 139.9 | 4.76E-05 | 2.94E+06 | 0.002796 |
| 12 | 92.08 | 30 | 153.3 | 3.52E-05 | 4.35E+06 | 0.002796 |
| 13 | 100.1 | 30 | 166.6 | 5.51E-05 | 3.03E+06 | 0.003462 |
| 14 | 108 | 30 | 179.9 | 4.39E-05 | 4.10E+06 | 0.003728 |
| 15 | 116.1 | 30 | 193.3 | 4.78E-05 | 4.04E+06 | 0.004128 |
| 16 | 124.1 | 30 | 206.6 | 5.94E-05 | 3.48E+06 | 0.004527 |
| 17 | 132 | 30 | 219.9 | 5.10E-05 | 4.31E+06 | 0.005193 |
| 18 | 140.1 | 30 | 233.4 | 7.08E-05 | 3.30E+06 | 0.005459 |
| 19 | 148.1 | 30 | 246.6 | 7.15E-05 | 3.45E+06 | 0.006258 |
| 20 | 156 | 30 | 260 | 7.64E-05 | 3.40E+06 | 0.006658 |
| 21 | 164.1 | 30 | 273.2 | 6.83E-05 | 4.00E+06 | 0.007324 |
| 22 | 172.1 | 30 | 286.6 | 7.11E-05 | 4.03E+06 | 0.008123 |
| 23 | 180.1 | 30 | 299.9 | 8.63E-05 | 3.48E+06 | 0.008522 |
| 24 | 188.1 | 30 | 313.5 | 8.70E-05 | 3.61E+06 | 0.009321 |
| 25 | 196.1 | 30 | 326.5 | 9.25E-05 | 3.53E+06 | 0.009454 |
| 26 | 204 | 30 | 339.8 | 0.000102 | 3.33E+06 | 0.01052 |
| 27 | 212.1 | 30 | 353.4 | 0.000109 | 3.25E+06 | 0.01145 |
| 28 | 220.1 | 30 | 366.5 | 0.000104 | 3.54E+06 | 0.01225 |
| 29 | 228 | 30 | 379.8 | 0.000117 | 3.26E+06 | 0.01278 |
| 30 | 236.1 | 30 | 393.4 | 0.00012 | 3.28E+06 | 0.01398 |
| 31 | 244.1 | 30 | 406.7 | 0.000138 | 2.95E+06 | 0.01478 |
| 32 | 252 | 30 | 420 | 0.000135 | 3.10E+06 | 0.01625 |
| 33 | 260.1 | 30 | 433.3 | 0.000136 | 3.19E+06 | 0.01731 |
| 34 | 268.1 | 30 | 446.4 | 0.000162 | 2.76E+06 | 0.01838 |
| 35 | 276 | 30 | 459.8 | 0.000161 | 2.85E+06 | 0.01971 |
| 36 | 284.1 | 30 | 473.4 | 0.000183 | 2.59E+06 | 0.02117 |
| 37 | 292.1 | 30 | 486.4 | 0.000185 | 2.63E+06 | 0.0229 |
| 38 | 300 | 30 | 500 | 0.000208 | 2.40E+06 | 0.02437 |
| 39 | 308.1 | 30 | 513.2 | 0.00022 | 2.33E+06 | 0.02623 |
| 40 | 316.1 | 30 | 526.5 | 0.000262 | 2.01E+06 | 0.0281 |

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|---|---|---|---|---|---|---|
| 41 | 324 | 30 | 539.8 | 0.000277 | 1.95E+06 | 0.03049 |
| 42 | 332.1 | 30 | 553.4 | 0.000298 | 1.86E+06 | 0.03289 |
| 43 | 340.1 | 30 | 566.7 | 0.000342 | 1.66E+06 | 0.03569 |
| 44 | 348 | 30 | 580 | 0.000391 | 1.49E+06 | 0.03888 |
| 45 | 356.1 | 30 | 593.3 | 0.00046 | 1.29E+06 | 0.04208 |
| 46 | 364.1 | 30 | 606.6 | 0.000537 | 1.13E+06 | 0.047 |
| 47 | 372 | 30 | 619.9 | 0.000639 | 9.71E+05 | 0.0522 |
| 48 | 380.1 | 30 | 633.5 | 0.000851 | 7.45E+05 | 0.05872 |
| 49 | 388.1 | 30 | 646.5 | 0.001196 | 5.40E+05 | 0.06858 |
| 50 | 396 | 30 | 659.8 | 0.002166 | 3.05E+05 | 0.08695 |
| 51 | 404.1 | 30 | 673.4 | 967.6 | 0.696 | 1.02E+04 |
| 52 | 412.1 | 30 | 686.5 | 5602 | 0.1225 | 5.46E+04 |
| 53 | 420 | 30 | 699.9 | 6825 | 0.1025 | 1.09E+05 |
| 54 | 428.1 | 30 | 713.2 | 7238 | 0.09853 | 1.68E+05 |
| 55 | 436.1 | 30 | 726.6 | 7463 | 0.09735 | 2.27E+05 |
| 56 | 444 | 30 | 739.9 | 7735 | 0.09565 | 2.89E+05 |
| 57 | 452.1 | 30 | 753.3 | 8020 | 0.09392 | 3.54E+05 |
| 58 | 460.1 | 30 | 766.6 | 8274 | 0.09265 | 4.19E+05 |
| 59 | 468 | 30 | 779.9 | 8516 | 0.09158 | 4.88E+05 |
| 60 | 476.1 | 30 | 793.3 | 8748 | 0.09068 | 5.58E+05 |
| 61 | 484.2 | 30 | 793.1 | 8793 | 0.0902 | 6.30E+05 |
| 62 | 492.3 | 30 | 779.6 | 8575 | 0.09091 | 6.99E+05 |
| 63 | 500.3 | 30 | 766.6 | 8348 | 0.09182 | 7.65E+05 |
| 64 | 508.2 | 30 | 753 | 8124 | 0.09268 | 8.30E+05 |
| 65 | 516.3 | 30 | 739.6 | 7887 | 0.09378 | 8.93E+05 |
| 66 | 524.3 | 30 | 726.3 | 7659 | 0.09483 | 9.54E+05 |
| 67 | 532.2 | 30 | 713.3 | 7444 | 0.09582 | 1.01E+06 |
| 68 | 540.3 | 30 | 699.6 | 7223 | 0.09686 | 1.07E+06 |
| 69 | 548.3 | 30 | 686.6 | 7015 | 0.09788 | 1.13E+06 |
| 70 | 556.2 | 30 | 673 | 6787 | 0.09916 | 1.18E+06 |
| 71 | 564.3 | 30 | 659.6 | 6568 | 0.1004 | 1.24E+06 |
| 72 | 572.3 | 30 | 646.6 | 6358 | 0.1017 | 1.29E+06 |
| 73 | 580.2 | 30 | 633 | 6146 | 0.103 | 1.33E+06 |
| 74 | 588.3 | 30 | 619.7 | 5933 | 0.1045 | 1.38E+06 |
| 75 | 596.3 | 30 | 606.4 | 5719 | 0.106 | 1.43E+06 |
| 76 | 604.2 | 30 | 593.1 | 5516 | 0.1075 | 1.47E+06 |
| 77 | 612.3 | 30 | 579.8 | 5311 | 0.1092 | 1.51E+06 |
| 78 | 620.3 | 30 | 566.5 | 5120 | 0.1106 | 1.56E+06 |
| 79 | 628.2 | 30 | 553.1 | 4940 | 0.112 | 1.59E+06 |
| 80 | 636.3 | 30 | 539.8 | 4750 | 0.1136 | 1.63E+06 |
| 81 | 644.3 | 30 | 526.5 | 4561 | 0.1154 | 1.67E+06 |
| 82 | 652.2 | 30 | 513.1 | 4386 | 0.117 | 1.70E+06 |
| 83 | 660.3 | 30 | 499.8 | 4213 | 0.1186 | 1.74E+06 |
| 84 | 668.3 | 30 | 486.5 | 4036 | 0.1205 | 1.77E+06 |
| 85 | 676.2 | 30 | 473.1 | 3873 | 0.1222 | 1.80E+06 |
| 86 | 684.3 | 30 | 459.5 | 3705 | 0.124 | 1.83E+06 |
| 87 | 692.3 | 30 | 446.6 | 3551 | 0.1257 | 1.86E+06 |
| 88 | 700.2 | 30 | 433.2 | 3406 | 0.1272 | 1.89E+06 |

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|---|---|---|---|---|---|---|
| 89 | 708.2 | 30 | 419.9 | 3259 | 0.1288 | 1.91E+06 |
| 90 | 716.3 | 30 | 406.5 | 3116 | 0.1305 | 1.94E+06 |
| 91 | 724.2 | 30 | 393.2 | 2963 | 0.1327 | 1.96E+06 |
| 92 | 732.3 | 30 | 379.6 | 2826 | 0.1343 | 1.98E+06 |
| 93 | 740.3 | 30 | 366.6 | 2704 | 0.1356 | 2.01E+06 |
| 94 | 748.2 | 30 | 353.2 | 2575 | 0.1372 | 2.03E+06 |
| 95 | 756.3 | 30 | 339.8 | 2452 | 0.1386 | 2.05E+06 |
| 96 | 764.2 | 30 | 326.5 | 2332 | 0.14 | 2.06E+06 |
| 97 | 772.2 | 30 | 313.2 | 2216 | 0.1413 | 2.08E+06 |
| 98 | 780.3 | 30 | 299.6 | 2098 | 0.1428 | 2.10E+06 |
| 99 | 788.3 | 30 | 286.5 | 1991 | 0.1439 | 2.11E+06 |
| 100 | 796.2 | 30 | 273.2 | 1882 | 0.1452 | 2.13E+06 |
| 101 | 804.3 | 30 | 259.8 | 1773 | 0.1465 | 2.14E+06 |
| 102 | 812.3 | 30 | 246.5 | 1667 | 0.1478 | 2.16E+06 |
| 103 | 820.2 | 30 | 233.1 | 1561 | 0.1493 | 2.17E+06 |
| 104 | 828.3 | 30 | 219.8 | 1459 | 0.1507 | 2.18E+06 |
| 105 | 836.3 | 30 | 206.5 | 1355 | 0.1524 | 2.19E+06 |
| 106 | 844.2 | 30 | 193.2 | 1253 | 0.1542 | 2.20E+06 |
| 107 | 852.3 | 30 | 179.8 | 1151 | 0.1563 | 2.21E+06 |
| 108 | 860.3 | 30 | 166.5 | 1050 | 0.1586 | 2.22E+06 |
| 109 | 868.2 | 30 | 152.9 | 944.8 | 0.1619 | 2.23E+06 |
| 110 | 876.3 | 30 | 139.7 | 841.5 | 0.166 | 2.23E+06 |
| 111 | 884.3 | 30 | 126.4 | 740.2 | 0.1708 | 2.24E+06 |
| 112 | 892.2 | 30 | 113.1 | 639.5 | 0.1769 | 2.24E+06 |
| 113 | 900.2 | 30 | 99.8 | 536.6 | 0.186 | 2.25E+06 |
| 114 | 908.3 | 30 | 86.49 | 433.9 | 0.1993 | 2.25E+06 |
| 115 | 916.2 | 30 | 73.13 | 330 | 0.2216 | 2.26E+06 |
| 116 | 924.2 | 30 | 59.73 | 225.9 | 0.2645 | 2.26E+06 |
| 117 | 932.2 | 30 | 46.35 | 113.5 | 0.4085 | 2.26E+06 |
| 118 | 940.2 | 30 | 33 | 0.1506 | 219.1 | 2.26E+06 |
| 119 | 948.2 | 30 | 19.67 | 0.003082 | 6382 | 2.26E+06 |
| 120 | 956.2 | 30 | 6.324 | -0.00231 | 2733 | 2.26E+06 |

### C2.1.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 3.024 | 30 | 5.102 | -5.18E-06 | 9.85E+05 | -0.01784 |
| 1, 2 | 9.041 | 30 | 14.97 | 5.27E-05 | 2.84E+05 | -0.01704 |
| 1, 3 | 15.03 | 30 | 25 | 5.59E-05 | 4.48E+05 | -0.01718 |
| 1, 4 | 21.04 | 30 | 34.98 | 5.47E-05 | 6.40E+05 | -0.01678 |
| 1, 5 | 27.04 | 30 | 44.98 | 7.46E-05 | 6.03E+05 | -0.01665 |
| 1, 6 | 33.04 | 30 | 54.99 | 0.000103 | 5.37E+05 | -0.01571 |
| 1, 7 | 39.04 | 30 | 64.79 | 0.000113 | 5.75E+05 | -0.01518 |
| 1, 8 | 45.03 | 30 | 74.82 | 6.25E-05 | 1.20E+06 | -0.01505 |
| 1, 9 | 51.04 | 30 | 84.84 | 0.000133 | 6.37E+05 | -0.01438 |
| 1, 10 | 57.04 | 30 | 94.84 | 0.00015 | 6.33E+05 | -0.01292 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 11 | 63.04 | 30 | 104.8 | 0.000125 | 8.41E+05 | -0.01292 |
| 1, 12 | 69.03 | 30 | 114.8 | 0.000109 | 1.05E+06 | -0.01198 |
| 1, 13 | 75.03 | 30 | 124.8 | 0.000127 | 9.81E+05 | -0.01065 |
| 1, 14 | 81.03 | 30 | 134.8 | 0.000157 | 8.58E+05 | -0.00985 |
| 1, 15 | 87.04 | 30 | 145 | 0.000164 | 8.82E+05 | -0.00932 |
| 1, 16 | 93.05 | 30 | 154.8 | 0.000145 | 1.07E+06 | -0.00839 |
| 1, 17 | 99.04 | 30 | 164.8 | 0.000196 | 8.41E+05 | -0.00653 |
| 1, 18 | 105 | 30 | 174.9 | 0.000196 | 8.95E+05 | -0.00546 |
| 1, 19 | 111 | 30 | 184.8 | 0.000206 | 8.97E+05 | -0.00519 |
| 1, 20 | 117 | 30 | 195 | 0.000226 | 8.62E+05 | -0.00293 |
| 1, 21 | 123 | 30 | 205 | 0.000234 | 8.75E+05 | -0.00133 |
| 1, 22 | 129 | 30 | 215 | 0.000228 | 9.41E+05 | -0.0008 |
| 1, 23 | 135 | 30 | 224.9 | 0.000315 | 7.15E+05 | 0.000799 |
| 1, 24 | 141 | 30 | 234.9 | 0.000271 | 8.66E+05 | 0.003196 |
| 1, 25 | 147 | 30 | 244.9 | 0.000254 | 9.63E+05 | 0.004927 |
| 1, 26 | 153 | 29.9 | 254.9 | 0.000327 | 7.79E+05 | 0.005992 |
| 1, 27 | 159 | 30 | 264.8 | 0.000315 | 8.42E+05 | 0.008522 |
| 1, 28 | 165 | 30 | 275.1 | 0.000399 | 6.89E+05 | 0.01185 |
| 1, 29 | 171 | 30 | 285 | 0.000396 | 7.20E+05 | 0.01332 |
| 1, 30 | 177 | 30 | 295 | 0.000381 | 7.73E+05 | 0.01571 |
| 1, 31 | 183 | 30 | 305 | 0.000507 | 6.01E+05 | 0.01997 |
| 1, 32 | 189 | 30 | 314.9 | 0.000537 | 5.87E+05 | 0.0225 |
| 1, 33 | 195 | 30 | 324.9 | 0.000534 | 6.09E+05 | 0.02597 |
| 1, 34 | 201 | 30 | 334.9 | 0.000709 | 4.73E+05 | 0.02969 |
| 1, 35 | 207 | 30 | 344.9 | 0.000787 | 4.38E+05 | 0.03489 |
| 1, 36 | 213 | 30 | 354.9 | 0.000816 | 4.35E+05 | 0.04061 |
| 1, 37 | 219 | 30 | 364.9 | 0.000999 | 3.65E+05 | 0.04554 |
| 1, 38 | 225 | 30 | 374.9 | 0.001464 | 2.56E+05 | 0.05526 |
| 1, 39 | 231 | 30 | 384.9 | 0.2989 | 1288 | 25.61 |
| 1, 40 | 237 | 30 | 394.8 | 1236 | 0.3195 | 8284 |
| 1, 41 | 243 | 30 | 404.8 | 3728 | 0.1086 | 3.08E+04 |
| 1, 42 | 249 | 30 | 414.8 | 4588 | 0.09041 | 5.83E+04 |
| 1, 43 | 255 | 30 | 424.9 | 5137 | 0.08271 | 8.94E+04 |
| 1, 44 | 261 | 30 | 434.9 | 5582 | 0.07791 | 1.23E+05 |
| 1, 45 | 267 | 30 | 444.8 | 5951 | 0.07475 | 1.59E+05 |
| 1, 46 | 273 | 30 | 455 | 6292 | 0.07232 | 1.96E+05 |
| 1, 47 | 279 | 30 | 465 | 6624 | 0.0702 | 2.36E+05 |
| 1, 48 | 285 | 30 | 475 | 6959 | 0.06825 | 2.78E+05 |
| 1, 49 | 291 | 30 | 484.9 | 7264 | 0.06675 | 3.22E+05 |
| 1, 50 | 297 | 30 | 494.9 | 7544 | 0.0656 | 3.67E+05 |
| 1, 51 | 303 | 30 | 504.9 | 7823 | 0.06454 | 4.14E+05 |
| 1, 52 | 309 | 30 | 514.9 | 8077 | 0.06375 | 4.62E+05 |
| 1, 53 | 315 | 30 | 524.9 | 8323 | 0.06306 | 5.12E+05 |
| 1, 54 | 321 | 30 | 534.9 | 8572 | 0.0624 | 5.64E+05 |
| 1, 55 | 327 | 30 | 544.9 | 8829 | 0.06172 | 6.17E+05 |
| 1, 56 | 333 | 30 | 555 | 9086 | 0.06108 | 6.71E+05 |
| 1, 57 | 339 | 30 | 564.9 | 9329 | 0.06056 | 7.27E+05 |
| 1, 58 | 345 | 30 | 574.9 | 9543 | 0.06024 | 7.85E+05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 59 | 351 | 30 | 584.9 | 9767 | 0.05989 | 8.43E+05 |
| 1, 60 | 357 | 30 | 594.9 | 9994 | 0.05952 | 9.03E+05 |
| 1, 61 | 363.1 | 30 | 594.7 | 1.01E+04 | 0.0591 | 9.65E+05 |
| 1, 62 | 369.2 | 30 | 584.7 | 9838 | 0.05943 | 1.02E+06 |
| 1, 63 | 375.2 | 30 | 574.7 | 9586 | 0.05995 | 1.08E+06 |
| 1, 64 | 381.2 | 30 | 564.7 | 9330 | 0.06053 | 1.14E+06 |
| 1, 65 | 387.2 | 30 | 554.8 | 9075 | 0.06113 | 1.19E+06 |
| 1, 66 | 393.2 | 30 | 544.8 | 8842 | 0.06162 | 1.25E+06 |
| 1, 67 | 399.2 | 30 | 534.8 | 8606 | 0.06214 | 1.30E+06 |
| 1, 68 | 405.2 | 30 | 524.8 | 8360 | 0.06278 | 1.35E+06 |
| 1, 69 | 411.2 | 30 | 514.8 | 8116 | 0.06343 | 1.40E+06 |
| 1, 70 | 417.2 | 30 | 504.8 | 7880 | 0.06405 | 1.44E+06 |
| 1, 71 | 423.2 | 30 | 495 | 7656 | 0.06465 | 1.49E+06 |
| 1, 72 | 429.2 | 30 | 484.7 | 7425 | 0.06528 | 1.53E+06 |
| 1, 73 | 435.2 | 30 | 474.8 | 7195 | 0.06599 | 1.58E+06 |
| 1, 74 | 441.2 | 30 | 464.8 | 6978 | 0.06661 | 1.62E+06 |
| 1, 75 | 447.2 | 30 | 454.8 | 6761 | 0.06726 | 1.66E+06 |
| 1, 76 | 453.2 | 30 | 444.8 | 6546 | 0.06795 | 1.70E+06 |
| 1, 77 | 459.2 | 30 | 434.8 | 6334 | 0.06865 | 1.74E+06 |
| 1, 78 | 465.2 | 30 | 424.8 | 6126 | 0.06935 | 1.77E+06 |
| 1, 79 | 471.2 | 30 | 414.8 | 5921 | 0.07007 | 1.81E+06 |
| 1, 80 | 477.2 | 30 | 404.9 | 5721 | 0.07077 | 1.84E+06 |
| 1, 81 | 483.2 | 30 | 394.9 | 5522 | 0.07151 | 1.88E+06 |
| 1, 82 | 489.2 | 30 | 384.9 | 5331 | 0.0722 | 1.91E+06 |
| 1, 83 | 495.2 | 30 | 374.7 | 5140 | 0.07291 | 1.94E+06 |
| 1, 84 | 501.2 | 30 | 364.8 | 4957 | 0.07359 | 1.97E+06 |
| 1, 85 | 507.2 | 30 | 354.9 | 4780 | 0.07424 | 2.00E+06 |
| 1, 86 | 513.2 | 30 | 344.9 | 4609 | 0.07483 | 2.02E+06 |
| 1, 87 | 519.2 | 30 | 334.6 | 4437 | 0.07542 | 2.05E+06 |
| 1, 88 | 525.2 | 30 | 324.8 | 4266 | 0.07613 | 2.08E+06 |
| 1, 89 | 531.2 | 30 | 314.8 | 4099 | 0.0768 | 2.10E+06 |
| 1, 90 | 537.2 | 30 | 304.8 | 3935 | 0.07746 | 2.13E+06 |
| 1, 91 | 543.2 | 30 | 294.8 | 3774 | 0.07811 | 2.15E+06 |
| 1, 92 | 549.2 | 30 | 284.8 | 3613 | 0.07884 | 2.17E+06 |
| 1, 93 | 555.2 | 30 | 274.9 | 3456 | 0.07953 | 2.19E+06 |
| 1, 94 | 561.2 | 30 | 264.9 | 3304 | 0.08016 | 2.21E+06 |
| 1, 95 | 567.2 | 30 | 254.9 | 3155 | 0.08079 | 2.23E+06 |
| 1, 96 | 573.2 | 30 | 244.7 | 3006 | 0.0814 | 2.25E+06 |
| 1, 97 | 579.2 | 30 | 234.7 | 2862 | 0.082 | 2.26E+06 |
| 1, 98 | 585.2 | 30 | 224.7 | 2719 | 0.08264 | 2.28E+06 |
| 1, 99 | 591.2 | 30 | 214.7 | 2578 | 0.08329 | 2.30E+06 |
| 1, 100 | 597.2 | 30 | 204.8 | 2439 | 0.08397 | 2.31E+06 |
| 1, 101 | 603.2 | 30 | 194.8 | 2300 | 0.0847 | 2.32E+06 |
| 1, 102 | 609.2 | 30 | 184.8 | 2162 | 0.08548 | 2.34E+06 |
| 1, 103 | 615.2 | 30 | 174.8 | 2025 | 0.08632 | 2.35E+06 |
| 1, 104 | 621.2 | 30 | 164.8 | 1890 | 0.08722 | 2.36E+06 |
| 1, 105 | 627.2 | 30 | 154.8 | 1756 | 0.08818 | 2.37E+06 |
| 1, 106 | 633.2 | 30 | 144.9 | 1623 | 0.08928 | 2.38E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 107 | 639.2 | 30 | 134.7 | 1486 | 0.09062 | 2.39E+06 |
| 1, 108 | 645.2 | 30 | 124.9 | 1357 | 0.09209 | 2.40E+06 |
| 1, 109 | 651.2 | 30 | 114.7 | 1220 | 0.09399 | 2.41E+06 |
| 1, 110 | 657.2 | 30 | 104.7 | 1087 | 0.09636 | 2.41E+06 |
| 1, 111 | 663.2 | 30 | 94.73 | 952.2 | 0.09948 | 2.42E+06 |
| 1, 112 | 669.2 | 30 | 84.95 | 820.2 | 0.1036 | 2.42E+06 |
| 1, 113 | 675.2 | 30 | 74.94 | 685 | 0.1094 | 2.43E+06 |
| 1, 114 | 681.2 | 30 | 64.91 | 550.4 | 0.1179 | 2.43E+06 |
| 1, 115 | 687.2 | 30 | 54.89 | 416.2 | 0.1319 | 2.43E+06 |
| 1, 116 | 693.2 | 30 | 44.92 | 284 | 0.1582 | 2.43E+06 |
| 1, 117 | 699.2 | 30 | 34.9 | 154.6 | 0.2258 | 2.43E+06 |
| 1, 118 | 705.2 | 30 | 24.86 | 29.04 | 0.8564 | 2.43E+06 |
| 1, 119 | 711.2 | 30 | 14.85 | 2.773 | 5.354 | 2.43E+06 |
| 1, 120 | 717.2 | 30 | 4.84 | -0.00456 | 1061 | 2.43E+06 |

**C2.1.4 Abu treated with 1000PPM PPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.016 | 30 | 8.472 | 3.59E-05 | 2.36E+05 | 0.00506 |
| 2 | 15.03 | 30 | 24.65 | 4.03E-05 | 6.11E+05 | 0.005459 |
| 3 | 25.06 | 30 | 41.71 | 4.71E-05 | 8.85E+05 | 0.005726 |
| 4 | 35.07 | 30 | 58.05 | 6.40E-05 | 9.07E+05 | 0.006258 |
| 5 | 45.04 | 30 | 75.02 | 7.78E-05 | 9.65E+05 | 0.007324 |
| 6 | 55.07 | 30 | 91.63 | 7.32E-05 | 1.25E+06 | 0.007856 |
| 7 | 65.07 | 30 | 108.3 | 9.05E-05 | 1.20E+06 | 0.008922 |
| 8 | 75.03 | 30 | 125 | 9.33E-05 | 1.34E+06 | 0.009587 |
| 9 | 85.07 | 30 | 141.7 | 9.57E-05 | 1.48E+06 | 0.01052 |
| 10 | 95.06 | 30 | 158.1 | 0.000103 | 1.54E+06 | 0.01185 |
| 11 | 105 | 30 | 175 | 0.000127 | 1.38E+06 | 0.01305 |
| 12 | 115.1 | 30 | 191.7 | 0.000112 | 1.71E+06 | 0.01398 |
| 13 | 125.1 | 30 | 208.4 | 0.000151 | 1.38E+06 | 0.01558 |
| 14 | 135 | 30 | 225 | 0.000169 | 1.33E+06 | 0.01651 |
| 15 | 145.1 | 30 | 241.6 | 0.000152 | 1.59E+06 | 0.01918 |
| 16 | 155.1 | 30 | 258.2 | 0.000174 | 1.48E+06 | 0.02091 |
| 17 | 165 | 30 | 274.9 | 0.000203 | 1.35E+06 | 0.02304 |
| 18 | 175.1 | 30 | 291.4 | 0.000215 | 1.36E+06 | 0.0241 |
| 19 | 185.1 | 30 | 308.1 | 0.000207 | 1.49E+06 | 0.02623 |
| 20 | 195 | 30 | 324.7 | 0.000223 | 1.46E+06 | 0.02876 |
| 21 | 205.1 | 30 | 341.7 | 0.000283 | 1.21E+06 | 0.03182 |
| 22 | 215.1 | 30 | 358.1 | 0.000266 | 1.35E+06 | 0.03529 |
| 23 | 225 | 30 | 374.8 | 0.00025 | 1.50E+06 | 0.03755 |
| 24 | 235.1 | 30 | 391.5 | 0.000363 | 1.08E+06 | 0.04115 |
| 25 | 245.1 | 30 | 408.1 | 0.000456 | 8.96E+05 | 0.04461 |
| 26 | 255 | 30 | 424.8 | 0.000411 | 1.03E+06 | 0.0494 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 27 | 265.1 | 30 | 441.7 | 0.000474 | 9.32E+05 | 0.05313 |
| 28 | 275.1 | 30 | 458.1 | 0.000471 | 9.73E+05 | 0.05872 |
| 29 | 285 | 30 | 474.8 | 0.000592 | 8.02E+05 | 0.06352 |
| 30 | 295.1 | 30 | 491.7 | 0.000641 | 7.68E+05 | 0.07204 |
| 31 | 305.1 | 30 | 508.4 | 0.000769 | 6.61E+05 | 0.07923 |
| 32 | 315 | 30 | 525 | 0.00085 | 6.18E+05 | 0.08802 |
| 33 | 325.1 | 30 | 541.7 | 0.001032 | 5.25E+05 | 0.09587 |
| 34 | 335.1 | 30 | 558.3 | 0.001147 | 4.87E+05 | 0.1073 |
| 35 | 345 | 30 | 574.9 | 0.001353 | 4.25E+05 | 0.121 |
| 36 | 355.1 | 30 | 591.5 | 0.001611 | 3.67E+05 | 0.1394 |
| 37 | 365.1 | 30 | 608.2 | 0.002019 | 3.01E+05 | 0.1598 |
| 38 | 375 | 30 | 624.9 | 0.002865 | 2.18E+05 | 0.1879 |
| 39 | 385.1 | 30 | 641.6 | 0.004858 | 1.32E+05 | 0.237 |
| 40 | 395.1 | 30 | 658.3 | 0.04022 | 1.64E+04 | 1.604 |
| 41 | 405 | 30 | 675 | 8939 | 0.07552 | 8.55E+04 |
| 42 | 415.1 | 30 | 691.7 | 1.16E+04 | 0.05946 | 2.02E+05 |
| 43 | 425.1 | 30 | 708.1 | 1.28E+04 | 0.05536 | 3.30E+05 |
| 44 | 435 | 30 | 724.8 | 1.37E+04 | 0.05296 | 4.67E+05 |
| 45 | 445.1 | 30 | 741.5 | 1.45E+04 | 0.0513 | 6.12E+05 |
| 46 | 455.1 | 30 | 758.1 | 1.52E+04 | 0.04996 | 7.63E+05 |
| 47 | 465 | 30 | 774.8 | 1.58E+04 | 0.04902 | 9.22E+05 |
| 48 | 475.1 | 30 | 791.5 | 1.65E+04 | 0.04809 | 1.09E+06 |
| 49 | 485.1 | 30 | 808.1 | 1.71E+04 | 0.04724 | 1.26E+06 |
| 50 | 495 | 30 | 824.8 | 1.78E+04 | 0.04645 | 1.44E+06 |
| 51 | 505.1 | 30 | 841.5 | 1.84E+04 | 0.0458 | 1.62E+06 |
| 52 | 515.1 | 30 | 858.2 | 1.90E+04 | 0.04526 | 1.81E+06 |
| 53 | 525 | 30 | 874.9 | 1.96E+04 | 0.04474 | 2.00E+06 |
| 54 | 535 | 30 | 891.5 | 2.02E+04 | 0.04417 | 2.21E+06 |
| 55 | 545 | 30 | 908.2 | 2.08E+04 | 0.04374 | 2.41E+06 |
| 56 | 555 | 30 | 924.9 | 2.13E+04 | 0.04334 | 2.63E+06 |
| 57 | 565.1 | 30 | 941.5 | 2.19E+04 | 0.04293 | 2.85E+06 |
| 58 | 575.1 | 30 | 958.2 | 2.26E+04 | 0.04248 | 3.07E+06 |
| 59 | 585 | 30 | 974.8 | 2.31E+04 | 0.04215 | 3.30E+06 |
| 60 | 595.1 | 30 | 991.5 | 2.37E+04 | 0.04186 | 3.54E+06 |
| 61 | 605.2 | 30 | 991.5 | 2.39E+04 | 0.04157 | 3.79E+06 |
| 62 | 615.2 | 30 | 974.8 | 2.32E+04 | 0.04202 | 4.02E+06 |
| 63 | 625.2 | 30 | 958.1 | 2.27E+04 | 0.0423 | 4.24E+06 |
| 64 | 635.2 | 30 | 941.5 | 2.21E+04 | 0.04268 | 4.46E+06 |
| 65 | 645.2 | 30 | 924.8 | 2.15E+04 | 0.04297 | 4.68E+06 |
| 66 | 655.2 | 30 | 908.1 | 2.09E+04 | 0.04337 | 4.89E+06 |
| 67 | 665.2 | 30 | 891.4 | 2.04E+04 | 0.04374 | 5.09E+06 |
| 68 | 675.2 | 30 | 875 | 1.98E+04 | 0.04419 | 5.29E+06 |
| 69 | 685.2 | 30 | 858.3 | 1.92E+04 | 0.04469 | 5.48E+06 |
| 70 | 695.2 | 30 | 841.3 | 1.86E+04 | 0.04521 | 5.67E+06 |
| 71 | 705.2 | 30 | 824.9 | 1.81E+04 | 0.04569 | 5.85E+06 |
| 72 | 715.2 | 30 | 808.2 | 1.75E+04 | 0.04614 | 6.02E+06 |
| 73 | 725.2 | 30 | 791.5 | 1.70E+04 | 0.04669 | 6.19E+06 |
| 74 | 735.2 | 30 | 774.8 | 1.64E+04 | 0.04716 | 6.36E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 75 | 745.2 | 30 | 758.1 | 1.59E+04 | 0.04765 | 6.51E+06 |
| 76 | 755.2 | 30 | 741.4 | 1.54E+04 | 0.04816 | 6.67E+06 |
| 77 | 765.2 | 30 | 724.8 | 1.49E+04 | 0.04872 | 6.82E+06 |
| 78 | 775.2 | 30 | 708.4 | 1.44E+04 | 0.0493 | 6.96E+06 |
| 79 | 785.2 | 30 | 691.3 | 1.39E+04 | 0.0499 | 7.10E+06 |
| 80 | 795.2 | 30 | 675 | 1.34E+04 | 0.05049 | 7.23E+06 |
| 81 | 805.2 | 30 | 658.3 | 1.29E+04 | 0.0511 | 7.36E+06 |
| 82 | 815.2 | 30 | 641.6 | 1.24E+04 | 0.05177 | 7.49E+06 |
| 83 | 825.2 | 30 | 624.9 | 1.19E+04 | 0.05244 | 7.60E+06 |
| 84 | 835.2 | 30 | 608.2 | 1.14E+04 | 0.05315 | 7.72E+06 |
| 85 | 845.2 | 30 | 591.5 | 1.10E+04 | 0.05378 | 7.83E+06 |
| 86 | 855.2 | 30 | 574.8 | 1.05E+04 | 0.05458 | 7.93E+06 |
| 87 | 865.2 | 30 | 558.1 | 1.01E+04 | 0.05542 | 8.03E+06 |
| 88 | 875.2 | 30 | 541.5 | 9625 | 0.05626 | 8.13E+06 |
| 89 | 885.2 | 30 | 524.8 | 9190 | 0.05711 | 8.22E+06 |
| 90 | 895.2 | 30 | 508.1 | 8769 | 0.05794 | 8.31E+06 |
| 91 | 905.2 | 30 | 491.5 | 8300 | 0.05921 | 8.39E+06 |
| 92 | 915.2 | 30 | 474.9 | 7816 | 0.06076 | 8.47E+06 |
| 93 | 925.2 | 30 | 458.2 | 7354 | 0.06231 | 8.54E+06 |
| 94 | 935.2 | 30 | 441.5 | 6985 | 0.06321 | 8.61E+06 |
| 95 | 945.2 | 30 | 424.9 | 6610 | 0.06428 | 8.68E+06 |
| 96 | 955.2 | 30 | 408.3 | 6233 | 0.06551 | 8.74E+06 |
| 97 | 965.2 | 30 | 391.4 | 5872 | 0.06665 | 8.80E+06 |
| 98 | 975.2 | 30 | 374.8 | 5530 | 0.06777 | 8.86E+06 |
| 99 | 985.2 | 30 | 358.1 | 5192 | 0.06899 | 8.91E+06 |
| 100 | 995.2 | 30 | 341.5 | 4866 | 0.07017 | 8.96E+06 |
| 101 | 1005 | 30 | 324.9 | 4552 | 0.07137 | 9.00E+06 |
| 102 | 1015 | 30 | 308.2 | 4245 | 0.07259 | 9.05E+06 |
| 103 | 1025 | 30 | 291.5 | 3940 | 0.074 | 9.08E+06 |
| 104 | 1035 | 30 | 274.8 | 3645 | 0.07541 | 9.12E+06 |
| 105 | 1045 | 30 | 258.1 | 3353 | 0.07698 | 9.15E+06 |
| 106 | 1055 | 30 | 241.4 | 3069 | 0.07868 | 9.19E+06 |
| 107 | 1065 | 30 | 224.8 | 2790 | 0.08057 | 9.21E+06 |
| 108 | 1075 | 30 | 208.1 | 2518 | 0.08265 | 9.24E+06 |
| 109 | 1085 | 30 | 191.4 | 2254 | 0.08494 | 9.26E+06 |
| 110 | 1095 | 30 | 175 | 2005 | 0.08728 | 9.28E+06 |
| 111 | 1105 | 30 | 158.3 | 1762 | 0.08982 | 9.30E+06 |
| 112 | 1115 | 30 | 141.6 | 1530 | 0.0925 | 9.31E+06 |
| 113 | 1125 | 30 | 124.9 | 1309 | 0.0954 | 9.33E+06 |
| 114 | 1135 | 30 | 108.2 | 1097 | 0.09864 | 9.34E+06 |
| 115 | 1145 | 30 | 91.51 | 892.3 | 0.1026 | 9.35E+06 |
| 116 | 1155 | 30 | 74.81 | 694.8 | 0.1077 | 9.35E+06 |
| 117 | 1165 | 30 | 58.09 | 503.8 | 0.1153 | 9.36E+06 |
| 118 | 1175 | 30 | 41.39 | 318.5 | 0.13 | 9.36E+06 |
| 119 | 1185 | 30 | 24.77 | 141.5 | 0.175 | 9.36E+06 |
| 120 | 1195 | 30 | 8.083 | 7.711 | 1.048 | 9.36E+06 |

### C2.1.5 Abu treated with 2000 PPMPPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 11.54 | 30 | 519.4 | 9.47E-05 | 5.49E+06 | 0.01505 |
| 2 | 34.56 | 30 | 557.1 | 5.70E-05 | 9.77E+06 | 0.01691 |
| 3 | 57.54 | 30 | 595.3 | 6.97E-05 | 8.54E+06 | 0.01838 |
| 4 | 80.55 | 30 | 634 | 6.68E-05 | 9.49E+06 | 0.01971 |
| 5 | 103.5 | 30 | 672.1 | 8.63E-05 | 7.79E+06 | 0.02104 |
| 6 | 126.5 | 30 | 710.9 | 8.40E-05 | 8.47E+06 | 0.02357 |
| 7 | 149.6 | 30 | 749 | 0.000125 | 5.97E+06 | 0.02636 |
| 8 | 172.6 | 30 | 787 | 0.000168 | 4.69E+06 | 0.02983 |
| 9 | 195.6 | 29.9 | 825.2 | 0.000277 | 2.98E+06 | 0.03675 |
| 10 | 218.6 | 30 | 864.1 | 0.000611 | 1.42E+06 | 0.05153 |
| 11 | 241.6 | 30 | 902.3 | 6062 | 0.1489 | 1.52E+05 |
| 12 | 264.5 | 30 | 940.4 | 1.77E+04 | 0.05308 | 5.59E+05 |
| 13 | 287.5 | 30 | 979.3 | 1.98E+04 | 0.04937 | 1.02E+06 |
| 14 | 310.5 | 30 | 1017 | 2.10E+04 | 0.04844 | 1.50E+06 |
| 15 | 333.5 | 30 | 1056 | 2.20E+04 | 0.04788 | 2.01E+06 |
| 16 | 356.5 | 30 | 1094 | 2.29E+04 | 0.04777 | 2.53E+06 |
| 17 | 379.6 | 30 | 1133 | 2.38E+04 | 0.04758 | 3.08E+06 |
| 18 | 402.6 | 30 | 1171 | 2.48E+04 | 0.0473 | 3.65E+06 |
| 19 | 425.5 | 30 | 1209 | 2.58E+04 | 0.04691 | 4.24E+06 |
| 20 | 448.6 | 30 | 1248 | 2.68E+04 | 0.04662 | 4.86E+06 |
| 21 | 471.6 | 30 | 1286 | 2.78E+04 | 0.04631 | 5.50E+06 |
| 22 | 494.5 | 30 | 1324 | 2.88E+04 | 0.0459 | 6.16E+06 |
| 23 | 517.6 | 30 | 1363 | 3.00E+04 | 0.04547 | 6.85E+06 |
| 24 | 540.6 | 30 | 1401 | 3.11E+04 | 0.04505 | 7.57E+06 |
| 25 | 563.5 | 30 | 1439 | 3.23E+04 | 0.04455 | 8.31E+06 |
| 26 | 586.6 | 30 | 1478 | 3.35E+04 | 0.04409 | 9.08E+06 |
| 27 | 609.6 | 30 | 1516 | 3.49E+04 | 0.04348 | 9.88E+06 |
| 28 | 632.6 | 30 | 1554 | 3.61E+04 | 0.04308 | 1.07E+07 |
| 29 | 655.6 | 30 | 1592 | 3.73E+04 | 0.04265 | 1.16E+07 |
| 30 | 678.6 | 30 | 1631 | 3.87E+04 | 0.04217 | 1.25E+07 |
| 31 | 701.5 | 30 | 1669 | 3.96E+04 | 0.04212 | 1.34E+07 |
| 32 | 724.6 | 30 | 1707 | 4.05E+04 | 0.04219 | 1.43E+07 |
| 33 | 747.6 | 30 | 1746 | 4.15E+04 | 0.04205 | 1.53E+07 |
| 34 | 770.5 | 30 | 1784 | 4.33E+04 | 0.04124 | 1.63E+07 |
| 35 | 793.6 | 30 | 1822 | 4.58E+04 | 0.03981 | 1.73E+07 |
| 36 | 816.6 | 30.1 | 1861 | 4.65E+04 | 0.04003 | 1.84E+07 |
| 37 | 839.5 | 30 | 1899 | 4.95E+04 | 0.03835 | 1.95E+07 |
| 38 | 851 | 30 | 1932 | 5.25E+04 | 0.0368 | 2.06E+07 |

### C2.1.6 Abu untreated with 20% Sertica

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.012 | 30 | 8.304 | 0.000144 | 5.78E+04 | -0.0016 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 15.07 | 30 | 25.01 | 2.48E-05 | 1.01E+06 | -0.0012 |
| 3 | 25.08 | 30 | 41.71 | 2.76E-05 | 1.51E+06 | -0.00107 |
| 4 | 35.04 | 30 | 58.06 | 3.44E-05 | 1.69E+06 | -0.0004 |
| 5 | 45.08 | 30 | 75.06 | 4.09E-05 | 1.84E+06 | -0.00027 |
| 6 | 55.09 | 30 | 91.4 | 4.46E-05 | 2.05E+06 | 0.000266 |
| 7 | 65.05 | 30 | 108.1 | 3.59E-05 | 3.01E+06 | 0.000533 |
| 8 | 75.03 | 30 | 124.7 | 4.79E-05 | 2.60E+06 | 0.001198 |
| 9 | 85.05 | 30 | 141.8 | 6.54E-05 | 2.17E+06 | 0.002264 |
| 10 | 95.05 | 30 | 158 | 7.14E-05 | 2.21E+06 | 0.003063 |
| 11 | 105.1 | 30 | 175 | 4.56E-05 | 3.84E+06 | 0.003063 |
| 12 | 115.1 | 30 | 191.7 | 8.47E-05 | 2.27E+06 | 0.003728 |
| 13 | 125 | 30 | 208.3 | 7.93E-05 | 2.63E+06 | 0.00466 |
| 14 | 135.1 | 30 | 225 | 0.000105 | 2.14E+06 | 0.006125 |
| 15 | 145.1 | 30 | 241.6 | 0.000128 | 1.89E+06 | 0.00759 |
| 16 | 155 | 30 | 258.3 | 0.00016 | 1.61E+06 | 0.008256 |
| 17 | 165.1 | 30 | 275 | 0.000139 | 1.98E+06 | 0.01092 |
| 18 | 175.1 | 30 | 291.6 | 0.000193 | 1.51E+06 | 0.01185 |
| 19 | 185 | 30 | 308.2 | 0.00024 | 1.28E+06 | 0.01531 |
| 20 | 195.1 | 30 | 324.9 | 0.00032 | 1.02E+06 | 0.01691 |
| 21 | 205.1 | 30 | 341.5 | 0.000344 | 9.92E+05 | 0.02091 |
| 22 | 215 | 30 | 358.1 | 0.000375 | 9.54E+05 | 0.0241 |
| 23 | 225.1 | 30 | 375.1 | 0.000524 | 7.16E+05 | 0.03076 |
| 24 | 235.1 | 30 | 391.4 | 0.000623 | 6.28E+05 | 0.03675 |
| 25 | 245 | 30 | 408.1 | 0.000838 | 4.87E+05 | 0.04501 |
| 26 | 255.1 | 30 | 425.1 | 0.001467 | 2.90E+05 | 0.05872 |
| 27 | 265.1 | 30 | 441.4 | 99.89 | 4.419 | 3511 |
| 28 | 275 | 30 | 458 | 1.10E+04 | 0.0417 | 1.13E+05 |
| 29 | 285.1 | 30 | 475 | 1.56E+04 | 0.03039 | 2.70E+05 |
| 30 | 295.1 | 30 | 491.7 | 1.48E+04 | 0.03321 | 4.18E+05 |
| 31 | 305 | 30 | 508 | 1.56E+04 | 0.03261 | 5.74E+05 |
| 32 | 315.1 | 30 | 525 | 1.66E+04 | 0.0317 | 7.41E+05 |
| 33 | 325.1 | 30 | 541.7 | 1.74E+04 | 0.03114 | 9.13E+05 |
| 34 | 335 | 30 | 558.3 | 1.82E+04 | 0.03061 | 1.10E+06 |
| 35 | 345.1 | 30 | 575 | 1.91E+04 | 0.03017 | 1.29E+06 |
| 36 | 355.1 | 30 | 591.4 | 1.98E+04 | 0.02982 | 1.49E+06 |
| 37 | 365 | 30 | 608.1 | 2.06E+04 | 0.02947 | 1.69E+06 |
| 38 | 375.1 | 30 | 624.8 | 2.14E+04 | 0.02919 | 1.91E+06 |
| 39 | 385.1 | 30 | 641.5 | 2.21E+04 | 0.02897 | 2.13E+06 |
| 40 | 395 | 30 | 658.1 | 2.29E+04 | 0.0287 | 2.36E+06 |
| 41 | 405.1 | 30 | 675.1 | 2.37E+04 | 0.02845 | 2.60E+06 |
| 42 | 415.1 | 30 | 691.5 | 2.45E+04 | 0.02824 | 2.84E+06 |
| 43 | 425 | 30 | 708.2 | 2.53E+04 | 0.028 | 3.09E+06 |
| 44 | 435.1 | 30 | 724.9 | 2.60E+04 | 0.02785 | 3.35E+06 |
| 45 | 445.1 | 30 | 741.6 | 2.69E+04 | 0.02757 | 3.62E+06 |
| 46 | 455 | 30 | 758.3 | 2.77E+04 | 0.02736 | 3.90E+06 |
| 47 | 465.1 | 30 | 774.9 | 2.86E+04 | 0.02707 | 4.19E+06 |
| 48 | 475.1 | 30 | 791.6 | 2.96E+04 | 0.02679 | 4.48E+06 |
| 49 | 485 | 30 | 808 | 3.05E+04 | 0.02654 | 4.79E+06 |

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|---|---|---|---|---|---|---|
| 50 | 495.1 | 30 | 825.1 | 3.11E+04 | 0.0265 | 5.10E+06 |
| 51 | 505.1 | 30 | 841.4 | 3.16E+04 | 0.02659 | 5.41E+06 |
| 52 | 515 | 30 | 858.1 | 3.23E+04 | 0.02658 | 5.74E+06 |
| 53 | 525.1 | 30 | 875.1 | 3.31E+04 | 0.02648 | 6.07E+06 |
| 54 | 535.1 | 30 | 891.5 | 3.40E+04 | 0.02619 | 6.41E+06 |
| 55 | 545 | 30 | 908.1 | 3.50E+04 | 0.02599 | 6.76E+06 |
| 56 | 555.1 | 30 | 925.1 | 3.62E+04 | 0.02555 | 7.12E+06 |
| 57 | 565.1 | 30 | 941.4 | 3.77E+04 | 0.02499 | 7.50E+06 |
| 58 | 575 | 30 | 958 | 3.89E+04 | 0.02461 | 7.89E+06 |
| 59 | 585.1 | 30 | 975 | 4.01E+04 | 0.02432 | 8.29E+06 |
| 60 | 595.1 | 30 | 991.7 | 4.10E+04 | 0.02418 | 8.70E+06 |
| 61 | 605.1 | 30 | 991.3 | 4.07E+04 | 0.02437 | 9.11E+06 |
| 62 | 615.2 | 30 | 975 | 3.97E+04 | 0.02454 | 9.51E+06 |
| 63 | 625.2 | 30 | 958.3 | 3.86E+04 | 0.02485 | 9.89E+06 |
| 64 | 635.2 | 30 | 941.7 | 3.74E+04 | 0.02521 | 1.03E+07 |
| 65 | 645.2 | 30 | 925 | 3.62E+04 | 0.02553 | 1.06E+07 |
| 66 | 655.2 | 30 | 908.3 | 3.49E+04 | 0.026 | 1.10E+07 |
| 67 | 665.2 | 30 | 891.7 | 3.37E+04 | 0.02645 | 1.13E+07 |
| 68 | 675.2 | 30 | 875 | 3.25E+04 | 0.02693 | 1.16E+07 |
| 69 | 685.2 | 30 | 858.3 | 3.13E+04 | 0.02745 | 1.20E+07 |
| 70 | 695.2 | 30 | 841.6 | 3.01E+04 | 0.02798 | 1.23E+07 |
| 71 | 705.2 | 30 | 825 | 2.88E+04 | 0.02866 | 1.25E+07 |
| 72 | 715.2 | 30 | 808.3 | 2.76E+04 | 0.02928 | 1.28E+07 |
| 73 | 725.2 | 30 | 791.6 | 2.66E+04 | 0.02981 | 1.31E+07 |
| 74 | 735.2 | 30 | 774.9 | 2.55E+04 | 0.03044 | 1.33E+07 |
| 75 | 745.2 | 30 | 758.2 | 2.44E+04 | 0.03103 | 1.36E+07 |
| 76 | 755.2 | 30 | 741.5 | 2.34E+04 | 0.03167 | 1.38E+07 |
| 77 | 765.2 | 30 | 725.1 | 2.25E+04 | 0.0322 | 1.40E+07 |
| 78 | 775.2 | 30 | 708.4 | 2.17E+04 | 0.03272 | 1.43E+07 |
| 79 | 785.2 | 30 | 691.4 | 2.09E+04 | 0.03315 | 1.45E+07 |
| 80 | 795.2 | 30 | 675.1 | 2.01E+04 | 0.0336 | 1.47E+07 |
| 81 | 805.2 | 30 | 658.1 | 1.94E+04 | 0.03397 | 1.49E+07 |
| 82 | 815.2 | 30 | 641.4 | 1.87E+04 | 0.03433 | 1.50E+07 |
| 83 | 825.2 | 30 | 624.8 | 1.80E+04 | 0.03471 | 1.52E+07 |
| 84 | 835.2 | 30 | 608.2 | 1.73E+04 | 0.0351 | 1.54E+07 |
| 85 | 845.2 | 30 | 591.5 | 1.67E+04 | 0.0355 | 1.56E+07 |
| 86 | 855.2 | 30 | 574.8 | 1.60E+04 | 0.03589 | 1.57E+07 |
| 87 | 865.2 | 30 | 558.2 | 1.54E+04 | 0.03636 | 1.59E+07 |
| 88 | 875.2 | 30 | 541.5 | 1.47E+04 | 0.03685 | 1.60E+07 |
| 89 | 885.2 | 30 | 524.8 | 1.41E+04 | 0.03731 | 1.62E+07 |
| 90 | 895.2 | 30 | 508.2 | 1.35E+04 | 0.03774 | 1.63E+07 |
| 91 | 905.2 | 30 | 491.5 | 1.29E+04 | 0.03811 | 1.64E+07 |
| 92 | 915.2 | 30 | 474.8 | 1.23E+04 | 0.03851 | 1.66E+07 |
| 93 | 925.2 | 30 | 458.1 | 1.18E+04 | 0.03892 | 1.67E+07 |
| 94 | 935.2 | 30 | 441.4 | 1.12E+04 | 0.03927 | 1.68E+07 |
| 95 | 945.2 | 30 | 425.1 | 1.08E+04 | 0.03947 | 1.69E+07 |
| 96 | 955.2 | 30 | 408.4 | 1.03E+04 | 0.03971 | 1.70E+07 |
| 97 | 965.2 | 30 | 391.7 | 9726 | 0.04027 | 1.71E+07 |

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|---|---|---|---|---|---|---|
| 98 | 975.2 | 30 | 375 | 9188 | 0.04082 | 1.72E+07 |
| 99 | 985.2 | 30 | 358.4 | 8779 | 0.04083 | 1.73E+07 |
| 100 | 995.2 | 30 | 341.4 | 8222 | 0.04152 | 1.74E+07 |
| 101 | 1005 | 30 | 325.1 | 7661 | 0.04243 | 1.74E+07 |
| 102 | 1015 | 30 | 308.4 | 7157 | 0.04309 | 1.75E+07 |
| 103 | 1025 | 30 | 291.7 | 6625 | 0.04403 | 1.76E+07 |
| 104 | 1035 | 30 | 275 | 6103 | 0.04507 | 1.76E+07 |
| 105 | 1045 | 30 | 258.3 | 5609 | 0.04605 | 1.77E+07 |
| 106 | 1055 | 30 | 241.6 | 5125 | 0.04714 | 1.77E+07 |
| 107 | 1065 | 30 | 225 | 4641 | 0.04848 | 1.78E+07 |
| 108 | 1075 | 30 | 208 | 4148 | 0.05015 | 1.78E+07 |
| 109 | 1085 | 30 | 191.4 | 3658 | 0.05231 | 1.79E+07 |
| 110 | 1095 | 30 | 175 | 3180 | 0.05502 | 1.79E+07 |
| 111 | 1105 | 30 | 158.3 | 2700 | 0.05863 | 1.79E+07 |
| 112 | 1115 | 30 | 141.6 | 2253 | 0.06287 | 1.79E+07 |
| 113 | 1125 | 30 | 125 | 1858 | 0.06727 | 1.80E+07 |
| 114 | 1135 | 30 | 108.4 | 1511 | 0.07175 | 1.80E+07 |
| 115 | 1145 | 30 | 91.72 | 1199 | 0.07651 | 1.80E+07 |
| 116 | 1155 | 30 | 74.99 | 904.8 | 0.08288 | 1.80E+07 |
| 117 | 1165 | 30 | 58.22 | 624.4 | 0.09323 | 1.80E+07 |
| 118 | 1175 | 30 | 41.52 | 378.8 | 0.1096 | 1.80E+07 |
| 119 | 1185 | 30 | 24.8 | 145.8 | 0.1701 | 1.80E+07 |
| 120 | 1195 | 30 | 8.089 | 2.953 | 2.74 | 1.80E+07 |

**C2.2 (T=35°C)**

**C2.2.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 2.013 | 35 | 3.384 | -0.00016 | 2.18E+04 | 0.01105 |
| 1, 2 | 6.03 | 35 | 9.981 | 3.11E-05 | 3.21E+05 | 0.01105 |
| 1, 3 | 10.05 | 35 | 16.65 | 2.10E-05 | 7.93E+05 | 0.01132 |
| 1, 4 | 14.05 | 35 | 23.23 | 3.03E-05 | 7.66E+05 | 0.01145 |
| 1, 5 | 18.04 | 35 | 29.89 | 6.79E-05 | 4.40E+05 | 0.01158 |
| 1, 6 | 22.06 | 35 | 36.7 | 3.03E-05 | 1.21E+06 | 0.01198 |
| 1, 7 | 26.07 | 35 | 43.36 | 1.78E-05 | 2.44E+06 | 0.01238 |
| 1, 8 | 30.05 | 35 | 50.02 | 4.41E-05 | 1.13E+06 | 0.01225 |
| 1, 9 | 34.06 | 35 | 56.72 | 7.09E-05 | 8.00E+05 | 0.01252 |
| 1, 10 | 38.05 | 35 | 63.27 | 8.26E-05 | 7.66E+05 | 0.01252 |
| 1, 11 | 42.03 | 35 | 69.97 | 1.63E-05 | 4.29E+06 | 0.01345 |
| 1, 12 | 46.06 | 35 | 76.67 | 0.000128 | 5.98E+05 | 0.01332 |
| 1, 13 | 50.06 | 35 | 83.33 | 0.000102 | 8.17E+05 | 0.01412 |
| 1, 14 | 54.04 | 35 | 89.99 | 9.27E-05 | 9.71E+05 | 0.01385 |
| 1, 15 | 58.05 | 35 | 96.61 | 0.000108 | 8.99E+05 | 0.01531 |
| 1, 16 | 62.05 | 35 | 103.3 | 9.40E-05 | 1.10E+06 | 0.01491 |
| 1, 17 | 66.04 | 35 | 109.9 | 0.000113 | 9.77E+05 | 0.01585 |
| 1, 18 | 70.07 | 35 | 116.7 | 0.000169 | 6.91E+05 | 0.01571 |
| 1, 19 | 74.07 | 35 | 123.3 | 0.000193 | 6.40E+05 | 0.01678 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 20 | 78.04 | 35 | 129.9 | 0.000157 | 8.28E+05 | 0.01678 |
| 1, 21 | 82.05 | 35 | 136.6 | 0.000153 | 8.91E+05 | 0.01798 |
| 1, 22 | 86.05 | 35 | 143.3 | 0.000248 | 5.78E+05 | 0.01891 |
| 1, 23 | 90.04 | 35 | 149.9 | 0.000134 | 1.12E+06 | 0.01931 |
| 1, 24 | 94.05 | 35 | 156.7 | 0.000148 | 1.06E+06 | 0.02011 |
| 1, 25 | 98.05 | 35 | 163.3 | 0.000204 | 8.01E+05 | 0.02037 |
| 1, 26 | 102 | 35 | 169.9 | 0.000226 | 7.50E+05 | 0.0225 |
| 1, 27 | 106.1 | 34.9 | 176.7 | 0.000315 | 5.62E+05 | 0.0233 |
| 1, 28 | 110.1 | 35 | 183.3 | 0.000293 | 6.26E+05 | 0.02477 |
| 1, 29 | 114 | 35 | 190 | 0.000398 | 4.78E+05 | 0.02477 |
| 1, 30 | 118 | 35 | 196.7 | 0.000346 | 5.68E+05 | 0.02743 |
| 1, 31 | 122.1 | 35 | 203.2 | 0.000438 | 4.64E+05 | 0.02836 |
| 1, 32 | 126 | 35 | 209.9 | 0.000563 | 3.73E+05 | 0.03143 |
| 1, 33 | 130 | 35 | 216.7 | 0.000666 | 3.25E+05 | 0.03316 |
| 1, 34 | 134 | 35 | 223.2 | 0.000908 | 2.46E+05 | 0.03768 |
| 1, 35 | 138 | 35 | 229.9 | 0.001293 | 1.78E+05 | 0.04221 |
| 1, 36 | 142.1 | 35 | 236.6 | 0.002343 | 1.01E+05 | 0.053 |
| 1, 37 | 146.1 | 35 | 243.3 | 0.3449 | 705.5 | 2.683 |
| 1, 38 | 150 | 35 | 250 | 140.1 | 1.784 | 804.6 |
| 1, 39 | 154.1 | 35 | 256.7 | 2195 | 0.117 | 1.03E+04 |
| 1, 40 | 158.1 | 35 | 263.2 | 5817 | 0.04525 | 3.36E+04 |
| 1, 41 | 162 | 35 | 269.9 | 7833 | 0.03446 | 6.50E+04 |
| 1, 42 | 166.1 | 35 | 276.7 | 9456 | 0.02926 | 1.03E+05 |
| 1, 43 | 170.1 | 35 | 283.3 | 1.05E+04 | 0.02695 | 1.45E+05 |
| 1, 44 | 174 | 35 | 289.9 | 1.13E+04 | 0.02567 | 1.90E+05 |
| 1, 45 | 178 | 35 | 296.7 | 1.20E+04 | 0.02474 | 2.39E+05 |
| 1, 46 | 182 | 35 | 303.3 | 1.27E+04 | 0.02392 | 2.89E+05 |
| 1, 47 | 186 | 35 | 310 | 1.33E+04 | 0.02323 | 3.42E+05 |
| 1, 48 | 190 | 35 | 316.6 | 1.40E+04 | 0.0226 | 3.99E+05 |
| 1, 49 | 194 | 35 | 323.3 | 1.47E+04 | 0.02206 | 4.57E+05 |
| 1, 50 | 198.1 | 35 | 330.1 | 1.53E+04 | 0.0216 | 5.20E+05 |
| 1, 51 | 202.1 | 35 | 336.6 | 1.58E+04 | 0.02125 | 5.82E+05 |
| 1, 52 | 206.1 | 35 | 343.3 | 1.64E+04 | 0.02092 | 6.48E+05 |
| 1, 53 | 210 | 35 | 350 | 1.70E+04 | 0.0206 | 7.16E+05 |
| 1, 54 | 214.1 | 35 | 356.7 | 1.75E+04 | 0.02033 | 7.86E+05 |
| 1, 55 | 218.1 | 35 | 363.3 | 1.81E+04 | 0.02009 | 8.58E+05 |
| 1, 56 | 222 | 35 | 369.9 | 1.86E+04 | 0.0199 | 9.33E+05 |
| 1, 57 | 226 | 35 | 376.7 | 1.91E+04 | 0.01971 | 1.01E+06 |
| 1, 58 | 230.1 | 35 | 383.4 | 1.96E+04 | 0.01954 | 1.09E+06 |
| 1, 59 | 234 | 35 | 390 | 2.01E+04 | 0.01939 | 1.17E+06 |
| 1, 60 | 238.1 | 35 | 396.6 | 2.06E+04 | 0.01925 | 1.25E+06 |
| 1, 61 | 242.2 | 35 | 396.4 | 2.10E+04 | 0.01888 | 1.34E+06 |
| 1, 62 | 246.2 | 35 | 389.9 | 2.09E+04 | 0.01864 | 1.42E+06 |
| 1, 63 | 250.2 | 35 | 383.2 | 2.06E+04 | 0.01859 | 1.50E+06 |
| 1, 64 | 254.2 | 35 | 376.3 | 2.02E+04 | 0.01861 | 1.59E+06 |
| 1, 65 | 258.2 | 35 | 369.8 | 1.98E+04 | 0.01868 | 1.66E+06 |
| 1, 66 | 262.2 | 35 | 363.1 | 1.94E+04 | 0.01877 | 1.74E+06 |
| 1, 67 | 266.2 | 35 | 356.3 | 1.89E+04 | 0.01888 | 1.82E+06 |

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|---|---|---|---|---|---|---|
| 1, 68 | 270.2 | 35 | 349.8 | 1.84E+04 | 0.01901 | 1.89E+06 |
| 1, 69 | 274.2 | 35 | 343.1 | 1.79E+04 | 0.01914 | 1.96E+06 |
| 1, 70 | 278.2 | 35 | 336.3 | 1.75E+04 | 0.01927 | 2.03E+06 |
| 1, 71 | 282.2 | 35 | 329.8 | 1.69E+04 | 0.01948 | 2.10E+06 |
| 1, 72 | 286.2 | 35 | 323.1 | 1.65E+04 | 0.01964 | 2.17E+06 |
| 1, 73 | 290.2 | 35 | 316.4 | 1.59E+04 | 0.01984 | 2.23E+06 |
| 1, 74 | 294.2 | 35 | 309.7 | 1.55E+04 | 0.02003 | 2.29E+06 |
| 1, 75 | 298.2 | 35 | 303.2 | 1.50E+04 | 0.02024 | 2.35E+06 |
| 1, 76 | 302.2 | 35 | 296.4 | 1.45E+04 | 0.02048 | 2.41E+06 |
| 1, 77 | 306.2 | 35 | 289.8 | 1.40E+04 | 0.02071 | 2.46E+06 |
| 1, 78 | 310.2 | 35 | 283.1 | 1.35E+04 | 0.02097 | 2.52E+06 |
| 1, 79 | 314.2 | 35 | 276.3 | 1.30E+04 | 0.02127 | 2.57E+06 |
| 1, 80 | 318.2 | 35 | 269.8 | 1.25E+04 | 0.02153 | 2.62E+06 |
| 1, 81 | 322.2 | 35 | 263.1 | 1.21E+04 | 0.02184 | 2.67E+06 |
| 1, 82 | 326.2 | 35 | 256.3 | 1.16E+04 | 0.02216 | 2.72E+06 |
| 1, 83 | 330.2 | 35 | 249.8 | 1.11E+04 | 0.02251 | 2.76E+06 |
| 1, 84 | 334.2 | 35 | 243.2 | 1.06E+04 | 0.02288 | 2.80E+06 |
| 1, 85 | 338.2 | 35 | 236.3 | 1.02E+04 | 0.02329 | 2.84E+06 |
| 1, 86 | 342.2 | 35 | 229.8 | 9694 | 0.02371 | 2.88E+06 |
| 1, 87 | 346.2 | 35 | 223.1 | 9235 | 0.02416 | 2.92E+06 |
| 1, 88 | 350.2 | 35 | 216.4 | 8795 | 0.02461 | 2.95E+06 |
| 1, 89 | 354.2 | 35 | 209.8 | 8363 | 0.02508 | 2.99E+06 |
| 1, 90 | 358.2 | 35 | 203.1 | 7946 | 0.02556 | 3.02E+06 |
| 1, 91 | 362.2 | 35 | 196.3 | 7536 | 0.02605 | 3.05E+06 |
| 1, 92 | 366.2 | 35 | 189.8 | 7164 | 0.02649 | 3.08E+06 |
| 1, 93 | 370.2 | 35 | 183.1 | 6798 | 0.02694 | 3.10E+06 |
| 1, 94 | 374.2 | 35 | 176.4 | 6458 | 0.02732 | 3.13E+06 |
| 1, 95 | 378.2 | 35 | 169.8 | 6123 | 0.02773 | 3.15E+06 |
| 1, 96 | 382.2 | 35 | 163.1 | 5793 | 0.02815 | 3.18E+06 |
| 1, 97 | 386.2 | 35 | 156.3 | 5474 | 0.02855 | 3.20E+06 |
| 1, 98 | 390.2 | 35 | 149.8 | 5175 | 0.02894 | 3.22E+06 |
| 1, 99 | 394.2 | 35 | 143.1 | 4879 | 0.02932 | 3.24E+06 |
| 1, 100 | 398.2 | 35 | 136.4 | 4591 | 0.02971 | 3.26E+06 |
| 1, 101 | 402.2 | 35 | 129.8 | 4305 | 0.03014 | 3.27E+06 |
| 1, 102 | 406.2 | 35 | 123.2 | 4032 | 0.03056 | 3.29E+06 |
| 1, 103 | 410.2 | 35 | 116.3 | 3744 | 0.03106 | 3.31E+06 |
| 1, 104 | 414.2 | 35 | 109.8 | 3480 | 0.03154 | 3.32E+06 |
| 1, 105 | 418.2 | 35 | 103.1 | 3214 | 0.03207 | 3.33E+06 |
| 1, 106 | 422.2 | 35 | 96.3 | 2949 | 0.03266 | 3.34E+06 |
| 1, 107 | 426.2 | 35 | 89.83 | 2698 | 0.0333 | 3.36E+06 |
| 1, 108 | 430.2 | 35 | 83.19 | 2444 | 0.03404 | 3.37E+06 |
| 1, 109 | 434.2 | 35 | 76.37 | 2186 | 0.03494 | 3.37E+06 |
| 1, 110 | 438.2 | 35 | 69.82 | 1940 | 0.036 | 3.38E+06 |
| 1, 111 | 442.2 | 35 | 63.24 | 1694 | 0.03732 | 3.39E+06 |
| 1, 112 | 446.2 | 35 | 56.3 | 1438 | 0.03915 | 3.39E+06 |
| 1, 113 | 450.2 | 35 | 49.91 | 1210 | 0.04126 | 3.40E+06 |
| 1, 114 | 454.2 | 35 | 43.22 | 979.5 | 0.04413 | 3.40E+06 |
| 1, 115 | 458.2 | 35 | 36.4 | 758.7 | 0.04798 | 3.41E+06 |

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|---|---|---|---|---|---|---|
| 1, 116 | 462.2 | 35 | 29.86 | 559.7 | 0.05334 | 3.41E+06 |
| 1, 117 | 466.2 | 35 | 23.14 | 373.6 | 0.06193 | 3.41E+06 |
| 1, 118 | 470.2 | 35 | 16.45 | 206.8 | 0.07951 | 3.41E+06 |
| 1, 119 | 474.2 | 35 | 9.859 | 66.25 | 0.1488 | 3.41E+06 |
| 1, 120 | 478.2 | 35 | 3.151 | 1.479 | 2.131 | 3.41E+06 |

### C2.2.2 Abu treated with 500PPM ROA

| Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|
| 1.265 | 35 | 2.091 | -0.00035 | 5994 | 0.01225 |
| 3.815 | 35 | 6.346 | 0.000315 | 2.01E+04 | 0.01292 |
| 6.317 | 35 | 10.37 | 0.000502 | 2.06E+04 | 0.01451 |
| 8.783 | 35 | 14.55 | 0.000314 | 4.63E+04 | 0.01558 |
| 11.31 | 35 | 18.82 | 0.00038 | 4.96E+04 | 0.01638 |
| 13.81 | 35 | 22.91 | 0.000337 | 6.80E+04 | 0.01665 |
| 16.28 | 35 | 27.01 | 0.000544 | 4.97E+04 | 0.01798 |
| 18.82 | 35 | 31.29 | 0.000481 | 6.50E+04 | 0.01957 |
| 21.33 | 35 | 35.39 | 0.000496 | 7.13E+04 | 0.02104 |
| 23.8 | 35.1 | 39.56 | 0.000432 | 9.17E+04 | 0.02277 |
| 26.32 | 35 | 43.85 | 0.000761 | 5.76E+04 | 0.02383 |
| 28.82 | 35.1 | 47.9 | 0.000567 | 8.44E+04 | 0.02517 |
| 31.28 | 35 | 52.01 | 0.000725 | 7.18E+04 | 0.02676 |
| 33.81 | 35 | 56.29 | 0.000845 | 6.66E+04 | 0.02996 |
| 36.32 | 35 | 60.38 | 0.000829 | 7.28E+04 | 0.03103 |
| 38.79 | 35 | 64.56 | 0.000815 | 7.92E+04 | 0.03409 |
| 41.32 | 35 | 68.82 | 0.001293 | 5.32E+04 | 0.03662 |
| 43.83 | 35 | 72.91 | 0.001158 | 6.29E+04 | 0.03941 |
| 46.29 | 35 | 77.09 | 0.001181 | 6.53E+04 | 0.04301 |
| 48.81 | 35 | 81.33 | 0.001417 | 5.74E+04 | 0.0458 |
| 51.31 | 35 | 85.4 | 0.001884 | 4.53E+04 | 0.05033 |
| 53.78 | 35 | 89.51 | 0.00185 | 4.84E+04 | 0.05619 |
| 56.31 | 35 | 93.81 | 0.002197 | 4.27E+04 | 0.06072 |
| 58.81 | 35 | 97.87 | 0.002933 | 3.34E+04 | 0.06831 |
| 61.29 | 35 | 102.1 | 0.004227 | 2.42E+04 | 0.0783 |
| 63.82 | 35 | 106.3 | 2.793 | 38.08 | 45.2 |
| 66.32 | 35 | 110.4 | 549 | 0.2011 | 1484 |
| 68.79 | 35 | 114.6 | 1590 | 0.07208 | 5600 |
| 71.33 | 35 | 118.9 | 2635 | 0.04512 | 1.24E+04 |
| 73.82 | 35 | 122.9 | 3136 | 0.03919 | 2.00E+04 |
| 76.28 | 35 | 127 | 3414 | 0.03722 | 2.85E+04 |
| 78.82 | 35 | 131.4 | 3614 | 0.03636 | 3.78E+04 |
| 81.33 | 35 | 135.4 | 3772 | 0.03589 | 4.70E+04 |
| 83.79 | 35 | 139.6 | 3932 | 0.03549 | 5.69E+04 |
| 86.33 | 35 | 143.8 | 4094 | 0.03513 | 6.75E+04 |
| 88.82 | 35 | 147.9 | 4249 | 0.03481 | 7.78E+04 |
| 91.28 | 35.1 | 152.1 | 4413 | 0.03446 | 8.88E+04 |
| 93.82 | 35 | 156.3 | 4582 | 0.03412 | 1.01E+05 |

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|---|---|---|---|---|---|
| 96.31 | 35 | 160.4 | 4746 | 0.03379 | 1.12E+05 |
| 98.78 | 35 | 164.6 | 4915 | 0.03348 | 1.25E+05 |
| 101.3 | 35 | 168.8 | 5089 | 0.03317 | 1.38E+05 |
| 103.8 | 35 | 172.9 | 5258 | 0.03288 | 1.50E+05 |
| 106.3 | 35 | 177.1 | 5429 | 0.03261 | 1.64E+05 |
| 108.8 | 35 | 181.4 | 5602 | 0.03238 | 1.78E+05 |
| 111.3 | 35 | 185.4 | 5767 | 0.03215 | 1.92E+05 |
| 113.8 | 35 | 189.6 | 5949 | 0.03187 | 2.07E+05 |
| 116.3 | 35 | 193.8 | 6123 | 0.03166 | 2.23E+05 |
| 118.8 | 35 | 197.8 | 6295 | 0.03143 | 2.38E+05 |
| 121.3 | 35 | 202 | 6479 | 0.03118 | 2.55E+05 |
| 123.8 | 35 | 206.4 | 6654 | 0.03101 | 2.72E+05 |
| 126.3 | 35 | 210.4 | 6817 | 0.03087 | 2.88E+05 |
| 128.8 | 35 | 214.5 | 7001 | 0.03064 | 3.06E+05 |
| 131.3 | 35 | 218.9 | 7186 | 0.03046 | 3.24E+05 |
| 133.8 | 35 | 222.9 | 7372 | 0.03023 | 3.42E+05 |
| 136.3 | 35 | 227 | 7563 | 0.03002 | 3.61E+05 |
| 138.8 | 35 | 231.3 | 7759 | 0.02981 | 3.81E+05 |
| 141.3 | 35 | 235.4 | 7939 | 0.02965 | 4.00E+05 |
| 143.8 | 35 | 239.6 | 8124 | 0.02949 | 4.21E+05 |
| 146.3 | 34.9 | 243.8 | 8333 | 0.02926 | 4.42E+05 |
| 148.8 | 34.9 | 247.9 | 8518 | 0.0291 | 4.63E+05 |
| 151.4 | 34.9 | 247.7 | 8666 | 0.02858 | 4.86E+05 |
| 153.9 | 34.9 | 243.6 | 8617 | 0.02827 | 5.07E+05 |
| 156.4 | 34.9 | 239.4 | 8503 | 0.02816 | 5.28E+05 |
| 158.9 | 34.9 | 235.2 | 8343 | 0.02819 | 5.50E+05 |
| 161.4 | 35 | 231.1 | 8190 | 0.02822 | 5.70E+05 |
| 163.9 | 35 | 226.9 | 8031 | 0.02825 | 5.90E+05 |
| 166.4 | 35 | 222.6 | 7859 | 0.02833 | 6.10E+05 |
| 168.9 | 35 | 218.6 | 7703 | 0.02837 | 6.28E+05 |
| 171.4 | 35 | 214.5 | 7550 | 0.02841 | 6.47E+05 |
| 173.9 | 35 | 210.2 | 7380 | 0.02848 | 6.66E+05 |
| 176.4 | 34.9 | 206.1 | 7217 | 0.02856 | 6.84E+05 |
| 178.9 | 35 | 201.9 | 7051 | 0.02864 | 7.01E+05 |
| 181.4 | 35 | 197.7 | 6876 | 0.02875 | 7.19E+05 |
| 183.9 | 35 | 193.6 | 6699 | 0.0289 | 7.35E+05 |
| 186.4 | 35 | 189.4 | 6530 | 0.029 | 7.52E+05 |
| 188.9 | 35 | 185.2 | 6358 | 0.02912 | 7.68E+05 |
| 191.4 | 35 | 181.1 | 6186 | 0.02928 | 7.83E+05 |
| 193.9 | 35 | 176.9 | 6015 | 0.02941 | 7.98E+05 |
| 196.4 | 35 | 172.7 | 5828 | 0.02963 | 8.13E+05 |
| 198.9 | 34.9 | 168.6 | 5663 | 0.02977 | 8.27E+05 |
| 201.4 | 35 | 164.4 | 5478 | 0.03002 | 8.40E+05 |
| 203.9 | 35 | 160.2 | 5301 | 0.03022 | 8.54E+05 |
| 206.4 | 35 | 156.1 | 5122 | 0.03048 | 8.66E+05 |
| 208.9 | 35 | 151.9 | 4944 | 0.03072 | 8.79E+05 |
| 211.4 | 35 | 147.6 | 4758 | 0.03102 | 8.91E+05 |
| 213.9 | 35 | 143.6 | 4584 | 0.03133 | 9.02E+05 |

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|---|---|---|---|---|---|
| 216.4 | 35 | 139.4 | 4405 | 0.03164 | 9.13E+05 |
| 218.9 | 35 | 135.1 | 4223 | 0.032 | 9.24E+05 |
| 221.4 | 35 | 131.1 | 4055 | 0.03234 | 9.34E+05 |
| 223.9 | 35 | 127 | 3879 | 0.03273 | 9.43E+05 |
| 226.4 | 35 | 122.7 | 3707 | 0.0331 | 9.53E+05 |
| 228.9 | 35 | 118.6 | 3542 | 0.03349 | 9.62E+05 |
| 231.4 | 35 | 114.5 | 3375 | 0.03392 | 9.70E+05 |
| 233.9 | 35 | 110.1 | 3204 | 0.03437 | 9.78E+05 |
| 236.4 | 35 | 106.1 | 3048 | 0.03482 | 9.86E+05 |
| 238.9 | 34.9 | 102 | 2887 | 0.03531 | 9.93E+05 |
| 241.4 | 35 | 97.71 | 2726 | 0.03584 | 1.00E+06 |
| 243.9 | 35 | 93.56 | 2571 | 0.03639 | 1.01E+06 |
| 246.4 | 35 | 89.41 | 2418 | 0.03697 | 1.01E+06 |
| 248.9 | 35 | 85.19 | 2266 | 0.03759 | 1.02E+06 |
| 251.4 | 35 | 81.11 | 2121 | 0.03824 | 1.02E+06 |
| 253.9 | 35 | 76.93 | 1975 | 0.03895 | 1.03E+06 |
| 256.4 | 35 | 72.73 | 1830 | 0.03974 | 1.03E+06 |
| 258.9 | 35 | 68.62 | 1691 | 0.04058 | 1.04E+06 |
| 261.4 | 34.9 | 64.45 | 1552 | 0.04152 | 1.04E+06 |
| 263.9 | 34.9 | 60.2 | 1414 | 0.04259 | 1.04E+06 |
| 266.4 | 35 | 56.15 | 1281 | 0.04382 | 1.05E+06 |
| 268.9 | 35 | 51.97 | 1149 | 0.04523 | 1.05E+06 |
| 271.4 | 35 | 47.69 | 1017 | 0.04691 | 1.05E+06 |
| 273.9 | 35 | 43.58 | 894.1 | 0.04874 | 1.06E+06 |
| 276.4 | 35 | 39.47 | 775.2 | 0.05092 | 1.06E+06 |
| 278.9 | 35 | 35.2 | 657.4 | 0.05355 | 1.06E+06 |
| 281.4 | 35 | 31.1 | 549 | 0.05665 | 1.06E+06 |
| 283.9 | 35 | 26.9 | 442.6 | 0.06078 | 1.06E+06 |
| 286.4 | 35 | 22.72 | 340.4 | 0.06674 | 1.06E+06 |
| 288.9 | 35 | 18.58 | 245.4 | 0.07573 | 1.06E+06 |
| 291.4 | 35 | 14.45 | 156.1 | 0.09252 | 1.06E+06 |
| 293.9 | 35 | 10.17 | 70.97 | 0.1433 | 1.06E+06 |
| 296.4 | 35 | 6.059 | 9.108 | 0.6652 | 1.06E+06 |
| 298.9 | 35 | 1.967 | -0.02744 | 71.69 | 1.06E+06 |

### C2.2.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 2.014 | 35 | 3.347 | -0.0002 | 1.65E+04 | -0.01172 |
| 2 | 6.033 | 35 | 9.935 | 0.000359 | 2.77E+04 | -0.01092 |
| 3 | 10.06 | 35 | 16.63 | 0.000444 | 3.75E+04 | -0.00892 |
| 4 | 14.06 | 35 | 23.33 | 0.000666 | 3.50E+04 | -0.00666 |
| 5 | 18.04 | 35 | 29.86 | 0.000849 | 3.52E+04 | -0.00226 |
| 6 | 22.07 | 35 | 36.68 | 0.001706 | 2.15E+04 | 0.003329 |
| 7 | 26.07 | 35 | 43.34 | 0.004426 | 9793 | 0.0225 |
| 8 | 30.04 | 35 | 49.99 | 0.01658 | 3015 | 0.09001 |
| 9 | 34.08 | 35 | 56.8 | 0.0698 | 813.8 | 0.5169 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | 38.07 | 35 | 63.32 | 84.83 | 0.7464 | 343.4 |
| 11 | 42.04 | 35 | 70 | 207.3 | 0.3377 | 1261 |
| 12 | 46.08 | 35 | 76.7 | 830.7 | 0.09233 | 4682 |
| 13 | 50.08 | 35 | 83.25 | 1351 | 0.06164 | 1.01E+04 |
| 14 | 54.04 | 35 | 89.93 | 1684 | 0.05341 | 1.68E+04 |
| 15 | 58.06 | 35 | 96.73 | 1957 | 0.04942 | 2.48E+04 |
| 16 | 62.07 | 35 | 103.3 | 2199 | 0.047 | 3.35E+04 |
| 17 | 66.04 | 35 | 110 | 2431 | 0.04524 | 4.32E+04 |
| 18 | 70.06 | 35 | 116.6 | 2659 | 0.04386 | 5.40E+04 |
| 19 | 74.07 | 35 | 123.3 | 2883 | 0.04277 | 6.55E+04 |
| 20 | 78.05 | 35 | 130 | 3103 | 0.04189 | 7.78E+04 |
| 21 | 82.07 | 35 | 136.8 | 3324 | 0.04115 | 9.14E+04 |
| 22 | 86.06 | 35 | 143.3 | 3536 | 0.04052 | 1.05E+05 |
| 23 | 90.03 | 35 | 149.9 | 3754 | 0.03994 | 1.20E+05 |
| 24 | 94.06 | 35 | 156.7 | 3978 | 0.03939 | 1.37E+05 |
| 25 | 98.07 | 35 | 163.3 | 4201 | 0.03888 | 1.53E+05 |
| 26 | 102 | 35 | 170 | 4430 | 0.03838 | 1.71E+05 |
| 27 | 106.1 | 35 | 176.7 | 4662 | 0.0379 | 1.90E+05 |
| 28 | 110.1 | 35 | 183.3 | 4888 | 0.03751 | 2.09E+05 |
| 29 | 114 | 35 | 190 | 5122 | 0.03709 | 2.30E+05 |
| 30 | 118.1 | 35 | 196.6 | 5355 | 0.03672 | 2.51E+05 |
| 31 | 122.1 | 35 | 203.3 | 5601 | 0.0363 | 2.74E+05 |
| 32 | 126 | 35 | 209.9 | 5840 | 0.03595 | 2.97E+05 |
| 33 | 130.1 | 35 | 216.8 | 6093 | 0.03557 | 3.22E+05 |
| 34 | 134.1 | 34.9 | 223.3 | 6323 | 0.03531 | 3.47E+05 |
| 35 | 138 | 35 | 229.9 | 6569 | 0.035 | 3.73E+05 |
| 36 | 142.1 | 35 | 236.7 | 6818 | 0.03472 | 4.00E+05 |
| 37 | 146.1 | 35 | 243.3 | 7078 | 0.03437 | 4.29E+05 |
| 38 | 150 | 35 | 249.9 | 7359 | 0.03396 | 4.58E+05 |
| 39 | 154.1 | 35 | 256.7 | 7629 | 0.03365 | 4.89E+05 |
| 40 | 158.1 | 35 | 263.2 | 7903 | 0.03331 | 5.20E+05 |
| 41 | 162 | 35 | 269.9 | 8177 | 0.03301 | 5.53E+05 |
| 42 | 166.1 | 35 | 276.7 | 8459 | 0.03271 | 5.87E+05 |
| 43 | 170.1 | 35 | 283.3 | 8731 | 0.03245 | 6.22E+05 |
| 44 | 174 | 35 | 290 | 9013 | 0.03217 | 6.58E+05 |
| 45 | 178.1 | 35 | 296.7 | 9306 | 0.03189 | 6.95E+05 |
| 46 | 182.1 | 35 | 303.2 | 9574 | 0.03167 | 7.33E+05 |
| 47 | 186 | 35 | 309.9 | 9848 | 0.03147 | 7.73E+05 |
| 48 | 190.1 | 35 | 316.7 | 1.01E+04 | 0.03123 | 8.14E+05 |
| 49 | 194.1 | 35 | 323.2 | 1.04E+04 | 0.03104 | 8.55E+05 |
| 50 | 198 | 35 | 329.9 | 1.07E+04 | 0.03076 | 8.98E+05 |
| 51 | 202.1 | 35 | 336.7 | 1.10E+04 | 0.03059 | 9.43E+05 |
| 52 | 206.1 | 35 | 343.2 | 1.12E+04 | 0.03058 | 9.87E+05 |
| 53 | 210 | 35 | 349.9 | 1.15E+04 | 0.03053 | 1.03E+06 |
| 54 | 214.1 | 35 | 356.7 | 1.17E+04 | 0.03044 | 1.08E+06 |
| 55 | 218.1 | 35 | 363.2 | 1.20E+04 | 0.03033 | 1.13E+06 |
| 56 | 222 | 35 | 370 | 1.23E+04 | 0.03014 | 1.18E+06 |
| 57 | 226.1 | 35 | 376.7 | 1.26E+04 | 0.03 | 1.23E+06 |

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|---|---|---|---|---|---|---|
| 58 | 230.1 | 35 | 383.2 | 1.28E+04 | 0.02998 | 1.28E+06 |
| 59 | 234 | 35 | 390 | 1.31E+04 | 0.02984 | 1.33E+06 |
| 60 | 238.1 | 35 | 396.7 | 1.34E+04 | 0.02973 | 1.39E+06 |
| 61 | 242.2 | 35 | 396.2 | 1.35E+04 | 0.0293 | 1.44E+06 |
| 62 | 246.3 | 35 | 389.7 | 1.34E+04 | 0.02918 | 1.49E+06 |
| 63 | 250.2 | 35 | 383 | 1.31E+04 | 0.02923 | 1.55E+06 |
| 64 | 254.2 | 35 | 376.4 | 1.28E+04 | 0.02938 | 1.60E+06 |
| 65 | 258.2 | 35 | 369.7 | 1.25E+04 | 0.02949 | 1.65E+06 |
| 66 | 262.2 | 35 | 363 | 1.23E+04 | 0.02956 | 1.70E+06 |
| 67 | 266.3 | 35 | 356.2 | 1.20E+04 | 0.02963 | 1.75E+06 |
| 68 | 270.2 | 35 | 349.7 | 1.18E+04 | 0.02974 | 1.79E+06 |
| 69 | 274.2 | 35 | 343.1 | 1.15E+04 | 0.02989 | 1.84E+06 |
| 70 | 278.3 | 35 | 336.2 | 1.12E+04 | 0.03002 | 1.88E+06 |
| 71 | 282.3 | 35 | 329.7 | 1.09E+04 | 0.03014 | 1.93E+06 |
| 72 | 286.2 | 35 | 323.1 | 1.07E+04 | 0.03016 | 1.97E+06 |
| 73 | 290.2 | 35 | 316.2 | 1.04E+04 | 0.03037 | 2.01E+06 |
| 74 | 294.2 | 35 | 309.8 | 1.01E+04 | 0.03055 | 2.05E+06 |
| 75 | 298.2 | 35 | 303.1 | 9862 | 0.03073 | 2.09E+06 |
| 76 | 302.3 | 35 | 296.3 | 9571 | 0.03096 | 2.13E+06 |
| 77 | 306.3 | 35 | 289.8 | 9298 | 0.03116 | 2.17E+06 |
| 78 | 310.2 | 35 | 283.1 | 9026 | 0.03137 | 2.20E+06 |
| 79 | 314.2 | 35 | 276.3 | 8744 | 0.0316 | 2.24E+06 |
| 80 | 318.2 | 35 | 269.8 | 8469 | 0.03185 | 2.27E+06 |
| 81 | 322.2 | 35 | 263.1 | 8198 | 0.03209 | 2.30E+06 |
| 82 | 326.2 | 35 | 256.3 | 7915 | 0.03238 | 2.34E+06 |
| 83 | 330.3 | 35 | 249.8 | 7639 | 0.0327 | 2.37E+06 |
| 84 | 334.2 | 35 | 243.1 | 7365 | 0.03301 | 2.40E+06 |
| 85 | 338.2 | 35 | 236.3 | 7081 | 0.03338 | 2.42E+06 |
| 86 | 342.2 | 35 | 229.8 | 6816 | 0.03371 | 2.45E+06 |
| 87 | 346.2 | 35 | 223.1 | 6542 | 0.0341 | 2.48E+06 |
| 88 | 350.2 | 35 | 216.3 | 6258 | 0.03456 | 2.50E+06 |
| 89 | 354.2 | 35 | 209.8 | 5994 | 0.03499 | 2.53E+06 |
| 90 | 358.2 | 35 | 203.1 | 5725 | 0.03547 | 2.55E+06 |
| 91 | 362.3 | 35 | 196.3 | 5458 | 0.03596 | 2.57E+06 |
| 92 | 366.3 | 35 | 189.7 | 5213 | 0.0364 | 2.59E+06 |
| 93 | 370.2 | 35 | 183 | 4959 | 0.03691 | 2.61E+06 |
| 94 | 374.2 | 35 | 176.4 | 4712 | 0.03743 | 2.63E+06 |
| 95 | 378.3 | 35 | 169.7 | 4466 | 0.038 | 2.65E+06 |
| 96 | 382.2 | 35 | 163.1 | 4226 | 0.03858 | 2.67E+06 |
| 97 | 386.3 | 35 | 156.3 | 3988 | 0.03918 | 2.68E+06 |
| 98 | 390.3 | 35 | 149.7 | 3768 | 0.03974 | 2.70E+06 |
| 99 | 394.2 | 35 | 143.1 | 3546 | 0.04035 | 2.71E+06 |
| 100 | 398.2 | 35 | 136.4 | 3324 | 0.04103 | 2.72E+06 |
| 101 | 402.2 | 35 | 129.8 | 3111 | 0.04172 | 2.74E+06 |
| 102 | 406.2 | 35 | 123.1 | 2897 | 0.04249 | 2.75E+06 |
| 103 | 410.2 | 35 | 116.3 | 2685 | 0.04332 | 2.76E+06 |
| 104 | 414.2 | 35 | 109.7 | 2482 | 0.04419 | 2.77E+06 |
| 105 | 418.2 | 35 | 103 | 2284 | 0.04512 | 2.78E+06 |

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|---|---|---|---|---|---|---|
| 106 | 422.2 | 35 | 96.37 | 2089 | 0.04614 | 2.79E+06 |
| 107 | 426.3 | 35 | 89.69 | 1898 | 0.04727 | 2.79E+06 |
| 108 | 430.2 | 35 | 83.15 | 1715 | 0.04847 | 2.80E+06 |
| 109 | 434.3 | 35 | 76.3 | 1531 | 0.04984 | 2.81E+06 |
| 110 | 438.2 | 35 | 69.76 | 1360 | 0.05131 | 2.81E+06 |
| 111 | 442.2 | 35 | 63.08 | 1191 | 0.05298 | 2.82E+06 |
| 112 | 446.2 | 35 | 56.27 | 1024 | 0.05495 | 2.82E+06 |
| 113 | 450.2 | 35 | 49.73 | 867.9 | 0.0573 | 2.82E+06 |
| 114 | 454.2 | 35 | 43.09 | 714 | 0.06034 | 2.83E+06 |
| 115 | 458.3 | 35 | 36.3 | 562.9 | 0.06449 | 2.83E+06 |
| 116 | 462.3 | 35 | 29.78 | 422 | 0.07058 | 2.83E+06 |
| 117 | 466.2 | 35 | 23.12 | 283.5 | 0.08154 | 2.83E+06 |
| 118 | 470.2 | 35 | 16.3 | 149.4 | 0.1091 | 2.83E+06 |
| 119 | 474.2 | 35 | 9.756 | 34.1 | 0.2861 | 2.83E+06 |
| 120 | 478.2 | 35 | 3.178 | 0.04875 | 65.19 | 2.83E+06 |

**C2.2.4 Abu treated with 1000PPM PPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas |
|---|---|---|---|---|---|
| 1 | 5.016 | 35 | 8.378 | 0.0001429 | 5.86E+04 |
| 2 | 15.04 | 35 | 24.79 | 6.64E-05 | 3.73E+05 |
| 3 | 25.07 | 35 | 41.48 | 5.30E-05 | 7.83E+05 |
| 4 | 35.06 | 35 | 58.13 | 8.07E-05 | 7.20E+05 |
| 5 | 45.03 | 35 | 74.8 | 6.44E-05 | 1.16E+06 |
| 6 | 55.06 | 35 | 91.45 | 3.17E-05 | 2.89E+06 |
| 7 | 65.06 | 35 | 108.1 | 8.90E-05 | 1.21E+06 |
| 8 | 75.09 | 35 | 125.1 | 0.0001156 | 1.08E+06 |
| 9 | 85.11 | 35 | 141.4 | 0.0001286 | 1.10E+06 |
| 10 | 95.05 | 35 | 158.1 | 0.0001706 | 9.27E+05 |
| 11 | 105 | 35 | 175.1 | 0.0001857 | 9.43E+05 |
| 12 | 115.1 | 35 | 191.6 | 0.0001763 | 1.09E+06 |
| 13 | 125 | 35 | 208.2 | 0.0001784 | 1.17E+06 |
| 14 | 135 | 34.9 | 224.8 | 0.0002455 | 9.16E+05 |
| 15 | 145.1 | 35 | 241.5 | 0.0002193 | 1.10E+06 |
| 16 | 155.1 | 34.9 | 258.1 | 0.0002774 | 9.30E+05 |
| 17 | 165 | 35 | 275 | 0.0002749 | 1.00E+06 |
| 18 | 175.1 | 34.9 | 291.7 | 0.0003253 | 8.97E+05 |
| 19 | 185.1 | 35 | 308.3 | 0.000368 | 8.38E+05 |
| 20 | 195 | 35 | 325 | 0.0004354 | 7.46E+05 |
| 21 | 205.1 | 35 | 341.6 | 0.0004326 | 7.90E+05 |
| 22 | 215.1 | 35 | 358.3 | 0.0004572 | 7.84E+05 |
| 23 | 225 | 35 | 374.9 | 0.0004972 | 7.54E+05 |
| 24 | 235.1 | 35 | 391.6 | 0.0005304 | 7.38E+05 |
| 25 | 245 | 35 | 408.2 | 0.0006126 | 6.66E+05 |
| 26 | 255 | 34.9 | 424.9 | 0.0006354 | 6.69E+05 |
| 27 | 265.1 | 35 | 441.6 | 0.0007398 | 5.97E+05 |
| 28 | 275.1 | 35 | 458 | 0.0007194 | 6.37E+05 |

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|---|---|---|---|---|---|
| 29 | 285 | 35 | 474.7 | 0.0008286 | 5.73E+05 |
| 30 | 295 | 35 | 491.4 | 0.0008582 | 5.73E+05 |
| 31 | 305.1 | 35 | 508.1 | 0.001008 | 5.04E+05 |
| 32 | 315 | 35 | 524.8 | 0.001095 | 4.79E+05 |
| 33 | 325 | 35 | 541.5 | 0.001259 | 4.30E+05 |
| 34 | 335.1 | 35 | 558.3 | 0.001421 | 3.93E+05 |
| 35 | 345 | 35 | 575 | 0.001741 | 3.30E+05 |
| 36 | 355.1 | 35 | 591.6 | 0.002122 | 2.79E+05 |
| 37 | 365.1 | 35 | 608.3 | 0.002815 | 2.16E+05 |
| 38 | 375.1 | 35 | 625 | 0.004508 | 1.39E+05 |
| 39 | 385.1 | 35 | 641.7 | 0.009354 | 6.86E+04 |
| 40 | 395 | 35 | 658 | 9966 | 0.06603 |
| 41 | 405 | 35 | 674.7 | 3.31E+04 | 0.02039 |
| 42 | 415 | 35 | 691.4 | 3.95E+04 | 0.01751 |
| 43 | 425 | 35 | 708.1 | 4.12E+04 | 0.0172 |
| 44 | 435.1 | 35 | 725 | 4.18E+04 | 0.01733 |
| 45 | 445.1 | 35 | 741.7 | 4.28E+04 | 0.01733 |
| 46 | 455 | 35 | 758 | 4.37E+04 | 0.01735 |
| 47 | 465.1 | 35 | 775 | 4.45E+04 | 0.0174 |
| 48 | 475.1 | 35 | 791.7 | 4.47E+04 | 0.01773 |
| 49 | 485.1 | 35 | 808.3 | 4.33E+04 | 0.01865 |
| 50 | 495.1 | 35 | 824.9 | 4.36E+04 | 0.01891 |
| 51 | 505.1 | 35 | 841.6 | 4.19E+04 | 0.0201 |
| 52 | 515.1 | 35 | 858.3 | 4.24E+04 | 0.02024 |
| 53 | 525.1 | 35 | 875 | 4.35E+04 | 0.02012 |
| 54 | 535.1 | 35 | 891.6 | 4.62E+04 | 0.01929 |
| 55 | 545 | 35 | 908.3 | 4.78E+04 | 0.01902 |
| 56 | 555.1 | 35 | 925 | 4.84E+04 | 0.0191 |
| 57 | 565.1 | 35 | 941.7 | 4.92E+04 | 0.01913 |
| 58 | 575 | 35 | 958 | 5.00E+04 | 0.01916 |
| 59 | 585.1 | 35 | 975.1 | 5.09E+04 | 0.01917 |
| 60 | 595.1 | 35 | 991.4 | 5.16E+04 | 0.01921 |
| 61 | 605.1 | 35 | 991.6 | 5.20E+04 | 0.01908 |
| 62 | 615.2 | 35 | 974.9 | 5.17E+04 | 0.01887 |
| 63 | 625.2 | 35 | 958.1 | 5.11E+04 | 0.01874 |
| 64 | 635.2 | 35 | 941.4 | 5.00E+04 | 0.01884 |
| 65 | 645.2 | 35 | 925.1 | 4.92E+04 | 0.01881 |
| 66 | 655.2 | 35 | 908.4 | 4.84E+04 | 0.01878 |
| 67 | 665.2 | 35 | 891.4 | 4.76E+04 | 0.01872 |
| 68 | 675.2 | 35 | 875 | 4.68E+04 | 0.0187 |
| 69 | 685.2 | 35 | 858.3 | 4.59E+04 | 0.0187 |
| 70 | 695.2 | 35 | 841.6 | 4.50E+04 | 0.0187 |
| 71 | 705.2 | 35 | 824.9 | 4.41E+04 | 0.0187 |
| 72 | 715.2 | 35 | 808.2 | 4.32E+04 | 0.01873 |
| 73 | 725.2 | 35 | 791.5 | 4.22E+04 | 0.01877 |
| 74 | 735.2 | 35 | 774.9 | 4.12E+04 | 0.0188 |
| 75 | 745.2 | 35 | 758.2 | 4.02E+04 | 0.01885 |
| 76 | 755.2 | 35 | 741.4 | 3.92E+04 | 0.01891 |

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|---|---|---|---|---|---|
| 77 | 765.2 | 35 | 725.1 | 3.82E+04 | 0.01897 |
| 78 | 775.2 | 35 | 708.4 | 3.72E+04 | 0.01905 |
| 79 | 785.2 | 35 | 691.4 | 3.61E+04 | 0.01913 |
| 80 | 795.2 | 35 | 674.7 | 3.51E+04 | 0.01921 |
| 81 | 805.2 | 35 | 658.1 | 3.41E+04 | 0.01929 |
| 82 | 815.2 | 35 | 641.5 | 3.31E+04 | 0.0194 |
| 83 | 825.2 | 35 | 624.9 | 3.20E+04 | 0.01951 |
| 84 | 835.2 | 35 | 608.2 | 3.10E+04 | 0.01963 |
| 85 | 845.2 | 35 | 591.5 | 2.99E+04 | 0.01978 |
| 86 | 855.2 | 35 | 574.9 | 2.88E+04 | 0.01994 |
| 87 | 865.2 | 35 | 558.2 | 2.78E+04 | 0.02012 |
| 88 | 875.2 | 35 | 541.5 | 2.67E+04 | 0.02029 |
| 89 | 885.2 | 35 | 524.9 | 2.57E+04 | 0.02046 |
| 90 | 895.2 | 35 | 508.2 | 2.46E+04 | 0.02066 |
| 91 | 905.2 | 35 | 491.5 | 2.36E+04 | 0.02085 |
| 92 | 915.2 | 35 | 474.9 | 2.25E+04 | 0.02107 |
| 93 | 925.2 | 35 | 458.3 | 2.15E+04 | 0.02131 |
| 94 | 935.2 | 35 | 441.6 | 2.05E+04 | 0.0216 |
| 95 | 945.2 | 35 | 425 | 1.94E+04 | 0.02192 |
| 96 | 955.2 | 35 | 408.3 | 1.83E+04 | 0.02231 |
| 97 | 965.2 | 35 | 391.3 | 1.73E+04 | 0.02269 |
| 98 | 975.2 | 35 | 375 | 1.62E+04 | 0.02312 |
| 99 | 985.2 | 35 | 358.4 | 1.52E+04 | 0.02354 |
| 100 | 995.2 | 35 | 341.7 | 1.43E+04 | 0.02397 |
| 101 | 1005 | 35 | 325 | 1.33E+04 | 0.0244 |
| 102 | 1015 | 35 | 308.3 | 1.24E+04 | 0.02483 |
| 103 | 1025 | 35 | 291.7 | 1.15E+04 | 0.02533 |
| 104 | 1035 | 35 | 275 | 1.06E+04 | 0.02586 |
| 105 | 1045 | 35 | 258.3 | 9776 | 0.02642 |
| 106 | 1055 | 35 | 241.6 | 8953 | 0.02699 |
| 107 | 1065 | 35 | 224.9 | 8157 | 0.02758 |
| 108 | 1075 | 35 | 208.3 | 7383 | 0.02822 |
| 109 | 1085 | 35 | 191.7 | 6638 | 0.02887 |
| 110 | 1095 | 35 | 175 | 5926 | 0.02953 |
| 111 | 1105 | 35 | 158.3 | 5230 | 0.03028 |
| 112 | 1115 | 35 | 141.7 | 4562 | 0.03105 |
| 113 | 1125 | 35 | 125 | 3917 | 0.03191 |
| 114 | 1135 | 35 | 108.3 | 3282 | 0.033 |
| 115 | 1145 | 35 | 91.6 | 2648 | 0.0346 |
| 116 | 1155 | 35 | 74.96 | 2032 | 0.03689 |
| 117 | 1165 | 35 | 58.25 | 1458 | 0.03994 |
| 118 | 1175 | 35 | 41.58 | 938.9 | 0.04428 |
| 119 | 1185 | 35 | 24.87 | 477.3 | 0.05211 |
| 120 | 1195 | 35 | 8.156 | 86.67 | 0.09411 |

**C2.2.5 Abu treated with 2000 PPMPPD**

| | Time s | Temperature °C | Shear Stress | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|

| | | | Pa | | | |
|---|---|---|---|---|---|---|
| 1 | 5.054 | 35 | 8.503 | -6.31E-05 | 1.35E+05 | 0.000932 |
| 2 | 15.07 | 35 | 24.69 | 4.31E-05 | 5.73E+05 | 0.001731 |
| 3 | 25.03 | 35 | 41.39 | 4.39E-05 | 9.44E+05 | 0.002131 |
| 4 | 35.07 | 35 | 58.44 | 5.30E-05 | 1.10E+06 | 0.002663 |
| 5 | 45.08 | 35 | 74.77 | 6.91E-05 | 1.08E+06 | 0.003728 |
| 6 | 55.04 | 35 | 91.43 | 0.000103 | 8.90E+05 | 0.004527 |
| 7 | 65.08 | 35 | 108.5 | 0.000105 | 1.03E+06 | 0.004794 |
| 8 | 75.08 | 35 | 124.8 | 8.11E-05 | 1.54E+06 | 0.006258 |
| 9 | 85.03 | 34.9 | 141.4 | 0.000122 | 1.16E+06 | 0.006525 |
| 10 | 95.08 | 35 | 158.1 | 0.000161 | 9.80E+05 | 0.009188 |
| 11 | 105.1 | 35 | 174.8 | 0.00015 | 1.17E+06 | 0.01065 |
| 12 | 115 | 35 | 191.5 | 0.000125 | 1.53E+06 | 0.01225 |
| 13 | 125.1 | 35 | 208.5 | 0.000167 | 1.25E+06 | 0.01238 |
| 14 | 135.1 | 35 | 224.8 | 0.000166 | 1.36E+06 | 0.01425 |
| 15 | 145 | 35 | 241.4 | 0.000201 | 1.20E+06 | 0.01651 |
| 16 | 155.1 | 35 | 258.4 | 0.000242 | 1.07E+06 | 0.02011 |
| 17 | 165.1 | 35 | 274.8 | 0.000225 | 1.22E+06 | 0.02264 |
| 18 | 175 | 35 | 291.4 | 0.000246 | 1.19E+06 | 0.02503 |
| 19 | 185.1 | 35 | 308.4 | 0.000271 | 1.14E+06 | 0.0273 |
| 20 | 195.1 | 35 | 324.8 | 0.000353 | 9.20E+05 | 0.03023 |
| 21 | 205 | 35 | 341.4 | 0.000399 | 8.56E+05 | 0.03449 |
| 22 | 215.1 | 35 | 358.4 | 0.000401 | 8.93E+05 | 0.03782 |
| 23 | 225.1 | 35 | 374.7 | 0.000445 | 8.42E+05 | 0.04274 |
| 24 | 235 | 35 | 391.4 | 0.000491 | 7.97E+05 | 0.047 |
| 25 | 245.1 | 35 | 408.2 | 0.000592 | 6.90E+05 | 0.05433 |
| 26 | 255.1 | 35 | 424.8 | 0.000649 | 6.54E+05 | 0.06032 |
| 27 | 265 | 35 | 441.5 | 0.000673 | 6.56E+05 | 0.06751 |
| 28 | 275.1 | 35 | 458.1 | 0.000819 | 5.59E+05 | 0.07377 |
| 29 | 285.1 | 35 | 474.9 | 0.000979 | 4.85E+05 | 0.08269 |
| 30 | 295 | 35 | 491.5 | 0.001141 | 4.31E+05 | 0.09414 |
| 31 | 305.1 | 35 | 508.2 | 0.001272 | 4.00E+05 | 0.1085 |
| 32 | 315.1 | 35 | 524.9 | 0.001513 | 3.47E+05 | 0.1241 |
| 33 | 325 | 35 | 541.5 | 0.001897 | 2.86E+05 | 0.1433 |
| 34 | 335.1 | 35 | 558.5 | 0.002665 | 2.10E+05 | 0.1703 |
| 35 | 345.1 | 35 | 574.7 | 0.004129 | 1.39E+05 | 0.2114 |
| 36 | 355 | 35 | 591.5 | 29.17 | 20.27 | 2634 |
| 37 | 365.1 | 35 | 608.5 | 1.84E+04 | 0.03316 | 1.84E+05 |
| 38 | 375.1 | 35 | 624.8 | 2.60E+04 | 0.02408 | 4.41E+05 |
| 39 | 385 | 35 | 641.5 | 2.84E+04 | 0.02258 | 7.25E+05 |
| 40 | 395.1 | 35 | 658.2 | 3.01E+04 | 0.0219 | 1.03E+06 |
| 41 | 405.1 | 35 | 674.9 | 3.14E+04 | 0.0215 | 1.34E+06 |
| 42 | 415 | 35 | 691.6 | 3.26E+04 | 0.02125 | 1.67E+06 |
| 43 | 425.1 | 35 | 708.2 | 3.36E+04 | 0.02108 | 2.00E+06 |
| 44 | 435.1 | 35 | 724.9 | 3.45E+04 | 0.02103 | 2.35E+06 |
| 45 | 445 | 35 | 741.5 | 3.53E+04 | 0.02101 | 2.70E+06 |
| 46 | 455.1 | 35 | 758.2 | 3.62E+04 | 0.02095 | 3.06E+06 |

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|---|---|---|---|---|---|---|
| 47 | 465.1 | 35 | 774.9 | 3.70E+04 | 0.02097 | 3.43E+06 |
| 48 | 475 | 35 | 791.6 | 3.77E+04 | 0.02102 | 3.81E+06 |
| 49 | 485.1 | 35 | 808.3 | 3.83E+04 | 0.02111 | 4.19E+06 |
| 50 | 495.1 | 35 | 824.9 | 3.90E+04 | 0.02117 | 4.58E+06 |
| 51 | 505 | 35 | 841.5 | 3.96E+04 | 0.02123 | 4.98E+06 |
| 52 | 515.1 | 35 | 858.5 | 4.03E+04 | 0.02132 | 5.38E+06 |
| 53 | 525.1 | 35 | 874.8 | 4.09E+04 | 0.0214 | 5.79E+06 |
| 54 | 535 | 35 | 891.4 | 4.15E+04 | 0.02147 | 6.20E+06 |
| 55 | 545.1 | 35 | 908.1 | 4.21E+04 | 0.02156 | 6.63E+06 |
| 56 | 555.1 | 35 | 924.9 | 4.27E+04 | 0.02164 | 7.05E+06 |
| 57 | 565 | 35 | 941.5 | 4.34E+04 | 0.02172 | 7.49E+06 |
| 58 | 575.1 | 35 | 958.2 | 4.40E+04 | 0.02179 | 7.93E+06 |
| 59 | 585.1 | 35 | 974.9 | 4.46E+04 | 0.02185 | 8.37E+06 |
| 60 | 595 | 35 | 991.5 | 4.53E+04 | 0.02191 | 8.82E+06 |
| 61 | 605.1 | 35 | 991.5 | 4.55E+04 | 0.02179 | 9.28E+06 |
| 62 | 615.1 | 35 | 974.9 | 4.49E+04 | 0.02172 | 9.73E+06 |
| 63 | 625.2 | 35 | 958.2 | 4.41E+04 | 0.02173 | 1.02E+07 |
| 64 | 635.2 | 35 | 941.8 | 4.33E+04 | 0.02176 | 1.06E+07 |
| 65 | 645.2 | 35 | 924.8 | 4.24E+04 | 0.02182 | 1.10E+07 |
| 66 | 655.2 | 35 | 908.1 | 4.15E+04 | 0.02188 | 1.15E+07 |
| 67 | 665.2 | 35 | 891.5 | 4.06E+04 | 0.02196 | 1.19E+07 |
| 68 | 675.1 | 35 | 875.1 | 3.97E+04 | 0.02206 | 1.23E+07 |
| 69 | 685.2 | 35 | 858 | 3.88E+04 | 0.02212 | 1.26E+07 |
| 70 | 695.2 | 35 | 841.7 | 3.79E+04 | 0.02224 | 1.30E+07 |
| 71 | 705.1 | 35 | 825 | 3.69E+04 | 0.02235 | 1.34E+07 |
| 72 | 715.2 | 35 | 808.4 | 3.60E+04 | 0.02249 | 1.37E+07 |
| 73 | 725.2 | 35 | 791.7 | 3.50E+04 | 0.0226 | 1.41E+07 |
| 74 | 735.2 | 35 | 775 | 3.41E+04 | 0.02272 | 1.44E+07 |
| 75 | 745.2 | 35 | 758.3 | 3.32E+04 | 0.02284 | 1.48E+07 |
| 76 | 755.2 | 35 | 741.7 | 3.21E+04 | 0.02308 | 1.51E+07 |
| 77 | 765.2 | 35 | 725 | 3.11E+04 | 0.02328 | 1.54E+07 |
| 78 | 775.2 | 35 | 708.4 | 3.01E+04 | 0.0235 | 1.57E+07 |
| 79 | 785.2 | 35 | 691.7 | 2.92E+04 | 0.02371 | 1.60E+07 |
| 80 | 795.1 | 35 | 675.1 | 2.82E+04 | 0.02395 | 1.63E+07 |
| 81 | 805.2 | 35 | 658.1 | 2.72E+04 | 0.0242 | 1.65E+07 |
| 82 | 815.2 | 35 | 641.7 | 2.62E+04 | 0.02447 | 1.68E+07 |
| 83 | 825.1 | 35 | 625 | 2.53E+04 | 0.02473 | 1.71E+07 |
| 84 | 835.2 | 35 | 608.3 | 2.43E+04 | 0.02508 | 1.73E+07 |
| 85 | 845.2 | 35 | 591.7 | 2.33E+04 | 0.02545 | 1.75E+07 |
| 86 | 855.2 | 35 | 575 | 2.23E+04 | 0.02583 | 1.78E+07 |
| 87 | 865.2 | 35 | 558.1 | 2.13E+04 | 0.0262 | 1.80E+07 |
| 88 | 875.2 | 35 | 541.5 | 2.04E+04 | 0.02658 | 1.82E+07 |
| 89 | 885.2 | 35 | 524.9 | 1.94E+04 | 0.02706 | 1.84E+07 |
| 90 | 895.2 | 35 | 508.2 | 1.85E+04 | 0.02753 | 1.86E+07 |
| 91 | 905.2 | 35 | 491.6 | 1.75E+04 | 0.02805 | 1.87E+07 |
| 92 | 915.1 | 35 | 474.9 | 1.67E+04 | 0.02854 | 1.89E+07 |
| 93 | 925.2 | 35 | 458.3 | 1.58E+04 | 0.02906 | 1.91E+07 |
| 94 | 935.2 | 35 | 441.7 | 1.49E+04 | 0.02962 | 1.92E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 95 | 945.2 | 35 | 425 | 1.41E+04 | 0.03016 | 1.93E+07 |
| 96 | 955.2 | 35 | 408.3 | 1.33E+04 | 0.03068 | 1.95E+07 |
| 97 | 965.2 | 35 | 391.6 | 1.26E+04 | 0.03121 | 1.96E+07 |
| 98 | 975.2 | 35 | 374.9 | 1.18E+04 | 0.03179 | 1.97E+07 |
| 99 | 985.2 | 34.9 | 358.2 | 1.11E+04 | 0.0324 | 1.98E+07 |
| 100 | 995.2 | 35 | 341.6 | 1.04E+04 | 0.03301 | 1.99E+07 |
| 101 | 1005 | 35 | 324.9 | 9681 | 0.03356 | 2.00E+07 |
| 102 | 1015 | 35 | 308.3 | 9015 | 0.0342 | 2.01E+07 |
| 103 | 1025 | 35 | 291.6 | 8352 | 0.03491 | 2.02E+07 |
| 104 | 1035 | 35 | 274.9 | 7709 | 0.03566 | 2.03E+07 |
| 105 | 1045 | 35 | 258.2 | 7090 | 0.03642 | 2.04E+07 |
| 106 | 1055 | 35 | 241.5 | 6481 | 0.03727 | 2.04E+07 |
| 107 | 1065 | 35 | 224.8 | 5903 | 0.03809 | 2.05E+07 |
| 108 | 1075 | 35 | 208.2 | 5317 | 0.03915 | 2.05E+07 |
| 109 | 1085 | 35 | 191.6 | 4777 | 0.0401 | 2.06E+07 |
| 110 | 1095 | 35 | 174.9 | 4252 | 0.04113 | 2.06E+07 |
| 111 | 1105 | 35 | 158.2 | 3740 | 0.04231 | 2.07E+07 |
| 112 | 1115 | 35 | 141.5 | 3235 | 0.04375 | 2.07E+07 |
| 113 | 1125 | 35 | 124.9 | 2739 | 0.04559 | 2.07E+07 |
| 114 | 1135 | 35 | 108.3 | 2255 | 0.04804 | 2.07E+07 |
| 115 | 1145 | 35 | 91.7 | 1792 | 0.05118 | 2.08E+07 |
| 116 | 1155 | 35 | 75.05 | 1363 | 0.05508 | 2.08E+07 |
| 117 | 1165 | 35 | 58.41 | 970.4 | 0.06019 | 2.08E+07 |
| 118 | 1175 | 35 | 41.72 | 609.7 | 0.06842 | 2.08E+07 |
| 119 | 1185 | 35 | 24.73 | 282.3 | 0.08758 | 2.08E+07 |
| 120 | 1195 | 35 | 8.342 | 38.64 | 0.2159 | 2.08E+07 |

**C2.2.6 Abu untreated with 20% Sertica**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.052 | 35 | 8.517 | 0.000354 | 2.41E+04 | 0.001465 |
| 2 | 15.07 | 35 | 24.72 | 0.00029 | 8.54E+04 | 0.003995 |
| 3 | 25.04 | 35 | 41.47 | 0.000341 | 1.22E+05 | 0.007723 |
| 4 | 35.03 | 35 | 58.17 | 0.000449 | 1.30E+05 | 0.01198 |
| 5 | 45.03 | 35 | 74.8 | 0.000532 | 1.41E+05 | 0.01784 |
| 6 | 55.03 | 34.9 | 91.44 | 0.000678 | 1.35E+05 | 0.02463 |
| 7 | 65.08 | 35 | 108.4 | 0.000942 | 1.15E+05 | 0.03369 |
| 8 | 75.08 | 35 | 125 | 0.001216 | 1.03E+05 | 0.04594 |
| 9 | 85.04 | 35 | 141.7 | 0.00181 | 7.83E+04 | 0.06445 |
| 10 | 95.08 | 35 | 158.3 | 0.002948 | 5.37E+04 | 0.09348 |
| 11 | 105.1 | 35 | 175 | 0.004876 | 3.59E+04 | 0.1441 |
| 12 | 115 | 35 | 191.7 | 789.7 | 0.2427 | 1.17E+04 |
| 13 | 125.1 | 35 | 208.3 | 6928 | 0.03007 | 8.14E+04 |
| 14 | 135.1 | 35 | 225 | 8765 | 0.02567 | 1.68E+05 |
| 15 | 145 | 35 | 241.4 | 1.01E+04 | 0.024 | 2.69E+05 |
| 16 | 155.1 | 35 | 258.4 | 1.12E+04 | 0.0231 | 3.82E+05 |
| 17 | 165.1 | 35 | 275 | 1.23E+04 | 0.02244 | 5.04E+05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 175.1 | 35 | 291.4 | 1.33E+04 | 0.02191 | 6.37E+05 |
| 19 | 185.1 | 35 | 308.4 | 1.44E+04 | 0.02142 | 7.82E+05 |
| 20 | 195.1 | 35 | 325 | 1.55E+04 | 0.02103 | 9.36E+05 |
| 21 | 205 | 35 | 341.7 | 1.65E+04 | 0.02068 | 1.10E+06 |
| 22 | 215.1 | 35 | 358.4 | 1.76E+04 | 0.02036 | 1.28E+06 |
| 23 | 225.1 | 35 | 374.7 | 1.87E+04 | 0.02008 | 1.46E+06 |
| 24 | 235 | 35 | 391.4 | 1.97E+04 | 0.01983 | 1.66E+06 |
| 25 | 245.1 | 35 | 408.4 | 2.09E+04 | 0.01958 | 1.87E+06 |
| 26 | 255.1 | 35 | 424.8 | 2.19E+04 | 0.01941 | 2.09E+06 |
| 27 | 265 | 35 | 441.5 | 2.30E+04 | 0.01924 | 2.32E+06 |
| 28 | 275.1 | 35 | 458.5 | 2.39E+04 | 0.01919 | 2.56E+06 |
| 29 | 285.1 | 35 | 474.8 | 2.49E+04 | 0.01911 | 2.81E+06 |
| 30 | 295 | 35 | 491.5 | 2.58E+04 | 0.01902 | 3.07E+06 |
| 31 | 305.1 | 35 | 508.2 | 2.67E+04 | 0.01902 | 3.34E+06 |
| 32 | 315.1 | 35 | 524.9 | 2.78E+04 | 0.01889 | 3.61E+06 |
| 33 | 325 | 35 | 541.6 | 2.89E+04 | 0.01876 | 3.90E+06 |
| 34 | 335.1 | 35 | 558.2 | 2.83E+04 | 0.01975 | 4.18E+06 |
| 35 | 345.1 | 35 | 574.9 | 2.88E+04 | 0.01996 | 4.47E+06 |
| 36 | 355 | 35 | 591.6 | 2.96E+04 | 0.01996 | 4.77E+06 |
| 37 | 365.1 | 35 | 608.3 | 3.05E+04 | 0.01994 | 5.07E+06 |
| 38 | 375.1 | 35 | 624.9 | 3.14E+04 | 0.01991 | 5.39E+06 |
| 39 | 385 | 35 | 641.5 | 3.23E+04 | 0.01989 | 5.71E+06 |
| 40 | 395.1 | 35 | 658.5 | 3.32E+04 | 0.01986 | 6.04E+06 |
| 41 | 405.1 | 35 | 674.8 | 3.40E+04 | 0.01984 | 6.38E+06 |
| 42 | 415 | 35 | 691.4 | 3.45E+04 | 0.02007 | 6.73E+06 |
| 43 | 425.1 | 35 | 708.4 | 3.51E+04 | 0.02018 | 7.08E+06 |
| 44 | 435.1 | 35 | 725 | 3.59E+04 | 0.02021 | 7.44E+06 |
| 45 | 445 | 35 | 741.4 | 3.65E+04 | 0.0203 | 7.80E+06 |
| 46 | 455.1 | 35 | 758.4 | 3.73E+04 | 0.02032 | 8.18E+06 |
| 47 | 465.1 | 35 | 774.8 | 3.81E+04 | 0.02035 | 8.55E+06 |
| 48 | 475 | 35 | 791.4 | 3.88E+04 | 0.02039 | 8.94E+06 |
| 49 | 485.1 | 35 | 808.4 | 3.96E+04 | 0.02041 | 9.34E+06 |
| 50 | 495.1 | 35 | 824.7 | 4.04E+04 | 0.02042 | 9.74E+06 |
| 51 | 505 | 35 | 841.4 | 4.12E+04 | 0.02045 | 1.02E+07 |
| 52 | 515.1 | 35 | 858.5 | 4.19E+04 | 0.02049 | 1.06E+07 |
| 53 | 525.1 | 35 | 874.8 | 4.27E+04 | 0.02051 | 1.10E+07 |
| 54 | 535 | 35 | 891.5 | 4.35E+04 | 0.02052 | 1.14E+07 |
| 55 | 545.1 | 35 | 908.2 | 4.42E+04 | 0.02053 | 1.19E+07 |
| 56 | 555.1 | 35 | 924.9 | 4.50E+04 | 0.02054 | 1.23E+07 |
| 57 | 565 | 35 | 941.6 | 4.58E+04 | 0.02056 | 1.28E+07 |
| 58 | 575.1 | 35 | 958.3 | 4.63E+04 | 0.02068 | 1.33E+07 |
| 59 | 585.1 | 35 | 974.7 | 4.70E+04 | 0.02072 | 1.37E+07 |
| 60 | 595 | 35 | 991.4 | 4.78E+04 | 0.02074 | 1.42E+07 |
| 61 | 605.1 | 35 | 991.6 | 4.81E+04 | 0.0206 | 1.47E+07 |
| 62 | 615.2 | 35 | 975 | 4.76E+04 | 0.02047 | 1.52E+07 |
| 63 | 625.2 | 35 | 958.3 | 4.70E+04 | 0.0204 | 1.56E+07 |
| 64 | 635.2 | 35 | 941.6 | 4.62E+04 | 0.02037 | 1.61E+07 |
| 65 | 645.2 | 35 | 925 | 4.55E+04 | 0.02033 | 1.65E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 66 | 655.2 | 35 | 908 | 4.47E+04 | 0.02032 | 1.70E+07 |
| 67 | 665.2 | 35 | 891.7 | 4.39E+04 | 0.0203 | 1.74E+07 |
| 68 | 675.1 | 35 | 875 | 4.31E+04 | 0.0203 | 1.79E+07 |
| 69 | 685.2 | 35 | 858 | 4.23E+04 | 0.0203 | 1.83E+07 |
| 70 | 695.2 | 35 | 841.7 | 4.15E+04 | 0.0203 | 1.87E+07 |
| 71 | 705.2 | 35 | 825 | 4.06E+04 | 0.02031 | 1.91E+07 |
| 72 | 715.2 | 35 | 808.4 | 3.97E+04 | 0.02034 | 1.95E+07 |
| 73 | 725.2 | 35 | 791.7 | 3.89E+04 | 0.02035 | 1.99E+07 |
| 74 | 735.2 | 35 | 774.9 | 3.80E+04 | 0.02038 | 2.03E+07 |
| 75 | 745.2 | 35 | 758.2 | 3.71E+04 | 0.02042 | 2.06E+07 |
| 76 | 755.2 | 35 | 741.6 | 3.63E+04 | 0.02046 | 2.10E+07 |
| 77 | 765.2 | 35 | 724.9 | 3.53E+04 | 0.02052 | 2.14E+07 |
| 78 | 775.2 | 35 | 708.3 | 3.44E+04 | 0.02058 | 2.17E+07 |
| 79 | 785.2 | 35 | 691.5 | 3.35E+04 | 0.02062 | 2.20E+07 |
| 80 | 795.2 | 35 | 674.9 | 3.26E+04 | 0.02072 | 2.24E+07 |
| 81 | 805.2 | 35 | 658.2 | 3.17E+04 | 0.02079 | 2.27E+07 |
| 82 | 815.2 | 35 | 641.5 | 3.08E+04 | 0.02086 | 2.30E+07 |
| 83 | 825.2 | 35 | 624.8 | 2.98E+04 | 0.02094 | 2.33E+07 |
| 84 | 835.2 | 35 | 608.1 | 2.89E+04 | 0.02105 | 2.36E+07 |
| 85 | 845.2 | 35 | 591.5 | 2.80E+04 | 0.02115 | 2.39E+07 |
| 86 | 855.2 | 35 | 574.8 | 2.70E+04 | 0.02127 | 2.41E+07 |
| 87 | 865.2 | 35 | 558.2 | 2.61E+04 | 0.02139 | 2.44E+07 |
| 88 | 875.2 | 35 | 541.5 | 2.52E+04 | 0.02153 | 2.46E+07 |
| 89 | 885.2 | 35 | 524.9 | 2.42E+04 | 0.02167 | 2.49E+07 |
| 90 | 895.2 | 35 | 508.2 | 2.33E+04 | 0.02186 | 2.51E+07 |
| 91 | 905.2 | 35 | 491.5 | 2.23E+04 | 0.02204 | 2.53E+07 |
| 92 | 915.2 | 35 | 474.9 | 2.14E+04 | 0.02225 | 2.56E+07 |
| 93 | 925.2 | 35 | 458.2 | 2.04E+04 | 0.02248 | 2.58E+07 |
| 94 | 935.2 | 35 | 441.5 | 1.95E+04 | 0.0227 | 2.59E+07 |
| 95 | 945.2 | 35 | 424.8 | 1.85E+04 | 0.02295 | 2.61E+07 |
| 96 | 955.2 | 35 | 408.2 | 1.76E+04 | 0.02319 | 2.63E+07 |
| 97 | 965.2 | 35 | 391.6 | 1.67E+04 | 0.02346 | 2.65E+07 |
| 98 | 975.2 | 35 | 374.9 | 1.58E+04 | 0.02375 | 2.66E+07 |
| 99 | 985.2 | 35 | 358.2 | 1.49E+04 | 0.02409 | 2.68E+07 |
| 100 | 995.2 | 35 | 341.6 | 1.40E+04 | 0.02442 | 2.69E+07 |
| 101 | 1005 | 35 | 324.9 | 1.31E+04 | 0.02477 | 2.71E+07 |
| 102 | 1015 | 35 | 308.3 | 1.23E+04 | 0.02509 | 2.72E+07 |
| 103 | 1025 | 35 | 291.6 | 1.15E+04 | 0.02544 | 2.73E+07 |
| 104 | 1035 | 35 | 274.9 | 1.07E+04 | 0.02581 | 2.74E+07 |
| 105 | 1045 | 35 | 258.3 | 9855 | 0.02621 | 2.75E+07 |
| 106 | 1055 | 35 | 241.6 | 9071 | 0.02663 | 2.76E+07 |
| 107 | 1065 | 35 | 224.9 | 8294 | 0.02712 | 2.77E+07 |
| 108 | 1075 | 35 | 208.3 | 7536 | 0.02763 | 2.77E+07 |
| 109 | 1085 | 35 | 191.6 | 6793 | 0.02821 | 2.78E+07 |
| 110 | 1095 | 35 | 174.9 | 6062 | 0.02886 | 2.79E+07 |
| 111 | 1105 | 35 | 158.3 | 5332 | 0.02968 | 2.79E+07 |
| 112 | 1115 | 35 | 141.6 | 4610 | 0.03072 | 2.80E+07 |
| 113 | 1125 | 35 | 125 | 3908 | 0.03199 | 2.80E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 114 | 1135 | 35 | 108.1 | 3207 | 0.0337 | 2.80E+07 |
| 115 | 1145 | 35 | 91.47 | 2545 | 0.03594 | 2.81E+07 |
| 116 | 1155 | 35 | 74.8 | 1919 | 0.03898 | 2.81E+07 |
| 117 | 1165 | 35 | 58.12 | 1326 | 0.04384 | 2.81E+07 |
| 118 | 1175 | 35 | 41.47 | 776.1 | 0.05343 | 2.81E+07 |
| 119 | 1185 | 35 | 24.86 | 330.7 | 0.07518 | 2.81E+07 |
| 120 | 1195 | 35 | 8.158 | 36.58 | 0.223 | 2.81E+07 |

**C2.3 (T=40°C)**

**C2.3.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 1.263 | 40 | 2.102 | 0.002482 | 846.9 | 0.006525 |
| 2 | 3.778 | 40 | 6.219 | 0.002392 | 2600 | 0.01185 |
| 3 | 6.293 | 40 | 10.39 | 0.002862 | 3632 | 0.01904 |
| 4 | 8.801 | 40 | 14.58 | 0.003411 | 4274 | 0.0277 |
| 5 | 11.29 | 40 | 18.75 | 0.003881 | 4831 | 0.03742 |
| 6 | 13.8 | 40 | 22.91 | 0.004205 | 5448 | 0.04807 |
| 7 | 16.3 | 40 | 27.05 | 0.004921 | 5497 | 0.06045 |
| 8 | 18.78 | 40 | 31.21 | 0.005499 | 5675 | 0.07404 |
| 9 | 21.3 | 40 | 35.46 | 0.00673 | 5269 | 0.09081 |
| 10 | 23.8 | 40 | 39.56 | 0.007796 | 5074 | 0.111 |
| 11 | 26.29 | 40 | 43.69 | 0.009325 | 4685 | 0.1356 |
| 12 | 28.79 | 40 | 47.94 | 0.01305 | 3674 | 0.1679 |
| 13 | 31.3 | 40 | 52.06 | 0.01788 | 2912 | 0.2137 |
| 14 | 33.79 | 40 | 56.23 | 0.0336 | 1673 | 0.304 |
| 15 | 36.29 | 40 | 60.41 | 182.5 | 0.3311 | 572.4 |
| 16 | 38.8 | 40 | 64.61 | 1194 | 0.0541 | 3599 |
| 17 | 41.29 | 40 | 68.7 | 2073 | 0.03313 | 8811 |
| 18 | 43.8 | 40 | 72.89 | 2725 | 0.02676 | 1.58E+04 |
| 19 | 46.31 | 40 | 77.07 | 3226 | 0.02389 | 2.38E+04 |
| 20 | 48.78 | 40 | 81.19 | 3620 | 0.02243 | 3.28E+04 |
| 21 | 51.3 | 40 | 85.42 | 3990 | 0.02141 | 4.30E+04 |
| 22 | 53.8 | 40 | 89.5 | 4362 | 0.02052 | 5.38E+04 |
| 23 | 56.28 | 40 | 93.76 | 4671 | 0.02007 | 6.56E+04 |
| 24 | 58.8 | 40 | 97.91 | 4968 | 0.01971 | 7.82E+04 |
| 25 | 61.3 | 40 | 102.1 | 5274 | 0.01936 | 9.12E+04 |
| 26 | 63.78 | 40 | 106.2 | 5565 | 0.01908 | 1.05E+05 |
| 27 | 66.3 | 40 | 110.5 | 5864 | 0.01883 | 1.20E+05 |
| 28 | 68.8 | 40 | 114.5 | 6145 | 0.01864 | 1.35E+05 |
| 29 | 71.29 | 40 | 118.8 | 6437 | 0.01845 | 1.51E+05 |
| 30 | 73.8 | 40 | 123 | 6738 | 0.01825 | 1.68E+05 |
| 31 | 76.3 | 40 | 127.1 | 7025 | 0.01809 | 1.86E+05 |
| 32 | 78.78 | 40 | 131.2 | 7318 | 0.01794 | 2.04E+05 |
| 33 | 81.3 | 40 | 135.4 | 7599 | 0.01782 | 2.23E+05 |
| 34 | 83.79 | 40 | 139.6 | 7890 | 0.01769 | 2.43E+05 |
| 35 | 86.28 | 40 | 143.7 | 8176 | 0.01757 | 2.63E+05 |

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|---|---|---|---|---|---|---|
| 36 | 88.79 | 40 | 147.9 | 8492 | 0.01742 | 2.85E+05 |
| 37 | 91.29 | 40 | 152.1 | 8792 | 0.0173 | 3.07E+05 |
| 38 | 93.83 | 40 | 156.3 | 9103 | 0.01718 | 3.30E+05 |
| 39 | 96.34 | 40 | 160.4 | 9394 | 0.01708 | 3.53E+05 |
| 40 | 98.8 | 40 | 164.6 | 9709 | 0.01695 | 3.77E+05 |
| 41 | 101.3 | 40 | 168.9 | 1.00E+04 | 0.01684 | 4.03E+05 |
| 42 | 103.8 | 40 | 173 | 1.03E+04 | 0.01674 | 4.28E+05 |
| 43 | 106.3 | 40 | 177.1 | 1.06E+04 | 0.01665 | 4.55E+05 |
| 44 | 108.8 | 40 | 181.2 | 1.10E+04 | 0.01655 | 4.82E+05 |
| 45 | 111.3 | 40 | 185.4 | 1.13E+04 | 0.01644 | 5.11E+05 |
| 46 | 113.8 | 40 | 189.5 | 1.16E+04 | 0.01634 | 5.39E+05 |
| 47 | 116.3 | 40 | 193.8 | 1.19E+04 | 0.01626 | 5.70E+05 |
| 48 | 118.8 | 40 | 197.9 | 1.22E+04 | 0.01618 | 6.00E+05 |
| 49 | 121.3 | 40 | 202 | 1.25E+04 | 0.01611 | 6.31E+05 |
| 50 | 123.8 | 40 | 206.2 | 1.29E+04 | 0.01605 | 6.63E+05 |
| 51 | 126.3 | 40 | 210.5 | 1.32E+04 | 0.01598 | 6.97E+05 |
| 52 | 128.8 | 40 | 214.6 | 1.35E+04 | 0.01591 | 7.30E+05 |
| 53 | 131.3 | 40 | 218.7 | 1.38E+04 | 0.01586 | 7.65E+05 |
| 54 | 133.8 | 40 | 222.9 | 1.41E+04 | 0.01581 | 8.00E+05 |
| 55 | 136.3 | 40 | 227.1 | 1.44E+04 | 0.01577 | 8.36E+05 |
| 56 | 138.8 | 40 | 231.4 | 1.47E+04 | 0.01571 | 8.74E+05 |
| 57 | 141.3 | 40 | 235.4 | 1.50E+04 | 0.01567 | 9.10E+05 |
| 58 | 143.8 | 40 | 239.5 | 1.53E+04 | 0.01561 | 9.48E+05 |
| 59 | 146.3 | 40 | 243.8 | 1.56E+04 | 0.0156 | 9.89E+05 |
| 60 | 148.8 | 40 | 247.9 | 1.60E+04 | 0.01554 | 1.03E+06 |
| 61 | 151.4 | 40 | 247.6 | 1.62E+04 | 0.01527 | 1.07E+06 |
| 62 | 154 | 40 | 243.5 | 1.62E+04 | 0.015 | 1.11E+06 |
| 63 | 156.4 | 40 | 239.4 | 1.61E+04 | 0.01486 | 1.15E+06 |
| 64 | 159 | 40 | 235.1 | 1.59E+04 | 0.01475 | 1.19E+06 |
| 65 | 161.5 | 40 | 231 | 1.57E+04 | 0.0147 | 1.23E+06 |
| 66 | 163.9 | 40 | 226.8 | 1.54E+04 | 0.01472 | 1.27E+06 |
| 67 | 166.5 | 40 | 222.6 | 1.52E+04 | 0.0147 | 1.31E+06 |
| 68 | 169 | 40 | 218.6 | 1.49E+04 | 0.01472 | 1.34E+06 |
| 69 | 171.4 | 40 | 214.4 | 1.45E+04 | 0.01476 | 1.38E+06 |
| 70 | 174 | 40 | 210.1 | 1.43E+04 | 0.01474 | 1.42E+06 |
| 71 | 176.5 | 40 | 206 | 1.40E+04 | 0.01476 | 1.45E+06 |
| 72 | 178.9 | 40 | 201.8 | 1.37E+04 | 0.01477 | 1.49E+06 |
| 73 | 181.5 | 40 | 197.6 | 1.33E+04 | 0.01482 | 1.52E+06 |
| 74 | 184 | 40 | 193.5 | 1.31E+04 | 0.01483 | 1.55E+06 |
| 75 | 186.4 | 40 | 189.3 | 1.27E+04 | 0.01487 | 1.58E+06 |
| 76 | 189 | 40 | 185.1 | 1.24E+04 | 0.01489 | 1.62E+06 |
| 77 | 191.5 | 40 | 181 | 1.21E+04 | 0.01493 | 1.64E+06 |
| 78 | 193.9 | 40 | 176.8 | 1.18E+04 | 0.01499 | 1.67E+06 |
| 79 | 196.5 | 40 | 172.5 | 1.15E+04 | 0.01503 | 1.70E+06 |
| 80 | 199 | 40 | 168.6 | 1.12E+04 | 0.01507 | 1.73E+06 |
| 81 | 201.4 | 40 | 164.4 | 1.09E+04 | 0.01511 | 1.76E+06 |
| 82 | 204 | 40 | 160.1 | 1.06E+04 | 0.01518 | 1.78E+06 |
| 83 | 206.5 | 40 | 156 | 1.03E+04 | 0.01522 | 1.81E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 84 | 208.9 | 40 | 151.9 | 9942 | 0.01528 | 1.83E+06 |
| 85 | 211.5 | 40 | 147.6 | 9634 | 0.01532 | 1.86E+06 |
| 86 | 214 | 40 | 143.5 | 9316 | 0.01541 | 1.88E+06 |
| 87 | 216.4 | 40 | 139.3 | 9015 | 0.01546 | 1.90E+06 |
| 88 | 219 | 40 | 135.1 | 8701 | 0.01553 | 1.93E+06 |
| 89 | 221.5 | 40 | 131 | 8399 | 0.0156 | 1.95E+06 |
| 90 | 223.9 | 40 | 126.8 | 8090 | 0.01568 | 1.97E+06 |
| 91 | 226.5 | 40 | 122.6 | 7778 | 0.01576 | 1.99E+06 |
| 92 | 229 | 40 | 118.5 | 7472 | 0.01587 | 2.01E+06 |
| 93 | 231.4 | 40 | 114.4 | 7180 | 0.01593 | 2.02E+06 |
| 94 | 234 | 40 | 110 | 6857 | 0.01605 | 2.04E+06 |
| 95 | 236.5 | 40 | 106 | 6557 | 0.01616 | 2.06E+06 |
| 96 | 238.9 | 40 | 101.8 | 6256 | 0.01627 | 2.07E+06 |
| 97 | 241.5 | 40 | 97.57 | 5944 | 0.01641 | 2.09E+06 |
| 98 | 244 | 40 | 93.53 | 5651 | 0.01655 | 2.10E+06 |
| 99 | 246.4 | 40 | 89.32 | 5351 | 0.01669 | 2.11E+06 |
| 100 | 249 | 40 | 85.09 | 5046 | 0.01686 | 2.13E+06 |
| 101 | 251.5 | 40 | 81.01 | 4751 | 0.01705 | 2.14E+06 |
| 102 | 253.9 | 40 | 76.85 | 4456 | 0.01724 | 2.15E+06 |
| 103 | 256.5 | 40 | 72.61 | 4157 | 0.01747 | 2.16E+06 |
| 104 | 259 | 40 | 68.53 | 3872 | 0.0177 | 2.17E+06 |
| 105 | 261.4 | 40 | 64.34 | 3583 | 0.01796 | 2.18E+06 |
| 106 | 264 | 40 | 60.08 | 3289 | 0.01826 | 2.19E+06 |
| 107 | 266.5 | 40 | 56.03 | 3012 | 0.0186 | 2.19E+06 |
| 108 | 268.9 | 40 | 51.85 | 2729 | 0.019 | 2.20E+06 |
| 109 | 271.5 | 40 | 47.58 | 2443 | 0.01948 | 2.21E+06 |
| 110 | 274 | 40 | 43.49 | 2174 | 0.02 | 2.21E+06 |
| 111 | 276.4 | 40 | 39.32 | 1905 | 0.02064 | 2.22E+06 |
| 112 | 279 | 40 | 35.12 | 1642 | 0.02139 | 2.22E+06 |
| 113 | 281.5 | 40 | 31.02 | 1393 | 0.02227 | 2.23E+06 |
| 114 | 283.9 | 40 | 26.77 | 1143 | 0.02342 | 2.23E+06 |
| 115 | 286.5 | 40 | 22.62 | 907.6 | 0.02492 | 2.23E+06 |
| 116 | 289 | 40 | 18.49 | 683.7 | 0.02704 | 2.23E+06 |
| 117 | 291.4 | 40 | 14.39 | 469.5 | 0.03064 | 2.23E+06 |
| 118 | 294 | 40 | 10.11 | 266.5 | 0.03794 | 2.23E+06 |
| 119 | 296.5 | 40 | 6.084 | 109.2 | 0.0557 | 2.23E+06 |
| 120 | 298.9 | 40 | 1.878 | 7.428 | 0.2529 | 2.23E+06 |

**C2.3.2 Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 1.293 | 40 | 2.144 | 3.924 | 0.5465 | 17.44 |
| 2 | 3.805 | 40 | 6.193 | 107.5 | 0.05759 | 307.1 |
| 3 | 6.28 | 40 | 10.38 | 324.3 | 0.032 | 1141 |
| 4 | 8.807 | 40 | 14.62 | 585.5 | 0.02497 | 2653 |
| 5 | 11.31 | 40 | 18.79 | 868.5 | 0.02163 | 4817 |
| 6 | 13.78 | 40 | 22.86 | 1159 | 0.01973 | 7724 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | 16.3 | 40 | 27.12 | 1466 | 0.0185 | 1.15E+04 |
| 8 | 18.81 | 40 | 31.22 | 1763 | 0.01771 | 1.58E+04 |
| 9 | 21.28 | 40 | 35.32 | 2056 | 0.01718 | 2.10E+04 |
| 10 | 23.81 | 40 | 39.62 | 2359 | 0.0168 | 2.71E+04 |
| 11 | 26.31 | 40 | 43.76 | 2644 | 0.01655 | 3.36E+04 |
| 12 | 28.78 | 40 | 47.91 | 2930 | 0.01635 | 4.09E+04 |
| 13 | 31.31 | 40 | 52.19 | 3218 | 0.01622 | 4.92E+04 |
| 14 | 33.81 | 40 | 56.17 | 3485 | 0.01612 | 5.77E+04 |
| 15 | 36.28 | 40 | 60.43 | 3762 | 0.01606 | 6.71E+04 |
| 16 | 38.8 | 40 | 64.58 | 4030 | 0.01603 | 7.74E+04 |
| 17 | 41.31 | 40 | 68.76 | 4294 | 0.01601 | 8.80E+04 |
| 18 | 43.78 | 40 | 72.85 | 4551 | 0.016 | 9.94E+04 |
| 19 | 46.31 | 40 | 77.15 | 4826 | 0.01599 | 1.12E+05 |
| 20 | 48.82 | 40 | 81.25 | 5083 | 0.01598 | 1.24E+05 |
| 21 | 51.28 | 40 | 85.4 | 5359 | 0.01594 | 1.38E+05 |
| 22 | 53.8 | 40 | 89.6 | 5627 | 0.01592 | 1.52E+05 |
| 23 | 56.3 | 40 | 93.77 | 5901 | 0.01589 | 1.67E+05 |
| 24 | 58.79 | 40 | 97.93 | 6174 | 0.01586 | 1.82E+05 |
| 25 | 61.3 | 40 | 102.2 | 6451 | 0.01583 | 1.98E+05 |
| 26 | 63.8 | 40 | 106.2 | 6721 | 0.0158 | 2.15E+05 |
| 27 | 66.28 | 39.9 | 110.4 | 7001 | 0.01577 | 2.32E+05 |
| 28 | 68.82 | 40 | 114.7 | 7279 | 0.01576 | 2.51E+05 |
| 29 | 71.32 | 40 | 118.8 | 7547 | 0.01573 | 2.70E+05 |
| 30 | 73.79 | 40 | 122.9 | 7823 | 0.01571 | 2.89E+05 |
| 31 | 76.3 | 40 | 127.1 | 8098 | 0.01569 | 3.10E+05 |
| 32 | 78.8 | 40 | 131.2 | 8374 | 0.01567 | 3.30E+05 |
| 33 | 81.28 | 40 | 135.4 | 8647 | 0.01566 | 3.52E+05 |
| 34 | 83.8 | 40 | 139.6 | 8920 | 0.01565 | 3.75E+05 |
| 35 | 86.3 | 40 | 143.7 | 9195 | 0.01563 | 3.97E+05 |
| 36 | 88.78 | 40 | 147.8 | 9459 | 0.01563 | 4.21E+05 |
| 37 | 91.31 | 40 | 152.2 | 9751 | 0.01561 | 4.46E+05 |
| 38 | 93.81 | 40 | 156.2 | 1.00E+04 | 0.01558 | 4.70E+05 |
| 39 | 96.29 | 40 | 160.4 | 1.03E+04 | 0.01557 | 4.96E+05 |
| 40 | 98.81 | 40.1 | 164.6 | 1.06E+04 | 0.01556 | 5.23E+05 |
| 41 | 101.3 | 40 | 168.7 | 1.09E+04 | 0.01553 | 5.50E+05 |
| 42 | 103.8 | 40 | 172.9 | 1.11E+04 | 0.01552 | 5.78E+05 |
| 43 | 106.3 | 40 | 177.1 | 1.14E+04 | 0.0155 | 6.07E+05 |
| 44 | 108.8 | 40 | 181.2 | 1.17E+04 | 0.01551 | 6.36E+05 |
| 45 | 111.3 | 40 | 185.4 | 1.20E+04 | 0.0155 | 6.65E+05 |
| 46 | 113.8 | 40 | 189.6 | 1.22E+04 | 0.01551 | 6.96E+05 |
| 47 | 116.3 | 40 | 193.7 | 1.25E+04 | 0.0155 | 7.27E+05 |
| 48 | 118.8 | 40 | 197.9 | 1.28E+04 | 0.0155 | 7.59E+05 |
| 49 | 121.3 | 40 | 202.1 | 1.31E+04 | 0.01547 | 7.93E+05 |
| 50 | 123.8 | 39.9 | 206.2 | 1.33E+04 | 0.01549 | 8.25E+05 |
| 51 | 126.3 | 39.9 | 210.4 | 1.36E+04 | 0.01549 | 8.59E+05 |
| 52 | 128.8 | 40 | 214.6 | 1.38E+04 | 0.01551 | 8.95E+05 |
| 53 | 131.3 | 40 | 218.7 | 1.41E+04 | 0.01548 | 9.29E+05 |
| 54 | 133.8 | 40 | 222.9 | 1.44E+04 | 0.0155 | 9.65E+05 |

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|---|---|---|---|---|---|---|
| 55 | 136.3 | 40 | 227.1 | 1.47E+04 | 0.0155 | 1.00E+06 |
| 56 | 138.8 | 40 | 231.2 | 1.49E+04 | 0.01549 | 1.04E+06 |
| 57 | 141.3 | 40 | 235.4 | 1.52E+04 | 0.01548 | 1.08E+06 |
| 58 | 143.8 | 40 | 239.7 | 1.55E+04 | 0.01549 | 1.12E+06 |
| 59 | 146.3 | 40 | 243.7 | 1.58E+04 | 0.01547 | 1.16E+06 |
| 60 | 148.8 | 40 | 247.9 | 1.61E+04 | 0.01544 | 1.20E+06 |
| 61 | 151.4 | 40 | 247.7 | 1.63E+04 | 0.01519 | 1.24E+06 |
| 62 | 154 | 40 | 243.3 | 1.63E+04 | 0.01492 | 1.28E+06 |
| 63 | 156.5 | 40 | 239.4 | 1.62E+04 | 0.01477 | 1.32E+06 |
| 64 | 158.9 | 40 | 235.2 | 1.60E+04 | 0.0147 | 1.36E+06 |
| 65 | 161.5 | 40 | 230.9 | 1.58E+04 | 0.01465 | 1.40E+06 |
| 66 | 164 | 40 | 226.8 | 1.55E+04 | 0.0146 | 1.44E+06 |
| 67 | 166.4 | 40 | 222.7 | 1.53E+04 | 0.01458 | 1.48E+06 |
| 68 | 169 | 40 | 218.4 | 1.50E+04 | 0.01456 | 1.52E+06 |
| 69 | 171.5 | 40 | 214.3 | 1.48E+04 | 0.01453 | 1.55E+06 |
| 70 | 173.9 | 40 | 210.3 | 1.45E+04 | 0.0145 | 1.59E+06 |
| 71 | 176.5 | 40 | 205.8 | 1.42E+04 | 0.0145 | 1.62E+06 |
| 72 | 179 | 40 | 201.8 | 1.40E+04 | 0.01447 | 1.66E+06 |
| 73 | 181.4 | 40 | 197.8 | 1.37E+04 | 0.01445 | 1.69E+06 |
| 74 | 184 | 40 | 193.4 | 1.34E+04 | 0.01442 | 1.73E+06 |
| 75 | 186.5 | 40 | 189.3 | 1.31E+04 | 0.01442 | 1.76E+06 |
| 76 | 188.9 | 40 | 185.2 | 1.29E+04 | 0.01439 | 1.79E+06 |
| 77 | 191.5 | 40 | 180.9 | 1.26E+04 | 0.0144 | 1.82E+06 |
| 78 | 194 | 40 | 176.8 | 1.23E+04 | 0.01438 | 1.85E+06 |
| 79 | 196.4 | 40 | 172.8 | 1.20E+04 | 0.01438 | 1.88E+06 |
| 80 | 199 | 40 | 168.4 | 1.17E+04 | 0.01434 | 1.91E+06 |
| 81 | 201.5 | 40 | 164.3 | 1.15E+04 | 0.01431 | 1.94E+06 |
| 82 | 203.9 | 40 | 160.2 | 1.12E+04 | 0.01432 | 1.97E+06 |
| 83 | 206.5 | 40 | 156 | 1.09E+04 | 0.0143 | 2.00E+06 |
| 84 | 209 | 40 | 151.9 | 1.06E+04 | 0.01429 | 2.02E+06 |
| 85 | 211.4 | 40 | 147.7 | 1.03E+04 | 0.01429 | 2.05E+06 |
| 86 | 214 | 40 | 143.4 | 1.00E+04 | 0.01428 | 2.07E+06 |
| 87 | 216.5 | 40 | 139.4 | 9756 | 0.01428 | 2.10E+06 |
| 88 | 218.9 | 40 | 135.2 | 9480 | 0.01426 | 2.12E+06 |
| 89 | 221.5 | 40 | 130.9 | 9185 | 0.01426 | 2.14E+06 |
| 90 | 224 | 40 | 126.8 | 8900 | 0.01425 | 2.17E+06 |
| 91 | 226.4 | 40 | 122.7 | 8610 | 0.01425 | 2.19E+06 |
| 92 | 229 | 40 | 118.4 | 8324 | 0.01422 | 2.21E+06 |
| 93 | 231.5 | 40 | 114.3 | 8037 | 0.01423 | 2.23E+06 |
| 94 | 233.9 | 40 | 110.2 | 7750 | 0.01423 | 2.25E+06 |
| 95 | 236.5 | 40 | 105.9 | 7445 | 0.01422 | 2.27E+06 |
| 96 | 239 | 40 | 101.9 | 7160 | 0.01423 | 2.28E+06 |
| 97 | 241.4 | 40 | 97.73 | 6870 | 0.01422 | 2.30E+06 |
| 98 | 244 | 40 | 93.39 | 6573 | 0.01421 | 2.32E+06 |
| 99 | 246.5 | 40 | 89.38 | 6282 | 0.01423 | 2.33E+06 |
| 100 | 248.9 | 40 | 85.2 | 5984 | 0.01424 | 2.35E+06 |
| 101 | 251.5 | 40 | 80.94 | 5684 | 0.01424 | 2.36E+06 |
| 102 | 254 | 40 | 76.86 | 5395 | 0.01425 | 2.38E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 103 | 256.4 | 40 | 72.72 | 5100 | 0.01426 | 2.39E+06 |
| 104 | 259 | 40 | 68.44 | 4796 | 0.01427 | 2.40E+06 |
| 105 | 261.5 | 40 | 64.38 | 4513 | 0.01426 | 2.41E+06 |
| 106 | 263.9 | 40 | 60.21 | 4218 | 0.01427 | 2.42E+06 |
| 107 | 266.5 | 40 | 55.92 | 3914 | 0.01429 | 2.43E+06 |
| 108 | 269 | 40 | 51.92 | 3630 | 0.0143 | 2.44E+06 |
| 109 | 271.4 | 40 | 47.74 | 3338 | 0.0143 | 2.45E+06 |
| 110 | 274 | 40 | 43.39 | 3032 | 0.01431 | 2.46E+06 |
| 111 | 276.5 | 40 | 39.32 | 2748 | 0.01431 | 2.46E+06 |
| 112 | 278.9 | 40 | 35.26 | 2466 | 0.0143 | 2.47E+06 |
| 113 | 281.5 | 40 | 30.9 | 2165 | 0.01427 | 2.48E+06 |
| 114 | 284 | 40 | 26.88 | 1889 | 0.01423 | 2.48E+06 |
| 115 | 286.4 | 40 | 22.71 | 1606 | 0.01414 | 2.48E+06 |
| 116 | 289 | 40 | 18.43 | 1319 | 0.01397 | 2.49E+06 |
| 117 | 291.5 | 40 | 14.43 | 1054 | 0.01368 | 2.49E+06 |
| 118 | 293.9 | 40 | 10.3 | 786.6 | 0.0131 | 2.49E+06 |
| 119 | 296.5 | 40 | 5.925 | 510.8 | 0.0116 | 2.49E+06 |
| 120 | 299 | 40 | 1.922 | 268.3 | 0.007164 | 2.49E+06 |

### C2.3.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.266 | 40 | 2.107 | 0.0418 | 50.41 | 0.1363 |
| 1, 2 | 3.784 | 40 | 6.231 | 1.52 | 4.098 | 6.723 |
| 1, 3 | 6.319 | 40 | 10.47 | 74.79 | 0.1401 | 213 |
| 1, 4 | 8.824 | 40 | 14.62 | 243.2 | 0.0601 | 830.2 |
| 1, 5 | 11.29 | 40 | 18.71 | 483.4 | 0.03871 | 2052 |
| 1, 6 | 13.81 | 40 | 22.98 | 750.4 | 0.03062 | 3992 |
| 1, 7 | 16.32 | 40 | 27.08 | 1038 | 0.02608 | 6565 |
| 1, 8 | 18.79 | 40 | 31.25 | 1332 | 0.02346 | 9920 |
| 1, 9 | 21.33 | 40 | 35.52 | 1624 | 0.02187 | 1.41E+04 |
| 1, 10 | 23.84 | 40 | 39.6 | 1889 | 0.02096 | 1.88E+04 |
| 1, 11 | 26.3 | 40 | 43.7 | 2144 | 0.02038 | 2.41E+04 |
| 1, 12 | 28.81 | 40 | 48.01 | 2406 | 0.01996 | 3.03E+04 |
| 1, 13 | 31.32 | 40 | 52.09 | 2648 | 0.01967 | 3.68E+04 |
| 1, 14 | 33.79 | 40 | 56.21 | 2889 | 0.01946 | 4.40E+04 |
| 1, 15 | 36.31 | 40 | 60.49 | 3135 | 0.01929 | 5.21E+04 |
| 1, 16 | 38.83 | 40 | 64.59 | 3370 | 0.01917 | 6.04E+04 |
| 1, 17 | 41.29 | 40 | 68.67 | 3604 | 0.01905 | 6.93E+04 |
| 1, 18 | 43.82 | 40 | 73.02 | 3853 | 0.01895 | 7.92E+04 |
| 1, 19 | 46.32 | 40 | 77.05 | 4080 | 0.01889 | 8.93E+04 |
| 1, 20 | 48.78 | 40 | 81.23 | 4317 | 0.01881 | 9.99E+04 |
| 1, 21 | 51.32 | 40 | 85.5 | 4559 | 0.01875 | 1.12E+05 |
| 1, 22 | 53.83 | 40 | 89.56 | 4791 | 0.0187 | 1.23E+05 |
| 1, 23 | 56.29 | 40 | 93.74 | 5025 | 0.01865 | 1.36E+05 |
| 1, 24 | 58.81 | 40 | 98 | 5268 | 0.0186 | 1.50E+05 |
| 1, 25 | 61.32 | 40 | 102.1 | 5504 | 0.01855 | 1.63E+05 |

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|---|---|---|---|---|---|---|
| 1, 26 | 63.79 | 40 | 106.2 | 5741 | 0.0185 | 1.77E+05 |
| 1, 27 | 66.33 | 40 | 110.5 | 6001 | 0.01842 | 1.93E+05 |
| 1, 28 | 68.83 | 40 | 114.5 | 6231 | 0.01838 | 2.08E+05 |
| 1, 29 | 71.29 | 40 | 118.7 | 6485 | 0.01831 | 2.24E+05 |
| 1, 30 | 73.82 | 40 | 123 | 6735 | 0.01826 | 2.42E+05 |
| 1, 31 | 76.31 | 40 | 127 | 6981 | 0.0182 | 2.59E+05 |
| 1, 32 | 78.79 | 40 | 131.2 | 7234 | 0.01814 | 2.77E+05 |
| 1, 33 | 81.32 | 40 | 135.5 | 7498 | 0.01808 | 2.96E+05 |
| 1, 34 | 83.82 | 40 | 139.5 | 7739 | 0.01803 | 3.15E+05 |
| 1, 35 | 86.29 | 40 | 143.7 | 7993 | 0.01798 | 3.35E+05 |
| 1, 36 | 88.82 | 40 | 148 | 8251 | 0.01794 | 3.56E+05 |
| 1, 37 | 91.32 | 40 | 152 | 8496 | 0.01789 | 3.77E+05 |
| 1, 38 | 93.79 | 40 | 156.3 | 8755 | 0.01785 | 3.99E+05 |
| 1, 39 | 96.32 | 40 | 160.5 | 9010 | 0.01781 | 4.22E+05 |
| 1, 40 | 98.81 | 40 | 164.6 | 9263 | 0.01776 | 4.44E+05 |
| 1, 41 | 101.3 | 40 | 168.7 | 9516 | 0.01773 | 4.68E+05 |
| 1, 42 | 103.8 | 40 | 173 | 9792 | 0.01767 | 4.93E+05 |
| 1, 43 | 106.3 | 40 | 177.1 | 1.01E+04 | 0.01762 | 5.18E+05 |
| 1, 44 | 108.8 | 40 | 181.2 | 1.03E+04 | 0.01756 | 5.43E+05 |
| 1, 45 | 111.3 | 40 | 185.5 | 1.06E+04 | 0.01751 | 5.71E+05 |
| 1, 46 | 113.8 | 40 | 189.6 | 1.09E+04 | 0.01746 | 5.97E+05 |
| 1, 47 | 116.3 | 40 | 193.7 | 1.11E+04 | 0.01744 | 6.25E+05 |
| 1, 48 | 118.8 | 40 | 198 | 1.14E+04 | 0.01743 | 6.54E+05 |
| 1, 49 | 121.3 | 40 | 202.1 | 1.16E+04 | 0.01737 | 6.82E+05 |
| 1, 50 | 123.8 | 40 | 206.2 | 1.19E+04 | 0.01734 | 7.12E+05 |
| 1, 51 | 126.3 | 40 | 210.5 | 1.22E+04 | 0.01732 | 7.43E+05 |
| 1, 52 | 128.8 | 40 | 214.5 | 1.24E+04 | 0.01731 | 7.74E+05 |
| 1, 53 | 131.3 | 40 | 218.7 | 1.27E+04 | 0.01729 | 8.05E+05 |
| 1, 54 | 133.8 | 40 | 222.9 | 1.29E+04 | 0.01725 | 8.39E+05 |
| 1, 55 | 136.3 | 40 | 227.1 | 1.32E+04 | 0.01727 | 8.71E+05 |
| 1, 56 | 138.8 | 40 | 231.2 | 1.34E+04 | 0.01725 | 9.04E+05 |
| 1, 57 | 141.3 | 40 | 235.5 | 1.37E+04 | 0.01723 | 9.39E+05 |
| 1, 58 | 143.8 | 40 | 239.5 | 1.39E+04 | 0.01721 | 9.73E+05 |
| 1, 59 | 146.3 | 40 | 243.8 | 1.42E+04 | 0.01717 | 1.01E+06 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.44E+04 | 0.01716 | 1.05E+06 |
| 1, 61 | 151.4 | 40 | 247.7 | 1.47E+04 | 0.0169 | 1.08E+06 |
| 1, 62 | 154 | 40 | 243.5 | 1.46E+04 | 0.01664 | 1.12E+06 |
| 1, 63 | 156.4 | 40 | 239.3 | 1.45E+04 | 0.01649 | 1.16E+06 |
| 1, 64 | 159 | 40 | 235.1 | 1.43E+04 | 0.01642 | 1.19E+06 |
| 1, 65 | 161.5 | 40 | 231 | 1.41E+04 | 0.01637 | 1.23E+06 |
| 1, 66 | 164 | 40 | 226.8 | 1.39E+04 | 0.01635 | 1.26E+06 |
| 1, 67 | 166.5 | 40 | 222.5 | 1.36E+04 | 0.01633 | 1.30E+06 |
| 1, 68 | 169 | 40 | 218.5 | 1.34E+04 | 0.01631 | 1.33E+06 |
| 1, 69 | 171.5 | 40 | 214.3 | 1.32E+04 | 0.0163 | 1.36E+06 |
| 1, 70 | 174 | 40 | 210 | 1.29E+04 | 0.01631 | 1.40E+06 |
| 1, 71 | 176.5 | 40 | 206 | 1.26E+04 | 0.01632 | 1.43E+06 |
| 1, 72 | 179 | 40 | 201.8 | 1.24E+04 | 0.01633 | 1.46E+06 |
| 1, 73 | 181.5 | 40 | 197.6 | 1.21E+04 | 0.01632 | 1.49E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 74 | 184 | 40 | 193.5 | 1.18E+04 | 0.01634 | 1.52E+06 |
| 1, 75 | 186.5 | 40 | 189.3 | 1.16E+04 | 0.01635 | 1.55E+06 |
| 1, 76 | 189 | 40 | 185 | 1.13E+04 | 0.01636 | 1.58E+06 |
| 1, 77 | 191.5 | 40 | 180.9 | 1.10E+04 | 0.01639 | 1.60E+06 |
| 1, 78 | 194 | 40 | 176.8 | 1.08E+04 | 0.01641 | 1.63E+06 |
| 1, 79 | 196.4 | 40 | 172.7 | 1.05E+04 | 0.01643 | 1.66E+06 |
| 1, 80 | 199 | 40 | 168.5 | 1.02E+04 | 0.01646 | 1.68E+06 |
| 1, 81 | 201.5 | 40 | 164.3 | 9971 | 0.01648 | 1.71E+06 |
| 1, 82 | 204 | 40 | 160.1 | 9706 | 0.01649 | 1.73E+06 |
| 1, 83 | 206.5 | 40 | 156 | 9433 | 0.01654 | 1.75E+06 |
| 1, 84 | 209 | 40 | 151.8 | 9165 | 0.01657 | 1.78E+06 |
| 1, 85 | 211.5 | 40 | 147.5 | 8888 | 0.0166 | 1.80E+06 |
| 1, 86 | 214 | 40 | 143.5 | 8620 | 0.01665 | 1.82E+06 |
| 1, 87 | 216.5 | 40 | 139.3 | 8343 | 0.01669 | 1.84E+06 |
| 1, 88 | 218.9 | 40 | 135.2 | 8082 | 0.01673 | 1.86E+06 |
| 1, 89 | 221.5 | 40 | 130.9 | 7809 | 0.01677 | 1.88E+06 |
| 1, 90 | 224 | 40 | 126.9 | 7541 | 0.01683 | 1.90E+06 |
| 1, 91 | 226.5 | 40 | 122.5 | 7260 | 0.01688 | 1.92E+06 |
| 1, 92 | 229 | 40 | 118.5 | 7003 | 0.01692 | 1.94E+06 |
| 1, 93 | 231.5 | 40 | 114.3 | 6733 | 0.01698 | 1.95E+06 |
| 1, 94 | 234 | 40 | 110.1 | 6454 | 0.01706 | 1.97E+06 |
| 1, 95 | 236.5 | 40 | 106 | 6189 | 0.01713 | 1.98E+06 |
| 1, 96 | 239 | 40 | 101.8 | 5930 | 0.01717 | 2.00E+06 |
| 1, 97 | 241.5 | 40 | 97.58 | 5653 | 0.01726 | 2.01E+06 |
| 1, 98 | 244 | 40 | 93.48 | 5393 | 0.01734 | 2.03E+06 |
| 1, 99 | 246.5 | 40 | 89.3 | 5123 | 0.01743 | 2.04E+06 |
| 1, 100 | 249 | 40 | 85.04 | 4850 | 0.01753 | 2.05E+06 |
| 1, 101 | 251.5 | 40 | 80.95 | 4592 | 0.01763 | 2.06E+06 |
| 1, 102 | 254 | 40 | 76.86 | 4335 | 0.01773 | 2.07E+06 |
| 1, 103 | 256.5 | 40 | 72.51 | 4058 | 0.01787 | 2.08E+06 |
| 1, 104 | 259 | 40 | 68.5 | 3807 | 0.01799 | 2.09E+06 |
| 1, 105 | 261.4 | 40 | 64.4 | 3551 | 0.01814 | 2.10E+06 |
| 1, 106 | 264 | 40 | 59.98 | 3279 | 0.01829 | 2.11E+06 |
| 1, 107 | 266.5 | 40 | 55.99 | 3033 | 0.01846 | 2.12E+06 |
| 1, 108 | 269 | 40 | 51.82 | 2778 | 0.01865 | 2.12E+06 |
| 1, 109 | 271.5 | 40 | 47.57 | 2521 | 0.01887 | 2.13E+06 |
| 1, 110 | 274 | 40 | 43.48 | 2275 | 0.01911 | 2.14E+06 |
| 1, 111 | 276.5 | 40 | 39.35 | 2030 | 0.01938 | 2.14E+06 |
| 1, 112 | 279 | 40 | 35.08 | 1780 | 0.01971 | 2.15E+06 |
| 1, 113 | 281.5 | 40 | 31 | 1546 | 0.02005 | 2.15E+06 |
| 1, 114 | 284 | 40 | 26.9 | 1314 | 0.02047 | 2.15E+06 |
| 1, 115 | 286.5 | 40 | 22.59 | 1077 | 0.02097 | 2.16E+06 |
| 1, 116 | 289 | 40 | 18.42 | 852.5 | 0.0216 | 2.16E+06 |
| 1, 117 | 291.5 | 40 | 14.31 | 640.1 | 0.02236 | 2.16E+06 |
| 1, 118 | 294 | 40 | 10.01 | 427 | 0.02345 | 2.16E+06 |
| 1, 119 | 296.5 | 40 | 6.013 | 241.3 | 0.02491 | 2.16E+06 |
| 1, 120 | 298.9 | 40 | 1.892 | 72.66 | 0.02604 | 2.16E+06 |

**C2.3.4 Abu treated with 1000PPM PPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 1.277 | 40 | 2.085 | 0.00906 | 230.2 | 0.02903 |
| 2 | 3.796 | 40 | 6.216 | 0.01753 | 354.6 | 0.07443 |
| 3 | 6.306 | 40 | 10.48 | 0.03065 | 341.9 | 0.1542 |
| 4 | 8.805 | 40 | 14.5 | 0.07155 | 202.7 | 0.3503 |
| 5 | 11.29 | 40 | 18.7 | 38.5 | 0.4857 | 154.7 |
| 6 | 13.81 | 40 | 22.96 | 494.7 | 0.04642 | 1441 |
| 7 | 16.3 | 40 | 27.06 | 976.2 | 0.02772 | 3873 |
| 8 | 18.78 | 40 | 31.21 | 1389 | 0.02247 | 7403 |
| 9 | 21.31 | 40 | 35.47 | 1762 | 0.02013 | 1.19E+04 |
| 10 | 23.8 | 40 | 39.55 | 2080 | 0.01902 | 1.71E+04 |
| 11 | 26.28 | 40 | 43.73 | 2400 | 0.01823 | 2.31E+04 |
| 12 | 28.79 | 40 | 47.99 | 2709 | 0.01771 | 2.99E+04 |
| 13 | 31.3 | 40 | 52.04 | 2994 | 0.01738 | 3.74E+04 |
| 14 | 33.79 | 40 | 56.22 | 3280 | 0.01714 | 4.56E+04 |
| 15 | 36.3 | 40 | 60.47 | 3566 | 0.01696 | 5.47E+04 |
| 16 | 38.8 | 40 | 64.59 | 3841 | 0.01682 | 6.42E+04 |
| 17 | 41.29 | 40 | 68.7 | 4113 | 0.01671 | 7.45E+04 |
| 18 | 43.81 | 40 | 72.96 | 4393 | 0.01661 | 8.56E+04 |
| 19 | 46.3 | 40 | 77.05 | 4661 | 0.01653 | 9.71E+04 |
| 20 | 48.78 | 40 | 81.21 | 4929 | 0.01648 | 1.10E+05 |
| 21 | 51.3 | 40 | 85.44 | 5201 | 0.01643 | 1.23E+05 |
| 22 | 53.8 | 40 | 89.53 | 5464 | 0.01639 | 1.36E+05 |
| 23 | 56.29 | 40 | 93.72 | 5728 | 0.01636 | 1.51E+05 |
| 24 | 58.8 | 40 | 97.95 | 6000 | 0.01633 | 1.66E+05 |
| 25 | 61.3 | 40 | 102 | 6248 | 0.01633 | 1.81E+05 |
| 26 | 63.83 | 40 | 106.4 | 6514 | 0.01633 | 1.98E+05 |
| 27 | 66.35 | 40 | 110.4 | 6776 | 0.0163 | 2.15E+05 |
| 28 | 68.81 | 40 | 114.5 | 7037 | 0.01627 | 2.32E+05 |
| 29 | 71.33 | 40 | 118.8 | 7329 | 0.01622 | 2.51E+05 |
| 30 | 73.86 | 40 | 123 | 7605 | 0.01618 | 2.70E+05 |
| 31 | 76.31 | 40 | 127.1 | 7884 | 0.01612 | 2.89E+05 |
| 32 | 78.83 | 40 | 131.4 | 8187 | 0.01605 | 3.10E+05 |
| 33 | 81.34 | 40 | 135.4 | 8478 | 0.01597 | 3.31E+05 |
| 34 | 83.8 | 40 | 139.5 | 8775 | 0.0159 | 3.53E+05 |
| 35 | 86.33 | 40 | 143.9 | 9102 | 0.0158 | 3.76E+05 |
| 36 | 88.84 | 40 | 147.9 | 9397 | 0.01574 | 3.99E+05 |
| 37 | 91.3 | 40 | 152 | 9719 | 0.01564 | 4.23E+05 |
| 38 | 93.78 | 40 | 156.3 | 1.01E+04 | 0.01555 | 4.49E+05 |
| 39 | 96.31 | 40 | 160.5 | 1.04E+04 | 0.01545 | 4.75E+05 |
| 40 | 98.8 | 40 | 164.6 | 1.07E+04 | 0.01537 | 5.01E+05 |
| 41 | 101.3 | 40 | 168.7 | 1.10E+04 | 0.01529 | 5.29E+05 |
| 42 | 103.8 | 40 | 172.9 | 1.14E+04 | 0.01521 | 5.58E+05 |
| 43 | 106.3 | 40 | 177 | 1.17E+04 | 0.01514 | 5.87E+05 |
| 44 | 108.8 | 40 | 181.2 | 1.20E+04 | 0.01506 | 6.17E+05 |

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|---|---|---|---|---|---|---|
| 45 | 111.3 | 40 | 185.4 | 1.24E+04 | 0.01497 | 6.48E+05 |
| 46 | 113.8 | 40 | 189.5 | 1.27E+04 | 0.01492 | 6.80E+05 |
| 47 | 116.3 | 40 | 193.7 | 1.31E+04 | 0.01484 | 7.12E+05 |
| 48 | 118.8 | 40 | 198 | 1.34E+04 | 0.01478 | 7.46E+05 |
| 49 | 121.3 | 40 | 202.1 | 1.37E+04 | 0.0147 | 7.80E+05 |
| 50 | 123.8 | 40 | 206.4 | 1.41E+04 | 0.01463 | 8.17E+05 |
| 51 | 126.3 | 40 | 210.4 | 1.44E+04 | 0.01458 | 8.52E+05 |
| 52 | 128.8 | 40 | 214.6 | 1.48E+04 | 0.0145 | 8.89E+05 |
| 53 | 131.3 | 40 | 218.9 | 1.52E+04 | 0.01443 | 9.28E+05 |
| 54 | 133.8 | 40 | 222.9 | 1.55E+04 | 0.01435 | 9.65E+05 |
| 55 | 136.3 | 40 | 227.1 | 1.59E+04 | 0.0143 | 1.01E+06 |
| 56 | 138.8 | 40 | 231.4 | 1.62E+04 | 0.01426 | 1.05E+06 |
| 57 | 141.3 | 40 | 235.4 | 1.66E+04 | 0.01423 | 1.09E+06 |
| 58 | 143.8 | 40 | 239.5 | 1.69E+04 | 0.01418 | 1.13E+06 |
| 59 | 146.3 | 40 | 243.7 | 1.73E+04 | 0.01413 | 1.17E+06 |
| 60 | 148.8 | 40 | 247.9 | 1.76E+04 | 0.01409 | 1.22E+06 |
| 61 | 151.4 | 40 | 247.6 | 1.79E+04 | 0.01385 | 1.27E+06 |
| 62 | 154 | 40 | 243.6 | 1.80E+04 | 0.01356 | 1.31E+06 |
| 63 | 156.4 | 40 | 239.4 | 1.79E+04 | 0.0134 | 1.35E+06 |
| 64 | 159 | 40 | 235.1 | 1.77E+04 | 0.0133 | 1.40E+06 |
| 65 | 161.5 | 40 | 231 | 1.75E+04 | 0.01321 | 1.44E+06 |
| 66 | 163.9 | 40 | 226.9 | 1.72E+04 | 0.01317 | 1.48E+06 |
| 67 | 166.5 | 40 | 222.6 | 1.69E+04 | 0.01314 | 1.53E+06 |
| 68 | 169 | 40 | 218.6 | 1.67E+04 | 0.01309 | 1.57E+06 |
| 69 | 171.4 | 40 | 214.4 | 1.64E+04 | 0.01304 | 1.61E+06 |
| 70 | 174 | 40 | 210.1 | 1.61E+04 | 0.01302 | 1.65E+06 |
| 71 | 176.5 | 40 | 206 | 1.58E+04 | 0.013 | 1.69E+06 |
| 72 | 178.9 | 40 | 201.9 | 1.56E+04 | 0.01297 | 1.73E+06 |
| 73 | 181.5 | 40 | 197.5 | 1.52E+04 | 0.01297 | 1.77E+06 |
| 74 | 184 | 40 | 193.5 | 1.50E+04 | 0.01294 | 1.80E+06 |
| 75 | 186.4 | 40 | 189.4 | 1.46E+04 | 0.01294 | 1.84E+06 |
| 76 | 189 | 40 | 185.1 | 1.43E+04 | 0.01292 | 1.88E+06 |
| 77 | 191.5 | 40 | 181.1 | 1.40E+04 | 0.01293 | 1.91E+06 |
| 78 | 193.9 | 40 | 176.9 | 1.37E+04 | 0.01289 | 1.95E+06 |
| 79 | 196.5 | 40 | 172.6 | 1.34E+04 | 0.01289 | 1.98E+06 |
| 80 | 199 | 40 | 168.5 | 1.31E+04 | 0.01287 | 2.01E+06 |
| 81 | 201.4 | 40 | 164.4 | 1.28E+04 | 0.01286 | 2.04E+06 |
| 82 | 204 | 40 | 160 | 1.25E+04 | 0.01286 | 2.08E+06 |
| 83 | 206.5 | 40 | 156 | 1.21E+04 | 0.01285 | 2.11E+06 |
| 84 | 208.9 | 40 | 151.9 | 1.18E+04 | 0.01286 | 2.13E+06 |
| 85 | 211.5 | 40 | 147.6 | 1.15E+04 | 0.01286 | 2.16E+06 |
| 86 | 214 | 40 | 143.5 | 1.12E+04 | 0.01286 | 2.19E+06 |
| 87 | 216.4 | 40 | 139.4 | 1.08E+04 | 0.01288 | 2.22E+06 |
| 88 | 219 | 40 | 135.1 | 1.05E+04 | 0.01289 | 2.25E+06 |
| 89 | 221.5 | 40 | 131.1 | 1.02E+04 | 0.01289 | 2.27E+06 |
| 90 | 223.9 | 40 | 126.9 | 9840 | 0.0129 | 2.29E+06 |
| 91 | 226.5 | 40 | 122.6 | 9506 | 0.0129 | 2.32E+06 |
| 92 | 229 | 40 | 118.6 | 9167 | 0.01293 | 2.34E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 93 | 231.4 | 40 | 114.4 | 8838 | 0.01294 | 2.36E+06 |
| 94 | 234 | 40 | 110.1 | 8492 | 0.01296 | 2.39E+06 |
| 95 | 236.5 | 40 | 106 | 8175 | 0.01297 | 2.40E+06 |
| 96 | 238.9 | 40 | 101.8 | 7840 | 0.01299 | 2.42E+06 |
| 97 | 241.5 | 40 | 97.61 | 7505 | 0.01301 | 2.44E+06 |
| 98 | 244 | 40 | 93.53 | 7177 | 0.01303 | 2.46E+06 |
| 99 | 246.4 | 40 | 89.36 | 6844 | 0.01306 | 2.48E+06 |
| 100 | 249 | 40 | 85.1 | 6506 | 0.01308 | 2.49E+06 |
| 101 | 251.5 | 40 | 81.02 | 6179 | 0.01311 | 2.51E+06 |
| 102 | 253.9 | 40 | 76.9 | 5858 | 0.01313 | 2.52E+06 |
| 103 | 256.5 | 40 | 72.64 | 5518 | 0.01316 | 2.54E+06 |
| 104 | 259 | 40 | 68.57 | 5194 | 0.0132 | 2.55E+06 |
| 105 | 261.4 | 40 | 64.39 | 4865 | 0.01324 | 2.56E+06 |
| 106 | 264 | 40 | 60.13 | 4524 | 0.01329 | 2.57E+06 |
| 107 | 266.5 | 40 | 56.06 | 4203 | 0.01334 | 2.58E+06 |
| 108 | 268.9 | 40 | 51.88 | 3874 | 0.01339 | 2.59E+06 |
| 109 | 271.5 | 40 | 47.59 | 3535 | 0.01346 | 2.60E+06 |
| 110 | 274 | 40 | 43.59 | 3222 | 0.01353 | 2.61E+06 |
| 111 | 276.4 | 40 | 39.41 | 2897 | 0.0136 | 2.62E+06 |
| 112 | 279 | 40 | 35.14 | 2567 | 0.01369 | 2.63E+06 |
| 113 | 281.5 | 40 | 31.03 | 2253 | 0.01378 | 2.63E+06 |
| 114 | 283.9 | 40 | 26.88 | 1940 | 0.01385 | 2.64E+06 |
| 115 | 286.5 | 40 | 22.57 | 1616 | 0.01397 | 2.64E+06 |
| 116 | 289 | 40 | 18.58 | 1323 | 0.01405 | 2.64E+06 |
| 117 | 291.4 | 40 | 14.4 | 1022 | 0.01409 | 2.65E+06 |
| 118 | 294 | 40 | 10.06 | 720.3 | 0.01397 | 2.65E+06 |
| 119 | 296.5 | 40 | 6.073 | 453.5 | 0.01339 | 2.65E+06 |
| 120 | 298.9 | 40 | 1.891 | 146.6 | 0.0129 | 2.65E+06 |

**C2.3.5 Abu treated with 2000 PPMPPD**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 1.278 | 40 | 2.096 | 0.001263 | 1659 | -0.0028 |
| 2 | 3.823 | 40 | 6.313 | 0.000995 | 6342 | -0.0028 |
| 3 | 6.31 | 40 | 10.37 | 0.001048 | 9898 | 0.000932 |
| 4 | 8.779 | 40 | 14.54 | 0.001053 | 1.38E+04 | 0.002264 |
| 5 | 11.3 | 40 | 18.79 | 0.001092 | 1.72E+04 | 0.00506 |
| 6 | 13.8 | 40 | 22.91 | 0.001357 | 1.69E+04 | 0.00799 |
| 7 | 16.28 | 40 | 27.07 | 0.001699 | 1.59E+04 | 0.01305 |
| 8 | 18.81 | 40 | 31.32 | 0.00163 | 1.92E+04 | 0.01851 |
| 9 | 21.31 | 40 | 35.33 | 0.002101 | 1.68E+04 | 0.02237 |
| 10 | 23.79 | 40 | 39.52 | 0.002509 | 1.58E+04 | 0.0277 |
| 11 | 26.32 | 40 | 43.8 | 0.002762 | 1.59E+04 | 0.03555 |
| 12 | 28.81 | 40 | 47.94 | 0.003755 | 1.28E+04 | 0.04554 |
| 13 | 31.28 | 40 | 52.02 | 0.004139 | 1.26E+04 | 0.05406 |
| 14 | 33.81 | 40 | 56.33 | 0.005553 | 1.02E+04 | 0.06578 |
| 15 | 36.31 | 40 | 60.35 | 0.008689 | 6945 | 0.08935 |

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|---|---|---|---|---|---|---|
| 16 | 38.78 | 40 | 64.54 | 0.01685 | 3830 | 0.1324 |
| 17 | 41.31 | 40 | 68.78 | 0.1621 | 424.2 | 5.098 |
| 18 | 43.82 | 40 | 72.87 | 257.1 | 0.2834 | 697.5 |
| 19 | 46.29 | 40 | 76.98 | 834.4 | 0.09226 | 2905 |
| 20 | 48.81 | 40 | 81.28 | 1623 | 0.05007 | 7079 |
| 21 | 51.31 | 40 | 85.38 | 2161 | 0.03951 | 1.24E+04 |
| 22 | 53.78 | 40 | 89.54 | 2600 | 0.03444 | 1.90E+04 |
| 23 | 56.3 | 40 | 93.8 | 2982 | 0.03146 | 2.65E+04 |
| 24 | 58.81 | 40 | 97.87 | 3328 | 0.02941 | 3.48E+04 |
| 25 | 61.28 | 40 | 102.1 | 3673 | 0.02781 | 4.40E+04 |
| 26 | 63.81 | 40 | 106.3 | 4000 | 0.02657 | 5.42E+04 |
| 27 | 66.3 | 40 | 110.4 | 4320 | 0.02555 | 6.48E+04 |
| 28 | 68.78 | 40 | 114.5 | 4640 | 0.02469 | 7.65E+04 |
| 29 | 71.32 | 40 | 118.9 | 4977 | 0.02389 | 8.92E+04 |
| 30 | 73.82 | 40 | 122.9 | 5277 | 0.02329 | 1.02E+05 |
| 31 | 76.29 | 40 | 127 | 5602 | 0.02268 | 1.16E+05 |
| 32 | 78.8 | 40 | 131.3 | 5939 | 0.0221 | 1.31E+05 |
| 33 | 81.31 | 40 | 135.4 | 6283 | 0.02155 | 1.47E+05 |
| 34 | 83.79 | 40 | 139.6 | 6627 | 0.02106 | 1.63E+05 |
| 35 | 86.31 | 40 | 143.8 | 6992 | 0.02057 | 1.81E+05 |
| 36 | 88.82 | 40 | 147.9 | 7363 | 0.02009 | 1.99E+05 |
| 37 | 91.28 | 40 | 152 | 7721 | 0.01969 | 2.19E+05 |
| 38 | 93.81 | 40 | 156.3 | 8116 | 0.01926 | 2.40E+05 |
| 39 | 96.32 | 40 | 160.4 | 8495 | 0.01888 | 2.60E+05 |
| 40 | 98.79 | 40 | 164.6 | 8882 | 0.01853 | 2.83E+05 |
| 41 | 101.3 | 40 | 168.8 | 9258 | 0.01824 | 3.06E+05 |
| 42 | 103.8 | 40 | 172.9 | 9637 | 0.01794 | 3.30E+05 |
| 43 | 106.3 | 40 | 177 | 1.00E+04 | 0.01764 | 3.55E+05 |
| 44 | 108.8 | 40 | 181.3 | 1.05E+04 | 0.01735 | 3.82E+05 |
| 45 | 111.3 | 40 | 185.3 | 1.09E+04 | 0.01707 | 4.08E+05 |
| 46 | 113.8 | 40 | 189.6 | 1.13E+04 | 0.01682 | 4.36E+05 |
| 47 | 116.3 | 40 | 193.8 | 1.17E+04 | 0.01656 | 4.66E+05 |
| 48 | 118.8 | 40 | 197.9 | 1.22E+04 | 0.01629 | 4.96E+05 |
| 49 | 121.3 | 40 | 202.1 | 1.26E+04 | 0.01604 | 5.28E+05 |
| 50 | 123.8 | 40 | 206.3 | 1.30E+04 | 0.01582 | 5.61E+05 |
| 51 | 126.3 | 40 | 210.4 | 1.35E+04 | 0.01557 | 5.94E+05 |
| 52 | 128.8 | 40 | 214.6 | 1.40E+04 | 0.01538 | 6.29E+05 |
| 53 | 131.3 | 40 | 218.8 | 1.44E+04 | 0.01522 | 6.66E+05 |
| 54 | 133.8 | 40 | 222.9 | 1.48E+04 | 0.01506 | 7.02E+05 |
| 55 | 136.3 | 40 | 227 | 1.52E+04 | 0.01491 | 7.40E+05 |
| 56 | 138.8 | 40 | 231.3 | 1.57E+04 | 0.01474 | 7.80E+05 |
| 57 | 141.3 | 40 | 235.4 | 1.61E+04 | 0.0146 | 8.20E+05 |
| 58 | 143.8 | 40 | 239.5 | 1.66E+04 | 0.01446 | 8.61E+05 |
| 59 | 146.3 | 40 | 243.8 | 1.71E+04 | 0.01429 | 9.05E+05 |
| 60 | 148.8 | 40 | 247.9 | 1.75E+04 | 0.01418 | 9.48E+05 |
| 61 | 151.4 | 40 | 247.7 | 1.79E+04 | 0.01384 | 9.95E+05 |
| 62 | 153.9 | 40 | 243.6 | 1.81E+04 | 0.01347 | 1.04E+06 |
| 63 | 156.4 | 40 | 239.4 | 1.81E+04 | 0.01324 | 1.09E+06 |

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|---|---|---|---|---|---|---|
| 64 | 158.9 | 40 | 235.2 | 1.80E+04 | 0.01308 | 1.13E+06 |
| 65 | 161.4 | 40 | 231 | 1.78E+04 | 0.01296 | 1.18E+06 |
| 66 | 164 | 40 | 226.8 | 1.76E+04 | 0.01286 | 1.22E+06 |
| 67 | 166.5 | 40 | 222.7 | 1.74E+04 | 0.0128 | 1.26E+06 |
| 68 | 168.9 | 40 | 218.6 | 1.72E+04 | 0.01274 | 1.31E+06 |
| 69 | 171.4 | 40 | 214.4 | 1.69E+04 | 0.01269 | 1.35E+06 |
| 70 | 173.9 | 40 | 210.2 | 1.66E+04 | 0.01266 | 1.39E+06 |
| 71 | 176.4 | 40 | 206 | 1.63E+04 | 0.01264 | 1.43E+06 |
| 72 | 178.9 | 40 | 201.8 | 1.60E+04 | 0.01259 | 1.47E+06 |
| 73 | 181.5 | 40 | 197.7 | 1.57E+04 | 0.01256 | 1.51E+06 |
| 74 | 183.9 | 40 | 193.6 | 1.54E+04 | 0.01256 | 1.55E+06 |
| 75 | 186.4 | 40 | 189.3 | 1.51E+04 | 0.01252 | 1.59E+06 |
| 76 | 189 | 40 | 185.3 | 1.48E+04 | 0.01252 | 1.62E+06 |
| 77 | 191.4 | 40 | 181.1 | 1.45E+04 | 0.01251 | 1.66E+06 |
| 78 | 193.9 | 40 | 176.8 | 1.41E+04 | 0.01251 | 1.70E+06 |
| 79 | 196.5 | 40 | 172.7 | 1.38E+04 | 0.01251 | 1.73E+06 |
| 80 | 198.9 | 40 | 168.5 | 1.35E+04 | 0.01251 | 1.76E+06 |
| 81 | 201.4 | 40 | 164.3 | 1.31E+04 | 0.01252 | 1.80E+06 |
| 82 | 204 | 40 | 160.2 | 1.28E+04 | 0.01254 | 1.83E+06 |
| 83 | 206.4 | 40 | 156.1 | 1.25E+04 | 0.01254 | 1.86E+06 |
| 84 | 209 | 40 | 151.8 | 1.21E+04 | 0.01256 | 1.89E+06 |
| 85 | 211.5 | 40 | 147.7 | 1.17E+04 | 0.01258 | 1.92E+06 |
| 86 | 213.9 | 40 | 143.6 | 1.14E+04 | 0.01259 | 1.95E+06 |
| 87 | 216.5 | 40 | 139.3 | 1.10E+04 | 0.01262 | 1.97E+06 |
| 88 | 219 | 40 | 135.2 | 1.07E+04 | 0.01265 | 2.00E+06 |
| 89 | 221.4 | 40 | 131 | 1.03E+04 | 0.01269 | 2.03E+06 |
| 90 | 223.9 | 40 | 126.8 | 9957 | 0.01273 | 2.05E+06 |
| 91 | 226.5 | 40 | 122.7 | 9611 | 0.01277 | 2.08E+06 |
| 92 | 228.9 | 40 | 118.5 | 9246 | 0.01282 | 2.10E+06 |
| 93 | 231.4 | 40 | 114.2 | 8864 | 0.01288 | 2.12E+06 |
| 94 | 234 | 40 | 110.2 | 8514 | 0.01294 | 2.14E+06 |
| 95 | 236.4 | 40 | 106 | 8156 | 0.013 | 2.16E+06 |
| 96 | 239 | 40 | 101.8 | 7778 | 0.01309 | 2.18E+06 |
| 97 | 241.5 | 40 | 97.69 | 7430 | 0.01315 | 2.20E+06 |
| 98 | 243.9 | 40 | 93.59 | 7068 | 0.01324 | 2.22E+06 |
| 99 | 246.5 | 40 | 89.25 | 6684 | 0.01335 | 2.23E+06 |
| 100 | 249 | 40 | 85.19 | 6338 | 0.01344 | 2.25E+06 |
| 101 | 251.4 | 40 | 81.06 | 5972 | 0.01358 | 2.26E+06 |
| 102 | 254 | 40 | 76.74 | 5597 | 0.01371 | 2.28E+06 |
| 103 | 256.5 | 40 | 72.7 | 5253 | 0.01384 | 2.29E+06 |
| 104 | 258.9 | 40 | 68.58 | 4893 | 0.01402 | 2.30E+06 |
| 105 | 261.4 | 40 | 64.29 | 4531 | 0.01419 | 2.32E+06 |
| 106 | 264 | 40 | 60.19 | 4187 | 0.01438 | 2.33E+06 |
| 107 | 266.4 | 40 | 56.1 | 3840 | 0.01461 | 2.34E+06 |
| 108 | 269 | 40 | 51.76 | 3475 | 0.0149 | 2.34E+06 |
| 109 | 271.5 | 40 | 47.72 | 3143 | 0.01518 | 2.35E+06 |
| 110 | 273.9 | 40 | 43.57 | 2804 | 0.01554 | 2.36E+06 |
| 111 | 276.4 | 40 | 39.25 | 2458 | 0.01597 | 2.37E+06 |

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|---|---|---|---|---|---|---|
| 112 | 279 | 40 | 35.28 | 2144 | 0.01646 | 2.37E+06 |
| 113 | 281.4 | 40 | 31.09 | 1822 | 0.01706 | 2.38E+06 |
| 114 | 284 | 40 | 26.74 | 1495 | 0.01788 | 2.38E+06 |
| 115 | 286.5 | 40 | 22.67 | 1199 | 0.01891 | 2.38E+06 |
| 116 | 288.9 | 40 | 18.56 | 913.6 | 0.02031 | 2.38E+06 |
| 117 | 291.5 | 40 | 14.27 | 634.3 | 0.02249 | 2.39E+06 |
| 118 | 294 | 40 | 10.25 | 399.1 | 0.02568 | 2.39E+06 |
| 119 | 296.4 | 40 | 6.073 | 187.9 | 0.03232 | 2.39E+06 |
| 120 | 298.9 | 40 | 1.795 | 25.01 | 0.07178 | 2.39E+06 |

**C2.3.6 Abu untreated with 20% Sertica**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.276 | 40 | 2.096 | 0.004353 | 481.4 | 0.02344 |
| 1, 2 | 3.833 | 40 | 6.365 | 0.006881 | 925 | 0.04208 |
| 1, 3 | 6.326 | 40 | 10.4 | 0.012 | 866.5 | 0.07217 |
| 1, 4 | 8.788 | 40 | 14.57 | 0.02778 | 524.6 | 0.1459 |
| 1, 5 | 11.33 | 40 | 18.86 | 0.08476 | 222.5 | 0.3744 |
| 1, 6 | 13.82 | 40 | 22.87 | 5.775 | 3.961 | 27.18 |
| 1, 7 | 16.29 | 40 | 27.1 | 156.9 | 0.1727 | 452.7 |
| 1, 8 | 18.83 | 40 | 31.27 | 528.3 | 0.05919 | 1852 |
| 1, 9 | 21.32 | 40 | 35.38 | 938 | 0.03772 | 4183 |
| 1, 10 | 23.8 | 40 | 39.56 | 1323 | 0.0299 | 7551 |
| 1, 11 | 26.34 | 40 | 43.82 | 1691 | 0.02592 | 1.19E+04 |
| 1, 12 | 28.83 | 40 | 47.92 | 2027 | 0.02365 | 1.69E+04 |
| 1, 13 | 31.3 | 40 | 52.1 | 2360 | 0.02208 | 2.28E+04 |
| 1, 14 | 33.83 | 40 | 56.37 | 2700 | 0.02088 | 2.98E+04 |
| 1, 15 | 36.33 | 40 | 60.38 | 3021 | 0.01999 | 3.71E+04 |
| 1, 16 | 38.79 | 40 | 64.58 | 3354 | 0.01925 | 4.55E+04 |
| 1, 17 | 41.32 | 40 | 68.86 | 3701 | 0.01861 | 5.50E+04 |
| 1, 18 | 43.83 | 40 | 72.88 | 4031 | 0.01808 | 6.49E+04 |
| 1, 19 | 46.29 | 40 | 77.09 | 4376 | 0.01762 | 7.59E+04 |
| 1, 20 | 48.83 | 40 | 81.35 | 4725 | 0.01722 | 8.82E+04 |
| 1, 21 | 51.35 | 40 | 85.42 | 5062 | 0.01687 | 1.01E+05 |
| 1, 22 | 53.8 | 40 | 89.59 | 5410 | 0.01656 | 1.14E+05 |
| 1, 23 | 56.32 | 40 | 93.89 | 5782 | 0.01624 | 1.29E+05 |
| 1, 24 | 58.82 | 40 | 97.86 | 6130 | 0.01596 | 1.44E+05 |
| 1, 25 | 61.29 | 40 | 102 | 6501 | 0.0157 | 1.60E+05 |
| 1, 26 | 63.83 | 40 | 106.4 | 6888 | 0.01545 | 1.78E+05 |
| 1, 27 | 66.33 | 40 | 110.4 | 7245 | 0.01524 | 1.95E+05 |
| 1, 28 | 68.79 | 40 | 114.5 | 7629 | 0.01502 | 2.15E+05 |
| 1, 29 | 71.32 | 40 | 118.9 | 8016 | 0.01483 | 2.35E+05 |
| 1, 30 | 73.83 | 40 | 122.9 | 8377 | 0.01467 | 2.56E+05 |
| 1, 31 | 76.31 | 40 | 127 | 8767 | 0.01449 | 2.78E+05 |

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|---|---|---|---|---|---|---|
| 1, 32 | 78.85 | 40 | 131.4 | 9150 | 0.01436 | 3.01E+05 |
| 1, 33 | 81.33 | 40 | 135.4 | 9514 | 0.01423 | 3.24E+05 |
| 1, 34 | 83.78 | 40 | 139.6 | 9877 | 0.01413 | 3.49E+05 |
| 1, 35 | 86.32 | 40 | 143.9 | 1.03E+04 | 0.01404 | 3.75E+05 |
| 1, 36 | 88.83 | 40 | 147.9 | 1.06E+04 | 0.01395 | 4.01E+05 |
| 1, 37 | 91.3 | 40 | 152.1 | 1.10E+04 | 0.01385 | 4.29E+05 |
| 1, 38 | 93.82 | 40 | 156.3 | 1.14E+04 | 0.01375 | 4.58E+05 |
| 1, 39 | 96.32 | 40 | 160.4 | 1.17E+04 | 0.01372 | 4.86E+05 |
| 1, 40 | 98.79 | 40 | 164.6 | 1.20E+04 | 0.01367 | 5.16E+05 |
| 1, 41 | 101.3 | 40 | 168.8 | 1.24E+04 | 0.0136 | 5.49E+05 |
| 1, 42 | 103.8 | 40 | 172.9 | 1.28E+04 | 0.01352 | 5.80E+05 |
| 1, 43 | 106.3 | 40 | 177.1 | 1.31E+04 | 0.01348 | 6.12E+05 |
| 1, 44 | 108.8 | 40 | 181.3 | 1.35E+04 | 0.01343 | 6.47E+05 |
| 1, 45 | 111.3 | 39.9 | 185.4 | 1.39E+04 | 0.01336 | 6.81E+05 |
| 1, 46 | 113.8 | 40 | 189.6 | 1.42E+04 | 0.01333 | 7.16E+05 |
| 1, 47 | 116.3 | 40 | 193.8 | 1.46E+04 | 0.01328 | 7.54E+05 |
| 1, 48 | 118.8 | 40 | 197.9 | 1.49E+04 | 0.01325 | 7.90E+05 |
| 1, 49 | 121.3 | 40 | 202 | 1.53E+04 | 0.01323 | 8.28E+05 |
| 1, 50 | 123.8 | 40 | 206.3 | 1.57E+04 | 0.01319 | 8.68E+05 |
| 1, 51 | 126.3 | 40 | 210.4 | 1.60E+04 | 0.01316 | 9.08E+05 |
| 1, 52 | 128.8 | 40 | 214.5 | 1.63E+04 | 0.01313 | 9.49E+05 |
| 1, 53 | 131.3 | 40 | 218.9 | 1.67E+04 | 0.01311 | 9.92E+05 |
| 1, 54 | 133.8 | 40 | 222.9 | 1.70E+04 | 0.01311 | 1.03E+06 |
| 1, 55 | 136.3 | 40 | 227 | 1.74E+04 | 0.01306 | 1.08E+06 |
| 1, 56 | 138.8 | 40 | 231.4 | 1.78E+04 | 0.01302 | 1.12E+06 |
| 1, 57 | 141.3 | 40 | 235.4 | 1.81E+04 | 0.01299 | 1.17E+06 |
| 1, 58 | 143.8 | 40 | 239.5 | 1.85E+04 | 0.01297 | 1.21E+06 |
| 1, 59 | 146.3 | 40 | 243.8 | 1.88E+04 | 0.01294 | 1.26E+06 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.92E+04 | 0.01291 | 1.31E+06 |
| 1, 61 | 151.4 | 40 | 247.7 | 1.95E+04 | 0.0127 | 1.36E+06 |
| 1, 62 | 153.9 | 40 | 243.6 | 1.96E+04 | 0.01246 | 1.41E+06 |
| 1, 63 | 156.4 | 40 | 239.4 | 1.95E+04 | 0.01229 | 1.46E+06 |
| 1, 64 | 158.9 | 40 | 235.1 | 1.93E+04 | 0.01219 | 1.51E+06 |
| 1, 65 | 161.4 | 40 | 231.1 | 1.91E+04 | 0.0121 | 1.55E+06 |
| 1, 66 | 163.9 | 40 | 226.9 | 1.88E+04 | 0.01205 | 1.60E+06 |
| 1, 67 | 166.4 | 40 | 222.6 | 1.86E+04 | 0.01199 | 1.65E+06 |
| 1, 68 | 168.9 | 40 | 218.5 | 1.83E+04 | 0.01194 | 1.69E+06 |
| 1, 69 | 171.4 | 40 | 214.4 | 1.80E+04 | 0.01188 | 1.74E+06 |
| 1, 70 | 173.9 | 40 | 210.2 | 1.78E+04 | 0.01184 | 1.78E+06 |
| 1, 71 | 176.4 | 40 | 206 | 1.75E+04 | 0.0118 | 1.82E+06 |
| 1, 72 | 178.9 | 40 | 201.9 | 1.71E+04 | 0.01178 | 1.87E+06 |
| 1, 73 | 181.4 | 40 | 197.7 | 1.69E+04 | 0.01173 | 1.91E+06 |
| 1, 74 | 183.9 | 40 | 193.6 | 1.65E+04 | 0.0117 | 1.95E+06 |
| 1, 75 | 186.4 | 40 | 189.4 | 1.63E+04 | 0.01165 | 1.99E+06 |
| 1, 76 | 188.9 | 40 | 185.2 | 1.59E+04 | 0.01164 | 2.03E+06 |
| 1, 77 | 191.4 | 40 | 181.1 | 1.56E+04 | 0.01162 | 2.07E+06 |
| 1, 78 | 193.9 | 40 | 176.9 | 1.53E+04 | 0.01159 | 2.11E+06 |
| 1, 79 | 196.4 | 40 | 172.7 | 1.49E+04 | 0.01159 | 2.15E+06 |

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|---|---|---|---|---|---|---|
| 1, 80 | 198.9 | 40 | 168.6 | 1.46E+04 | 0.01154 | 2.18E+06 |
| 1, 81 | 201.4 | 40 | 164.4 | 1.43E+04 | 0.01153 | 2.22E+06 |
| 1, 82 | 203.9 | 40 | 160.2 | 1.39E+04 | 0.01151 | 2.25E+06 |
| 1, 83 | 206.4 | 40 | 156.1 | 1.36E+04 | 0.01148 | 2.29E+06 |
| 1, 84 | 208.9 | 40 | 151.9 | 1.32E+04 | 0.01147 | 2.32E+06 |
| 1, 85 | 211.4 | 40 | 147.7 | 1.29E+04 | 0.01146 | 2.35E+06 |
| 1, 86 | 213.9 | 40 | 143.6 | 1.25E+04 | 0.01145 | 2.38E+06 |
| 1, 87 | 216.4 | 40 | 139.4 | 1.22E+04 | 0.01141 | 2.41E+06 |
| 1, 88 | 218.9 | 40 | 135.1 | 1.19E+04 | 0.0114 | 2.44E+06 |
| 1, 89 | 221.4 | 40 | 131.1 | 1.15E+04 | 0.01139 | 2.47E+06 |
| 1, 90 | 223.9 | 40 | 126.9 | 1.12E+04 | 0.01137 | 2.50E+06 |
| 1, 91 | 226.4 | 40 | 122.6 | 1.08E+04 | 0.01133 | 2.53E+06 |
| 1, 92 | 228.9 | 40 | 118.6 | 1.05E+04 | 0.01132 | 2.55E+06 |
| 1, 93 | 231.4 | 40 | 114.3 | 1.01E+04 | 0.0113 | 2.58E+06 |
| 1, 94 | 233.9 | 40 | 110.1 | 9767 | 0.01128 | 2.60E+06 |
| 1, 95 | 236.4 | 40 | 106.1 | 9428 | 0.01125 | 2.63E+06 |
| 1, 96 | 238.9 | 40 | 101.8 | 9056 | 0.01125 | 2.65E+06 |
| 1, 97 | 241.4 | 40 | 97.65 | 8691 | 0.01124 | 2.67E+06 |
| 1, 98 | 243.9 | 40 | 93.54 | 8336 | 0.01122 | 2.69E+06 |
| 1, 99 | 246.4 | 40 | 89.37 | 7970 | 0.01121 | 2.71E+06 |
| 1, 100 | 248.9 | 40 | 85.14 | 7595 | 0.01121 | 2.73E+06 |
| 1, 101 | 251.4 | 40 | 81.09 | 7235 | 0.01121 | 2.75E+06 |
| 1, 102 | 253.9 | 40 | 76.93 | 6879 | 0.01118 | 2.77E+06 |
| 1, 103 | 256.4 | 40 | 72.62 | 6498 | 0.01117 | 2.78E+06 |
| 1, 104 | 258.9 | 40 | 68.56 | 6148 | 0.01115 | 2.80E+06 |
| 1, 105 | 261.4 | 40 | 64.38 | 5784 | 0.01113 | 2.81E+06 |
| 1, 106 | 263.9 | 40 | 60.19 | 5403 | 0.01114 | 2.83E+06 |
| 1, 107 | 266.4 | 40 | 56.06 | 5041 | 0.01112 | 2.84E+06 |
| 1, 108 | 268.9 | 40 | 51.96 | 4682 | 0.0111 | 2.85E+06 |
| 1, 109 | 271.4 | 40 | 47.61 | 4301 | 0.01107 | 2.86E+06 |
| 1, 110 | 273.9 | 40 | 43.6 | 3955 | 0.01103 | 2.87E+06 |
| 1, 111 | 276.4 | 40 | 39.34 | 3586 | 0.01097 | 2.88E+06 |
| 1, 112 | 278.9 | 40 | 35.17 | 3225 | 0.01091 | 2.89E+06 |
| 1, 113 | 281.4 | 40 | 31.1 | 2871 | 0.01083 | 2.89E+06 |
| 1, 114 | 283.9 | 40 | 26.94 | 2508 | 0.01074 | 2.90E+06 |
| 1, 115 | 286.4 | 40 | 22.69 | 2140 | 0.0106 | 2.91E+06 |
| 1, 116 | 288.9 | 40 | 18.59 | 1786 | 0.01041 | 2.91E+06 |
| 1, 117 | 291.4 | 40 | 14.48 | 1430 | 0.01013 | 2.91E+06 |
| 1, 118 | 293.9 | 40 | 10.18 | 1063 | 0.009576 | 2.92E+06 |
| 1, 119 | 296.4 | 40 | 6.071 | 717.4 | 0.008462 | 2.92E+06 |
| 1, 120 | 298.9 | 40 | 1.932 | 381.8 | 0.00506 | 2.92E+06 |

**C3 (Cooling rate=0.5C/min&SLR=25Pa/min)**

**C3.1 (T=30°C)**

**C3.1.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|

| | | | Pa | | | |
|---|---|---|---|---|---|---|
| 1 | 20.02 | 30 | 8.339 | 1.39E-06 | 5.98E+06 | 0.000666 |
| 2 | 60.04 | 30 | 24.7 | 2.49E-06 | 9.91E+06 | 0.000666 |
| 3 | 100 | 30 | 41.4 | 1.15E-06 | 3.60E+07 | 0.000932 |
| 4 | 140.1 | 30 | 58.1 | 2.05E-06 | 2.84E+07 | 0.000932 |
| 5 | 180.1 | 30 | 74.8 | 3.18E-06 | 2.35E+07 | 0.001065 |
| 6 | 220 | 30 | 91.5 | 2.68E-06 | 3.41E+07 | 0.001198 |
| 7 | 260.1 | 30 | 108.2 | 4.94E-06 | 2.19E+07 | 0.001598 |
| 8 | 300.1 | 30 | 124.8 | 3.96E-06 | 3.15E+07 | 0.001465 |
| 9 | 340 | 30 | 141.4 | 3.67E-06 | 3.85E+07 | 0.001598 |
| 10 | 380.1 | 30 | 158.1 | 5.87E-06 | 2.69E+07 | 0.001864 |
| 11 | 420.1 | 30 | 174.7 | 3.27E-06 | 5.34E+07 | 0.001864 |
| 12 | 460 | 30 | 191.4 | 4.35E-06 | 4.41E+07 | 0.002397 |
| 13 | 500.1 | 30 | 208.1 | 3.00E-06 | 6.93E+07 | 0.002264 |
| 14 | 540.1 | 30 | 224.8 | 3.45E-06 | 6.51E+07 | 0.002663 |
| 15 | 580 | 30 | 241.4 | 4.98E-06 | 4.85E+07 | 0.002663 |
| 16 | 620.1 | 30 | 258.1 | 3.32E-06 | 7.78E+07 | 0.002929 |
| 17 | 660.1 | 30 | 274.8 | 5.29E-06 | 5.19E+07 | 0.003196 |
| 18 | 700 | 30 | 291.5 | 5.13E-06 | 5.68E+07 | 0.003462 |
| 19 | 740.1 | 30 | 308.2 | 7.07E-06 | 4.36E+07 | 0.003462 |
| 20 | 780.1 | 30 | 324.9 | 5.70E-06 | 5.70E+07 | 0.003862 |
| 21 | 820 | 30 | 341.6 | 6.46E-06 | 5.29E+07 | 0.004128 |
| 22 | 860 | 30 | 358.3 | 6.78E-06 | 5.28E+07 | 0.004261 |
| 23 | 900.1 | 30 | 374.7 | 7.27E-06 | 5.15E+07 | 0.00466 |
| 24 | 940 | 30 | 391.4 | 7.77E-06 | 5.04E+07 | 0.00466 |
| 25 | 980 | 30 | 408 | 4.62E-06 | 8.83E+07 | 0.005593 |
| 26 | 1020 | 30 | 425 | 7.89E-06 | 5.39E+07 | 0.005992 |
| 27 | 1060 | 30 | 441.6 | 1.44E-05 | 3.07E+07 | 0.006125 |
| 28 | 1100 | 30 | 458.3 | 1.56E-05 | 2.94E+07 | 0.006924 |
| 29 | 1140 | 30 | 474.9 | 1.66E-05 | 2.87E+07 | 0.007457 |
| 30 | 1180 | 30 | 491.6 | 2.08E-05 | 2.37E+07 | 0.008522 |
| 31 | 1220 | 30 | 508.2 | 2.87E-05 | 1.77E+07 | 0.009454 |
| 32 | 1260 | 30 | 524.8 | 4.60E-05 | 1.14E+07 | 0.01132 |
| 33 | 1300 | 30 | 541.5 | 9.18E-05 | 5.90E+06 | 0.01518 |
| 34 | 1340 | 30 | 558.1 | 0.005718 | 9.76E+04 | 1.847 |
| 35 | 1380 | 30 | 574.8 | 1.14E+04 | 0.05049 | 4.52E+05 |
| 36 | 1420 | 30 | 591.5 | 2.35E+04 | 0.02514 | 1.39E+06 |
| 37 | 1460 | 30 | 608.1 | 2.56E+04 | 0.02374 | 2.42E+06 |
| 38 | 1500 | 30 | 624.8 | 2.64E+04 | 0.02366 | 3.47E+06 |
| 39 | 1540 | 30 | 641.4 | 2.61E+04 | 0.02462 | 4.51E+06 |
| 40 | 1580 | 30 | 658.1 | 2.62E+04 | 0.02514 | 5.56E+06 |
| 41 | 1620 | 30 | 674.8 | 2.61E+04 | 0.02589 | 6.60E+06 |
| 42 | 1660 | 30 | 691.5 | 2.63E+04 | 0.0263 | 7.66E+06 |
| 43 | 1700 | 30 | 708.1 | 2.65E+04 | 0.02673 | 8.72E+06 |
| 44 | 1740 | 30 | 724.8 | 2.69E+04 | 0.02697 | 9.79E+06 |
| 45 | 1780 | 30 | 741.5 | 2.65E+04 | 0.02795 | 1.09E+07 |
| 46 | 1820 | 30 | 758.2 | 2.64E+04 | 0.02868 | 1.19E+07 |
| 47 | 1860 | 30 | 774.9 | 2.70E+04 | 0.02872 | 1.30E+07 |

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|---|---|---|---|---|---|---|
| 48 | 1900 | 30 | 791.6 | 2.72E+04 | 0.02909 | 1.41E+07 |
| 49 | 1940 | 30 | 808.2 | 2.75E+04 | 0.02943 | 1.52E+07 |
| 50 | 1980 | 30 | 824.9 | 2.80E+04 | 0.02947 | 1.63E+07 |
| 51 | 2020 | 30 | 841.6 | 2.74E+04 | 0.03074 | 1.74E+07 |
| 52 | 2060 | 30 | 858.3 | 2.62E+04 | 0.03274 | 1.84E+07 |
| 53 | 2100 | 30 | 875 | 2.40E+04 | 0.03651 | 1.94E+07 |
| 54 | 2140 | 30 | 891.6 | 2.33E+04 | 0.03821 | 2.03E+07 |
| 55 | 2180 | 30 | 908.3 | 2.40E+04 | 0.0379 | 2.13E+07 |
| 56 | 2220 | 30 | 925 | 2.46E+04 | 0.03762 | 2.23E+07 |
| 57 | 2260 | 30 | 941.7 | 2.48E+04 | 0.03791 | 2.33E+07 |
| 58 | 2300 | 30 | 958 | 2.53E+04 | 0.0379 | 2.43E+07 |
| 59 | 2340 | 30 | 974.7 | 2.58E+04 | 0.0378 | 2.53E+07 |
| 60 | 2380 | 30 | 991.4 | 2.64E+04 | 0.03753 | 2.64E+07 |
| 61 | 2420 | 30 | 991.6 | 2.64E+04 | 0.03753 | 2.74E+07 |
| 62 | 2460 | 30 | 975.3 | 2.57E+04 | 0.03803 | 2.85E+07 |
| 63 | 2500 | 30 | 958.6 | 2.47E+04 | 0.0388 | 2.94E+07 |
| 64 | 2540 | 30 | 941.9 | 2.38E+04 | 0.03956 | 3.04E+07 |
| 65 | 2580 | 30 | 925.2 | 2.29E+04 | 0.04037 | 3.13E+07 |
| 66 | 2620 | 30 | 908.5 | 2.21E+04 | 0.04113 | 3.22E+07 |
| 67 | 2660 | 30 | 891.9 | 2.13E+04 | 0.04186 | 3.30E+07 |
| 68 | 2700 | 30 | 875.2 | 2.06E+04 | 0.04257 | 3.39E+07 |
| 69 | 2740 | 30 | 858.5 | 1.97E+04 | 0.04352 | 3.47E+07 |
| 70 | 2780 | 30 | 841.9 | 1.90E+04 | 0.04424 | 3.54E+07 |
| 71 | 2820 | 30 | 825.2 | 1.83E+04 | 0.04506 | 3.61E+07 |
| 72 | 2860 | 30 | 808.5 | 1.76E+04 | 0.04586 | 3.68E+07 |
| 73 | 2900 | 30 | 791.9 | 1.70E+04 | 0.04659 | 3.75E+07 |
| 74 | 2940 | 30 | 775.2 | 1.64E+04 | 0.04737 | 3.82E+07 |
| 75 | 2980 | 30 | 758.5 | 1.57E+04 | 0.04828 | 3.88E+07 |
| 76 | 3020 | 30 | 741.8 | 1.50E+04 | 0.04935 | 3.94E+07 |
| 77 | 3060 | 30 | 725.1 | 1.44E+04 | 0.05042 | 4.00E+07 |
| 78 | 3100 | 30 | 708.4 | 1.36E+04 | 0.05195 | 4.05E+07 |
| 79 | 3140 | 30 | 691.7 | 1.29E+04 | 0.05375 | 4.10E+07 |
| 80 | 3180 | 30 | 675 | 1.20E+04 | 0.05624 | 4.15E+07 |
| 81 | 3220 | 30 | 658.4 | 1.10E+04 | 0.05969 | 4.20E+07 |
| 82 | 3260 | 30 | 641.7 | 9980 | 0.0643 | 4.24E+07 |
| 83 | 3300 | 30 | 625 | 8877 | 0.07041 | 4.27E+07 |
| 84 | 3340 | 30 | 608.4 | 7675 | 0.07927 | 4.30E+07 |
| 85 | 3380 | 30 | 591.7 | 6730 | 0.08792 | 4.33E+07 |
| 86 | 3420 | 30 | 575 | 6191 | 0.09288 | 4.35E+07 |
| 87 | 3460 | 30 | 558.4 | 5743 | 0.09723 | 4.38E+07 |
| 88 | 3500 | 30 | 541.7 | 5347 | 0.1013 | 4.40E+07 |
| 89 | 3540 | 30 | 525 | 4973 | 0.1056 | 4.42E+07 |
| 90 | 3580 | 30 | 508.3 | 4628 | 0.1098 | 4.44E+07 |
| 91 | 3620 | 30 | 491.7 | 4300 | 0.1143 | 4.45E+07 |
| 92 | 3660 | 30 | 475 | 3989 | 0.1191 | 4.47E+07 |
| 93 | 3700 | 30 | 458.3 | 3719 | 0.1232 | 4.49E+07 |
| 94 | 3740 | 30 | 441.7 | 3473 | 0.1272 | 4.50E+07 |
| 95 | 3780 | 30 | 425 | 3233 | 0.1315 | 4.51E+07 |

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|---|---|---|---|---|---|---|
| 96 | 3820 | 30 | 408.4 | 3014 | 0.1355 | 4.52E+07 |
| 97 | 3860 | 30 | 391.8 | 2805 | 0.1397 | 4.54E+07 |
| 98 | 3900 | 30 | 375.1 | 2595 | 0.1445 | 4.55E+07 |
| 99 | 3940 | 30 | 358.5 | 2394 | 0.1498 | 4.56E+07 |
| 100 | 3980 | 30 | 341.8 | 2196 | 0.1557 | 4.56E+07 |
| 101 | 4020 | 30 | 325.1 | 1999 | 0.1626 | 4.57E+07 |
| 102 | 4060 | 30 | 308.4 | 1803 | 0.1711 | 4.58E+07 |
| 103 | 4100 | 30 | 291.8 | 1618 | 0.1803 | 4.59E+07 |
| 104 | 4140 | 30 | 275.1 | 1441 | 0.1909 | 4.59E+07 |
| 105 | 4180 | 30 | 258.4 | 1258 | 0.2055 | 4.60E+07 |
| 106 | 4220 | 30 | 241.7 | 1078 | 0.2242 | 4.60E+07 |
| 107 | 4260 | 30 | 225.1 | 901.5 | 0.2497 | 4.60E+07 |
| 108 | 4300 | 30 | 208.4 | 727.2 | 0.2866 | 4.61E+07 |
| 109 | 4340 | 30 | 191.7 | 565.5 | 0.339 | 4.61E+07 |
| 110 | 4380 | 30 | 175 | 424.5 | 0.4123 | 4.61E+07 |
| 111 | 4420 | 30 | 158.3 | 304.1 | 0.5208 | 4.61E+07 |
| 112 | 4460 | 30 | 141.7 | 225.3 | 0.6288 | 4.61E+07 |
| 113 | 4500 | 30 | 125 | 170.1 | 0.7351 | 4.61E+07 |
| 114 | 4540 | 30 | 108.4 | 114.3 | 0.9478 | 4.61E+07 |
| 115 | 4580 | 30 | 91.73 | 83.1 | 1.104 | 4.61E+07 |
| 116 | 4620 | 30 | 75.06 | 56.8 | 1.322 | 4.61E+07 |
| 117 | 4660 | 30 | 58.36 | 30.17 | 1.934 | 4.61E+07 |
| 118 | 4700 | 30 | 41.68 | 11.4 | 3.657 | 4.61E+07 |
| 119 | 4740 | 30 | 24.99 | 5.779 | 4.324 | 4.61E+07 |
| 120 | 4780 | 30 | 8.283 | 0.2758 | 30.03 | 4.61E+07 |

### C3.1.2 Abu treated with 500PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 20.02 | 30 | 8.364 | 9.98E-06 | 8.38E+05 | -0.00786 |
| 2 | 60.06 | 30 | 24.72 | 1.02E-05 | 2.42E+06 | -0.00732 |
| 3 | 100.1 | 30 | 41.37 | 1.30E-05 | 3.19E+06 | -0.00666 |
| 4 | 140 | 30 | 58.02 | 1.21E-05 | 4.81E+06 | -0.00626 |
| 5 | 180.1 | 30 | 74.7 | 9.51E-06 | 7.85E+06 | -0.00573 |
| 6 | 220.1 | 30 | 91.4 | 1.53E-05 | 5.97E+06 | -0.00493 |
| 7 | 260 | 30 | 108.1 | 1.62E-05 | 6.66E+06 | -0.00439 |
| 8 | 300.1 | 30 | 124.7 | 1.80E-05 | 6.92E+06 | -0.00386 |
| 9 | 340.1 | 30 | 141.4 | 2.07E-05 | 6.82E+06 | -0.0028 |
| 10 | 380 | 30 | 158 | 2.01E-05 | 7.86E+06 | -0.00186 |
| 11 | 420.1 | 30 | 174.7 | 2.02E-05 | 8.65E+06 | -0.0012 |
| 12 | 460.1 | 30 | 191.4 | 2.07E-05 | 9.25E+06 | -0.00027 |
| 13 | 500 | 30 | 208.4 | 2.57E-05 | 8.12E+06 | 0.0004 |
| 14 | 540.1 | 30 | 225 | 2.76E-05 | 8.16E+06 | 0.001465 |
| 15 | 580.1 | 30 | 241.7 | 2.95E-05 | 8.19E+06 | 0.002796 |
| 16 | 620 | 30 | 258.3 | 2.57E-05 | 1.01E+07 | 0.003995 |
| 17 | 660 | 30 | 275 | 2.84E-05 | 9.69E+06 | 0.005459 |
| 18 | 700 | 30 | 291.6 | 3.86E-05 | 7.56E+06 | 0.006258 |

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|---|---|---|---|---|---|---|
| 19 | 740.1 | 30 | 308.3 | 3.83E-05 | 8.05E+06 | 0.008522 |
| 20 | 780.1 | 30 | 325 | 4.27E-05 | 7.61E+06 | 0.009321 |
| 21 | 820.1 | 30 | 341.6 | 4.39E-05 | 7.78E+06 | 0.01158 |
| 22 | 860 | 30 | 358.3 | 5.31E-05 | 6.75E+06 | 0.01385 |
| 23 | 900 | 30 | 375 | 6.04E-05 | 6.21E+06 | 0.01571 |
| 24 | 940 | 30 | 391.6 | 6.26E-05 | 6.26E+06 | 0.01824 |
| 25 | 980.1 | 30 | 408.3 | 8.54E-05 | 4.78E+06 | 0.0217 |
| 26 | 1020 | 30 | 424.9 | 0.000113 | 3.75E+06 | 0.02583 |
| 27 | 1060 | 30 | 441.6 | 0.000143 | 3.09E+06 | 0.03262 |
| 28 | 1100 | 30 | 458.2 | 0.000262 | 1.75E+06 | 0.04328 |
| 29 | 1140 | 30 | 474.9 | 0.000453 | 1.05E+06 | 0.06045 |
| 30 | 1180 | 30 | 491.6 | 0.000521 | 9.44E+05 | 0.08109 |
| 31 | 1220 | 30 | 508.3 | 0.000582 | 8.73E+05 | 0.1044 |
| 32 | 1260 | 30 | 524.9 | 0.000713 | 7.36E+05 | 0.1342 |
| 33 | 1300 | 30 | 541.5 | 0.000961 | 5.63E+05 | 0.1727 |
| 34 | 1340 | 30 | 558.2 | 0.00156 | 3.58E+05 | 0.2377 |
| 35 | 1380 | 30 | 574.8 | 0.0121 | 4.75E+04 | 1.753 |
| 36 | 1420 | 30 | 591.5 | 1.20E+04 | 0.04926 | 4.64E+05 |
| 37 | 1460 | 30 | 608.1 | 1.50E+04 | 0.04056 | 1.07E+06 |
| 38 | 1500 | 30 | 624.8 | 1.58E+04 | 0.03946 | 1.70E+06 |
| 39 | 1540 | 30 | 641.5 | 1.65E+04 | 0.03891 | 2.36E+06 |
| 40 | 1580 | 30 | 658.1 | 1.71E+04 | 0.03842 | 3.04E+06 |
| 41 | 1620 | 30 | 674.8 | 1.78E+04 | 0.03799 | 3.75E+06 |
| 42 | 1660 | 30 | 691.5 | 1.83E+04 | 0.03773 | 4.49E+06 |
| 43 | 1700 | 30 | 708.1 | 1.89E+04 | 0.03744 | 5.25E+06 |
| 44 | 1740 | 30 | 724.8 | 1.95E+04 | 0.03718 | 6.02E+06 |
| 45 | 1780 | 30 | 741.5 | 2.01E+04 | 0.03693 | 6.83E+06 |
| 46 | 1820 | 30 | 758.1 | 2.07E+04 | 0.03668 | 7.66E+06 |
| 47 | 1860 | 30 | 774.8 | 2.12E+04 | 0.03648 | 8.50E+06 |
| 48 | 1900 | 30 | 791.5 | 2.19E+04 | 0.03619 | 9.38E+06 |
| 49 | 1940 | 30 | 808.2 | 2.25E+04 | 0.036 | 1.03E+07 |
| 50 | 1980 | 30 | 824.9 | 2.31E+04 | 0.03572 | 1.12E+07 |
| 51 | 2020 | 30 | 841.6 | 2.37E+04 | 0.03547 | 1.22E+07 |
| 52 | 2060 | 30 | 858.2 | 2.44E+04 | 0.03523 | 1.31E+07 |
| 53 | 2100 | 30 | 874.9 | 2.50E+04 | 0.03494 | 1.41E+07 |
| 54 | 2140 | 30 | 891.6 | 2.57E+04 | 0.03467 | 1.52E+07 |
| 55 | 2180 | 30 | 908.3 | 2.64E+04 | 0.03441 | 1.62E+07 |
| 56 | 2220 | 30 | 924.7 | 2.71E+04 | 0.03409 | 1.73E+07 |
| 57 | 2260 | 30 | 941.7 | 2.79E+04 | 0.03374 | 1.84E+07 |
| 58 | 2300 | 30 | 958 | 2.87E+04 | 0.03343 | 1.96E+07 |
| 59 | 2340 | 30 | 975 | 2.94E+04 | 0.03317 | 2.07E+07 |
| 60 | 2380 | 30 | 991.6 | 3.01E+04 | 0.033 | 2.19E+07 |
| 61 | 2420 | 30 | 991.7 | 3.02E+04 | 0.03281 | 2.32E+07 |
| 62 | 2460 | 30 | 975 | 2.96E+04 | 0.03292 | 2.43E+07 |
| 63 | 2500 | 30 | 958.4 | 2.89E+04 | 0.03313 | 2.55E+07 |
| 64 | 2540 | 30 | 941.6 | 2.82E+04 | 0.0334 | 2.66E+07 |
| 65 | 2580 | 30 | 925 | 2.75E+04 | 0.03369 | 2.77E+07 |
| 66 | 2620 | 30 | 908.3 | 2.67E+04 | 0.03397 | 2.88E+07 |

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|---|---|---|---|---|---|---|
| 67 | 2660 | 30 | 891.6 | 2.60E+04 | 0.03426 | 2.98E+07 |
| 68 | 2700 | 30 | 874.9 | 2.54E+04 | 0.03444 | 3.08E+07 |
| 69 | 2740 | 30 | 858.3 | 2.47E+04 | 0.0347 | 3.18E+07 |
| 70 | 2780 | 30 | 841.6 | 2.41E+04 | 0.03494 | 3.28E+07 |
| 71 | 2820 | 30 | 825.2 | 2.35E+04 | 0.03518 | 3.37E+07 |
| 72 | 2860 | 30 | 808.6 | 2.28E+04 | 0.03541 | 3.47E+07 |
| 73 | 2900 | 30 | 791.9 | 2.22E+04 | 0.03572 | 3.55E+07 |
| 74 | 2940 | 30 | 775.2 | 2.15E+04 | 0.03605 | 3.64E+07 |
| 75 | 2980 | 30 | 758.5 | 2.09E+04 | 0.03634 | 3.72E+07 |
| 76 | 3020 | 30 | 741.8 | 2.03E+04 | 0.03659 | 3.80E+07 |
| 77 | 3060 | 30 | 725.2 | 1.96E+04 | 0.03695 | 3.88E+07 |
| 78 | 3100 | 30 | 708.5 | 1.90E+04 | 0.03731 | 3.96E+07 |
| 79 | 3140 | 30 | 691.8 | 1.83E+04 | 0.03773 | 4.03E+07 |
| 80 | 3180 | 30 | 675.2 | 1.77E+04 | 0.03819 | 4.10E+07 |
| 81 | 3220 | 30 | 658.5 | 1.71E+04 | 0.0385 | 4.17E+07 |
| 82 | 3260 | 30 | 641.8 | 1.65E+04 | 0.03886 | 4.24E+07 |
| 83 | 3300 | 30 | 625.1 | 1.59E+04 | 0.03929 | 4.30E+07 |
| 84 | 3340 | 30 | 608.5 | 1.53E+04 | 0.03975 | 4.36E+07 |
| 85 | 3380 | 30 | 591.8 | 1.47E+04 | 0.0402 | 4.42E+07 |
| 86 | 3420 | 30 | 575.1 | 1.41E+04 | 0.04076 | 4.48E+07 |
| 87 | 3460 | 30 | 558.4 | 1.35E+04 | 0.04129 | 4.53E+07 |
| 88 | 3500 | 30 | 541.7 | 1.30E+04 | 0.04183 | 4.58E+07 |
| 89 | 3540 | 30 | 525 | 1.24E+04 | 0.04237 | 4.63E+07 |
| 90 | 3580 | 30 | 508.4 | 1.18E+04 | 0.04298 | 4.68E+07 |
| 91 | 3620 | 30 | 491.7 | 1.13E+04 | 0.04364 | 4.72E+07 |
| 92 | 3660 | 30 | 475.1 | 1.07E+04 | 0.04434 | 4.77E+07 |
| 93 | 3700 | 30 | 458.4 | 1.02E+04 | 0.04512 | 4.81E+07 |
| 94 | 3740 | 30 | 441.7 | 9640 | 0.04582 | 4.85E+07 |
| 95 | 3780 | 30 | 425.1 | 9154 | 0.04644 | 4.88E+07 |
| 96 | 3820 | 30 | 408.5 | 8646 | 0.04724 | 4.92E+07 |
| 97 | 3860 | 30 | 391.8 | 8126 | 0.04822 | 4.95E+07 |
| 98 | 3900 | 30 | 375.1 | 7619 | 0.04924 | 4.98E+07 |
| 99 | 3940 | 30 | 358.5 | 7115 | 0.05039 | 5.01E+07 |
| 100 | 3980 | 30 | 341.9 | 6627 | 0.05158 | 5.04E+07 |
| 101 | 4020 | 30 | 325.2 | 6164 | 0.05275 | 5.06E+07 |
| 102 | 4060 | 30 | 308.5 | 5698 | 0.05414 | 5.08E+07 |
| 103 | 4100 | 30 | 291.8 | 5243 | 0.05565 | 5.10E+07 |
| 104 | 4140 | 30 | 275.1 | 4793 | 0.0574 | 5.12E+07 |
| 105 | 4180 | 30 | 258.4 | 4358 | 0.0593 | 5.14E+07 |
| 106 | 4220 | 30 | 241.7 | 3949 | 0.06122 | 5.16E+07 |
| 107 | 4260 | 30 | 225.1 | 3560 | 0.06323 | 5.17E+07 |
| 108 | 4300 | 30 | 208.4 | 3198 | 0.06518 | 5.18E+07 |
| 109 | 4340 | 30 | 191.8 | 2878 | 0.06664 | 5.19E+07 |
| 110 | 4380 | 30 | 175.1 | 2570 | 0.06811 | 5.20E+07 |
| 111 | 4420 | 30 | 158.4 | 2277 | 0.06958 | 5.21E+07 |
| 112 | 4460 | 30 | 141.8 | 2001 | 0.07084 | 5.22E+07 |
| 113 | 4500 | 30 | 125.1 | 1740 | 0.07188 | 5.23E+07 |
| 114 | 4540 | 30 | 108.4 | 1486 | 0.07293 | 5.23E+07 |

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|---|---|---|---|---|---|---|
| 115 | 4580 | 30 | 91.73 | 1243 | 0.07381 | 5.24E+07 |
| 116 | 4620 | 30 | 75.05 | 998.5 | 0.07516 | 5.24E+07 |
| 117 | 4660 | 30 | 58.35 | 754.8 | 0.0773 | 5.25E+07 |
| 118 | 4700 | 30 | 41.62 | 509.4 | 0.08171 | 5.25E+07 |
| 119 | 4740 | 30 | 24.93 | 263.4 | 0.09461 | 5.25E+07 |
| 120 | 4780 | 30 | 8.571 | 40.9 | 0.2096 | 5.25E+07 |

**C3.1.3 Abu treated with 1000PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 20.03 | 30 | 8.353 | 5.83E-06 | 1.43E+06 | -0.01412 |
| 2 | 60.05 | 30 | 24.71 | 8.96E-06 | 2.76E+06 | -0.01385 |
| 3 | 100 | 30 | 41.36 | 1.09E-05 | 3.79E+06 | -0.01371 |
| 4 | 140.1 | 30 | 58.05 | 7.09E-06 | 8.18E+06 | -0.01318 |
| 5 | 180.1 | 30 | 74.75 | 1.25E-05 | 5.99E+06 | -0.01292 |
| 6 | 220 | 30 | 91.43 | 1.08E-05 | 8.46E+06 | -0.01225 |
| 7 | 260 | 30 | 108.1 | 1.27E-05 | 8.50E+06 | -0.01198 |
| 8 | 300 | 30 | 124.8 | 1.51E-05 | 8.25E+06 | -0.01145 |
| 9 | 340 | 30 | 141.4 | 1.16E-05 | 1.22E+07 | -0.01092 |
| 10 | 380 | 30 | 158.4 | 1.70E-05 | 9.30E+06 | -0.01039 |
| 11 | 420 | 30 | 175 | 1.46E-05 | 1.20E+07 | -0.00932 |
| 12 | 460 | 30 | 191.6 | 2.07E-05 | 9.28E+06 | -0.00906 |
| 13 | 500 | 30 | 208.3 | 2.10E-05 | 9.91E+06 | -0.00812 |
| 14 | 540 | 30 | 225 | 2.16E-05 | 1.04E+07 | -0.00732 |
| 15 | 580.1 | 30 | 241.6 | 2.39E-05 | 1.01E+07 | -0.00613 |
| 16 | 620.1 | 30 | 258.3 | 3.17E-05 | 8.14E+06 | -0.00533 |
| 17 | 660 | 30 | 274.9 | 4.69E-05 | 5.87E+06 | -0.00306 |
| 18 | 700.1 | 30 | 291.6 | 0.000346 | 8.42E+05 | 0.01358 |
| 19 | 740.1 | 30 | 308.3 | 0.000435 | 7.09E+05 | 0.03009 |
| 20 | 780.1 | 30 | 324.9 | 0.000372 | 8.73E+05 | 0.04514 |
| 21 | 820.1 | 30 | 341.6 | 0.000381 | 8.96E+05 | 0.06005 |
| 22 | 860.1 | 30 | 358.3 | 0.000427 | 8.39E+05 | 0.07816 |
| 23 | 900 | 30 | 374.9 | 0.000502 | 7.47E+05 | 0.09814 |
| 24 | 940.1 | 30 | 391.6 | 0.000632 | 6.20E+05 | 0.1234 |
| 25 | 980.1 | 30 | 408.3 | 0.000855 | 4.78E+05 | 0.1566 |
| 26 | 1020 | 30 | 424.9 | 0.00142 | 2.99E+05 | 0.2144 |
| 27 | 1060 | 30 | 441.6 | 11.69 | 37.77 | 4858 |
| 28 | 1100 | 30 | 458.2 | 9382 | 0.04884 | 3.76E+05 |
| 29 | 1140 | 30 | 474.9 | 1.19E+04 | 0.03979 | 8.54E+05 |
| 30 | 1180 | 30 | 491.6 | 1.24E+04 | 0.03966 | 1.35E+06 |
| 31 | 1220 | 30 | 508.2 | 1.29E+04 | 0.03953 | 1.86E+06 |
| 32 | 1260 | 30 | 524.9 | 1.34E+04 | 0.03922 | 2.40E+06 |
| 33 | 1300 | 30 | 541.5 | 1.40E+04 | 0.03881 | 2.96E+06 |
| 34 | 1340 | 30 | 558.2 | 1.45E+04 | 0.03848 | 3.54E+06 |
| 35 | 1380 | 30 | 574.8 | 1.50E+04 | 0.03828 | 4.14E+06 |
| 36 | 1420 | 30 | 591.5 | 1.55E+04 | 0.03808 | 4.76E+06 |

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|---|---|---|---|---|---|---|
| 37 | 1460 | 30 | 608.1 | 1.61E+04 | 0.03784 | 5.40E+06 |
| 38 | 1500 | 30 | 624.7 | 1.66E+04 | 0.03759 | 6.07E+06 |
| 39 | 1540 | 30 | 641.4 | 1.72E+04 | 0.03731 | 6.76E+06 |
| 40 | 1580 | 30 | 658 | 1.78E+04 | 0.03707 | 7.47E+06 |
| 41 | 1620 | 30 | 674.7 | 1.83E+04 | 0.03685 | 8.20E+06 |
| 42 | 1660 | 30 | 691.4 | 1.89E+04 | 0.03664 | 8.96E+06 |
| 43 | 1700 | 30 | 708 | 1.94E+04 | 0.03644 | 9.73E+06 |
| 44 | 1740 | 30 | 724.7 | 2.00E+04 | 0.0362 | 1.05E+07 |
| 45 | 1780 | 30 | 741.4 | 2.07E+04 | 0.03586 | 1.14E+07 |
| 46 | 1820 | 30 | 758.1 | 2.13E+04 | 0.03562 | 1.22E+07 |
| 47 | 1860 | 30 | 774.8 | 2.19E+04 | 0.0354 | 1.31E+07 |
| 48 | 1900 | 30 | 791.4 | 2.25E+04 | 0.03521 | 1.40E+07 |
| 49 | 1940 | 30 | 808.1 | 2.32E+04 | 0.03491 | 1.49E+07 |
| 50 | 1980 | 30 | 824.8 | 2.37E+04 | 0.03474 | 1.59E+07 |
| 51 | 2020 | 30 | 841.5 | 2.44E+04 | 0.03454 | 1.68E+07 |
| 52 | 2060 | 30 | 858.2 | 2.50E+04 | 0.03433 | 1.78E+07 |
| 53 | 2100 | 30 | 874.9 | 2.57E+04 | 0.03406 | 1.89E+07 |
| 54 | 2140 | 30 | 891.5 | 2.64E+04 | 0.03382 | 1.99E+07 |
| 55 | 2180 | 30 | 908.2 | 2.70E+04 | 0.03361 | 2.10E+07 |
| 56 | 2220 | 30 | 924.9 | 2.77E+04 | 0.03342 | 2.21E+07 |
| 57 | 2260 | 30 | 941.6 | 2.83E+04 | 0.03327 | 2.32E+07 |
| 58 | 2300 | 30 | 958.3 | 2.90E+04 | 0.03306 | 2.44E+07 |
| 59 | 2340 | 30 | 975 | 2.97E+04 | 0.0328 | 2.56E+07 |
| 60 | 2380 | 30 | 991.7 | 3.04E+04 | 0.03266 | 2.68E+07 |
| 61 | 2420 | 30 | 991.7 | 3.05E+04 | 0.03248 | 2.80E+07 |
| 62 | 2460 | 30 | 975 | 3.00E+04 | 0.03246 | 2.92E+07 |
| 63 | 2500 | 30 | 958.3 | 2.95E+04 | 0.03248 | 3.04E+07 |
| 64 | 2540 | 30 | 941.6 | 2.89E+04 | 0.0326 | 3.16E+07 |
| 65 | 2580 | 30 | 925.3 | 2.83E+04 | 0.03274 | 3.27E+07 |
| 66 | 2620 | 30 | 908.6 | 2.76E+04 | 0.03289 | 3.38E+07 |
| 67 | 2660 | 30 | 891.9 | 2.70E+04 | 0.03304 | 3.49E+07 |
| 68 | 2700 | 30 | 875.2 | 2.63E+04 | 0.03325 | 3.59E+07 |
| 69 | 2740 | 30 | 858.5 | 2.57E+04 | 0.03341 | 3.70E+07 |
| 70 | 2780 | 30 | 841.8 | 2.50E+04 | 0.03364 | 3.80E+07 |
| 71 | 2820 | 30 | 825.1 | 2.44E+04 | 0.03388 | 3.89E+07 |
| 72 | 2860 | 30 | 808.4 | 2.37E+04 | 0.03414 | 3.99E+07 |
| 73 | 2900 | 30 | 791.7 | 2.30E+04 | 0.03445 | 4.08E+07 |
| 74 | 2940 | 30 | 775 | 2.23E+04 | 0.03478 | 4.17E+07 |
| 75 | 2980 | 30 | 758.4 | 2.16E+04 | 0.03509 | 4.26E+07 |
| 76 | 3020 | 30 | 741.7 | 2.10E+04 | 0.03537 | 4.34E+07 |
| 77 | 3060 | 30 | 725 | 2.03E+04 | 0.03574 | 4.42E+07 |
| 78 | 3100 | 30 | 708.3 | 1.96E+04 | 0.03615 | 4.50E+07 |
| 79 | 3140 | 30 | 691.6 | 1.89E+04 | 0.03657 | 4.58E+07 |
| 80 | 3180 | 30 | 675 | 1.82E+04 | 0.03704 | 4.65E+07 |
| 81 | 3220 | 30 | 658.3 | 1.76E+04 | 0.03752 | 4.72E+07 |
| 82 | 3260 | 30 | 641.6 | 1.69E+04 | 0.03799 | 4.79E+07 |
| 83 | 3300 | 30 | 625 | 1.62E+04 | 0.0385 | 4.85E+07 |
| 84 | 3340 | 30 | 608.3 | 1.56E+04 | 0.039 | 4.91E+07 |

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|---|---|---|---|---|---|---|
| 85 | 3380 | 30 | 591.6 | 1.50E+04 | 0.03956 | 4.97E+07 |
| 86 | 3420 | 30 | 575 | 1.43E+04 | 0.04016 | 5.03E+07 |
| 87 | 3460 | 30 | 558.4 | 1.37E+04 | 0.04079 | 5.08E+07 |
| 88 | 3500 | 30 | 541.7 | 1.31E+04 | 0.04146 | 5.14E+07 |
| 89 | 3540 | 30 | 525 | 1.24E+04 | 0.04223 | 5.19E+07 |
| 90 | 3580 | 30 | 508.4 | 1.18E+04 | 0.04304 | 5.23E+07 |
| 91 | 3620 | 30 | 491.7 | 1.12E+04 | 0.04401 | 5.28E+07 |
| 92 | 3660 | 30 | 475 | 1.05E+04 | 0.04514 | 5.32E+07 |
| 93 | 3700 | 30 | 458.3 | 9880 | 0.04639 | 5.36E+07 |
| 94 | 3740 | 30 | 441.6 | 9218 | 0.04791 | 5.40E+07 |
| 95 | 3780 | 30 | 425 | 8514 | 0.04992 | 5.43E+07 |
| 96 | 3820 | 30 | 408.3 | 7760 | 0.05262 | 5.46E+07 |
| 97 | 3860 | 30 | 391.7 | 7125 | 0.05497 | 5.49E+07 |
| 98 | 3900 | 30 | 375 | 6644 | 0.05644 | 5.52E+07 |
| 99 | 3940 | 30 | 358.3 | 6234 | 0.05748 | 5.54E+07 |
| 100 | 3980 | 30 | 341.6 | 5856 | 0.05834 | 5.57E+07 |
| 101 | 4020 | 30 | 325 | 5497 | 0.05912 | 5.59E+07 |
| 102 | 4060 | 30 | 308.3 | 5167 | 0.05967 | 5.61E+07 |
| 103 | 4100 | 30 | 291.7 | 4842 | 0.06025 | 5.63E+07 |
| 104 | 4140 | 30 | 275.1 | 4516 | 0.06091 | 5.65E+07 |
| 105 | 4180 | 30 | 258.4 | 4189 | 0.06167 | 5.66E+07 |
| 106 | 4220 | 30 | 241.7 | 3873 | 0.0624 | 5.68E+07 |
| 107 | 4260 | 30 | 225 | 3563 | 0.06314 | 5.69E+07 |
| 108 | 4300 | 30 | 208.3 | 3261 | 0.06388 | 5.71E+07 |
| 109 | 4340 | 30 | 191.6 | 2965 | 0.06464 | 5.72E+07 |
| 110 | 4380 | 30 | 174.9 | 2675 | 0.06539 | 5.73E+07 |
| 111 | 4420 | 30 | 158.3 | 2391 | 0.06621 | 5.74E+07 |
| 112 | 4460 | 30 | 141.6 | 2109 | 0.06716 | 5.75E+07 |
| 113 | 4500 | 30 | 125 | 1826 | 0.06845 | 5.75E+07 |
| 114 | 4540 | 30 | 108.3 | 1540 | 0.07037 | 5.76E+07 |
| 115 | 4580 | 30 | 91.69 | 1269 | 0.07224 | 5.76E+07 |
| 116 | 4620 | 30 | 75 | 994.9 | 0.07539 | 5.77E+07 |
| 117 | 4660 | 30 | 58.63 | 730.6 | 0.08024 | 5.77E+07 |
| 118 | 4700 | 30 | 41.91 | 453.7 | 0.09238 | 5.77E+07 |
| 119 | 4740 | 30 | 25.21 | 188.3 | 0.1339 | 5.77E+07 |
| 120 | 4780 | 30 | 8.494 | 5.298 | 1.603 | 5.77E+07 |

**C3.2 (T=35°C)**

**C3.2.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 8.016 | 35 | 3.345 | 1.14E-05 | 2.94E+05 | -0.00493 |
| 1, 2 | 24.04 | 35 | 9.896 | 2.11E-05 | 4.68E+05 | -0.00439 |
| 1, 3 | 40.05 | 35 | 16.58 | 1.18E-05 | 1.41E+06 | -0.00413 |
| 1, 4 | 56.05 | 35 | 23.25 | 1.50E-05 | 1.56E+06 | -0.00386 |
| 1, 5 | 72.04 | 35 | 29.9 | 2.57E-05 | 1.16E+06 | -0.00333 |
| 1, 6 | 88.06 | 35 | 36.54 | 2.37E-05 | 1.54E+06 | -0.0028 |

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|---|---|---|---|---|---|---|
| 1, 7 | 104.1 | 35 | 43.22 | 3.35E-05 | 1.29E+06 | -0.00266 |
| 1, 8 | 120 | 35 | 49.89 | 4.32E-05 | 1.16E+06 | -0.00226 |
| 1, 9 | 136 | 35 | 56.56 | 2.80E-05 | 2.02E+06 | -0.00173 |
| 1, 10 | 152 | 35 | 63.23 | 4.09E-05 | 1.55E+06 | -0.00107 |
| 1, 11 | 168 | 35 | 69.89 | 5.02E-05 | 1.39E+06 | -0.0004 |
| 1, 12 | 184 | 35 | 76.57 | 4.20E-05 | 1.83E+06 | 0.000266 |
| 1, 13 | 200.1 | 35 | 83.23 | 3.97E-05 | 2.10E+06 | 0.001332 |
| 1, 14 | 216 | 35 | 89.89 | 5.01E-05 | 1.80E+06 | 0.00253 |
| 1, 15 | 232 | 35 | 96.58 | 6.76E-05 | 1.43E+06 | 0.003329 |
| 1, 16 | 248.1 | 35 | 103.3 | 5.68E-05 | 1.82E+06 | 0.004261 |
| 1, 17 | 264 | 35 | 109.9 | 6.35E-05 | 1.73E+06 | 0.005193 |
| 1, 18 | 280 | 35 | 116.6 | 6.02E-05 | 1.94E+06 | 0.006392 |
| 1, 19 | 296 | 35 | 123.3 | 6.18E-05 | 2.00E+06 | 0.007057 |
| 1, 20 | 312 | 35 | 130 | 6.83E-05 | 1.90E+06 | 0.00799 |
| 1, 21 | 328 | 35 | 136.6 | 6.71E-05 | 2.04E+06 | 0.009321 |
| 1, 22 | 344.1 | 35 | 143.3 | 7.99E-05 | 1.79E+06 | 0.01025 |
| 1, 23 | 360.1 | 35 | 150 | 6.33E-05 | 2.37E+06 | 0.01185 |
| 1, 24 | 376.1 | 35 | 156.6 | 8.46E-05 | 1.85E+06 | 0.01265 |
| 1, 25 | 392 | 35 | 163.3 | 7.65E-05 | 2.13E+06 | 0.01385 |
| 1, 26 | 408.1 | 35 | 169.9 | 0.000105 | 1.61E+06 | 0.01558 |
| 1, 27 | 424.1 | 35 | 176.6 | 0.000118 | 1.50E+06 | 0.01718 |
| 1, 28 | 440 | 35 | 183.2 | 0.000117 | 1.57E+06 | 0.01944 |
| 1, 29 | 456.1 | 35 | 189.9 | 0.000154 | 1.24E+06 | 0.02157 |
| 1, 30 | 472.1 | 35 | 196.6 | 0.000211 | 9.33E+05 | 0.02543 |
| 1, 31 | 488 | 35 | 203.3 | 0.000312 | 6.52E+05 | 0.03063 |
| 1, 32 | 504.1 | 35 | 209.9 | 0.000473 | 4.44E+05 | 0.03782 |
| 1, 33 | 520.1 | 35 | 216.6 | 0.000988 | 2.19E+05 | 0.05486 |
| 1, 34 | 536 | 35 | 223.3 | 0.5474 | 407.9 | 20.59 |
| 1, 35 | 552.1 | 35 | 229.9 | 3730 | 0.06164 | 6.12E+04 |
| 1, 36 | 568.1 | 35 | 236.6 | 8007 | 0.02955 | 1.88E+05 |
| 1, 37 | 584 | 35 | 243.3 | 7781 | 0.03126 | 3.13E+05 |
| 1, 38 | 600.1 | 35 | 249.9 | 8125 | 0.03076 | 4.44E+05 |
| 1, 39 | 616.1 | 35 | 256.6 | 8588 | 0.02988 | 5.81E+05 |
| 1, 40 | 632 | 35 | 263.3 | 9041 | 0.02912 | 7.26E+05 |
| 1, 41 | 648.1 | 35 | 270.1 | 9492 | 0.02845 | 8.78E+05 |
| 1, 42 | 664.1 | 35 | 276.6 | 9892 | 0.02796 | 1.04E+06 |
| 1, 43 | 680 | 35 | 283.2 | 1.03E+04 | 0.02759 | 1.20E+06 |
| 1, 44 | 696.1 | 35 | 290 | 1.06E+04 | 0.02737 | 1.37E+06 |
| 1, 45 | 712.1 | 35 | 296.5 | 1.08E+04 | 0.02738 | 1.54E+06 |
| 1, 46 | 728 | 35 | 303.3 | 1.10E+04 | 0.02768 | 1.72E+06 |
| 1, 47 | 744.1 | 35 | 310 | 1.11E+04 | 0.0279 | 1.90E+06 |
| 1, 48 | 760.1 | 35 | 316.6 | 1.13E+04 | 0.02811 | 2.08E+06 |
| 1, 49 | 776 | 35 | 323.3 | 1.14E+04 | 0.02834 | 2.26E+06 |
| 1, 50 | 792.1 | 35 | 330 | 1.17E+04 | 0.02814 | 2.45E+06 |
| 1, 51 | 808.1 | 35 | 336.6 | 1.20E+04 | 0.02804 | 2.64E+06 |
| 1, 52 | 824 | 35 | 343.3 | 1.24E+04 | 0.02781 | 2.84E+06 |
| 1, 53 | 840.1 | 35 | 350 | 1.26E+04 | 0.02787 | 3.04E+06 |
| 1, 54 | 856.1 | 35 | 356.7 | 1.29E+04 | 0.02776 | 3.24E+06 |

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|---|---|---|---|---|---|---|
| 1, 55 | 872 | 35 | 363.2 | 1.32E+04 | 0.02749 | 3.45E+06 |
| 1, 56 | 888.1 | 35 | 370 | 1.36E+04 | 0.02728 | 3.67E+06 |
| 1, 57 | 904.1 | 35 | 376.5 | 1.39E+04 | 0.02712 | 3.89E+06 |
| 1, 58 | 920 | 35 | 383.3 | 1.42E+04 | 0.02697 | 4.12E+06 |
| 1, 59 | 936.1 | 35 | 390 | 1.45E+04 | 0.02686 | 4.36E+06 |
| 1, 60 | 952.1 | 35 | 396.6 | 1.48E+04 | 0.02675 | 4.59E+06 |
| 1, 61 | 968.1 | 35 | 396.7 | 1.49E+04 | 0.02658 | 4.83E+06 |
| 1, 62 | 984.2 | 35 | 389.9 | 1.46E+04 | 0.0267 | 5.07E+06 |
| 1, 63 | 1000 | 35 | 383.3 | 1.42E+04 | 0.02697 | 5.29E+06 |
| 1, 64 | 1016 | 35 | 376.6 | 1.37E+04 | 0.02756 | 5.51E+06 |
| 1, 65 | 1032 | 35 | 370 | 1.33E+04 | 0.02794 | 5.72E+06 |
| 1, 66 | 1048 | 35 | 363.3 | 1.29E+04 | 0.02815 | 5.93E+06 |
| 1, 67 | 1064 | 35 | 356.7 | 1.26E+04 | 0.02842 | 6.13E+06 |
| 1, 68 | 1080 | 35 | 350 | 1.22E+04 | 0.02869 | 6.33E+06 |
| 1, 69 | 1096 | 35 | 343.4 | 1.19E+04 | 0.02894 | 6.52E+06 |
| 1, 70 | 1112 | 35 | 336.6 | 1.15E+04 | 0.02916 | 6.70E+06 |
| 1, 71 | 1128 | 35 | 330.1 | 1.12E+04 | 0.02938 | 6.88E+06 |
| 1, 72 | 1144 | 35 | 323.4 | 1.09E+04 | 0.02957 | 7.05E+06 |
| 1, 73 | 1160 | 35 | 316.7 | 1.06E+04 | 0.02979 | 7.22E+06 |
| 1, 74 | 1176 | 35 | 310 | 1.03E+04 | 0.03004 | 7.39E+06 |
| 1, 75 | 1192 | 35 | 303.4 | 1.00E+04 | 0.03028 | 7.55E+06 |
| 1, 76 | 1208 | 35 | 296.7 | 9715 | 0.03054 | 7.71E+06 |
| 1, 77 | 1224 | 35 | 290 | 9430 | 0.03075 | 7.86E+06 |
| 1, 78 | 1240 | 35 | 283.3 | 9121 | 0.03107 | 8.00E+06 |
| 1, 79 | 1256 | 35 | 276.7 | 8801 | 0.03144 | 8.14E+06 |
| 1, 80 | 1272 | 35 | 270 | 8511 | 0.03173 | 8.28E+06 |
| 1, 81 | 1288 | 35 | 263.3 | 8223 | 0.03202 | 8.41E+06 |
| 1, 82 | 1304 | 35 | 256.7 | 7943 | 0.03232 | 8.54E+06 |
| 1, 83 | 1320 | 35 | 250 | 7684 | 0.03254 | 8.66E+06 |
| 1, 84 | 1336 | 35 | 243.2 | 7413 | 0.03281 | 8.78E+06 |
| 1, 85 | 1352 | 35 | 236.7 | 7061 | 0.03353 | 8.89E+06 |
| 1, 86 | 1368 | 35 | 230.1 | 6698 | 0.03435 | 9.00E+06 |
| 1, 87 | 1384 | 35 | 223.3 | 6448 | 0.03463 | 9.10E+06 |
| 1, 88 | 1400 | 35 | 216.6 | 6181 | 0.03505 | 9.20E+06 |
| 1, 89 | 1416 | 35 | 210.1 | 5872 | 0.03578 | 9.29E+06 |
| 1, 90 | 1432 | 35 | 203.3 | 5582 | 0.03641 | 9.38E+06 |
| 1, 91 | 1448 | 35 | 196.6 | 5324 | 0.03693 | 9.47E+06 |
| 1, 92 | 1464 | 35 | 190 | 5064 | 0.03751 | 9.55E+06 |
| 1, 93 | 1480 | 35 | 183.3 | 4809 | 0.03811 | 9.63E+06 |
| 1, 94 | 1496 | 35 | 176.6 | 4571 | 0.03864 | 9.70E+06 |
| 1, 95 | 1512 | 35 | 170 | 4334 | 0.03922 | 9.77E+06 |
| 1, 96 | 1528 | 35 | 163.3 | 4073 | 0.0401 | 9.83E+06 |
| 1, 97 | 1544 | 35 | 156.7 | 3834 | 0.04086 | 9.90E+06 |
| 1, 98 | 1560 | 35 | 150 | 3610 | 0.04156 | 9.95E+06 |
| 1, 99 | 1576 | 35 | 143.3 | 3396 | 0.04221 | 1.00E+07 |
| 1, 100 | 1592 | 35 | 136.7 | 3178 | 0.04301 | 1.01E+07 |
| 1, 101 | 1608 | 35 | 130 | 2959 | 0.04393 | 1.01E+07 |
| 1, 102 | 1624 | 35 | 123.3 | 2735 | 0.04509 | 1.02E+07 |

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|---|---|---|---|---|---|---|
| 1, 103 | 1640 | 35 | 116.7 | 2512 | 0.04643 | 1.02E+07 |
| 1, 104 | 1656 | 35 | 110 | 2301 | 0.0478 | 1.02E+07 |
| 1, 105 | 1672 | 35 | 103.3 | 2098 | 0.04924 | 1.03E+07 |
| 1, 106 | 1688 | 35 | 96.65 | 1903 | 0.05079 | 1.03E+07 |
| 1, 107 | 1704 | 35 | 90.01 | 1724 | 0.05222 | 1.03E+07 |
| 1, 108 | 1720 | 35 | 83.34 | 1554 | 0.05363 | 1.03E+07 |
| 1, 109 | 1736 | 35 | 76.65 | 1388 | 0.05523 | 1.04E+07 |
| 1, 110 | 1752 | 35 | 69.96 | 1231 | 0.05683 | 1.04E+07 |
| 1, 111 | 1768 | 35 | 63.27 | 1080 | 0.0586 | 1.04E+07 |
| 1, 112 | 1784 | 35 | 56.74 | 940.4 | 0.06034 | 1.04E+07 |
| 1, 113 | 1800 | 35 | 50.07 | 807 | 0.06205 | 1.04E+07 |
| 1, 114 | 1816 | 35 | 43.26 | 676.3 | 0.06396 | 1.04E+07 |
| 1, 115 | 1832 | 35 | 36.73 | 550.4 | 0.06674 | 1.05E+07 |
| 1, 116 | 1848 | 35 | 30.06 | 422.9 | 0.07107 | 1.05E+07 |
| 1, 117 | 1864 | 35 | 23.39 | 299.1 | 0.07818 | 1.05E+07 |
| 1, 118 | 1880 | 35 | 16.7 | 178.1 | 0.09378 | 1.05E+07 |
| 1, 119 | 1896 | 35 | 10 | 64.47 | 0.1551 | 1.05E+07 |
| 1, 120 | 1912 | 35 | 3.309 | 2.656 | 1.246 | 1.05E+07 |

### C3.2.2 Abu treated with 500PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 8.018 | 35 | 3.34 | 1.74E-05 | 1.92E+05 | 0.000266 |
| 2 | 24.06 | 35 | 10.02 | 1.44E-05 | 6.97E+05 | 0.000666 |
| 3 | 40.06 | 35 | 16.55 | 2.92E-05 | 5.68E+05 | 0.000932 |
| 4 | 56.04 | 35 | 23.2 | 2.66E-05 | 8.71E+05 | 0.001598 |
| 5 | 72.06 | 35 | 29.88 | 3.33E-05 | 8.98E+05 | 0.001997 |
| 6 | 88.06 | 35 | 36.57 | 3.46E-05 | 1.06E+06 | 0.003063 |
| 7 | 104 | 35 | 43.22 | 4.36E-05 | 9.91E+05 | 0.003728 |
| 8 | 120.1 | 35 | 50.03 | 4.43E-05 | 1.13E+06 | 0.004394 |
| 9 | 136.1 | 35 | 56.55 | 7.31E-05 | 7.74E+05 | 0.005326 |
| 10 | 152 | 35 | 63.22 | 7.48E-05 | 8.46E+05 | 0.006392 |
| 11 | 168.1 | 35 | 70.03 | 9.31E-05 | 7.53E+05 | 0.008256 |
| 12 | 184.1 | 35 | 76.57 | 0.000121 | 6.33E+05 | 0.00972 |
| 13 | 200 | 35 | 83.25 | 0.000163 | 5.11E+05 | 0.01252 |
| 14 | 216 | 35 | 89.92 | 0.000223 | 4.04E+05 | 0.01585 |
| 15 | 232.1 | 35 | 96.57 | 0.00029 | 3.33E+05 | 0.02077 |
| 16 | 248 | 35 | 103.2 | 0.000378 | 2.73E+05 | 0.02716 |
| 18 | 280 | 35 | 116.5 | 0.001455 | 8.01E+04 | 0.07803 |
| 19 | 296 | 35 | 123.2 | 0.001661 | 7.42E+04 | 0.1049 |
| 20 | 312 | 35 | 130 | 0.002907 | 4.47E+04 | 0.1527 |
| 21 | 328.1 | 35 | 136.6 | 17.56 | 7.775 | 533.3 |
| 22 | 344 | 35 | 143.2 | 1598 | 0.08962 | 2.60E+04 |
| 23 | 360.1 | 35 | 150 | 2998 | 0.05004 | 7.39E+04 |
| 24 | 376 | 35 | 156.7 | 3468 | 0.04517 | 1.29E+05 |
| 25 | 392 | 35 | 163.3 | 3830 | 0.04264 | 1.91E+05 |
| 26 | 408.1 | 35 | 170 | 4157 | 0.0409 | 2.57E+05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 27 | 424.1 | 35 | 176.7 | 4426 | 0.03991 | 3.28E+05 |
| 28 | 440 | 35 | 183.3 | 4675 | 0.03921 | 4.03E+05 |
| 29 | 456.1 | 35 | 190 | 4798 | 0.0396 | 4.80E+05 |
| 30 | 472.1 | 35 | 196.6 | 4979 | 0.0395 | 5.59E+05 |
| 31 | 488 | 35 | 203.3 | 5227 | 0.0389 | 6.43E+05 |
| 32 | 504.1 | 35 | 210 | 5471 | 0.03838 | 7.31E+05 |
| 33 | 520.1 | 35 | 216.7 | 5710 | 0.03794 | 8.22E+05 |
| 34 | 536 | 35 | 223.3 | 5961 | 0.03746 | 9.17E+05 |
| 35 | 552 | 35 | 230 | 6209 | 0.03704 | 1.02E+06 |
| 36 | 568.1 | 35 | 236.5 | 6466 | 0.03658 | 1.12E+06 |
| 37 | 584 | 35 | 243.2 | 6719 | 0.0362 | 1.23E+06 |
| 38 | 600 | 35 | 249.9 | 7036 | 0.03552 | 1.34E+06 |
| 39 | 616 | 35 | 256.6 | 7292 | 0.03519 | 1.46E+06 |
| 40 | 632 | 35 | 263.2 | 7585 | 0.0347 | 1.58E+06 |
| 41 | 648 | 35 | 270 | 7855 | 0.03437 | 1.71E+06 |
| 42 | 664 | 35 | 276.5 | 8131 | 0.03401 | 1.84E+06 |
| 43 | 680 | 35 | 283.3 | 8410 | 0.03369 | 1.97E+06 |
| 44 | 696 | 35 | 289.9 | 8697 | 0.03333 | 2.11E+06 |
| 45 | 712 | 35 | 296.5 | 8988 | 0.03299 | 2.25E+06 |
| 46 | 728 | 35 | 303.2 | 9290 | 0.03264 | 2.40E+06 |
| 47 | 744 | 35 | 310 | 9606 | 0.03227 | 2.56E+06 |
| 48 | 760 | 35 | 316.5 | 9900 | 0.03197 | 2.71E+06 |
| 49 | 776.1 | 35 | 323.3 | 1.02E+04 | 0.03171 | 2.88E+06 |
| 50 | 792.1 | 35 | 330 | 1.05E+04 | 0.03144 | 3.05E+06 |
| 51 | 808 | 35 | 336.7 | 1.08E+04 | 0.03123 | 3.22E+06 |
| 52 | 824.1 | 35 | 343.3 | 1.11E+04 | 0.03101 | 3.40E+06 |
| 53 | 840.1 | 35 | 349.9 | 1.14E+04 | 0.03083 | 3.58E+06 |
| 54 | 856 | 35 | 356.6 | 1.17E+04 | 0.03058 | 3.76E+06 |
| 55 | 872.1 | 35 | 363.3 | 1.20E+04 | 0.03035 | 3.96E+06 |
| 56 | 888.1 | 35 | 369.9 | 1.23E+04 | 0.03016 | 4.15E+06 |
| 57 | 904 | 35 | 376.6 | 1.26E+04 | 0.02995 | 4.35E+06 |
| 58 | 920.1 | 35 | 383.3 | 1.29E+04 | 0.02966 | 4.56E+06 |
| 59 | 936.1 | 35 | 389.9 | 1.33E+04 | 0.02943 | 4.77E+06 |
| 60 | 952 | 35 | 396.6 | 1.36E+04 | 0.02927 | 4.99E+06 |
| 61 | 968.1 | 35 | 396.6 | 1.37E+04 | 0.02907 | 5.21E+06 |
| 62 | 984.2 | 35 | 390 | 1.33E+04 | 0.02928 | 5.42E+06 |
| 63 | 1000 | 35 | 383.3 | 1.30E+04 | 0.02951 | 5.63E+06 |
| 64 | 1016 | 35 | 376.7 | 1.27E+04 | 0.02971 | 5.83E+06 |
| 65 | 1032 | 35 | 370 | 1.24E+04 | 0.02986 | 6.03E+06 |
| 66 | 1048 | 35 | 363.4 | 1.21E+04 | 0.02997 | 6.22E+06 |
| 67 | 1064 | 34.9 | 356.7 | 1.19E+04 | 0.03008 | 6.41E+06 |
| 68 | 1080 | 35 | 350.1 | 1.16E+04 | 0.0302 | 6.60E+06 |
| 69 | 1096 | 35.1 | 343.3 | 1.13E+04 | 0.03026 | 6.78E+06 |
| 70 | 1112 | 35 | 336.7 | 1.11E+04 | 0.03041 | 6.96E+06 |
| 71 | 1128 | 35 | 330.1 | 1.08E+04 | 0.03059 | 7.13E+06 |
| 72 | 1144 | 35.1 | 323.3 | 1.05E+04 | 0.03067 | 7.30E+06 |
| 73 | 1160 | 35 | 316.6 | 1.03E+04 | 0.03083 | 7.46E+06 |
| 74 | 1176 | 35 | 309.9 | 9951 | 0.03115 | 7.62E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 75 | 1192 | 35 | 303.3 | 9628 | 0.0315 | 7.78E+06 |
| 76 | 1208 | 35.1 | 296.6 | 9323 | 0.03182 | 7.93E+06 |
| 77 | 1224 | 35 | 290 | 9026 | 0.03213 | 8.07E+06 |
| 78 | 1240 | 35 | 283.3 | 8676 | 0.03266 | 8.21E+06 |
| 79 | 1256 | 35 | 276.6 | 8324 | 0.03323 | 8.34E+06 |
| 80 | 1272 | 35 | 270 | 7998 | 0.03376 | 8.47E+06 |
| 81 | 1288 | 34.9 | 263.3 | 7677 | 0.0343 | 8.59E+06 |
| 82 | 1304 | 34.9 | 256.7 | 7375 | 0.0348 | 8.71E+06 |
| 83 | 1320 | 35 | 250 | 7118 | 0.03512 | 8.82E+06 |
| 84 | 1336 | 35 | 243.3 | 6901 | 0.03526 | 8.93E+06 |
| 85 | 1352 | 35 | 236.6 | 6674 | 0.03546 | 9.04E+06 |
| 86 | 1368 | 35 | 230 | 6422 | 0.03581 | 9.14E+06 |
| 87 | 1384 | 35 | 223.3 | 6163 | 0.03623 | 9.24E+06 |
| 88 | 1400 | 35 | 216.6 | 5919 | 0.0366 | 9.34E+06 |
| 89 | 1416 | 35 | 210 | 5685 | 0.03694 | 9.43E+06 |
| 90 | 1432 | 35 | 203.3 | 5455 | 0.03727 | 9.52E+06 |
| 91 | 1448 | 35 | 196.7 | 5225 | 0.03764 | 9.60E+06 |
| 92 | 1464 | 35 | 190 | 5000 | 0.038 | 9.68E+06 |
| 93 | 1480 | 35 | 183.4 | 4776 | 0.03839 | 9.76E+06 |
| 94 | 1496 | 35 | 176.7 | 4553 | 0.03881 | 9.83E+06 |
| 95 | 1512 | 35 | 170 | 4326 | 0.03931 | 9.90E+06 |
| 96 | 1528 | 35 | 163.4 | 4112 | 0.03972 | 9.96E+06 |
| 97 | 1544 | 35 | 156.7 | 3911 | 0.04007 | 1.00E+07 |
| 98 | 1560 | 35 | 150.1 | 3706 | 0.04049 | 1.01E+07 |
| 99 | 1576 | 35 | 143.4 | 3497 | 0.041 | 1.01E+07 |
| 100 | 1592 | 35 | 136.7 | 3288 | 0.04157 | 1.02E+07 |
| 101 | 1608 | 35 | 130 | 3099 | 0.04196 | 1.02E+07 |
| 102 | 1624 | 35 | 123.4 | 2912 | 0.04238 | 1.03E+07 |
| 103 | 1640 | 35 | 116.7 | 2722 | 0.04288 | 1.03E+07 |
| 104 | 1656 | 35 | 110 | 2532 | 0.04346 | 1.04E+07 |
| 105 | 1672 | 35 | 103.3 | 2344 | 0.04405 | 1.04E+07 |
| 106 | 1688 | 35 | 96.63 | 2165 | 0.04463 | 1.04E+07 |
| 107 | 1704 | 35 | 89.98 | 1989 | 0.04524 | 1.05E+07 |
| 108 | 1720 | 35 | 83.31 | 1812 | 0.04598 | 1.05E+07 |
| 109 | 1736 | 35 | 76.64 | 1640 | 0.04674 | 1.05E+07 |
| 110 | 1752 | 35 | 69.96 | 1468 | 0.04767 | 1.06E+07 |
| 111 | 1768 | 35 | 63.29 | 1300 | 0.0487 | 1.06E+07 |
| 112 | 1784 | 35 | 56.75 | 1139 | 0.04983 | 1.06E+07 |
| 113 | 1800 | 35 | 50.08 | 977.3 | 0.05124 | 1.06E+07 |
| 114 | 1816 | 35 | 43.27 | 815.4 | 0.05307 | 1.06E+07 |
| 115 | 1832 | 35 | 36.75 | 661.5 | 0.05555 | 1.06E+07 |
| 116 | 1848 | 35 | 30.07 | 506.6 | 0.05935 | 1.06E+07 |
| 117 | 1864 | 35 | 23.38 | 355.6 | 0.06576 | 1.07E+07 |
| 118 | 1880 | 35 | 16.69 | 209.7 | 0.07961 | 1.07E+07 |
| 119 | 1896 | 35 | 10.01 | 73.36 | 0.1364 | 1.07E+07 |
| 120 | 1912 | 35 | 3.311 | 1.569 | 2.111 | 1.07E+07 |

**C3.2.3 Abu treated with 1000PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 16.01 | 35 | 6.668 | 4.97E-05 | 1.34E+05 | -0.01305 |
| 2 | 48.04 | 35 | 19.98 | 8.52E-05 | 2.35E+05 | -0.01065 |
| 3 | 80.04 | 35 | 33.26 | 0.000143 | 2.33E+05 | -0.00586 |
| 4 | 112 | 35 | 46.54 | 0.000322 | 1.45E+05 | 0.004527 |
| 5 | 144.1 | 35 | 59.81 | 0.001088 | 5.50E+04 | 0.04048 |
| 6 | 176.1 | 35 | 73.36 | 0.00239 | 3.07E+04 | 0.117 |
| 7 | 208 | 35 | 86.64 | 0.01211 | 7155 | 1.572 |
| 8 | 240 | 35 | 99.91 | 104.6 | 0.955 | 6240 |
| 9 | 272 | 35 | 113.1 | 1817 | 0.06228 | 6.44E+04 |
| 10 | 304 | 35 | 126.7 | 2539 | 0.04989 | 1.46E+05 |
| 11 | 336 | 35 | 139.9 | 3047 | 0.04592 | 2.43E+05 |
| 12 | 368.1 | 35 | 153.2 | 3542 | 0.04326 | 3.57E+05 |
| 13 | 400.1 | 35 | 166.4 | 4031 | 0.04129 | 4.86E+05 |
| 14 | 432 | 35 | 180 | 4551 | 0.03955 | 6.32E+05 |
| 15 | 464.1 | 35 | 193.3 | 5060 | 0.0382 | 7.94E+05 |
| 16 | 496.1 | 35 | 206.6 | 5578 | 0.03703 | 9.72E+05 |
| 17 | 528 | 35 | 219.8 | 6106 | 0.036 | 1.17E+06 |
| 18 | 560.1 | 35 | 233.3 | 6642 | 0.03513 | 1.38E+06 |
| 19 | 592.1 | 35 | 246.6 | 7157 | 0.03446 | 1.61E+06 |
| 20 | 624 | 35 | 259.9 | 7632 | 0.03405 | 1.85E+06 |
| 21 | 656.1 | 35 | 273.2 | 8100 | 0.03372 | 2.11E+06 |
| 22 | 688.1 | 35 | 286.4 | 8570 | 0.03342 | 2.39E+06 |
| 23 | 720 | 35 | 300 | 9049 | 0.03315 | 2.68E+06 |
| 24 | 752.1 | 35 | 313.2 | 9488 | 0.03301 | 2.98E+06 |
| 25 | 784.1 | 35 | 326.5 | 9969 | 0.03275 | 3.30E+06 |
| 26 | 816 | 35 | 340 | 1.03E+04 | 0.0329 | 3.63E+06 |
| 27 | 848.1 | 35 | 353.3 | 1.09E+04 | 0.03233 | 3.98E+06 |
| 28 | 880.1 | 35 | 366.5 | 1.16E+04 | 0.03156 | 4.35E+06 |
| 29 | 912 | 35 | 379.8 | 1.23E+04 | 0.03098 | 4.75E+06 |
| 30 | 944.1 | 35 | 393.3 | 1.29E+04 | 0.03045 | 5.16E+06 |
| 31 | 976.1 | 35 | 406.6 | 1.36E+04 | 0.02997 | 5.59E+06 |
| 32 | 1008 | 35 | 419.9 | 1.42E+04 | 0.02959 | 6.05E+06 |
| 33 | 1040 | 35 | 433.4 | 1.48E+04 | 0.02923 | 6.52E+06 |
| 34 | 1072 | 35 | 446.6 | 1.55E+04 | 0.02884 | 7.02E+06 |
| 35 | 1104 | 35 | 459.9 | 1.62E+04 | 0.02841 | 7.54E+06 |
| 36 | 1136 | 35 | 473.1 | 1.69E+04 | 0.02804 | 8.08E+06 |
| 37 | 1168 | 35 | 486.7 | 1.76E+04 | 0.02767 | 8.64E+06 |
| 38 | 1200 | 35 | 500 | 1.83E+04 | 0.02738 | 9.22E+06 |
| 39 | 1232 | 35 | 513.3 | 1.90E+04 | 0.02706 | 9.83E+06 |
| 40 | 1264 | 35 | 526.5 | 1.97E+04 | 0.0267 | 1.05E+07 |
| 41 | 1296 | 35 | 540 | 2.05E+04 | 0.02633 | 1.11E+07 |
| 42 | 1328 | 35 | 553.3 | 2.13E+04 | 0.02604 | 1.18E+07 |
| 43 | 1360 | 35 | 566.5 | 2.20E+04 | 0.02572 | 1.25E+07 |
| 44 | 1392 | 35 | 580 | 2.28E+04 | 0.02542 | 1.32E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 45 | 1424 | 35 | 593.3 | 2.36E+04 | 0.02515 | 1.40E+07 |
| 46 | 1456 | 35 | 606.5 | 2.43E+04 | 0.02493 | 1.48E+07 |
| 47 | 1488 | 35 | 620.1 | 2.51E+04 | 0.02472 | 1.56E+07 |
| 48 | 1520 | 35 | 633.3 | 2.58E+04 | 0.02451 | 1.64E+07 |
| 49 | 1552 | 35 | 646.6 | 2.66E+04 | 0.02433 | 1.73E+07 |
| 50 | 1584 | 35 | 659.8 | 2.73E+04 | 0.02414 | 1.81E+07 |
| 51 | 1616 | 35 | 673.4 | 2.81E+04 | 0.02393 | 1.90E+07 |
| 52 | 1648 | 35 | 686.7 | 2.89E+04 | 0.0238 | 2.00E+07 |
| 53 | 1680 | 35 | 699.9 | 2.96E+04 | 0.02368 | 2.09E+07 |
| 54 | 1712 | 35 | 713.2 | 3.03E+04 | 0.02356 | 2.19E+07 |
| 55 | 1744 | 35 | 726.5 | 3.10E+04 | 0.02345 | 2.29E+07 |
| 56 | 1776 | 35 | 740 | 3.14E+04 | 0.02355 | 2.39E+07 |
| 57 | 1808 | 35 | 753.3 | 3.18E+04 | 0.02372 | 2.49E+07 |
| 58 | 1840 | 35 | 766.5 | 3.24E+04 | 0.02365 | 2.59E+07 |
| 59 | 1872 | 35 | 779.8 | 3.30E+04 | 0.02367 | 2.70E+07 |
| 60 | 1904 | 35 | 793.3 | 3.36E+04 | 0.02359 | 2.80E+07 |
| 61 | 1936 | 35 | 793.4 | 3.39E+04 | 0.02342 | 2.91E+07 |
| 62 | 1968 | 35 | 780.1 | 3.32E+04 | 0.02349 | 3.02E+07 |
| 63 | 2000 | 35 | 766.6 | 3.25E+04 | 0.02359 | 3.12E+07 |
| 64 | 2032 | 35 | 753.3 | 3.18E+04 | 0.02368 | 3.23E+07 |
| 65 | 2064 | 35 | 740 | 3.11E+04 | 0.02379 | 3.33E+07 |
| 66 | 2096 | 35 | 726.8 | 3.04E+04 | 0.02391 | 3.42E+07 |
| 67 | 2128 | 35 | 713.3 | 2.97E+04 | 0.024 | 3.52E+07 |
| 68 | 2160 | 35 | 700 | 2.90E+04 | 0.02413 | 3.61E+07 |
| 69 | 2192 | 35 | 686.7 | 2.83E+04 | 0.02427 | 3.70E+07 |
| 70 | 2224 | 35 | 673.4 | 2.75E+04 | 0.02445 | 3.79E+07 |
| 71 | 2256 | 35 | 660.1 | 2.68E+04 | 0.02462 | 3.87E+07 |
| 72 | 2288 | 35 | 646.6 | 2.61E+04 | 0.02476 | 3.96E+07 |
| 73 | 2320 | 35 | 633.4 | 2.54E+04 | 0.02492 | 4.04E+07 |
| 74 | 2352 | 35 | 620.1 | 2.47E+04 | 0.02514 | 4.12E+07 |
| 75 | 2384 | 35 | 606.8 | 2.39E+04 | 0.02534 | 4.19E+07 |
| 76 | 2416 | 35 | 593.2 | 2.32E+04 | 0.02559 | 4.27E+07 |
| 77 | 2448 | 35 | 580 | 2.25E+04 | 0.02581 | 4.34E+07 |
| 78 | 2480 | 35 | 566.8 | 2.18E+04 | 0.02605 | 4.41E+07 |
| 79 | 2512 | 35 | 553.5 | 2.10E+04 | 0.0263 | 4.48E+07 |
| 80 | 2544 | 35 | 540 | 2.03E+04 | 0.02663 | 4.54E+07 |
| 81 | 2576 | 35 | 526.7 | 1.95E+04 | 0.02695 | 4.60E+07 |
| 82 | 2608 | 35 | 513.3 | 1.88E+04 | 0.02728 | 4.66E+07 |
| 83 | 2640 | 35 | 500 | 1.81E+04 | 0.02757 | 4.72E+07 |
| 84 | 2672 | 35 | 486.7 | 1.75E+04 | 0.02787 | 4.78E+07 |
| 85 | 2704 | 35 | 473.5 | 1.68E+04 | 0.02817 | 4.83E+07 |
| 86 | 2736 | 35 | 460.2 | 1.61E+04 | 0.02853 | 4.88E+07 |
| 87 | 2768 | 35 | 446.6 | 1.55E+04 | 0.0289 | 4.93E+07 |
| 88 | 2800 | 35 | 433.3 | 1.48E+04 | 0.02924 | 4.98E+07 |
| 89 | 2832 | 35 | 420.1 | 1.42E+04 | 0.02959 | 5.03E+07 |
| 90 | 2864 | 35 | 406.5 | 1.36E+04 | 0.02999 | 5.07E+07 |
| 91 | 2896 | 35 | 393.3 | 1.30E+04 | 0.03037 | 5.11E+07 |
| 92 | 2928 | 35 | 380 | 1.23E+04 | 0.03081 | 5.15E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 93 | 2960 | 35 | 366.8 | 1.17E+04 | 0.03123 | 5.19E+07 |
| 94 | 2992 | 35 | 353.5 | 1.12E+04 | 0.03169 | 5.22E+07 |
| 95 | 3024 | 35 | 339.9 | 1.05E+04 | 0.03227 | 5.26E+07 |
| 96 | 3056 | 35 | 326.7 | 9941 | 0.03286 | 5.29E+07 |
| 97 | 3088 | 35 | 313.4 | 9372 | 0.03345 | 5.32E+07 |
| 98 | 3120 | 35 | 300.2 | 8816 | 0.03405 | 5.35E+07 |
| 99 | 3152 | 35 | 286.6 | 8250 | 0.03474 | 5.37E+07 |
| 100 | 3184 | 35 | 273.3 | 7689 | 0.03555 | 5.40E+07 |
| 101 | 3216 | 35 | 260 | 7133 | 0.03646 | 5.42E+07 |
| 102 | 3248 | 35 | 246.8 | 6572 | 0.03755 | 5.44E+07 |
| 103 | 3280 | 35 | 233.5 | 6008 | 0.03887 | 5.46E+07 |
| 104 | 3312 | 35 | 220 | 5424 | 0.04055 | 5.48E+07 |
| 105 | 3344 | 35 | 206.7 | 4883 | 0.04233 | 5.49E+07 |
| 106 | 3376 | 35 | 193.4 | 4404 | 0.04391 | 5.51E+07 |
| 107 | 3408 | 35 | 180.2 | 3976 | 0.04531 | 5.52E+07 |
| 108 | 3440 | 35 | 166.6 | 3574 | 0.04662 | 5.53E+07 |
| 109 | 3472 | 35 | 153.4 | 3206 | 0.04784 | 5.54E+07 |
| 110 | 3504 | 35 | 140.1 | 2849 | 0.04918 | 5.55E+07 |
| 111 | 3536 | 35 | 126.8 | 2509 | 0.05054 | 5.56E+07 |
| 112 | 3568 | 35 | 113.3 | 2186 | 0.0518 | 5.57E+07 |
| 113 | 3600 | 35 | 99.97 | 1880 | 0.05318 | 5.57E+07 |
| 114 | 3632 | 35 | 86.68 | 1584 | 0.05474 | 5.58E+07 |
| 115 | 3664 | 35 | 73.39 | 1298 | 0.05656 | 5.58E+07 |
| 116 | 3696 | 35 | 60.13 | 1021 | 0.05891 | 5.59E+07 |
| 117 | 3728 | 35 | 46.84 | 749.4 | 0.0625 | 5.59E+07 |
| 118 | 3760 | 35 | 33.26 | 479 | 0.06943 | 5.59E+07 |
| 119 | 3792 | 35 | 19.98 | 221.8 | 0.09008 | 5.59E+07 |
| 120 | 3824 | 35 | 6.658 | 16.99 | 0.3919 | 5.59E+07 |

### C3.2.4 Abu untreated with 20% Sertica

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.042 | 35 | 8.526 | 0.000277 | 3.08E+04 | -0.0012 |
| 2 | 15.06 | 35 | 24.73 | 0.000335 | 7.38E+04 | 0.002264 |
| 3 | 25.03 | 35 | 41.43 | 0.000459 | 9.03E+04 | 0.006924 |
| 4 | 35.05 | 35 | 58.12 | 0.00057 | 1.02E+05 | 0.01252 |
| 5 | 45.06 | 35 | 74.84 | 0.000732 | 1.02E+05 | 0.01957 |
| 6 | 55.03 | 35 | 91.53 | 0.000821 | 1.12E+05 | 0.02823 |
| 7 | 65.06 | 35 | 108.3 | 0.001004 | 1.08E+05 | 0.03782 |
| 8 | 75.06 | 35 | 124.9 | 0.001188 | 1.05E+05 | 0.04954 |
| 9 | 85.03 | 35 | 141.6 | 0.001415 | 1.00E+05 | 0.06378 |
| 10 | 95.05 | 35 | 158.2 | 0.001762 | 8.98E+04 | 0.08109 |
| 11 | 105.1 | 35 | 174.8 | 0.002209 | 7.92E+04 | 0.1039 |
| 12 | 115 | 35 | 191.5 | 0.003105 | 6.17E+04 | 0.1352 |
| 13 | 125.1 | 35 | 208.2 | 0.005573 | 3.74E+04 | 0.1939 |
| 14 | 135.1 | 35 | 224.8 | 3812 | 0.05898 | 4.08E+04 |
| 15 | 145 | 35 | 241.5 | 1.18E+04 | 0.02046 | 1.59E+05 |

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|---|---|---|---|---|---|---|
| 16 | 155 | 35 | 258.2 | 1.53E+04 | 0.01692 | 3.13E+05 |
| 17 | 165.1 | 35 | 274.9 | 1.75E+04 | 0.01569 | 4.87E+05 |
| 18 | 175 | 35 | 291.6 | 1.95E+04 | 0.01499 | 6.82E+05 |
| 19 | 185.1 | 35 | 308.3 | 2.13E+04 | 0.01447 | 8.97E+05 |
| 20 | 195.1 | 35 | 324.9 | 2.30E+04 | 0.01411 | 1.13E+06 |
| 21 | 205 | 35 | 341.6 | 2.47E+04 | 0.01381 | 1.37E+06 |
| 22 | 215 | 35 | 358.2 | 2.63E+04 | 0.01362 | 1.64E+06 |
| 23 | 225 | 35 | 374.8 | 2.78E+04 | 0.01346 | 1.91E+06 |
| 24 | 235 | 35 | 391.5 | 2.94E+04 | 0.01332 | 2.21E+06 |
| 25 | 245.1 | 35 | 408.1 | 3.09E+04 | 0.01322 | 2.52E+06 |
| 26 | 255 | 35 | 424.8 | 3.23E+04 | 0.01314 | 2.84E+06 |
| 27 | 265 | 35 | 441.6 | 3.37E+04 | 0.0131 | 3.18E+06 |
| 28 | 275 | 35 | 458.2 | 3.51E+04 | 0.01305 | 3.53E+06 |
| 29 | 285.1 | 35 | 474.9 | 3.65E+04 | 0.01303 | 3.89E+06 |
| 30 | 295 | 35 | 491.5 | 3.78E+04 | 0.01302 | 4.27E+06 |
| 31 | 305.1 | 35 | 508.2 | 3.90E+04 | 0.01304 | 4.66E+06 |
| 32 | 315.1 | 35 | 524.9 | 4.02E+04 | 0.01307 | 5.06E+06 |
| 33 | 325 | 35 | 541.5 | 4.13E+04 | 0.01311 | 5.48E+06 |
| 34 | 335.1 | 35 | 558.2 | 4.24E+04 | 0.01317 | 5.90E+06 |
| 35 | 345.1 | 35 | 574.9 | 4.34E+04 | 0.01324 | 6.34E+06 |
| 36 | 355.1 | 35 | 591.6 | 4.44E+04 | 0.01331 | 6.78E+06 |
| 37 | 365.1 | 35 | 608.3 | 4.54E+04 | 0.01339 | 7.24E+06 |
| 38 | 375 | 35 | 624.6 | 4.63E+04 | 0.01348 | 7.70E+06 |
| 39 | 385 | 35 | 641.3 | 4.73E+04 | 0.01357 | 8.17E+06 |
| 40 | 395 | 35 | 658.3 | 4.82E+04 | 0.01366 | 8.65E+06 |
| 41 | 405 | 35 | 674.6 | 4.91E+04 | 0.01374 | 9.14E+06 |
| 42 | 415 | 35 | 691.4 | 4.99E+04 | 0.01385 | 9.64E+06 |
| 43 | 425 | 35 | 708 | 5.09E+04 | 0.01391 | 1.02E+07 |
| 44 | 435.1 | 35 | 724.8 | 5.18E+04 | 0.014 | 1.07E+07 |
| 45 | 445.1 | 35 | 741.7 | 5.24E+04 | 0.01415 | 1.12E+07 |
| 46 | 450.1 | 35 | 744.8 | 5.25E+04 | 0.01418 | 1.13E+07 |

**C3.3 (T=40°C)**

**C3.3.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.051 | 40 | 2.118 | 0.000332 | 6372 | 0.001465 |
| 1, 2 | 15.07 | 40 | 6.242 | 0.000145 | 4.29E+04 | 0.003196 |
| 1, 3 | 25.04 | 40 | 10.41 | 0.000179 | 5.83E+04 | 0.004927 |
| 1, 4 | 35.07 | 40 | 14.59 | 0.000196 | 7.44E+04 | 0.006392 |
| 1, 5 | 45.08 | 40 | 18.75 | 0.000196 | 9.57E+04 | 0.009321 |
| 1, 6 | 55.04 | 40 | 22.92 | 0.000258 | 8.88E+04 | 0.01185 |
| 1, 7 | 65.08 | 40 | 27.09 | 0.000268 | 1.01E+05 | 0.01385 |
| 1, 8 | 75.07 | 40 | 31.18 | 0.000283 | 1.10E+05 | 0.01758 |
| 1, 9 | 85.03 | 40 | 35.34 | 0.000313 | 1.13E+05 | 0.02037 |
| 1, 10 | 95.08 | 40 | 39.6 | 0.000359 | 1.10E+05 | 0.0237 |
| 1, 11 | 105.1 | 40 | 43.68 | 0.000367 | 1.19E+05 | 0.02783 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 12 | 115 | 40 | 47.84 | 0.000428 | 1.12E+05 | 0.03209 |
| 1, 13 | 125.1 | 40 | 52.1 | 0.000449 | 1.16E+05 | 0.03635 |
| 1, 14 | 135.1 | 40 | 56.2 | 0.000648 | 8.67E+04 | 0.04234 |
| 1, 15 | 145 | 40 | 60.36 | 0.000564 | 1.07E+05 | 0.04847 |
| 1, 16 | 155.1 | 40 | 64.54 | 0.000648 | 9.96E+04 | 0.05513 |
| 1, 17 | 165.1 | 40 | 68.71 | 0.000707 | 9.72E+04 | 0.06192 |
| 1, 18 | 175 | 40 | 72.89 | 0.000826 | 8.83E+04 | 0.06978 |
| 1, 19 | 185.1 | 40 | 77.07 | 0.000966 | 7.98E+04 | 0.07963 |
| 1, 20 | 195.1 | 40 | 81.23 | 0.00113 | 7.19E+04 | 0.09015 |
| 1, 21 | 205 | 40 | 85.4 | 0.001473 | 5.80E+04 | 0.1059 |
| 1, 22 | 215.1 | 40 | 89.57 | 0.00192 | 4.67E+04 | 0.1266 |
| 1, 23 | 225.1 | 40 | 93.73 | 0.0033 | 2.84E+04 | 0.1603 |
| 1, 24 | 235 | 40 | 97.9 | 99.12 | 0.9876 | 2062 |
| 1, 25 | 245.1 | 40 | 102.1 | 3333 | 0.03062 | 3.56E+04 |
| 1, 26 | 255.1 | 40 | 106.2 | 5100 | 0.02083 | 8.61E+04 |
| 1, 27 | 265 | 40 | 110.4 | 5978 | 0.01847 | 1.46E+05 |
| 1, 28 | 275.1 | 40 | 114.6 | 6609 | 0.01733 | 2.13E+05 |
| 1, 29 | 285.1 | 40 | 118.7 | 7141 | 0.01663 | 2.84E+05 |
| 1, 30 | 295 | 40 | 122.9 | 7620 | 0.01613 | 3.60E+05 |
| 1, 31 | 305.1 | 40 | 127 | 8067 | 0.01575 | 4.41E+05 |
| 1, 32 | 315.1 | 40 | 131.2 | 8497 | 0.01544 | 5.26E+05 |
| 1, 33 | 325 | 40 | 135.4 | 8915 | 0.01519 | 6.15E+05 |
| 1, 34 | 335.1 | 40 | 139.5 | 9321 | 0.01497 | 7.09E+05 |
| 1, 35 | 345.1 | 40 | 143.7 | 9710 | 0.0148 | 8.05E+05 |
| 1, 36 | 355 | 40 | 147.9 | 1.01E+04 | 0.01465 | 9.06E+05 |
| 1, 37 | 365.1 | 40 | 152 | 1.05E+04 | 0.01451 | 1.01E+06 |
| 1, 38 | 375.1 | 40 | 156.2 | 1.09E+04 | 0.01437 | 1.12E+06 |
| 1, 39 | 385 | 40 | 160.4 | 1.12E+04 | 0.01428 | 1.23E+06 |
| 1, 40 | 395.1 | 40 | 164.6 | 1.16E+04 | 0.01417 | 1.35E+06 |
| 1, 41 | 405.1 | 40 | 168.7 | 1.20E+04 | 0.01406 | 1.47E+06 |
| 1, 42 | 415 | 40 | 172.9 | 1.24E+04 | 0.01394 | 1.59E+06 |
| 1, 43 | 425.1 | 40 | 177.1 | 1.28E+04 | 0.01383 | 1.72E+06 |
| 1, 44 | 435.1 | 40 | 181.2 | 1.32E+04 | 0.01375 | 1.85E+06 |
| 1, 45 | 445 | 40 | 185.4 | 1.36E+04 | 0.01367 | 1.99E+06 |
| 1, 46 | 455.1 | 40 | 189.6 | 1.40E+04 | 0.01359 | 2.13E+06 |
| 1, 47 | 465.1 | 40 | 193.7 | 1.43E+04 | 0.01352 | 2.27E+06 |
| 1, 48 | 475 | 40 | 197.9 | 1.47E+04 | 0.01347 | 2.42E+06 |
| 1, 49 | 485.1 | 40 | 202.1 | 1.51E+04 | 0.01341 | 2.57E+06 |
| 1, 50 | 495.1 | 40 | 206.2 | 1.54E+04 | 0.01336 | 2.72E+06 |
| 1, 51 | 505 | 40 | 210.4 | 1.58E+04 | 0.01332 | 2.88E+06 |
| 1, 52 | 515.1 | 40 | 214.6 | 1.62E+04 | 0.01328 | 3.04E+06 |
| 1, 53 | 525.1 | 40 | 218.7 | 1.65E+04 | 0.01327 | 3.21E+06 |
| 1, 54 | 535 | 40 | 222.8 | 1.68E+04 | 0.01324 | 3.38E+06 |
| 1, 55 | 545.1 | 40 | 227.1 | 1.73E+04 | 0.01317 | 3.55E+06 |
| 1, 56 | 555.1 | 40 | 231.2 | 1.77E+04 | 0.01309 | 3.73E+06 |
| 1, 57 | 565 | 40 | 235.3 | 1.80E+04 | 0.01304 | 3.91E+06 |
| 1, 58 | 575.1 | 40 | 239.6 | 1.84E+04 | 0.013 | 4.09E+06 |
| 1, 59 | 585.1 | 40 | 243.7 | 1.88E+04 | 0.01298 | 4.28E+06 |

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|---|---|---|---|---|---|---|
| 1, 60 | 595 | 40 | 247.8 | 1.91E+04 | 0.01296 | 4.47E+06 |
| 1, 61 | 605.1 | 40 | 247.9 | 1.93E+04 | 0.01282 | 4.67E+06 |
| 1, 62 | 615.1 | 40 | 243.7 | 1.92E+04 | 0.01273 | 4.86E+06 |
| 1, 63 | 625.2 | 40 | 239.6 | 1.89E+04 | 0.01271 | 5.05E+06 |
| 1, 64 | 635.2 | 40 | 235.4 | 1.85E+04 | 0.0127 | 5.23E+06 |
| 1, 65 | 645.2 | 40 | 231.2 | 1.82E+04 | 0.01272 | 5.41E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.78E+04 | 0.01273 | 5.59E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.75E+04 | 0.01275 | 5.77E+06 |
| 1, 68 | 675.1 | 40 | 218.7 | 1.72E+04 | 0.01275 | 5.94E+06 |
| 1, 69 | 685.2 | 40 | 214.6 | 1.68E+04 | 0.0128 | 6.11E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.63E+04 | 0.01291 | 6.27E+06 |
| 1, 71 | 705.2 | 40 | 206.2 | 1.60E+04 | 0.01292 | 6.43E+06 |
| 1, 72 | 715.2 | 40 | 202.1 | 1.57E+04 | 0.01287 | 6.58E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.54E+04 | 0.01287 | 6.74E+06 |
| 1, 74 | 735.1 | 40 | 193.8 | 1.51E+04 | 0.01287 | 6.89E+06 |
| 1, 75 | 745.1 | 40 | 189.6 | 1.47E+04 | 0.01288 | 7.04E+06 |
| 1, 76 | 755.2 | 40 | 185.4 | 1.44E+04 | 0.01291 | 7.18E+06 |
| 1, 77 | 765.1 | 40 | 181.3 | 1.40E+04 | 0.01294 | 7.32E+06 |
| 1, 78 | 775.2 | 40 | 177.1 | 1.36E+04 | 0.01298 | 7.46E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 1.33E+04 | 0.01303 | 7.59E+06 |
| 1, 80 | 795.2 | 40 | 168.7 | 1.29E+04 | 0.01308 | 7.72E+06 |
| 1, 81 | 805.2 | 40 | 164.6 | 1.26E+04 | 0.01311 | 7.84E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.22E+04 | 0.01312 | 7.96E+06 |
| 1, 83 | 825.2 | 40 | 156.2 | 1.18E+04 | 0.01323 | 8.08E+06 |
| 1, 84 | 835.2 | 40 | 152 | 1.15E+04 | 0.01327 | 8.20E+06 |
| 1, 85 | 845.2 | 40 | 147.9 | 1.11E+04 | 0.0133 | 8.31E+06 |
| 1, 86 | 855.2 | 40 | 143.7 | 1.08E+04 | 0.01334 | 8.42E+06 |
| 1, 87 | 865.2 | 40 | 139.5 | 1.04E+04 | 0.0134 | 8.52E+06 |
| 1, 88 | 875.1 | 40 | 135.4 | 1.01E+04 | 0.01345 | 8.62E+06 |
| 1, 89 | 885.2 | 40 | 131.2 | 9704 | 0.01352 | 8.72E+06 |
| 1, 90 | 895.2 | 40 | 127 | 9354 | 0.01358 | 8.81E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 8997 | 0.01366 | 8.90E+06 |
| 1, 92 | 915.2 | 40 | 118.7 | 8637 | 0.01374 | 8.99E+06 |
| 1, 93 | 925.2 | 40 | 114.6 | 8282 | 0.01384 | 9.07E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 7921 | 0.01394 | 9.15E+06 |
| 1, 95 | 945.2 | 40 | 106.2 | 7562 | 0.01404 | 9.22E+06 |
| 1, 96 | 955.2 | 40 | 102.1 | 7193 | 0.01419 | 9.30E+06 |
| 1, 97 | 965.1 | 40 | 97.94 | 6835 | 0.01433 | 9.36E+06 |
| 1, 98 | 975.2 | 40 | 93.69 | 6474 | 0.01447 | 9.43E+06 |
| 1, 99 | 985.2 | 40 | 89.54 | 6119 | 0.01463 | 9.49E+06 |
| 1, 100 | 995.2 | 40 | 85.38 | 5764 | 0.01481 | 9.55E+06 |
| 1, 101 | 1005 | 40 | 81.22 | 5405 | 0.01503 | 9.60E+06 |
| 1, 102 | 1015 | 40 | 77.06 | 5051 | 0.01526 | 9.65E+06 |
| 1, 103 | 1025 | 40 | 72.89 | 4696 | 0.01552 | 9.70E+06 |
| 1, 104 | 1035 | 40 | 68.7 | 4347 | 0.0158 | 9.74E+06 |
| 1, 105 | 1045 | 40 | 64.6 | 4004 | 0.01613 | 9.78E+06 |
| 1, 106 | 1055 | 40 | 60.43 | 3659 | 0.01652 | 9.82E+06 |
| 1, 107 | 1065 | 40 | 56.25 | 3320 | 0.01694 | 9.85E+06 |

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|---|---|---|---|---|---|---|
| 1, 108 | 1075 | 40 | 52.08 | 2989 | 0.01742 | 9.88E+06 |
| 1, 109 | 1085 | 40 | 47.91 | 2665 | 0.01798 | 9.91E+06 |
| 1, 110 | 1095 | 40 | 43.74 | 2352 | 0.0186 | 9.93E+06 |
| 1, 111 | 1105 | 40 | 39.57 | 2050 | 0.01931 | 9.95E+06 |
| 1, 112 | 1115 | 40 | 35.4 | 1759 | 0.02013 | 9.97E+06 |
| 1, 113 | 1125 | 40 | 31.24 | 1480 | 0.0211 | 9.98E+06 |
| 1, 114 | 1135 | 40 | 27.09 | 1214 | 0.02231 | 1.00E+07 |
| 1, 115 | 1145 | 40 | 22.93 | 958.6 | 0.02392 | 1.00E+07 |
| 1, 116 | 1155 | 40 | 18.68 | 704.3 | 0.02653 | 1.00E+07 |
| 1, 117 | 1165 | 40 | 14.6 | 467.3 | 0.03124 | 1.00E+07 |
| 1, 118 | 1175 | 40 | 10.42 | 247.1 | 0.04218 | 1.00E+07 |
| 1, 119 | 1185 | 40 | 6.239 | 82.59 | 0.07554 | 1.00E+07 |
| 1, 120 | 1195 | 40 | 2.068 | 3.665 | 0.5643 | 1.00E+07 |

### C3.3.2 Abu treated with 500PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.033 | 40 | 2.124 | 0.00675 | 314.7 | 0.06764 |
| 2 | 15.05 | 40 | 6.182 | 0.02008 | 307.9 | 0.2957 |
| 3 | 25.03 | 40 | 10.35 | 169.1 | 0.06122 | 1890 |
| 4 | 35.05 | 40 | 14.53 | 691.8 | 0.021 | 8907 |
| 5 | 45.05 | 40 | 18.7 | 1049 | 0.01782 | 1.94E+04 |
| 6 | 55.04 | 40 | 22.86 | 1351 | 0.01692 | 3.30E+04 |
| 7 | 65.06 | 40 | 27.04 | 1631 | 0.01658 | 4.94E+04 |
| 8 | 75.06 | 40 | 31.22 | 1907 | 0.01638 | 6.85E+04 |
| 9 | 85.03 | 40 | 35.4 | 2184 | 0.01621 | 9.03E+04 |
| 10 | 95.05 | 40 | 39.57 | 2465 | 0.01606 | 1.15E+05 |
| 11 | 105 | 40 | 43.74 | 2747 | 0.01592 | 1.43E+05 |
| 12 | 115 | 40 | 47.91 | 3030 | 0.01581 | 1.73E+05 |
| 13 | 125.1 | 40 | 52.08 | 3318 | 0.0157 | 2.06E+05 |
| 14 | 135.1 | 40 | 56.18 | 3602 | 0.0156 | 2.42E+05 |
| 15 | 145 | 40 | 60.37 | 3893 | 0.01551 | 2.81E+05 |
| 16 | 155.1 | 40 | 64.53 | 4185 | 0.01542 | 3.23E+05 |
| 17 | 165.1 | 40 | 68.71 | 4476 | 0.01535 | 3.68E+05 |
| 18 | 175 | 40 | 72.89 | 4771 | 0.01528 | 4.16E+05 |
| 19 | 185 | 40 | 77.08 | 5069 | 0.01521 | 4.67E+05 |
| 20 | 195 | 40 | 81.17 | 5363 | 0.01514 | 5.20E+05 |
| 21 | 205.1 | 40 | 85.42 | 5667 | 0.01507 | 5.77E+05 |
| 22 | 215.1 | 40 | 89.57 | 5969 | 0.015 | 6.37E+05 |
| 23 | 225.1 | 40 | 93.73 | 6265 | 0.01496 | 6.99E+05 |
| 24 | 235 | 40 | 97.9 | 6559 | 0.01493 | 7.65E+05 |
| 25 | 245.1 | 40 | 102.1 | 6865 | 0.01487 | 8.34E+05 |
| 26 | 255 | 40 | 106.2 | 7170 | 0.01481 | 9.05E+05 |
| 27 | 265 | 40 | 110.4 | 7482 | 0.01475 | 9.80E+05 |
| 28 | 275 | 40 | 114.5 | 7792 | 0.0147 | 1.06E+06 |
| 29 | 285 | 40 | 118.7 | 8108 | 0.01464 | 1.14E+06 |
| 30 | 295.1 | 40 | 122.9 | 8439 | 0.01457 | 1.23E+06 |

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|---|---|---|---|---|---|---|
| 31 | 305.1 | 40 | 127 | 8752 | 0.01451 | 1.31E+06 |
| 32 | 315 | 40 | 131.2 | 9063 | 0.01448 | 1.40E+06 |
| 33 | 325 | 40 | 135.4 | 9361 | 0.01446 | 1.50E+06 |
| 34 | 335 | 40 | 139.5 | 9668 | 0.01443 | 1.59E+06 |
| 35 | 345 | 40 | 143.7 | 9973 | 0.01441 | 1.69E+06 |
| 36 | 355.1 | 40 | 147.9 | 1.03E+04 | 0.0144 | 1.80E+06 |
| 37 | 365.1 | 40 | 152 | 1.06E+04 | 0.0144 | 1.90E+06 |
| 38 | 375 | 40 | 156.2 | 1.09E+04 | 0.01434 | 2.01E+06 |
| 39 | 385 | 40 | 160.4 | 1.12E+04 | 0.01429 | 2.12E+06 |
| 40 | 395 | 40 | 164.6 | 1.16E+04 | 0.01424 | 2.24E+06 |
| 41 | 405 | 40 | 168.7 | 1.19E+04 | 0.0142 | 2.36E+06 |
| 42 | 415.1 | 40 | 172.9 | 1.22E+04 | 0.01416 | 2.48E+06 |
| 43 | 425.1 | 40 | 177 | 1.25E+04 | 0.01414 | 2.60E+06 |
| 44 | 435 | 40 | 181.2 | 1.28E+04 | 0.01413 | 2.73E+06 |
| 45 | 445.1 | 40 | 185.4 | 1.31E+04 | 0.01413 | 2.87E+06 |
| 46 | 455.1 | 40 | 189.5 | 1.34E+04 | 0.01411 | 3.00E+06 |
| 47 | 465 | 40 | 193.7 | 1.38E+04 | 0.01407 | 3.14E+06 |
| 48 | 475.1 | 40 | 197.9 | 1.41E+04 | 0.01404 | 3.28E+06 |
| 49 | 485.1 | 40 | 202 | 1.44E+04 | 0.01404 | 3.42E+06 |
| 50 | 495 | 40 | 206.2 | 1.47E+04 | 0.01402 | 3.57E+06 |
| 51 | 505.1 | 40 | 210.4 | 1.50E+04 | 0.01403 | 3.72E+06 |
| 52 | 515.1 | 40 | 214.5 | 1.53E+04 | 0.01403 | 3.87E+06 |
| 53 | 525.1 | 40 | 218.7 | 1.56E+04 | 0.01402 | 4.03E+06 |
| 54 | 535.1 | 40 | 222.9 | 1.59E+04 | 0.014 | 4.19E+06 |
| 55 | 545.1 | 40 | 227.1 | 1.62E+04 | 0.014 | 4.35E+06 |
| 56 | 555 | 40 | 231.2 | 1.65E+04 | 0.01399 | 4.51E+06 |
| 57 | 565.1 | 40 | 235.4 | 1.68E+04 | 0.01399 | 4.68E+06 |
| 58 | 575.1 | 40 | 239.6 | 1.72E+04 | 0.01397 | 4.85E+06 |
| 59 | 585.1 | 40 | 243.7 | 1.74E+04 | 0.01398 | 5.03E+06 |
| 60 | 595.1 | 40 | 247.9 | 1.78E+04 | 0.01397 | 5.21E+06 |
| 61 | 605.2 | 40 | 247.8 | 1.79E+04 | 0.01382 | 5.39E+06 |
| 62 | 615.3 | 40 | 243.7 | 1.78E+04 | 0.01373 | 5.57E+06 |
| 63 | 625.3 | 40 | 239.5 | 1.75E+04 | 0.01369 | 5.74E+06 |
| 64 | 635.3 | 40 | 235.3 | 1.72E+04 | 0.01367 | 5.91E+06 |
| 65 | 645.3 | 40 | 231.2 | 1.69E+04 | 0.01366 | 6.08E+06 |
| 66 | 655.3 | 40 | 227 | 1.66E+04 | 0.01364 | 6.25E+06 |
| 67 | 665.3 | 40 | 222.9 | 1.63E+04 | 0.01365 | 6.41E+06 |
| 68 | 675.3 | 40 | 218.7 | 1.60E+04 | 0.01364 | 6.57E+06 |
| 69 | 685.3 | 40 | 214.5 | 1.57E+04 | 0.01364 | 6.73E+06 |
| 70 | 695.3 | 40 | 210.3 | 1.54E+04 | 0.01363 | 6.88E+06 |
| 71 | 705.3 | 40 | 206.2 | 1.51E+04 | 0.01363 | 7.03E+06 |
| 72 | 715.3 | 40 | 202 | 1.48E+04 | 0.01365 | 7.18E+06 |
| 73 | 725.3 | 40 | 197.8 | 1.45E+04 | 0.01367 | 7.33E+06 |
| 74 | 735.3 | 40 | 193.7 | 1.42E+04 | 0.01367 | 7.47E+06 |
| 75 | 745.2 | 40 | 189.5 | 1.38E+04 | 0.01369 | 7.61E+06 |
| 76 | 755.3 | 40 | 185.3 | 1.35E+04 | 0.01371 | 7.74E+06 |
| 77 | 765.3 | 40 | 181.2 | 1.32E+04 | 0.01373 | 7.87E+06 |
| 78 | 775.3 | 40 | 177 | 1.29E+04 | 0.01373 | 8.00E+06 |

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|---|---|---|---|---|---|---|
| 79 | 785.3 | 40 | 172.8 | 1.26E+04 | 0.01374 | 8.13E+06 |
| 80 | 795.3 | 40 | 168.7 | 1.23E+04 | 0.01376 | 8.25E+06 |
| 81 | 805.3 | 40 | 164.5 | 1.19E+04 | 0.01378 | 8.37E+06 |
| 82 | 815.3 | 40 | 160.3 | 1.16E+04 | 0.0138 | 8.49E+06 |
| 83 | 825.3 | 40 | 156.2 | 1.13E+04 | 0.01382 | 8.60E+06 |
| 84 | 835.2 | 40 | 152 | 1.10E+04 | 0.01385 | 8.71E+06 |
| 85 | 845.3 | 40 | 147.8 | 1.06E+04 | 0.01389 | 8.82E+06 |
| 86 | 855.3 | 40 | 143.7 | 1.03E+04 | 0.01392 | 8.92E+06 |
| 87 | 865.3 | 40 | 139.5 | 9989 | 0.01397 | 9.02E+06 |
| 88 | 875.3 | 40 | 135.3 | 9667 | 0.014 | 9.12E+06 |
| 89 | 885.3 | 40 | 131.2 | 9345 | 0.01404 | 9.21E+06 |
| 90 | 895.3 | 40 | 127 | 9013 | 0.01409 | 9.30E+06 |
| 91 | 905.3 | 40 | 122.8 | 8684 | 0.01415 | 9.39E+06 |
| 92 | 915.3 | 40 | 118.7 | 8352 | 0.01421 | 9.47E+06 |
| 93 | 925.3 | 40 | 114.5 | 8016 | 0.01429 | 9.55E+06 |
| 94 | 935.3 | 40 | 110.4 | 7684 | 0.01436 | 9.63E+06 |
| 95 | 945.3 | 40 | 106.2 | 7355 | 0.01444 | 9.70E+06 |
| 96 | 955.3 | 40 | 102 | 7021 | 0.01453 | 9.77E+06 |
| 97 | 965.3 | 40 | 97.88 | 6690 | 0.01463 | 9.84E+06 |
| 98 | 975.3 | 40 | 93.71 | 6363 | 0.01473 | 9.90E+06 |
| 99 | 985.2 | 40 | 89.55 | 6035 | 0.01484 | 9.96E+06 |
| 100 | 995.3 | 40 | 85.33 | 5705 | 0.01496 | 1.00E+07 |
| 101 | 1005 | 40 | 81.17 | 5377 | 0.0151 | 1.01E+07 |
| 102 | 1015 | 40 | 77.08 | 5061 | 0.01523 | 1.01E+07 |
| 103 | 1025 | 40 | 72.81 | 4730 | 0.01539 | 1.02E+07 |
| 104 | 1035 | 40 | 68.71 | 4417 | 0.01556 | 1.02E+07 |
| 105 | 1045 | 40 | 64.53 | 4101 | 0.01573 | 1.03E+07 |
| 106 | 1055 | 40 | 60.34 | 3787 | 0.01594 | 1.03E+07 |
| 107 | 1065 | 40 | 56.17 | 3476 | 0.01616 | 1.03E+07 |
| 108 | 1075 | 40 | 51.99 | 3173 | 0.01639 | 1.04E+07 |
| 109 | 1085 | 40 | 47.82 | 2873 | 0.01665 | 1.04E+07 |
| 110 | 1095 | 40 | 43.73 | 2581 | 0.01695 | 1.04E+07 |
| 111 | 1105 | 40 | 39.56 | 2286 | 0.01731 | 1.04E+07 |
| 112 | 1115 | 40 | 35.38 | 1996 | 0.01773 | 1.05E+07 |
| 113 | 1125 | 40 | 31.22 | 1711 | 0.01825 | 1.05E+07 |
| 114 | 1135 | 40 | 27.04 | 1430 | 0.01891 | 1.05E+07 |
| 115 | 1145 | 40 | 22.86 | 1154 | 0.0198 | 1.05E+07 |
| 116 | 1155 | 40 | 18.68 | 886.7 | 0.02106 | 1.05E+07 |
| 117 | 1165 | 40 | 14.56 | 634.3 | 0.02296 | 1.05E+07 |
| 118 | 1175 | 40 | 10.38 | 393 | 0.02641 | 1.05E+07 |
| 119 | 1185 | 40 | 6.2 | 180.5 | 0.03434 | 1.05E+07 |
| 120 | 1195 | 40 | 2.024 | 24.11 | 0.08395 | 1.05E+07 |

### C3.3.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 1 | 5.018 | 39.8 | 2.079 | 0.003037 | 684.5 | 0.02916 |
| 1, 2 | 15.04 | 39.8 | 6.255 | 0.005425 | 1153 | 0.08389 |
| 1, 3 | 25.08 | 39.8 | 10.42 | 0.01046 | 996.1 | 0.1916 |
| 1, 4 | 35.07 | 39.8 | 14.51 | 0.0335 | 433.2 | 0.728 |
| 1, 5 | 45.03 | 39.8 | 18.68 | 477.1 | 0.03916 | 4768 |
| 1, 6 | 55.07 | 39.9 | 22.94 | 952.6 | 0.02409 | 1.43E+04 |
| 1, 7 | 65.07 | 39.9 | 27.04 | 1173 | 0.02306 | 2.60E+04 |
| 1, 8 | 75.03 | 39.9 | 31.22 | 1359 | 0.02296 | 3.96E+04 |
| 1, 9 | 85.06 | 39.9 | 35.39 | 1537 | 0.02302 | 5.51E+04 |
| 1, 10 | 95.07 | 39.9 | 39.56 | 1716 | 0.02305 | 7.22E+04 |
| 1, 11 | 105 | 40 | 43.74 | 1902 | 0.023 | 9.12E+04 |
| 1, 12 | 115.1 | 40 | 47.92 | 2101 | 0.02281 | 1.12E+05 |
| 1, 13 | 125.1 | 40 | 52.01 | 2304 | 0.02257 | 1.35E+05 |
| 1, 14 | 135 | 40 | 56.19 | 2520 | 0.02229 | 1.61E+05 |
| 1, 15 | 145.1 | 40 | 60.36 | 2739 | 0.02204 | 1.88E+05 |
| 1, 16 | 155.1 | 40 | 64.54 | 2957 | 0.02183 | 2.18E+05 |
| 1, 17 | 165 | 40 | 68.71 | 3178 | 0.02162 | 2.49E+05 |
| 1, 18 | 175.1 | 40 | 72.9 | 3401 | 0.02144 | 2.84E+05 |
| 1, 19 | 185.1 | 40 | 77.08 | 3623 | 0.02128 | 3.20E+05 |
| 1, 20 | 195 | 40 | 81.17 | 3849 | 0.02109 | 3.58E+05 |
| 1, 21 | 205.1 | 40 | 85.35 | 4083 | 0.02091 | 3.99E+05 |
| 1, 22 | 215.1 | 40 | 89.51 | 4318 | 0.02073 | 4.42E+05 |
| 1, 23 | 225 | 40 | 93.68 | 4552 | 0.02058 | 4.88E+05 |
| 1, 24 | 235.1 | 40 | 97.92 | 4796 | 0.02042 | 5.36E+05 |
| 1, 25 | 245.1 | 40 | 102.1 | 5038 | 0.02026 | 5.86E+05 |
| 1, 26 | 255 | 40.1 | 106.2 | 5293 | 0.02007 | 6.39E+05 |
| 1, 27 | 265.1 | 40.1 | 110.4 | 5553 | 0.01988 | 6.95E+05 |
| 1, 28 | 275.1 | 40.1 | 114.6 | 5813 | 0.01971 | 7.53E+05 |
| 1, 29 | 285 | 40.1 | 118.7 | 6076 | 0.01954 | 8.14E+05 |
| 1, 30 | 295.1 | 40 | 122.9 | 6330 | 0.01941 | 8.78E+05 |
| 1, 31 | 305.1 | 40 | 127 | 6585 | 0.01929 | 9.43E+05 |
| 1, 32 | 315 | 40.1 | 131.2 | 6833 | 0.0192 | 1.01E+06 |
| 1, 33 | 325.1 | 40.1 | 135.4 | 7096 | 0.01909 | 1.08E+06 |
| 1, 34 | 335.1 | 40 | 139.5 | 7346 | 0.01899 | 1.16E+06 |
| 1, 35 | 345 | 40 | 143.8 | 7607 | 0.0189 | 1.23E+06 |
| 1, 36 | 355.1 | 40 | 147.9 | 7859 | 0.01882 | 1.31E+06 |
| 1, 37 | 365.1 | 40 | 152 | 8100 | 0.01877 | 1.39E+06 |
| 1, 38 | 375 | 40 | 156.3 | 8359 | 0.01869 | 1.48E+06 |
| 1, 39 | 385.1 | 40 | 160.4 | 8618 | 0.01861 | 1.56E+06 |
| 1, 40 | 395.1 | 40 | 164.6 | 8880 | 0.01853 | 1.65E+06 |
| 1, 41 | 405 | 40 | 168.7 | 9128 | 0.01849 | 1.74E+06 |
| 1, 42 | 415.1 | 40 | 172.9 | 9373 | 0.01845 | 1.84E+06 |
| 1, 43 | 425.1 | 40 | 177 | 9625 | 0.01839 | 1.93E+06 |
| 1, 44 | 435 | 40 | 181.2 | 9874 | 0.01835 | 2.03E+06 |
| 1, 45 | 445.1 | 40 | 185.4 | 1.01E+04 | 0.0183 | 2.13E+06 |
| 1, 46 | 455.1 | 40 | 189.5 | 1.04E+04 | 0.01824 | 2.24E+06 |

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|---|---|---|---|---|---|---|
| 1, 47 | 465 | 40 | 193.7 | 1.07E+04 | 0.01818 | 2.34E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.09E+04 | 0.01816 | 2.45E+06 |
| 1, 49 | 485.1 | 40 | 202.1 | 1.12E+04 | 0.01812 | 2.56E+06 |
| 1, 50 | 495 | 40 | 206.2 | 1.14E+04 | 0.0181 | 2.68E+06 |
| 1, 51 | 505.1 | 40 | 210.4 | 1.17E+04 | 0.01804 | 2.79E+06 |
| 1, 52 | 515.1 | 40 | 214.6 | 1.19E+04 | 0.01799 | 2.91E+06 |
| 1, 53 | 525 | 40 | 218.7 | 1.22E+04 | 0.01795 | 3.04E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.25E+04 | 0.01789 | 3.16E+06 |
| 1, 55 | 545.1 | 40 | 227.1 | 1.27E+04 | 0.01784 | 3.29E+06 |
| 1, 56 | 555 | 40 | 231.2 | 1.30E+04 | 0.01779 | 3.42E+06 |
| 1, 57 | 565.1 | 39.9 | 235.4 | 1.32E+04 | 0.0178 | 3.55E+06 |
| 1, 58 | 575.1 | 40 | 239.5 | 1.35E+04 | 0.01778 | 3.68E+06 |
| 1, 59 | 585 | 40 | 243.7 | 1.37E+04 | 0.01779 | 3.82E+06 |
| 1, 60 | 595.1 | 40 | 247.9 | 1.39E+04 | 0.01778 | 3.96E+06 |
| 1, 61 | 605.2 | 40 | 247.9 | 1.41E+04 | 0.01764 | 4.10E+06 |
| 1, 62 | 615.2 | 40 | 243.8 | 1.39E+04 | 0.01754 | 4.24E+06 |
| 1, 63 | 625.2 | 40 | 239.6 | 1.37E+04 | 0.01753 | 4.38E+06 |
| 1, 64 | 635.2 | 40 | 235.3 | 1.34E+04 | 0.01754 | 4.51E+06 |
| 1, 65 | 645.2 | 40 | 231.3 | 1.32E+04 | 0.01753 | 4.64E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.30E+04 | 0.01752 | 4.77E+06 |
| 1, 67 | 665.2 | 40 | 222.8 | 1.27E+04 | 0.01755 | 4.90E+06 |
| 1, 68 | 675.2 | 40 | 218.7 | 1.25E+04 | 0.01755 | 5.03E+06 |
| 1, 69 | 685.2 | 40 | 214.6 | 1.22E+04 | 0.01758 | 5.15E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.20E+04 | 0.0176 | 5.27E+06 |
| 1, 71 | 705.2 | 40 | 206.2 | 1.17E+04 | 0.01764 | 5.38E+06 |
| 1, 72 | 715.2 | 40 | 202.1 | 1.14E+04 | 0.01767 | 5.50E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.12E+04 | 0.01771 | 5.61E+06 |
| 1, 74 | 735.2 | 40 | 193.7 | 1.09E+04 | 0.01773 | 5.72E+06 |
| 1, 75 | 745.2 | 40 | 189.6 | 1.07E+04 | 0.01776 | 5.83E+06 |
| 1, 76 | 755.2 | 40 | 185.3 | 1.04E+04 | 0.01779 | 5.93E+06 |
| 1, 77 | 765.2 | 40 | 181.2 | 1.02E+04 | 0.0178 | 6.03E+06 |
| 1, 78 | 775.2 | 40 | 177.1 | 9929 | 0.01783 | 6.13E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 9675 | 0.01787 | 6.23E+06 |
| 1, 80 | 795.2 | 40 | 168.7 | 9431 | 0.01789 | 6.32E+06 |
| 1, 81 | 805.2 | 40 | 164.5 | 9176 | 0.01793 | 6.41E+06 |
| 1, 82 | 815.2 | 40 | 160.3 | 8923 | 0.01797 | 6.50E+06 |
| 1, 83 | 825.2 | 40 | 156.2 | 8672 | 0.01801 | 6.59E+06 |
| 1, 84 | 835.2 | 40 | 152.1 | 8436 | 0.01803 | 6.67E+06 |
| 1, 85 | 845.2 | 40 | 147.8 | 8181 | 0.01807 | 6.76E+06 |
| 1, 86 | 855.2 | 40 | 143.8 | 7934 | 0.01812 | 6.84E+06 |
| 1, 87 | 865.2 | 40 | 139.6 | 7684 | 0.01817 | 6.91E+06 |
| 1, 88 | 875.2 | 40 | 135.3 | 7431 | 0.01821 | 6.99E+06 |
| 1, 89 | 885.2 | 40 | 131.2 | 7187 | 0.01825 | 7.06E+06 |
| 1, 90 | 895.2 | 40 | 127 | 6940 | 0.0183 | 7.13E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 6685 | 0.01838 | 7.19E+06 |
| 1, 92 | 915.2 | 40 | 118.7 | 6437 | 0.01844 | 7.26E+06 |

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|---|---|---|---|---|---|---|
| 1, 93 | 925.2 | 40 | 114.5 | 6191 | 0.0185 | 7.32E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 5947 | 0.01856 | 7.38E+06 |
| 1, 95 | 945.2 | 40 | 106.2 | 5700 | 0.01863 | 7.44E+06 |
| 1, 96 | 955.2 | 40 | 102 | 5448 | 0.01873 | 7.49E+06 |
| 1, 97 | 965.2 | 40 | 97.87 | 5196 | 0.01884 | 7.54E+06 |
| 1, 98 | 975.2 | 40 | 93.72 | 4951 | 0.01893 | 7.59E+06 |
| 1, 99 | 985.2 | 40 | 89.57 | 4700 | 0.01906 | 7.64E+06 |
| 1, 100 | 995.2 | 40 | 85.4 | 4456 | 0.01917 | 7.68E+06 |
| 1, 101 | 1005 | 40 | 81.22 | 4207 | 0.01931 | 7.73E+06 |
| 1, 102 | 1015 | 40 | 77.04 | 3957 | 0.01947 | 7.77E+06 |
| 1, 103 | 1025 | 40 | 72.87 | 3710 | 0.01964 | 7.80E+06 |
| 1, 104 | 1035 | 40 | 68.69 | 3460 | 0.01985 | 7.84E+06 |
| 1, 105 | 1045 | 40 | 64.6 | 3217 | 0.02008 | 7.87E+06 |
| 1, 106 | 1055 | 40 | 60.34 | 2964 | 0.02036 | 7.90E+06 |
| 1, 107 | 1065 | 40 | 56.24 | 2723 | 0.02066 | 7.93E+06 |
| 1, 108 | 1075 | 40 | 52.07 | 2477 | 0.02102 | 7.95E+06 |
| 1, 109 | 1085 | 40 | 47.89 | 2235 | 0.02143 | 7.97E+06 |
| 1, 110 | 1095 | 40 | 43.72 | 1998 | 0.02188 | 7.99E+06 |
| 1, 111 | 1105 | 40 | 39.55 | 1765 | 0.02241 | 8.01E+06 |
| 1, 112 | 1115 | 40 | 35.38 | 1532 | 0.02309 | 8.03E+06 |
| 1, 113 | 1125 | 40 | 31.2 | 1306 | 0.0239 | 8.04E+06 |
| 1, 114 | 1135 | 40 | 27.03 | 1085 | 0.02491 | 8.05E+06 |
| 1, 115 | 1145 | 40 | 22.87 | 871.1 | 0.02626 | 8.06E+06 |
| 1, 116 | 1155 | 40 | 18.77 | 668.4 | 0.02809 | 8.07E+06 |
| 1, 117 | 1165 | 40 | 14.57 | 469.8 | 0.03102 | 8.07E+06 |
| 1, 118 | 1175 | 40 | 10.39 | 285.5 | 0.0364 | 8.07E+06 |
| 1, 119 | 1185 | 40 | 6.231 | 125.5 | 0.04966 | 8.07E+06 |
| 1, 120 | 1195 | 40 | 2.044 | 12.35 | 0.1655 | 8.07E+06 |

### C3.3.4 Abu treated with 1000PPM PPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.015 | 40.1 | 2.101 | 0.001166 | 1801 | 0.01598 |
| 1, 2 | 15.07 | 40 | 6.218 | 0.00166 | 3747 | 0.03289 |
| 1, 3 | 25.09 | 40 | 10.4 | 0.00226 | 4600 | 0.05526 |
| 1, 4 | 35.06 | 40.1 | 14.57 | 0.003175 | 4590 | 0.08708 |
| 1, 5 | 45.08 | 40 | 18.75 | 0.004811 | 3897 | 0.1361 |
| 1, 6 | 55.08 | 40 | 22.91 | 0.008254 | 2776 | 0.2194 |
| 1, 7 | 65.03 | 40 | 27.08 | 0.4525 | 59.86 | 35.38 |
| 1, 8 | 75.07 | 40 | 31.25 | 1094 | 0.02856 | 1.09E+04 |
| 1, 9 | 85.08 | 40 | 35.35 | 1918 | 0.01843 | 3.00E+04 |
| 1, 10 | 95.04 | 40 | 39.53 | 2275 | 0.01738 | 5.28E+04 |
| 1, 11 | 105.1 | 40 | 43.7 | 2528 | 0.01729 | 7.83E+04 |
| 1, 12 | 115.1 | 40 | 47.86 | 2766 | 0.0173 | 1.06E+05 |
| 1, 13 | 125 | 40 | 52.02 | 2998 | 0.01735 | 1.36E+05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 14 | 135.1 | 40 | 56.19 | 3251 | 0.01728 | 1.69E+05 |
| 1, 15 | 145.1 | 40 | 60.37 | 3516 | 0.01717 | 2.04E+05 |
| 1, 16 | 155 | 40 | 64.55 | 3788 | 0.01704 | 2.42E+05 |
| 1, 17 | 165.1 | 40 | 68.73 | 4069 | 0.01689 | 2.83E+05 |
| 1, 18 | 175.1 | 40 | 72.9 | 4359 | 0.01673 | 3.26E+05 |
| 1, 19 | 185 | 40 | 77.08 | 4654 | 0.01656 | 3.72E+05 |
| 1, 20 | 195.1 | 40 | 81.25 | 4956 | 0.01639 | 4.23E+05 |
| 1, 21 | 205.1 | 40 | 85.42 | 5261 | 0.01624 | 4.75E+05 |
| 1, 22 | 215 | 40 | 89.58 | 5569 | 0.01609 | 5.30E+05 |
| 1, 23 | 225.1 | 40 | 93.74 | 5877 | 0.01595 | 5.90E+05 |
| 1, 24 | 235.1 | 39.9 | 97.91 | 6190 | 0.01582 | 6.51E+05 |
| 1, 25 | 245 | 40 | 102.1 | 6500 | 0.0157 | 7.16E+05 |
| 1, 26 | 255.1 | 40 | 106.2 | 6821 | 0.01558 | 7.85E+05 |
| 1, 27 | 265.1 | 40 | 110.4 | 7153 | 0.01543 | 8.56E+05 |
| 1, 28 | 275 | 40 | 114.6 | 7497 | 0.01528 | 9.31E+05 |
| 1, 29 | 285.1 | 40 | 118.7 | 7852 | 0.01512 | 1.01E+06 |
| 1, 30 | 295.1 | 40 | 122.9 | 8209 | 0.01497 | 1.09E+06 |
| 1, 31 | 305.1 | 40 | 127.1 | 8566 | 0.01483 | 1.18E+06 |
| 1, 32 | 315.1 | 40 | 131.2 | 8928 | 0.0147 | 1.27E+06 |
| 1, 33 | 325.1 | 40 | 135.4 | 9289 | 0.01458 | 1.36E+06 |
| 1, 34 | 335 | 40 | 139.6 | 9662 | 0.01444 | 1.46E+06 |
| 1, 35 | 345.1 | 40 | 143.7 | 1.00E+04 | 0.01431 | 1.56E+06 |
| 1, 36 | 355.1 | 40 | 147.9 | 1.04E+04 | 0.01419 | 1.66E+06 |
| 1, 37 | 365 | 40 | 152.1 | 1.08E+04 | 0.01408 | 1.77E+06 |
| 1, 38 | 375.1 | 40 | 156.2 | 1.12E+04 | 0.01398 | 1.88E+06 |
| 1, 39 | 385.1 | 40 | 160.4 | 1.16E+04 | 0.01387 | 2.00E+06 |
| 1, 40 | 395 | 40 | 164.6 | 1.20E+04 | 0.01377 | 2.12E+06 |
| 1, 41 | 405.1 | 40 | 168.8 | 1.23E+04 | 0.01368 | 2.24E+06 |
| 1, 42 | 415.1 | 40 | 172.9 | 1.27E+04 | 0.01359 | 2.37E+06 |
| 1, 43 | 425 | 40 | 177.1 | 1.31E+04 | 0.01351 | 2.50E+06 |
| 1, 44 | 435.1 | 40 | 181.2 | 1.35E+04 | 0.01346 | 2.63E+06 |
| 1, 45 | 445.1 | 40 | 185.4 | 1.38E+04 | 0.01339 | 2.77E+06 |
| 1, 46 | 455 | 40 | 189.6 | 1.42E+04 | 0.01334 | 2.91E+06 |
| 1, 47 | 465.1 | 40 | 193.7 | 1.46E+04 | 0.0133 | 3.06E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.49E+04 | 0.01325 | 3.21E+06 |
| 1, 49 | 485.1 | 40 | 202.1 | 1.53E+04 | 0.01321 | 3.36E+06 |
| 1, 50 | 495.1 | 40 | 206.3 | 1.57E+04 | 0.01316 | 3.52E+06 |
| 1, 51 | 505.1 | 40 | 210.3 | 1.60E+04 | 0.01314 | 3.68E+06 |
| 1, 52 | 515 | 40 | 214.5 | 1.64E+04 | 0.01311 | 3.84E+06 |
| 1, 53 | 525.1 | 40 | 218.8 | 1.67E+04 | 0.01308 | 4.01E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.71E+04 | 0.01307 | 4.18E+06 |
| 1, 55 | 545 | 40 | 227.1 | 1.74E+04 | 0.01305 | 4.35E+06 |
| 1, 56 | 555.1 | 40 | 231.2 | 1.78E+04 | 0.01303 | 4.53E+06 |
| 1, 57 | 565.1 | 40 | 235.4 | 1.81E+04 | 0.01302 | 4.71E+06 |
| 1, 58 | 575 | 40 | 239.6 | 1.84E+04 | 0.01302 | 4.90E+06 |
| 1, 59 | 585.1 | 40 | 243.7 | 1.87E+04 | 0.01301 | 5.08E+06 |
| 1, 60 | 595.1 | 40 | 247.9 | 1.91E+04 | 0.013 | 5.27E+06 |
| 1, 61 | 605.1 | 40 | 247.9 | 1.93E+04 | 0.01286 | 5.47E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 62 | 615.2 | 40 | 243.8 | 1.91E+04 | 0.01277 | 5.66E+06 |
| 1, 63 | 625.2 | 40 | 239.6 | 1.88E+04 | 0.01273 | 5.85E+06 |
| 1, 64 | 635.2 | 40 | 235.3 | 1.85E+04 | 0.01273 | 6.03E+06 |
| 1, 65 | 645.2 | 40 | 231.3 | 1.82E+04 | 0.01272 | 6.21E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.79E+04 | 0.01272 | 6.39E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.75E+04 | 0.01272 | 6.57E+06 |
| 1, 68 | 675.2 | 40 | 218.7 | 1.72E+04 | 0.01271 | 6.74E+06 |
| 1, 69 | 685.2 | 40 | 214.6 | 1.69E+04 | 0.01269 | 6.91E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.66E+04 | 0.01271 | 7.07E+06 |
| 1, 71 | 705.2 | 40 | 206.3 | 1.62E+04 | 0.01272 | 7.24E+06 |
| 1, 72 | 715.2 | 40 | 202.1 | 1.59E+04 | 0.01272 | 7.40E+06 |
| 1, 73 | 725.2 | 40 | 197.8 | 1.56E+04 | 0.01273 | 7.55E+06 |
| 1, 74 | 735.2 | 40 | 193.8 | 1.52E+04 | 0.01272 | 7.70E+06 |
| 1, 75 | 745.2 | 40 | 189.6 | 1.49E+04 | 0.01274 | 7.85E+06 |
| 1, 76 | 755.2 | 40 | 185.3 | 1.46E+04 | 0.01274 | 8.00E+06 |
| 1, 77 | 765.2 | 40 | 181.3 | 1.42E+04 | 0.01276 | 8.14E+06 |
| 1, 78 | 775.2 | 40 | 177.1 | 1.39E+04 | 0.01277 | 8.28E+06 |
| 1, 79 | 785.2 | 40 | 172.9 | 1.35E+04 | 0.01279 | 8.41E+06 |
| 1, 80 | 795.2 | 40 | 168.7 | 1.32E+04 | 0.01282 | 8.54E+06 |
| 1, 81 | 805.2 | 40 | 164.6 | 1.28E+04 | 0.01284 | 8.67E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.25E+04 | 0.01287 | 8.80E+06 |
| 1, 83 | 825.2 | 40 | 156.2 | 1.21E+04 | 0.0129 | 8.92E+06 |
| 1, 84 | 835.2 | 40 | 152.1 | 1.18E+04 | 0.01293 | 9.04E+06 |
| 1, 85 | 845.2 | 40 | 147.9 | 1.14E+04 | 0.01295 | 9.15E+06 |
| 1, 86 | 855.2 | 40 | 143.7 | 1.11E+04 | 0.01299 | 9.26E+06 |
| 1, 87 | 865.2 | 40 | 139.5 | 1.07E+04 | 0.01303 | 9.37E+06 |
| 1, 88 | 875.2 | 40 | 135.3 | 1.04E+04 | 0.01307 | 9.47E+06 |
| 1, 89 | 885.2 | 40 | 131.3 | 1.00E+04 | 0.01311 | 9.57E+06 |
| 1, 90 | 895.2 | 40 | 127 | 9655 | 0.01316 | 9.67E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 9296 | 0.01322 | 9.76E+06 |
| 1, 92 | 915.2 | 40 | 118.7 | 8957 | 0.01325 | 9.85E+06 |
| 1, 93 | 925.2 | 40 | 114.5 | 8598 | 0.01332 | 9.94E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 8236 | 0.0134 | 1.00E+07 |
| 1, 95 | 945.2 | 40 | 106.2 | 7887 | 0.01347 | 1.01E+07 |
| 1, 96 | 955.2 | 40 | 102 | 7530 | 0.01355 | 1.02E+07 |
| 1, 97 | 965.2 | 40 | 97.84 | 7180 | 0.01363 | 1.02E+07 |
| 1, 98 | 975.2 | 40 | 93.77 | 6838 | 0.01371 | 1.03E+07 |
| 1, 99 | 985.2 | 40 | 89.51 | 6481 | 0.01381 | 1.04E+07 |
| 1, 100 | 995.2 | 40 | 85.41 | 6138 | 0.01392 | 1.04E+07 |
| 1, 101 | 1005 | 40 | 81.24 | 5792 | 0.01403 | 1.05E+07 |
| 1, 102 | 1015 | 40 | 77 | 5440 | 0.01415 | 1.06E+07 |
| 1, 103 | 1025 | 40 | 72.91 | 5102 | 0.01429 | 1.06E+07 |
| 1, 104 | 1035 | 40 | 68.73 | 4756 | 0.01445 | 1.07E+07 |
| 1, 105 | 1045 | 40 | 64.56 | 4413 | 0.01463 | 1.07E+07 |
| 1, 106 | 1055 | 40 | 60.4 | 4073 | 0.01483 | 1.07E+07 |
| 1, 107 | 1065 | 40 | 56.21 | 3740 | 0.01503 | 1.08E+07 |
| 1, 108 | 1075 | 40 | 52.02 | 3405 | 0.01528 | 1.08E+07 |
| 1, 109 | 1085 | 40 | 47.92 | 3080 | 0.01556 | 1.08E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 110 | 1095 | 40 | 43.74 | 2751 | 0.0159 | 1.09E+07 |
| 1, 111 | 1105 | 40 | 39.55 | 2428 | 0.01629 | 1.09E+07 |
| 1, 112 | 1115 | 40 | 35.39 | 2110 | 0.01677 | 1.09E+07 |
| 1, 113 | 1125 | 40 | 31.22 | 1800 | 0.01735 | 1.09E+07 |
| 1, 114 | 1135 | 40 | 27.04 | 1493 | 0.01811 | 1.09E+07 |
| 1, 115 | 1145 | 40 | 22.94 | 1202 | 0.01908 | 1.10E+07 |
| 1, 116 | 1155 | 40 | 18.76 | 913.5 | 0.02053 | 1.10E+07 |
| 1, 117 | 1165 | 40 | 14.56 | 640 | 0.02276 | 1.10E+07 |
| 1, 118 | 1175 | 40 | 10.39 | 387.1 | 0.02683 | 1.10E+07 |
| 1, 119 | 1185 | 40 | 6.205 | 169.1 | 0.03669 | 1.10E+07 |
| 1, 120 | 1195 | 40 | 2.029 | 17.83 | 0.1138 | 1.10E+07 |

**C3.3.5 Abu untreated with 20% Sertica**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 5.021 | 40 | 2.099 | 0.0018 | 1166 | 0.01678 |
| 1, 2 | 15.07 | 40 | 6.237 | 0.004412 | 1414 | 0.06298 |
| 1, 3 | 25.09 | 40 | 10.41 | 0.01571 | 662.6 | 0.2589 |
| 1, 4 | 35.05 | 40 | 14.51 | 80.4 | 0.1805 | 928.1 |
| 1, 5 | 45.08 | 40 | 18.78 | 421.2 | 0.04458 | 5168 |
| 1, 6 | 55.09 | 40 | 22.93 | 691.6 | 0.03316 | 1.21E+04 |
| 1, 7 | 65.05 | 40 | 27.01 | 930.7 | 0.02902 | 2.14E+04 |
| 1, 8 | 75.08 | 40 | 31.27 | 1186 | 0.02636 | 3.34E+04 |
| 1, 9 | 85.08 | 40 | 35.35 | 1436 | 0.02461 | 4.77E+04 |
| 1, 10 | 95.04 | 40 | 39.52 | 1696 | 0.0233 | 6.47E+04 |
| 1, 11 | 105.1 | 40 | 43.78 | 1962 | 0.02232 | 8.45E+04 |
| 1, 12 | 115.1 | 40 | 47.85 | 2225 | 0.02151 | 1.07E+05 |
| 1, 13 | 125 | 40 | 52.02 | 2497 | 0.02083 | 1.32E+05 |
| 1, 14 | 135.1 | 40 | 56.26 | 2781 | 0.02023 | 1.60E+05 |
| 1, 15 | 145.1 | 40 | 60.34 | 3063 | 0.0197 | 1.90E+05 |
| 1, 16 | 155 | 40 | 64.53 | 3358 | 0.01922 | 2.24E+05 |
| 1, 17 | 165.1 | 40 | 68.7 | 3659 | 0.01878 | 2.61E+05 |
| 1, 18 | 175.1 | 40 | 72.87 | 3960 | 0.0184 | 3.00E+05 |
| 1, 19 | 185 | 40 | 77.06 | 4262 | 0.01808 | 3.43E+05 |
| 1, 20 | 195.1 | 40 | 81.25 | 4560 | 0.01782 | 3.89E+05 |
| 1, 21 | 205.1 | 40 | 85.42 | 4860 | 0.01758 | 4.37E+05 |
| 1, 22 | 215 | 40 | 89.51 | 5153 | 0.01737 | 4.89E+05 |
| 1, 23 | 225.1 | 40 | 93.77 | 5464 | 0.01716 | 5.44E+05 |
| 1, 24 | 235.1 | 40 | 97.86 | 5766 | 0.01697 | 6.01E+05 |
| 1, 25 | 245 | 40 | 102 | 6074 | 0.0168 | 6.62E+05 |
| 1, 26 | 255.1 | 40 | 106.3 | 6384 | 0.01665 | 7.26E+05 |
| 1, 27 | 265.1 | 40 | 110.4 | 6686 | 0.01651 | 7.93E+05 |
| 1, 28 | 275 | 40 | 114.5 | 6998 | 0.01637 | 8.63E+05 |
| 1, 29 | 285.1 | 40 | 118.8 | 7327 | 0.01621 | 9.37E+05 |
| 1, 30 | 295.1 | 40 | 122.9 | 7635 | 0.01609 | 1.01E+06 |
| 1, 31 | 305 | 40 | 127 | 7961 | 0.01596 | 1.09E+06 |
| 1, 32 | 315.1 | 40 | 131.3 | 8277 | 0.01586 | 1.18E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 33 | 325.1 | 40 | 135.4 | 8588 | 0.01576 | 1.26E+06 |
| 1, 34 | 335 | 40 | 139.6 | 8906 | 0.01567 | 1.35E+06 |
| 1, 35 | 345.1 | 40 | 143.7 | 9220 | 0.01559 | 1.44E+06 |
| 1, 36 | 355.1 | 40 | 147.9 | 9520 | 0.01554 | 1.54E+06 |
| 1, 37 | 365 | 40 | 152.1 | 9825 | 0.01548 | 1.64E+06 |
| 1, 38 | 375.1 | 40 | 156.3 | 1.02E+04 | 0.0154 | 1.74E+06 |
| 1, 39 | 385.1 | 40 | 160.3 | 1.04E+04 | 0.01536 | 1.84E+06 |
| 1, 40 | 395 | 40 | 164.5 | 1.08E+04 | 0.0153 | 1.95E+06 |
| 1, 41 | 405.1 | 40 | 168.8 | 1.11E+04 | 0.01526 | 2.06E+06 |
| 1, 42 | 415.1 | 40 | 172.9 | 1.14E+04 | 0.01522 | 2.17E+06 |
| 1, 43 | 425 | 40 | 177 | 1.17E+04 | 0.01516 | 2.29E+06 |
| 1, 44 | 435.1 | 40 | 181.3 | 1.20E+04 | 0.01512 | 2.41E+06 |
| 1, 45 | 445.1 | 40 | 185.4 | 1.23E+04 | 0.01507 | 2.53E+06 |
| 1, 46 | 455 | 40 | 189.6 | 1.26E+04 | 0.01508 | 2.66E+06 |
| 1, 47 | 465.1 | 40 | 193.7 | 1.29E+04 | 0.01507 | 2.79E+06 |
| 1, 48 | 475.1 | 40 | 197.9 | 1.32E+04 | 0.01503 | 2.92E+06 |
| 1, 49 | 485 | 40 | 202.1 | 1.35E+04 | 0.01498 | 3.05E+06 |
| 1, 50 | 495.1 | 40 | 206.2 | 1.38E+04 | 0.01495 | 3.19E+06 |
| 1, 51 | 505.1 | 40 | 210.4 | 1.41E+04 | 0.01492 | 3.33E+06 |
| 1, 52 | 515 | 40 | 214.6 | 1.44E+04 | 0.01488 | 3.48E+06 |
| 1, 53 | 525.1 | 40 | 218.7 | 1.47E+04 | 0.01484 | 3.63E+06 |
| 1, 54 | 535.1 | 40 | 222.9 | 1.51E+04 | 0.01481 | 3.78E+06 |
| 1, 55 | 545 | 40 | 227.1 | 1.54E+04 | 0.01478 | 3.93E+06 |
| 1, 56 | 555.1 | 40 | 231.2 | 1.57E+04 | 0.01477 | 4.09E+06 |
| 1, 57 | 565.1 | 40 | 235.4 | 1.60E+04 | 0.01473 | 4.25E+06 |
| 1, 58 | 575 | 40 | 239.5 | 1.63E+04 | 0.01471 | 4.41E+06 |
| 1, 59 | 585.1 | 40 | 243.7 | 1.66E+04 | 0.01468 | 4.58E+06 |
| 1, 60 | 595.1 | 40 | 247.9 | 1.69E+04 | 0.01463 | 4.74E+06 |
| 1, 61 | 605.1 | 40 | 247.9 | 1.71E+04 | 0.01448 | 4.92E+06 |
| 1, 62 | 615.2 | 40 | 243.8 | 1.69E+04 | 0.01442 | 5.09E+06 |
| 1, 63 | 625.1 | 40 | 239.6 | 1.67E+04 | 0.01439 | 5.25E+06 |
| 1, 64 | 635.2 | 40 | 235.3 | 1.64E+04 | 0.01435 | 5.42E+06 |
| 1, 65 | 645.2 | 40 | 231.3 | 1.61E+04 | 0.01435 | 5.58E+06 |
| 1, 66 | 655.2 | 40 | 227.1 | 1.58E+04 | 0.01435 | 5.74E+06 |
| 1, 67 | 665.2 | 40 | 222.9 | 1.55E+04 | 0.01435 | 5.89E+06 |
| 1, 68 | 675.2 | 40 | 218.7 | 1.53E+04 | 0.01434 | 6.04E+06 |
| 1, 69 | 685.1 | 40 | 214.6 | 1.50E+04 | 0.01433 | 6.19E+06 |
| 1, 70 | 695.2 | 40 | 210.4 | 1.47E+04 | 0.01433 | 6.34E+06 |
| 1, 71 | 705.2 | 40 | 206.2 | 1.44E+04 | 0.01432 | 6.48E+06 |
| 1, 72 | 715.1 | 40 | 202.1 | 1.41E+04 | 0.01433 | 6.63E+06 |
| 1, 73 | 725.2 | 40 | 197.9 | 1.38E+04 | 0.01434 | 6.76E+06 |
| 1, 74 | 735.2 | 40 | 193.7 | 1.35E+04 | 0.01434 | 6.90E+06 |
| 1, 75 | 745.1 | 40 | 189.5 | 1.32E+04 | 0.01437 | 7.03E+06 |
| 1, 76 | 755.2 | 40 | 185.4 | 1.29E+04 | 0.01438 | 7.16E+06 |
| 1, 77 | 765.2 | 40 | 181.3 | 1.26E+04 | 0.0144 | 7.28E+06 |
| 1, 78 | 775.1 | 40 | 177.1 | 1.23E+04 | 0.01441 | 7.41E+06 |
| 1, 79 | 785.2 | 40 | 172.8 | 1.20E+04 | 0.01443 | 7.53E+06 |
| 1, 80 | 795.2 | 40 | 168.8 | 1.17E+04 | 0.01444 | 7.64E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 81 | 805.1 | 40 | 164.6 | 1.14E+04 | 0.01448 | 7.76E+06 |
| 1, 82 | 815.2 | 40 | 160.4 | 1.11E+04 | 0.01449 | 7.87E+06 |
| 1, 83 | 825.2 | 40 | 156.3 | 1.08E+04 | 0.0145 | 7.98E+06 |
| 1, 84 | 835.1 | 40 | 152.1 | 1.05E+04 | 0.01453 | 8.08E+06 |
| 1, 85 | 845.2 | 40 | 147.8 | 1.02E+04 | 0.01456 | 8.18E+06 |
| 1, 86 | 855.2 | 40 | 143.8 | 9854 | 0.01459 | 8.28E+06 |
| 1, 87 | 865.2 | 40 | 139.6 | 9548 | 0.01462 | 8.38E+06 |
| 1, 88 | 875.2 | 40 | 135.4 | 9243 | 0.01465 | 8.47E+06 |
| 1, 89 | 885.2 | 40 | 131.2 | 8936 | 0.01469 | 8.56E+06 |
| 1, 90 | 895.1 | 40 | 127.1 | 8643 | 0.0147 | 8.64E+06 |
| 1, 91 | 905.2 | 40 | 122.9 | 8344 | 0.01473 | 8.73E+06 |
| 1, 92 | 915.2 | 40 | 118.8 | 8042 | 0.01477 | 8.81E+06 |
| 1, 93 | 925.1 | 40 | 114.6 | 7735 | 0.01481 | 8.89E+06 |
| 1, 94 | 935.2 | 40 | 110.4 | 7435 | 0.01485 | 8.96E+06 |
| 1, 95 | 945.2 | 40 | 106.3 | 7127 | 0.01491 | 9.03E+06 |
| 1, 96 | 955.2 | 40 | 102 | 6818 | 0.01496 | 9.10E+06 |
| 1, 97 | 965.2 | 40 | 97.87 | 6511 | 0.01503 | 9.16E+06 |
| 1, 98 | 975.2 | 40 | 93.71 | 6210 | 0.01509 | 9.23E+06 |
| 1, 99 | 985.1 | 40 | 89.55 | 5910 | 0.01515 | 9.29E+06 |
| 1, 100 | 995.2 | 40 | 85.38 | 5606 | 0.01523 | 9.34E+06 |
| 1, 101 | 1005 | 40 | 81.21 | 5303 | 0.01531 | 9.39E+06 |
| 1, 102 | 1015 | 40 | 77.05 | 5005 | 0.0154 | 9.44E+06 |
| 1, 103 | 1025 | 40 | 72.89 | 4704 | 0.0155 | 9.49E+06 |
| 1, 104 | 1035 | 40 | 68.72 | 4405 | 0.0156 | 9.54E+06 |
| 1, 105 | 1045 | 40 | 64.55 | 4110 | 0.01571 | 9.58E+06 |
| 1, 106 | 1055 | 40 | 60.37 | 3816 | 0.01582 | 9.61E+06 |
| 1, 107 | 1065 | 40 | 56.28 | 3528 | 0.01595 | 9.65E+06 |
| 1, 108 | 1075 | 40 | 52.03 | 3229 | 0.01611 | 9.68E+06 |
| 1, 109 | 1085 | 40 | 47.93 | 2940 | 0.0163 | 9.71E+06 |
| 1, 110 | 1095 | 40 | 43.76 | 2656 | 0.01648 | 9.74E+06 |
| 1, 111 | 1105 | 40 | 39.59 | 2357 | 0.01679 | 9.76E+06 |
| 1, 112 | 1115 | 40 | 35.41 | 2068 | 0.01712 | 9.78E+06 |
| 1, 113 | 1125 | 40 | 31.24 | 1784 | 0.01751 | 9.80E+06 |
| 1, 114 | 1135 | 40 | 27.06 | 1503 | 0.01801 | 9.81E+06 |
| 1, 115 | 1145 | 40 | 22.89 | 1227 | 0.01866 | 9.83E+06 |
| 1, 116 | 1155 | 40 | 18.79 | 960.2 | 0.01956 | 9.84E+06 |
| 1, 117 | 1165 | 40 | 14.6 | 693.9 | 0.02104 | 9.84E+06 |
| 1, 118 | 1175 | 40 | 10.4 | 438.6 | 0.02372 | 9.85E+06 |
| 1, 119 | 1185 | 40 | 6.213 | 205.7 | 0.03021 | 9.85E+06 |
| 1, 120 | 1195 | 40 | 2.024 | 31.19 | 0.06489 | 9.85E+06 |

**C4 (Cooling rate=0.5C/min&SLR=100Pa/min)**

**C4.1 (T=30°C)**

**C4.1.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 7.514 | 30 | 12.56 | 2.37E-05 | 5.29E+05 | 0.001465 |
| 2 | 22.54 | 30 | 37.05 | 1.80E-05 | 2.06E+06 | 0.001864 |
| 3 | 37.55 | 30 | 62.09 | 2.09E-05 | 2.98E+06 | 0.001997 |
| 4 | 52.55 | 30 | 87.13 | 2.14E-05 | 4.07E+06 | 0.002264 |
| 5 | 67.54 | 30 | 112.1 | 2.71E-05 | 4.14E+06 | 0.002796 |
| 6 | 82.54 | 30 | 137.1 | 1.82E-05 | 7.55E+06 | 0.002929 |
| 7 | 97.53 | 30 | 162.1 | 3.34E-05 | 4.85E+06 | 0.003462 |
| 8 | 112.5 | 30 | 187 | 3.15E-05 | 5.94E+06 | 0.003728 |
| 9 | 127.5 | 30 | 212.1 | 3.95E-05 | 5.38E+06 | 0.00466 |
| 10 | 142.5 | 30 | 237.1 | 4.76E-05 | 4.99E+06 | 0.005193 |
| 11 | 157.5 | 30 | 262.2 | 6.02E-05 | 4.36E+06 | 0.006125 |
| 12 | 172.5 | 30 | 287.2 | 5.73E-05 | 5.01E+06 | 0.006791 |
| 13 | 187.5 | 30 | 312.2 | 5.62E-05 | 5.56E+06 | 0.007856 |
| 14 | 202.5 | 30 | 337.3 | 8.71E-05 | 3.87E+06 | 0.008788 |
| 15 | 217.5 | 30 | 362.3 | 0.000123 | 2.95E+06 | 0.01225 |
| 16 | 232.5 | 30 | 387.3 | 0.000621 | 6.24E+05 | 0.02184 |
| 17 | 247.5 | 30 | 412.4 | 0.000767 | 5.37E+05 | 0.03262 |
| 18 | 262.5 | 30 | 437.4 | 0.001057 | 4.14E+05 | 0.0478 |
| 19 | 277.5 | 30 | 462.4 | 0.001823 | 2.54E+05 | 0.07657 |
| 20 | 292.5 | 30 | 487.4 | 0.4502 | 1082 | 10.92 |
| 21 | 307.5 | 30 | 512.3 | 1499 | 0.3418 | 4.03E+04 |
| 22 | 322.5 | 30 | 537.3 | 2.53E+04 | 0.02126 | 4.16E+05 |
| 23 | 337.5 | 30 | 562.4 | 3.42E+04 | 0.01646 | 9.29E+05 |
| 24 | 352.5 | 30 | 587.4 | 3.85E+04 | 0.01527 | 1.51E+06 |
| 25 | 367.5 | 30 | 612.3 | 4.12E+04 | 0.01486 | 2.13E+06 |
| 26 | 382.5 | 30 | 637.2 | 4.32E+04 | 0.01475 | 2.78E+06 |
| 27 | 397.5 | 30 | 662.2 | 4.49E+04 | 0.01475 | 3.45E+06 |
| 28 | 412.5 | 30 | 687.3 | 4.65E+04 | 0.01477 | 4.15E+06 |
| 29 | 427.5 | 30 | 712.3 | 4.81E+04 | 0.01482 | 4.87E+06 |
| 30 | 442.5 | 30 | 737.3 | 4.96E+04 | 0.01487 | 5.61E+06 |
| 31 | 457.5 | 30 | 762.3 | 5.16E+04 | 0.01478 | 6.38E+06 |
| 32 | 465 | 30 | 784.2 | 5.26E+04 | 0.01492 | 7.07E+06 |

**C4.1.2 Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.015 | 30 | 8.505 | 2.21E-05 | 3.86E+05 | -0.01025 |
| 2 | 15.04 | 30 | 24.71 | 2.62E-05 | 9.44E+05 | -0.00972 |
| 3 | 25.04 | 30 | 41.41 | 3.31E-05 | 1.25E+06 | -0.00959 |
| 4 | 35.03 | 30 | 58.07 | 4.20E-05 | 1.38E+06 | -0.00906 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 45.05 | 30 | 75.08 | 4.28E-05 | 1.76E+06 | -0.00892 |
| 6 | 55.05 | 30 | 91.67 | 3.92E-05 | 2.34E+06 | -0.00826 |
| 7 | 65.04 | 30 | 108.3 | 5.92E-05 | 1.83E+06 | -0.00759 |
| 8 | 75.05 | 30 | 124.9 | 3.59E-05 | 3.48E+06 | -0.00706 |
| 9 | 85.04 | 30 | 141.6 | 5.74E-05 | 2.47E+06 | -0.00679 |
| 10 | 95.03 | 30 | 158.3 | 6.08E-05 | 2.60E+06 | -0.00626 |
| 11 | 105 | 30 | 174.9 | 6.88E-05 | 2.54E+06 | -0.00573 |
| 12 | 115 | 30 | 191.3 | 4.99E-05 | 3.84E+06 | -0.00493 |
| 13 | 125 | 30 | 208 | 7.91E-05 | 2.63E+06 | -0.004 |
| 14 | 135.1 | 30 | 225.1 | 0.000104 | 2.16E+06 | -0.00346 |
| 15 | 145.1 | 30 | 241.4 | 7.69E-05 | 3.14E+06 | -0.00266 |
| 16 | 155 | 30 | 258.1 | 7.94E-05 | 3.25E+06 | -0.002 |
| 17 | 165 | 30 | 274.8 | 0.000113 | 2.44E+06 | -0.00013 |
| 18 | 175.1 | 30 | 291.5 | 0.00011 | 2.66E+06 | 0.001065 |
| 19 | 185.1 | 30 | 308.5 | 0.000124 | 2.48E+06 | 0.001864 |
| 20 | 195.1 | 30 | 324.8 | 0.000143 | 2.27E+06 | 0.003063 |
| 21 | 205 | 30 | 341.4 | 0.000197 | 1.74E+06 | 0.005193 |
| 22 | 215.1 | 30 | 358.4 | 0.000298 | 1.20E+06 | 0.008123 |
| 23 | 225.1 | 30 | 374.7 | 0.000585 | 6.40E+05 | 0.01465 |
| 24 | 235 | 30 | 391.4 | 0.000785 | 4.98E+05 | 0.02264 |
| 25 | 245 | 30 | 408 | 0.000664 | 6.14E+05 | 0.02863 |
| 26 | 255 | 30 | 425 | 0.000694 | 6.12E+05 | 0.03489 |
| 27 | 265.1 | 30 | 441.7 | 0.000661 | 6.69E+05 | 0.04234 |
| 28 | 275 | 30 | 458.3 | 0.000681 | 6.73E+05 | 0.05033 |
| 29 | 285 | 30 | 475 | 0.000743 | 6.40E+05 | 0.05752 |
| 30 | 295 | 30 | 491.6 | 0.000814 | 6.04E+05 | 0.06525 |
| 31 | 305.1 | 30 | 508.2 | 0.000952 | 5.34E+05 | 0.07523 |
| 32 | 315.1 | 30 | 524.9 | 0.001004 | 5.23E+05 | 0.08442 |
| 33 | 325 | 30 | 541.5 | 0.001136 | 4.77E+05 | 0.09667 |
| 34 | 335.1 | 30 | 558.2 | 0.001286 | 4.34E+05 | 0.1079 |
| 35 | 345.1 | 30 | 574.9 | 0.001522 | 3.78E+05 | 0.1232 |
| 36 | 355 | 30 | 591.6 | 0.001876 | 3.15E+05 | 0.1421 |
| 37 | 365.1 | 30 | 608.2 | 0.002389 | 2.55E+05 | 0.1675 |
| 38 | 375.1 | 30 | 624.9 | 0.00329 | 1.90E+05 | 0.2007 |
| 39 | 385 | 30 | 641.6 | 0.005605 | 1.15E+05 | 0.2575 |
| 40 | 395.1 | 30 | 658.3 | 0.03076 | 2.14E+04 | 0.7768 |
| 41 | 405.1 | 30 | 674.9 | 1.04E+04 | 0.06486 | 1.00E+05 |
| 42 | 415 | 30 | 691.6 | 1.80E+04 | 0.03849 | 2.79E+05 |
| 43 | 425.1 | 30 | 708.2 | 2.04E+04 | 0.03477 | 4.85E+05 |
| 44 | 435.1 | 30 | 724.9 | 2.17E+04 | 0.03342 | 7.01E+05 |
| 45 | 445 | 30 | 741.5 | 2.25E+04 | 0.03295 | 9.25E+05 |
| 46 | 455.1 | 30 | 758.5 | 2.32E+04 | 0.03265 | 1.16E+06 |
| 47 | 465.1 | 30 | 774.8 | 2.39E+04 | 0.03245 | 1.40E+06 |
| 48 | 475.1 | 30 | 791.5 | 2.46E+04 | 0.03217 | 1.64E+06 |
| 49 | 485.1 | 30 | 808.1 | 2.53E+04 | 0.03198 | 1.90E+06 |
| 50 | 495.1 | 30 | 824.9 | 2.60E+04 | 0.03175 | 2.16E+06 |
| 51 | 505 | 30 | 841.6 | 2.67E+04 | 0.03151 | 2.42E+06 |
| 52 | 515.1 | 30 | 858.2 | 2.74E+04 | 0.03131 | 2.70E+06 |

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|---|---|---|---|---|---|---|
| 53 | 525.1 | 30 | 874.9 | 2.81E+04 | 0.03111 | 2.98E+06 |
| 54 | 535 | 30 | 891.6 | 2.88E+04 | 0.03092 | 3.27E+06 |
| 55 | 545.1 | 30 | 908.3 | 2.96E+04 | 0.03072 | 3.56E+06 |
| 56 | 555.1 | 30 | 925 | 3.03E+04 | 0.03053 | 3.87E+06 |
| 57 | 565 | 30 | 941.7 | 3.10E+04 | 0.03037 | 4.18E+06 |
| 58 | 575.1 | 30 | 958.4 | 3.17E+04 | 0.0302 | 4.50E+06 |
| 59 | 585.1 | 30 | 974.7 | 3.25E+04 | 0.03003 | 4.82E+06 |
| 60 | 595 | 30 | 991.4 | 3.32E+04 | 0.02987 | 5.15E+06 |
| 61 | 605.1 | 30 | 991.6 | 3.35E+04 | 0.0296 | 5.49E+06 |
| 62 | 615.2 | 30 | 974.9 | 3.29E+04 | 0.02962 | 5.82E+06 |
| 63 | 625.2 | 30 | 958.2 | 3.22E+04 | 0.02977 | 6.14E+06 |
| 64 | 635.2 | 30 | 941.5 | 3.14E+04 | 0.02995 | 6.45E+06 |
| 65 | 645.2 | 30 | 924.9 | 3.07E+04 | 0.03018 | 6.76E+06 |
| 66 | 655.2 | 30 | 908.2 | 2.99E+04 | 0.03042 | 7.06E+06 |
| 67 | 665.2 | 30 | 891.5 | 2.91E+04 | 0.03069 | 7.35E+06 |
| 68 | 675.2 | 30 | 875 | 2.83E+04 | 0.03095 | 7.63E+06 |
| 69 | 685.2 | 30 | 858.3 | 2.75E+04 | 0.0312 | 7.91E+06 |
| 70 | 695.2 | 30 | 841.6 | 2.68E+04 | 0.03146 | 8.17E+06 |
| 71 | 705.1 | 30 | 825 | 2.61E+04 | 0.03168 | 8.43E+06 |
| 72 | 715.2 | 30 | 808 | 2.53E+04 | 0.0319 | 8.69E+06 |
| 73 | 725.2 | 30 | 791.7 | 2.46E+04 | 0.03216 | 8.93E+06 |
| 74 | 735.2 | 30 | 775 | 2.39E+04 | 0.0324 | 9.17E+06 |
| 75 | 745.2 | 30 | 758 | 2.32E+04 | 0.03265 | 9.41E+06 |
| 76 | 755.2 | 30 | 741.7 | 2.26E+04 | 0.03288 | 9.63E+06 |
| 77 | 765.2 | 30 | 725 | 2.19E+04 | 0.03311 | 9.85E+06 |
| 78 | 775.2 | 30 | 708.3 | 2.13E+04 | 0.03326 | 1.01E+07 |
| 79 | 785.2 | 30 | 691.7 | 2.07E+04 | 0.03345 | 1.03E+07 |
| 80 | 795.2 | 30 | 675 | 2.00E+04 | 0.03377 | 1.05E+07 |
| 81 | 805.2 | 30 | 658 | 1.93E+04 | 0.03405 | 1.07E+07 |
| 82 | 815.2 | 30 | 641.7 | 1.87E+04 | 0.03435 | 1.09E+07 |
| 83 | 825.2 | 30 | 624.8 | 1.80E+04 | 0.03466 | 1.10E+07 |
| 84 | 835.2 | 30 | 608.1 | 1.74E+04 | 0.035 | 1.12E+07 |
| 85 | 845.2 | 30 | 591.8 | 1.68E+04 | 0.03533 | 1.14E+07 |
| 86 | 855.2 | 30 | 575.1 | 1.61E+04 | 0.03569 | 1.15E+07 |
| 87 | 865.2 | 30 | 558.1 | 1.55E+04 | 0.03603 | 1.17E+07 |
| 88 | 875.2 | 30 | 541.7 | 1.49E+04 | 0.03641 | 1.18E+07 |
| 89 | 885.2 | 30 | 525.1 | 1.43E+04 | 0.03681 | 1.20E+07 |
| 90 | 895.2 | 30 | 508.1 | 1.37E+04 | 0.03722 | 1.21E+07 |
| 91 | 905.2 | 30 | 491.7 | 1.30E+04 | 0.03771 | 1.22E+07 |
| 92 | 915.2 | 30 | 475 | 1.24E+04 | 0.03819 | 1.24E+07 |
| 93 | 925.2 | 30 | 458.1 | 1.18E+04 | 0.03875 | 1.25E+07 |
| 94 | 935.2 | 30 | 441.8 | 1.12E+04 | 0.03935 | 1.26E+07 |
| 95 | 945.1 | 30 | 424.8 | 1.06E+04 | 0.03994 | 1.27E+07 |
| 96 | 955.2 | 30 | 408.2 | 1.01E+04 | 0.04061 | 1.28E+07 |
| 97 | 965.2 | 30 | 391.6 | 9470 | 0.04135 | 1.29E+07 |
| 98 | 975.1 | 30 | 374.9 | 8915 | 0.04206 | 1.30E+07 |
| 99 | 985.2 | 30 | 358.3 | 8356 | 0.04288 | 1.31E+07 |
| 100 | 995.2 | 30 | 341.7 | 7809 | 0.04376 | 1.32E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 101 | 1005 | 30 | 325 | 7268 | 0.04471 | 1.32E+07 |
| 102 | 1015 | 30 | 308.3 | 6751 | 0.04567 | 1.33E+07 |
| 103 | 1025 | 30 | 291.6 | 6244 | 0.0467 | 1.34E+07 |
| 104 | 1035 | 30 | 274.9 | 5750 | 0.0478 | 1.34E+07 |
| 105 | 1045 | 30 | 258.3 | 5270 | 0.04901 | 1.35E+07 |
| 106 | 1055 | 30 | 241.6 | 4806 | 0.05027 | 1.35E+07 |
| 107 | 1065 | 30 | 224.9 | 4352 | 0.05167 | 1.36E+07 |
| 108 | 1075 | 30 | 208.3 | 3907 | 0.05331 | 1.36E+07 |
| 109 | 1085 | 30 | 191.5 | 3473 | 0.05515 | 1.36E+07 |
| 110 | 1095 | 30 | 175.1 | 3061 | 0.05722 | 1.37E+07 |
| 111 | 1105 | 30 | 158.1 | 2657 | 0.0595 | 1.37E+07 |
| 112 | 1115 | 30 | 141.8 | 2293 | 0.06183 | 1.37E+07 |
| 113 | 1125 | 30 | 125.1 | 1946 | 0.06426 | 1.37E+07 |
| 114 | 1135 | 30 | 108.1 | 1612 | 0.06706 | 1.37E+07 |
| 115 | 1145 | 30 | 91.46 | 1305 | 0.07009 | 1.38E+07 |
| 116 | 1155 | 30 | 75.12 | 1021 | 0.07361 | 1.38E+07 |
| 117 | 1165 | 30 | 58.38 | 741.8 | 0.07871 | 1.38E+07 |
| 118 | 1175 | 30 | 41.65 | 475.1 | 0.08765 | 1.38E+07 |
| 119 | 1185 | 30 | 24.95 | 220.7 | 0.1131 | 1.38E+07 |
| 120 | 1195 | 30 | 8.226 | 15.16 | 0.5426 | 1.38E+07 |

### C4.1.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 5.02 | 30 | 8.499 | 1.84E-05 | 4.63E+05 | -0.00759 |
| 2 | 15.04 | 30 | 24.69 | 1.04E-05 | 2.38E+06 | -0.00759 |
| 3 | 25.07 | 30 | 41.75 | 1.26E-05 | 3.30E+06 | -0.00746 |
| 4 | 35.07 | 30 | 58.03 | 2.39E-05 | 2.43E+06 | -0.00719 |
| 5 | 45.04 | 30 | 74.73 | 1.49E-05 | 5.03E+06 | -0.00692 |
| 6 | 55.06 | 30 | 91.7 | 2.32E-05 | 3.95E+06 | -0.00666 |
| 7 | 65.06 | 30 | 108 | 2.88E-05 | 3.76E+06 | -0.00653 |
| 8 | 75.03 | 30 | 124.8 | 2.09E-05 | 5.96E+06 | -0.00666 |
| 9 | 85.06 | 30 | 141.5 | 1.74E-05 | 8.15E+06 | -0.00639 |
| 10 | 95.07 | 30 | 158.2 | 3.11E-05 | 5.09E+06 | -0.00586 |
| 11 | 105 | 30 | 174.8 | 2.77E-05 | 6.30E+06 | -0.00586 |
| 12 | 115.1 | 30 | 191.4 | 2.82E-05 | 6.80E+06 | -0.00546 |
| 13 | 125.1 | 30 | 208.2 | 2.66E-05 | 7.84E+06 | -0.00519 |
| 14 | 135 | 30 | 224.8 | 3.81E-05 | 5.91E+06 | -0.00506 |
| 15 | 145.1 | 30 | 241.5 | 3.06E-05 | 7.89E+06 | -0.00466 |
| 16 | 155.1 | 30 | 258.1 | 2.75E-05 | 9.39E+06 | -0.00426 |
| 17 | 165 | 30 | 274.9 | 3.55E-05 | 7.74E+06 | -0.00426 |
| 18 | 175.1 | 30 | 291.5 | 3.07E-05 | 9.50E+06 | -0.00373 |
| 19 | 185.1 | 30 | 308.2 | 3.62E-05 | 8.51E+06 | -0.0032 |
| 20 | 195 | 30 | 324.9 | 2.84E-05 | 1.15E+07 | -0.00293 |
| 21 | 205.1 | 30 | 341.6 | 3.31E-05 | 1.03E+07 | -0.00266 |
| 22 | 215.1 | 30 | 358.3 | 4.72E-05 | 7.59E+06 | -0.00253 |
| 23 | 225 | 30 | 374.9 | 3.32E-05 | 1.13E+07 | -0.002 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 24 | 235.1 | 30 | 391.6 | 3.52E-05 | 1.11E+07 | -0.00133 |
| 25 | 245.1 | 30 | 408.3 | 3.96E-05 | 1.03E+07 | -0.00107 |
| 26 | 255 | 30 | 425 | 5.67E-05 | 7.50E+06 | -0.00053 |
| 27 | 265.1 | 30 | 441.6 | 5.20E-05 | 8.50E+06 | 0 |
| 28 | 275.1 | 30 | 458.3 | 4.71E-05 | 9.72E+06 | 0.000533 |
| 29 | 285 | 30 | 475 | 7.17E-05 | 6.63E+06 | 0.001065 |
| 30 | 295.1 | 30 | 491.6 | 8.06E-05 | 6.10E+06 | 0.001864 |
| 31 | 305.1 | 30 | 508.3 | 8.50E-05 | 5.98E+06 | 0.002397 |
| 32 | 315 | 30 | 524.9 | 7.53E-05 | 6.98E+06 | 0.003196 |
| 33 | 325.1 | 30 | 541.6 | 1.13E-04 | 4.80E+06 | 0.004527 |
| 34 | 335.1 | 30 | 558.3 | 1.46E-04 | 3.82E+06 | 0.005992 |
| 35 | 345 | 30 | 574.9 | 2.51E-04 | 2.29E+06 | 0.008655 |
| 36 | 355 | 30 | 591.6 | 7.13E-04 | 8.30E+05 | 0.01624 |
| 37 | 365 | 30 | 608.2 | 7.58E-03 | 8.02E+04 | 0.08895 |
| 38 | 375 | 30 | 624.9 | 1.41E-02 | 4.44E+04 | 0.2957 |
| 39 | 385.1 | 30 | 641.5 | 7.72E+03 | 8.31E-02 | 7.74E+04 |
| 40 | 395.1 | 30 | 658.2 | 1.57E+04 | 4.19E-02 | 2.33E+05 |
| 41 | 405 | 30 | 674.9 | 1.76E+04 | 3.83E-02 | 4.10E+05 |
| 42 | 415.1 | 30 | 691.5 | 1.87E+04 | 3.70E-02 | 5.98E+05 |
| 43 | 425.1 | 30 | 708.2 | 1.92E+04 | 3.69E-02 | 7.89E+05 |
| 44 | 435 | 30 | 724.9 | 1.98E+04 | 3.66E-02 | 9.87E+05 |
| 45 | 445.1 | 30 | 741.6 | 2.04E+04 | 3.64E-02 | 1.19E+06 |
| 46 | 455.1 | 30 | 758.3 | 2.10E+04 | 3.61E-02 | 1.40E+06 |
| 47 | 465 | 30 | 774.9 | 2.17E+04 | 3.58E-02 | 1.62E+06 |
| 48 | 475.1 | 30 | 791.6 | 2.24E+04 | 3.54E-02 | 1.84E+06 |
| 49 | 485.1 | 30 | 808.3 | 2.30E+04 | 3.51E-02 | 2.07E+06 |
| 50 | 495 | 30 | 824.9 | 2.37E+04 | 3.48E-02 | 2.31E+06 |
| 51 | 505.1 | 30 | 841.6 | 2.44E+04 | 3.45E-02 | 2.55E+06 |
| 52 | 515.1 | 30 | 858.2 | 2.51E+04 | 3.42E-02 | 2.80E+06 |
| 53 | 525 | 30 | 874.9 | 2.58E+04 | 3.39E-02 | 3.06E+06 |
| 54 | 535.1 | 30 | 891.6 | 2.65E+04 | 3.36E-02 | 3.33E+06 |
| 55 | 545.1 | 30 | 908.3 | 2.72E+04 | 3.34E-02 | 3.60E+06 |
| 56 | 555 | 30 | 924.9 | 2.79E+04 | 3.32E-02 | 3.88E+06 |
| 57 | 565 | 30 | 941.6 | 2.86E+04 | 3.30E-02 | 4.16E+06 |
| 58 | 575 | 30 | 958.3 | 2.93E+04 | 3.27E-02 | 4.46E+06 |
| 59 | 585 | 30 | 975 | 3.00E+04 | 3.25E-02 | 4.76E+06 |
| 60 | 595.1 | 30 | 991.7 | 3.06E+04 | 3.24E-02 | 5.06E+06 |
| 61 | 605.2 | 30 | 991.6 | 3.08E+04 | 0.03225 | 5.38E+06 |
| 62 | 615.2 | 30 | 974.9 | 3.01E+04 | 0.03236 | 5.68E+06 |
| 63 | 625.2 | 30 | 958.3 | 2.94E+04 | 0.03264 | 5.97E+06 |
| 64 | 635.2 | 30 | 941.3 | 2.86E+04 | 0.03295 | 6.26E+06 |
| 65 | 645.2 | 30 | 925 | 2.78E+04 | 0.03326 | 6.53E+06 |
| 66 | 655.2 | 30 | 908.3 | 2.70E+04 | 0.0337 | 6.80E+06 |
| 67 | 665.2 | 30 | 891.6 | 2.61E+04 | 0.03417 | 7.07E+06 |
| 68 | 675.2 | 30 | 874.9 | 2.53E+04 | 0.0346 | 7.32E+06 |
| 69 | 685.2 | 30 | 858.3 | 2.45E+04 | 0.03508 | 7.56E+06 |
| 70 | 695.2 | 30 | 841.6 | 2.37E+04 | 0.03555 | 7.80E+06 |
| 71 | 705.2 | 30 | 824.9 | 2.29E+04 | 0.03603 | 8.02E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 72 | 715.2 | 30 | 808.3 | 2.21E+04 | 0.03656 | 8.25E+06 |
| 73 | 725.2 | 30 | 791.6 | 2.14E+04 | 0.03708 | 8.46E+06 |
| 74 | 735.2 | 30 | 774.9 | 2.06E+04 | 0.03769 | 8.67E+06 |
| 75 | 745.2 | 30 | 758.2 | 1.98E+04 | 0.03831 | 8.86E+06 |
| 76 | 755.2 | 30 | 741.5 | 1.90E+04 | 0.03896 | 9.05E+06 |
| 77 | 765.2 | 30 | 724.9 | 1.83E+04 | 0.03963 | 9.24E+06 |
| 78 | 775.2 | 30 | 708.2 | 1.76E+04 | 0.04033 | 9.41E+06 |
| 79 | 785.2 | 30 | 691.3 | 1.69E+04 | 0.04101 | 9.58E+06 |
| 80 | 795.2 | 30 | 675 | 1.62E+04 | 0.04166 | 9.74E+06 |
| 81 | 805.2 | 30 | 658.3 | 1.55E+04 | 0.04243 | 9.90E+06 |
| 82 | 815.2 | 30 | 641.5 | 1.49E+04 | 0.04316 | 1.01E+07 |
| 83 | 825.2 | 30 | 624.9 | 1.42E+04 | 0.04391 | 1.02E+07 |
| 84 | 835.2 | 30 | 608.3 | 1.36E+04 | 0.04478 | 1.03E+07 |
| 85 | 845.2 | 30 | 591.6 | 1.30E+04 | 0.04567 | 1.05E+07 |
| 86 | 855.2 | 30 | 574.9 | 1.23E+04 | 0.04665 | 1.06E+07 |
| 87 | 865.2 | 30 | 558.3 | 1.17E+04 | 0.04773 | 1.07E+07 |
| 88 | 875.2 | 30 | 541.6 | 1.11E+04 | 0.04893 | 1.08E+07 |
| 89 | 885.2 | 30 | 524.9 | 1.05E+04 | 0.05022 | 1.09E+07 |
| 90 | 895.2 | 30 | 508.3 | 9831 | 0.0517 | 1.10E+07 |
| 91 | 905.2 | 30 | 491.6 | 9212 | 0.05336 | 1.11E+07 |
| 92 | 915.2 | 30 | 474.9 | 8578 | 0.05536 | 1.12E+07 |
| 93 | 925.2 | 30 | 458.2 | 7958 | 0.05758 | 1.13E+07 |
| 94 | 935.2 | 30 | 441.5 | 7353 | 0.06005 | 1.13E+07 |
| 95 | 945.2 | 30 | 424.9 | 6802 | 0.06247 | 1.14E+07 |
| 96 | 955.2 | 30 | 408.3 | 6333 | 0.06448 | 1.15E+07 |
| 97 | 965.2 | 30 | 391.6 | 5940 | 0.06593 | 1.15E+07 |
| 98 | 975.2 | 30 | 374.9 | 5598 | 0.06698 | 1.16E+07 |
| 99 | 985.2 | 30 | 358.3 | 5284 | 0.06781 | 1.16E+07 |
| 100 | 995.2 | 30 | 341.4 | 4974 | 0.06862 | 1.17E+07 |
| 101 | 1005 | 30 | 325.1 | 4689 | 0.06933 | 1.17E+07 |
| 102 | 1015 | 30 | 308.1 | 4392 | 0.07014 | 1.18E+07 |
| 103 | 1025 | 30 | 291.4 | 4102 | 0.07104 | 1.18E+07 |
| 104 | 1035 | 30 | 274.8 | 3815 | 0.07202 | 1.19E+07 |
| 105 | 1045 | 30 | 258.1 | 3528 | 0.07316 | 1.19E+07 |
| 106 | 1055 | 30 | 241.5 | 3250 | 0.0743 | 1.19E+07 |
| 107 | 1065 | 30 | 224.8 | 2980 | 0.07544 | 1.20E+07 |
| 108 | 1075 | 30 | 208.4 | 2717 | 0.07672 | 1.20E+07 |
| 109 | 1085 | 30 | 191.7 | 2449 | 0.07828 | 1.20E+07 |
| 110 | 1095 | 30 | 175 | 2181 | 0.08025 | 1.20E+07 |
| 111 | 1105 | 30 | 158.3 | 1914 | 0.08274 | 1.20E+07 |
| 112 | 1115 | 30 | 141.3 | 1642 | 0.08605 | 1.21E+07 |
| 113 | 1125 | 30 | 125 | 1384 | 0.09033 | 1.21E+07 |
| 114 | 1135 | 30 | 108.3 | 1120 | 0.09667 | 1.21E+07 |
| 115 | 1145 | 30 | 91.29 | 856.5 | 0.1066 | 1.21E+07 |
| 116 | 1155 | 30 | 74.97 | 604.8 | 0.124 | 1.21E+07 |
| 117 | 1165 | 30 | 58.26 | 363.6 | 0.1602 | 1.21E+07 |
| 118 | 1175 | 30 | 41.6 | 146.5 | 0.2841 | 1.21E+07 |
| 119 | 1185 | 30 | 24.92 | 8.924 | 2.793 | 1.21E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 120 | 1195 | 30 | 8.214 | -0.00308 | 2669 | 1.21E+07 |

**C4.2 (T=35°C)**

**C4.2.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 2.018 | 35 | 3.377 | 0.00022 | 1.54E+04 | 0.01158 |
| 1, 2 | 6.069 | 35 | 10.09 | 7.66E-05 | 1.32E+05 | 0.01198 |
| 1, 3 | 10.07 | 35 | 16.58 | 5.33E-05 | 3.11E+05 | 0.01198 |
| 1, 4 | 14.03 | 35 | 23.23 | 7.14E-05 | 3.26E+05 | 0.01252 |
| 1, 5 | 18.06 | 35 | 29.99 | 8.85E-05 | 3.39E+05 | 0.01252 |
| 1, 6 | 22.07 | 35 | 36.64 | 9.41E-05 | 3.89E+05 | 0.01278 |
| 1, 7 | 26.05 | 35 | 43.25 | 0.000134 | 3.24E+05 | 0.01358 |
| 1, 8 | 30.08 | 35 | 50.04 | 0.000111 | 4.53E+05 | 0.01412 |
| 1, 9 | 34.07 | 35 | 56.71 | 9.66E-05 | 5.87E+05 | 0.01465 |
| 1, 10 | 38.03 | 35 | 63.35 | 0.000144 | 4.41E+05 | 0.01425 |
| 1, 11 | 42.07 | 35 | 70.11 | 0.000119 | 5.88E+05 | 0.01491 |
| 1, 12 | 46.08 | 35 | 76.61 | 0.000122 | 6.29E+05 | 0.01531 |
| 1, 13 | 50.05 | 35 | 83.25 | 0.000147 | 5.68E+05 | 0.01638 |
| 1, 14 | 54.07 | 35 | 90.05 | 0.000147 | 6.11E+05 | 0.01704 |
| 1, 15 | 58.07 | 35 | 96.55 | 0.000127 | 7.59E+05 | 0.01784 |
| 1, 16 | 62.04 | 35 | 103.3 | 0.000196 | 5.28E+05 | 0.01771 |
| 1, 17 | 66.07 | 35 | 110 | 0.000207 | 5.32E+05 | 0.01891 |
| 1, 18 | 70.07 | 35 | 116.7 | 0.000216 | 5.42E+05 | 0.01918 |
| 1, 19 | 74.04 | 35 | 123.3 | 0.000226 | 5.45E+05 | 0.02077 |
| 1, 20 | 78.08 | 35 | 130.1 | 0.000239 | 5.45E+05 | 0.02117 |
| 1, 21 | 82.07 | 35 | 136.7 | 0.000226 | 6.05E+05 | 0.02224 |
| 1, 22 | 86.03 | 35 | 143.3 | 0.000247 | 5.81E+05 | 0.02304 |
| 1, 23 | 90.06 | 35 | 150.1 | 0.000281 | 5.35E+05 | 0.02477 |
| 1, 24 | 94.06 | 35 | 156.6 | 0.000279 | 5.61E+05 | 0.02503 |
| 1, 25 | 98.03 | 35 | 163.3 | 0.000253 | 6.45E+05 | 0.02663 |
| 1, 26 | 102.1 | 35 | 170.1 | 0.000354 | 4.81E+05 | 0.0277 |
| 1, 27 | 106.1 | 35 | 176.6 | 0.000404 | 4.37E+05 | 0.02983 |
| 1, 28 | 110 | 35 | 183.3 | 0.000401 | 4.57E+05 | 0.03089 |
| 1, 29 | 114.1 | 35 | 190.1 | 0.000445 | 4.27E+05 | 0.03329 |
| 1, 30 | 118.1 | 35 | 196.6 | 0.000431 | 4.56E+05 | 0.03489 |
| 1, 31 | 122 | 35 | 203.3 | 0.000544 | 3.74E+05 | 0.03689 |
| 1, 32 | 126.1 | 35 | 210.1 | 0.000777 | 2.71E+05 | 0.03981 |
| 1, 33 | 130.1 | 35 | 216.6 | 0.001112 | 1.95E+05 | 0.04434 |
| 1, 34 | 134 | 35 | 223.3 | 0.002062 | 1.08E+05 | 0.0534 |
| 1, 35 | 138.1 | 35 | 230 | 0.004254 | 5.41E+04 | 0.07151 |
| 1, 36 | 142.1 | 35 | 236.6 | 0.04564 | 5184 | 0.6492 |
| 1, 37 | 146 | 35 | 243.2 | 7.026 | 34.62 | 31.82 |
| 1, 38 | 150.1 | 35 | 250 | 484.4 | 0.5161 | 2793 |
| 1, 39 | 154.1 | 35 | 256.6 | 5075 | 0.05055 | 2.34E+04 |
| 1, 40 | 158 | 35 | 263.3 | 8387 | 0.0314 | 5.68E+04 |
| 1, 41 | 162.1 | 35 | 270 | 1.01E+04 | 0.02667 | 9.81E+04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 42 | 166.1 | 35 | 276.6 | 1.13E+04 | 0.02456 | 1.43E+05 |
| 1, 43 | 170 | 35 | 283.2 | 1.23E+04 | 0.02312 | 1.92E+05 |
| 1, 44 | 174.1 | 35 | 290.1 | 1.32E+04 | 0.02201 | 2.45E+05 |
| 1, 45 | 178.1 | 35 | 296.6 | 1.40E+04 | 0.02121 | 3.01E+05 |
| 1, 46 | 182 | 35 | 303.3 | 1.48E+04 | 0.02049 | 3.60E+05 |
| 1, 47 | 186.1 | 35 | 310.1 | 1.56E+04 | 0.01991 | 4.23E+05 |
| 1, 48 | 190.1 | 35 | 316.6 | 1.62E+04 | 0.01957 | 4.87E+05 |
| 1, 49 | 194 | 35 | 323.3 | 1.68E+04 | 0.01925 | 5.54E+05 |
| 1, 50 | 198.1 | 34.9 | 330.1 | 1.75E+04 | 0.0189 | 6.25E+05 |
| 1, 51 | 202.1 | 35 | 336.6 | 1.80E+04 | 0.01871 | 6.96E+05 |
| 1, 52 | 206 | 35 | 343.3 | 1.85E+04 | 0.01851 | 7.70E+05 |
| 1, 53 | 210.1 | 35 | 350.1 | 1.91E+04 | 0.01831 | 8.48E+05 |
| 1, 54 | 214.1 | 35 | 356.6 | 1.97E+04 | 0.01812 | 9.26E+05 |
| 1, 55 | 218 | 35 | 363.3 | 2.02E+04 | 0.01798 | 1.01E+06 |
| 1, 56 | 222.1 | 35 | 370 | 2.08E+04 | 0.01781 | 1.09E+06 |
| 1, 57 | 226.1 | 35 | 376.7 | 2.14E+04 | 0.01764 | 1.18E+06 |
| 1, 58 | 230 | 35 | 383.3 | 2.19E+04 | 0.01752 | 1.26E+06 |
| 1, 59 | 234.1 | 35 | 390 | 2.24E+04 | 0.0174 | 1.35E+06 |
| 1, 60 | 238.1 | 35 | 396.7 | 2.29E+04 | 0.01729 | 1.44E+06 |
| 1, 61 | 242.1 | 35 | 396.5 | 2.33E+04 | 0.01701 | 1.54E+06 |
| 1, 62 | 246.2 | 35 | 389.9 | 2.33E+04 | 0.01675 | 1.63E+06 |
| 1, 63 | 250.2 | 35 | 383.2 | 2.30E+04 | 0.01664 | 1.73E+06 |
| 1, 64 | 254.2 | 35 | 376.4 | 2.26E+04 | 0.01663 | 1.82E+06 |
| 1, 65 | 258.2 | 35 | 369.9 | 2.22E+04 | 0.01667 | 1.90E+06 |
| 1, 66 | 262.2 | 35 | 363.2 | 2.18E+04 | 0.01666 | 1.99E+06 |
| 1, 67 | 266.2 | 35 | 356.5 | 2.13E+04 | 0.01673 | 2.08E+06 |
| 1, 68 | 270.2 | 35 | 349.8 | 2.09E+04 | 0.01677 | 2.16E+06 |
| 1, 69 | 274.2 | 35 | 343.2 | 2.03E+04 | 0.01689 | 2.24E+06 |
| 1, 70 | 278.2 | 35 | 336.5 | 1.99E+04 | 0.01695 | 2.32E+06 |
| 1, 71 | 282.2 | 35 | 329.8 | 1.94E+04 | 0.01704 | 2.40E+06 |
| 1, 72 | 286.2 | 35 | 323.3 | 1.89E+04 | 0.01713 | 2.47E+06 |
| 1, 73 | 290.2 | 35 | 316.5 | 1.84E+04 | 0.01724 | 2.55E+06 |
| 1, 74 | 294.2 | 35 | 309.8 | 1.79E+04 | 0.01736 | 2.62E+06 |
| 1, 75 | 298.2 | 35 | 303.1 | 1.74E+04 | 0.01745 | 2.69E+06 |
| 1, 76 | 302.2 | 35 | 296.4 | 1.68E+04 | 0.0176 | 2.76E+06 |
| 1, 77 | 306.2 | 35 | 289.9 | 1.64E+04 | 0.01772 | 2.82E+06 |
| 1, 78 | 310.2 | 35 | 283.1 | 1.59E+04 | 0.01785 | 2.88E+06 |
| 1, 79 | 314.2 | 35 | 276.4 | 1.54E+04 | 0.01801 | 2.95E+06 |
| 1, 80 | 318.2 | 35 | 269.9 | 1.49E+04 | 0.01817 | 3.00E+06 |
| 1, 81 | 322.2 | 35 | 263.1 | 1.43E+04 | 0.01835 | 3.06E+06 |
| 1, 82 | 326.2 | 35 | 256.5 | 1.38E+04 | 0.01853 | 3.12E+06 |
| 1, 83 | 330.2 | 35 | 249.8 | 1.34E+04 | 0.01871 | 3.17E+06 |
| 1, 84 | 334.2 | 35 | 243.2 | 1.29E+04 | 0.0189 | 3.22E+06 |
| 1, 85 | 338.2 | 35 | 236.5 | 1.24E+04 | 0.01914 | 3.27E+06 |
| 1, 86 | 342.2 | 35 | 229.8 | 1.19E+04 | 0.01938 | 3.32E+06 |
| 1, 87 | 346.2 | 35 | 223.3 | 1.14E+04 | 0.01962 | 3.36E+06 |
| 1, 88 | 350.2 | 35 | 216.4 | 1.09E+04 | 0.0199 | 3.41E+06 |
| 1, 89 | 354.2 | 35 | 209.8 | 1.04E+04 | 0.02019 | 3.45E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 90 | 358.2 | 35 | 203.2 | 9911 | 0.0205 | 3.49E+06 |
| 1, 91 | 362.2 | 35 | 196.5 | 9421 | 0.02086 | 3.53E+06 |
| 1, 92 | 366.2 | 35 | 189.9 | 8948 | 0.02122 | 3.56E+06 |
| 1, 93 | 370.1 | 35 | 183.2 | 8472 | 0.02163 | 3.60E+06 |
| 1, 94 | 374.2 | 35 | 176.4 | 7985 | 0.02209 | 3.63E+06 |
| 1, 95 | 378.2 | 35 | 169.9 | 7525 | 0.02258 | 3.66E+06 |
| 1, 96 | 382.2 | 35 | 163.2 | 7060 | 0.02312 | 3.69E+06 |
| 1, 97 | 386.2 | 35 | 156.4 | 6589 | 0.02374 | 3.71E+06 |
| 1, 98 | 390.2 | 35 | 149.8 | 6155 | 0.02433 | 3.74E+06 |
| 1, 99 | 394.2 | 35 | 143.2 | 5728 | 0.02499 | 3.76E+06 |
| 1, 100 | 398.2 | 35 | 136.5 | 5308 | 0.02572 | 3.78E+06 |
| 1, 101 | 402.2 | 35 | 129.8 | 4915 | 0.02642 | 3.80E+06 |
| 1, 102 | 406.2 | 35 | 123.2 | 4548 | 0.02709 | 3.82E+06 |
| 1, 103 | 410.2 | 35 | 116.5 | 4199 | 0.02775 | 3.84E+06 |
| 1, 104 | 414.2 | 35 | 109.9 | 3872 | 0.02837 | 3.85E+06 |
| 1, 105 | 418.2 | 35 | 103.2 | 3556 | 0.02902 | 3.86E+06 |
| 1, 106 | 422.2 | 35 | 96.38 | 3245 | 0.0297 | 3.88E+06 |
| 1, 107 | 426.2 | 35 | 89.86 | 2959 | 0.03037 | 3.89E+06 |
| 1, 108 | 430.2 | 35 | 83.19 | 2676 | 0.03109 | 3.90E+06 |
| 1, 109 | 434.2 | 35 | 76.42 | 2400 | 0.03185 | 3.91E+06 |
| 1, 110 | 438.2 | 35 | 69.78 | 2134 | 0.03269 | 3.92E+06 |
| 1, 111 | 442.2 | 35 | 63.1 | 1874 | 0.03367 | 3.93E+06 |
| 1, 112 | 446.2 | 35 | 56.44 | 1619 | 0.03486 | 3.93E+06 |
| 1, 113 | 450.2 | 35 | 49.78 | 1370 | 0.03635 | 3.94E+06 |
| 1, 114 | 454.1 | 35 | 43.15 | 1124 | 0.03839 | 3.94E+06 |
| 1, 115 | 458.2 | 35 | 36.49 | 881.5 | 0.0414 | 3.95E+06 |
| 1, 116 | 462.2 | 35 | 29.83 | 648.8 | 0.04597 | 3.95E+06 |
| 1, 117 | 466.2 | 35 | 23.01 | 426.6 | 0.05394 | 3.95E+06 |
| 1, 118 | 470.2 | 35 | 16.46 | 236.3 | 0.06967 | 3.95E+06 |
| 1, 119 | 474.2 | 35 | 9.79 | 76.43 | 0.1281 | 3.95E+06 |
| 1, 120 | 478.1 | 35 | 3.153 | 3.067 | 1.028 | 3.95E+06 |

### C4.2.2 Abu treated with 500PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 2.019 | 35 | 3.382 | -0.00046 | 7342 | -0.00932 |
| 2 | 6.067 | 35 | 9.998 | 0.000183 | 5.48E+04 | -0.00812 |
| 3 | 10.07 | 35 | 16.54 | 0.000238 | 6.95E+04 | -0.00759 |
| 4 | 14.03 | 35 | 23.24 | 0.000265 | 8.77E+04 | -0.00653 |
| 5 | 18.07 | 35 | 30.04 | 0.000304 | 9.90E+04 | -0.00519 |
| 6 | 22.08 | 35 | 36.69 | 0.000336 | 1.09E+05 | -0.004 |
| 7 | 26.05 | 35 | 43.35 | 0.000428 | 1.01E+05 | -0.00226 |
| 8 | 30.07 | 35 | 50.06 | 0.000516 | 9.71E+04 | 0 |
| 9 | 34.06 | 35 | 56.63 | 0.000641 | 8.83E+04 | 0.00253 |
| 10 | 38.03 | 35 | 63.37 | 0.000753 | 8.41E+04 | 0.005859 |
| 11 | 42.07 | 35 | 70.02 | 0.000965 | 7.25E+04 | 0.00972 |
| 12 | 46.07 | 35 | 76.66 | 0.00109 | 7.03E+04 | 0.01371 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 13 | 50.04 | 35 | 83.32 | 0.001293 | 6.44E+04 | 0.01891 |
| 14 | 54.07 | 35 | 90 | 0.001436 | 6.27E+04 | 0.02463 |
| 15 | 58.07 | 35 | 96.66 | 0.001667 | 5.80E+04 | 0.03143 |
| 16 | 62.04 | 35 | 103.3 | 0.00185 | 5.59E+04 | 0.03848 |
| 17 | 66.07 | 35 | 110 | 0.00217 | 5.07E+04 | 0.04754 |
| 18 | 70.06 | 35 | 116.6 | 0.002619 | 4.45E+04 | 0.05779 |
| 19 | 74.04 | 35 | 123.3 | 0.003079 | 4.00E+04 | 0.07031 |
| 20 | 78.07 | 35 | 130.1 | 0.003832 | 3.40E+04 | 0.08549 |
| 21 | 82.06 | 35 | 136.6 | 0.00484 | 2.82E+04 | 0.1052 |
| 22 | 86.03 | 35 | 143.4 | 0.006521 | 2.20E+04 | 0.1309 |
| 23 | 90.06 | 35 | 150 | 0.01027 | 1.46E+04 | 0.1735 |
| 24 | 94.07 | 35 | 156.7 | 0.02434 | 6437 | 0.2828 |
| 25 | 98.05 | 34.9 | 163.3 | 861.3 | 0.1896 | 3882 |
| 26 | 102.1 | 35 | 170 | 3211 | 0.05294 | 1.71E+04 |
| 27 | 106.1 | 35 | 176.7 | 4115 | 0.04293 | 3.32E+04 |
| 28 | 110 | 35 | 183.3 | 4669 | 0.03927 | 5.19E+04 |
| 29 | 114.1 | 35 | 190 | 5110 | 0.03718 | 7.27E+04 |
| 30 | 118.1 | 35 | 196.7 | 5515 | 0.03566 | 9.45E+04 |
| 31 | 122 | 35 | 203.3 | 5890 | 0.03452 | 1.18E+05 |
| 32 | 126.1 | 35 | 210 | 6253 | 0.03359 | 1.44E+05 |
| 33 | 130.1 | 35 | 216.7 | 6612 | 0.03277 | 1.70E+05 |
| 34 | 134 | 35 | 223.3 | 6961 | 0.03208 | 1.97E+05 |
| 35 | 138.1 | 35 | 230 | 7305 | 0.03148 | 2.27E+05 |
| 36 | 142.1 | 35 | 236.5 | 7637 | 0.03097 | 2.57E+05 |
| 37 | 146 | 35 | 243.2 | 7993 | 0.03043 | 2.89E+05 |
| 38 | 150.1 | 35 | 250 | 8350 | 0.02995 | 3.24E+05 |
| 39 | 154.1 | 35 | 256.6 | 8685 | 0.02954 | 3.57E+05 |
| 40 | 158 | 35 | 263.2 | 9035 | 0.02914 | 3.94E+05 |
| 41 | 162.1 | 35 | 270 | 9392 | 0.02875 | 4.32E+05 |
| 42 | 166.1 | 35 | 276.6 | 9749 | 0.02837 | 4.70E+05 |
| 43 | 170 | 35 | 283.3 | 1.01E+04 | 0.02802 | 5.11E+05 |
| 44 | 174.1 | 35 | 290.1 | 1.05E+04 | 0.02769 | 5.54E+05 |
| 45 | 178.1 | 34.9 | 296.7 | 1.09E+04 | 0.02736 | 5.96E+05 |
| 46 | 182 | 35 | 303.3 | 1.12E+04 | 0.02703 | 6.41E+05 |
| 47 | 186.1 | 35 | 310.1 | 1.16E+04 | 0.02673 | 6.88E+05 |
| 48 | 190.1 | 35 | 316.6 | 1.20E+04 | 0.02642 | 7.36E+05 |
| 49 | 194 | 35 | 323.3 | 1.24E+04 | 0.0261 | 7.85E+05 |
| 50 | 198.1 | 35 | 330.1 | 1.28E+04 | 0.02581 | 8.37E+05 |
| 51 | 202.1 | 35 | 336.6 | 1.32E+04 | 0.02551 | 8.89E+05 |
| 52 | 206 | 35 | 343.3 | 1.36E+04 | 0.02533 | 9.43E+05 |
| 53 | 210.1 | 35 | 350.1 | 1.40E+04 | 0.0251 | 1.00E+06 |
| 54 | 214.1 | 35 | 356.6 | 1.43E+04 | 0.02487 | 1.06E+06 |
| 55 | 218 | 35 | 363.3 | 1.47E+04 | 0.02466 | 1.12E+06 |
| 56 | 222.1 | 35 | 370.1 | 1.51E+04 | 0.02446 | 1.18E+06 |
| 57 | 226.1 | 35 | 376.6 | 1.55E+04 | 0.02425 | 1.24E+06 |
| 58 | 230 | 35 | 383.3 | 1.60E+04 | 0.02403 | 1.30E+06 |
| 59 | 234.1 | 35 | 390.1 | 1.64E+04 | 0.02381 | 1.37E+06 |
| 60 | 238.1 | 35 | 396.6 | 1.68E+04 | 0.02365 | 1.43E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 61 | 242.1 | 35 | 396.4 | 1.70E+04 | 0.02326 | 1.51E+06 |
| 62 | 246.2 | 35 | 389.9 | 1.70E+04 | 0.02295 | 1.57E+06 |
| 63 | 250.1 | 35 | 383.2 | 1.67E+04 | 0.02296 | 1.64E+06 |
| 64 | 254.2 | 35 | 376.4 | 1.64E+04 | 0.02293 | 1.71E+06 |
| 65 | 258.2 | 35 | 369.8 | 1.61E+04 | 0.023 | 1.77E+06 |
| 66 | 262.1 | 35 | 363.2 | 1.57E+04 | 0.02308 | 1.83E+06 |
| 67 | 266.2 | 35 | 356.4 | 1.54E+04 | 0.02315 | 1.90E+06 |
| 68 | 270.2 | 35 | 349.9 | 1.51E+04 | 0.02325 | 1.95E+06 |
| 69 | 274.1 | 35 | 343.2 | 1.47E+04 | 0.02334 | 2.01E+06 |
| 70 | 278.2 | 35 | 336.4 | 1.43E+04 | 0.02346 | 2.07E+06 |
| 71 | 282.2 | 35 | 329.8 | 1.40E+04 | 0.02359 | 2.13E+06 |
| 72 | 286.1 | 35 | 323.3 | 1.36E+04 | 0.02371 | 2.18E+06 |
| 73 | 290.2 | 35 | 316.4 | 1.33E+04 | 0.02384 | 2.24E+06 |
| 74 | 294.2 | 35 | 309.9 | 1.29E+04 | 0.02399 | 2.29E+06 |
| 75 | 298.1 | 35 | 303.2 | 1.26E+04 | 0.02416 | 2.34E+06 |
| 76 | 302.2 | 35 | 296.4 | 1.22E+04 | 0.02432 | 2.39E+06 |
| 77 | 306.2 | 35 | 289.9 | 1.18E+04 | 0.02449 | 2.43E+06 |
| 78 | 310.1 | 35 | 283.2 | 1.15E+04 | 0.02468 | 2.48E+06 |
| 79 | 314.2 | 35 | 276.4 | 1.11E+04 | 0.02487 | 2.52E+06 |
| 80 | 318.2 | 35 | 269.9 | 1.08E+04 | 0.02504 | 2.57E+06 |
| 81 | 322.1 | 35 | 263.2 | 1.04E+04 | 0.0253 | 2.61E+06 |
| 82 | 326.2 | 35 | 256.5 | 1.01E+04 | 0.02552 | 2.65E+06 |
| 83 | 330.2 | 35 | 249.8 | 9705 | 0.02574 | 2.69E+06 |
| 84 | 334.1 | 35 | 243.2 | 9363 | 0.02597 | 2.72E+06 |
| 85 | 338.2 | 35 | 236.5 | 9004 | 0.02626 | 2.76E+06 |
| 86 | 342.2 | 35 | 229.8 | 8659 | 0.02654 | 2.79E+06 |
| 87 | 346.1 | 35 | 223.1 | 8318 | 0.02683 | 2.83E+06 |
| 88 | 350.2 | 35 | 216.4 | 7977 | 0.02713 | 2.86E+06 |
| 89 | 354.2 | 35 | 209.9 | 7650 | 0.02744 | 2.89E+06 |
| 90 | 358.1 | 35 | 203.3 | 7324 | 0.02775 | 2.92E+06 |
| 91 | 362.2 | 35 | 196.4 | 6987 | 0.02811 | 2.95E+06 |
| 92 | 366.2 | 35 | 189.9 | 6670 | 0.02847 | 2.97E+06 |
| 93 | 370.1 | 35 | 183.2 | 6348 | 0.02886 | 3.00E+06 |
| 94 | 374.2 | 35 | 176.5 | 6030 | 0.02927 | 3.02E+06 |
| 95 | 378.2 | 35 | 169.9 | 5725 | 0.02968 | 3.05E+06 |
| 96 | 382.1 | 35 | 163.3 | 5424 | 0.0301 | 3.07E+06 |
| 97 | 386.2 | 35 | 156.5 | 5120 | 0.03056 | 3.09E+06 |
| 98 | 390.2 | 35 | 149.9 | 4824 | 0.03108 | 3.11E+06 |
| 99 | 394.1 | 35 | 143.2 | 4534 | 0.03159 | 3.13E+06 |
| 100 | 398.2 | 35 | 136.4 | 4246 | 0.03213 | 3.14E+06 |
| 101 | 402.2 | 35 | 129.8 | 3967 | 0.03273 | 3.16E+06 |
| 102 | 406.1 | 35 | 123.2 | 3694 | 0.03334 | 3.17E+06 |
| 103 | 410.2 | 35 | 116.5 | 3430 | 0.03397 | 3.19E+06 |
| 104 | 414.2 | 35 | 109.8 | 3170 | 0.03464 | 3.20E+06 |
| 105 | 418.1 | 35 | 103.1 | 2916 | 0.03537 | 3.21E+06 |
| 106 | 422.2 | 35 | 96.47 | 2666 | 0.03618 | 3.22E+06 |
| 107 | 426.2 | 35 | 89.95 | 2429 | 0.03703 | 3.23E+06 |
| 108 | 430.1 | 35 | 83.25 | 2191 | 0.038 | 3.24E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 109 | 434.2 | 35 | 76.54 | 1957 | 0.03912 | 3.25E+06 |
| 110 | 438.2 | 35 | 69.84 | 1727 | 0.04043 | 3.25E+06 |
| 111 | 442.1 | 35 | 63.15 | 1504 | 0.04198 | 3.26E+06 |
| 112 | 446.2 | 35 | 56.48 | 1286 | 0.0439 | 3.27E+06 |
| 113 | 450.2 | 35 | 49.8 | 1078 | 0.04622 | 3.27E+06 |
| 114 | 454.1 | 35 | 43.26 | 881.6 | 0.04907 | 3.27E+06 |
| 115 | 458.2 | 35 | 36.53 | 691.6 | 0.05282 | 3.28E+06 |
| 116 | 462.2 | 35 | 29.86 | 513.6 | 0.05813 | 3.28E+06 |
| 117 | 466.1 | 35 | 23.21 | 347.5 | 0.06679 | 3.28E+06 |
| 118 | 470.2 | 35 | 16.5 | 193.6 | 0.08523 | 3.28E+06 |
| 119 | 474.2 | 35 | 9.82 | 58.92 | 0.1667 | 3.28E+06 |
| 120 | 478.1 | 35 | 3.142 | 0.2399 | 13.1 | 3.28E+06 |

### C4.2.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 4.02 | 35 | 6.802 | -3.90E-05 | 1.74E+05 | 0.004927 |
| 2 | 12.03 | 35 | 20.02 | 0.000415 | 4.82E+04 | 0.008389 |
| 3 | 20.06 | 35 | 33.29 | 0.000751 | 4.44E+04 | 0.01478 |
| 4 | 28.06 | 35 | 46.54 | 0.001614 | 2.88E+04 | 0.02783 |
| 5 | 36.04 | 35 | 59.83 | 0.002808 | 2.13E+04 | 0.05033 |
| 6 | 44.07 | 35 | 73.44 | 0.005413 | 1.36E+04 | 0.09401 |
| 7 | 52.08 | 35 | 86.5 | 0.01031 | 8394 | 0.1786 |
| 8 | 60.04 | 35 | 99.84 | 47.27 | 2.112 | 625.1 |
| 9 | 68.07 | 35 | 113.2 | 1147 | 0.0987 | 1.00E+04 |
| 10 | 76.07 | 35 | 126.6 | 2216 | 0.05712 | 2.76E+04 |
| 11 | 84.03 | 35 | 139.8 | 2824 | 0.04952 | 5.04E+04 |
| 12 | 92.08 | 35 | 153.4 | 3371 | 0.04551 | 7.76E+04 |
| 13 | 100.1 | 35 | 166.5 | 3890 | 0.04281 | 1.09E+05 |
| 14 | 108 | 35 | 179.8 | 4441 | 0.04048 | 1.44E+05 |
| 15 | 116.1 | 35 | 193.3 | 5000 | 0.03866 | 1.85E+05 |
| 16 | 124.1 | 35 | 206.4 | 5539 | 0.03726 | 2.29E+05 |
| 17 | 132 | 35 | 220 | 6120 | 0.03595 | 2.78E+05 |
| 18 | 140.1 | 35 | 233.3 | 6694 | 0.03485 | 3.32E+05 |
| 19 | 148.1 | 35 | 246.6 | 7277 | 0.03389 | 3.90E+05 |
| 20 | 156 | 35 | 259.9 | 7870 | 0.03303 | 4.53E+05 |
| 21 | 164.1 | 35 | 273.3 | 8475 | 0.03224 | 5.21E+05 |
| 22 | 172.1 | 35 | 286.6 | 9065 | 0.03161 | 5.93E+05 |
| 23 | 180 | 35 | 299.9 | 9645 | 0.03109 | 6.70E+05 |
| 24 | 188.1 | 35 | 313.2 | 1.02E+04 | 0.03071 | 7.53E+05 |
| 25 | 196.1 | 35 | 326.6 | 1.08E+04 | 0.03039 | 8.38E+05 |
| 26 | 204 | 35 | 339.9 | 1.13E+04 | 0.03004 | 9.29E+05 |
| 27 | 212.1 | 35 | 353.2 | 1.19E+04 | 0.02971 | 1.03E+06 |
| 28 | 220.1 | 35 | 366.6 | 1.25E+04 | 0.02943 | 1.12E+06 |
| 29 | 228 | 35 | 379.9 | 1.30E+04 | 0.02924 | 1.23E+06 |
| 30 | 236.1 | 35 | 393.2 | 1.36E+04 | 0.02901 | 1.34E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 31 | 244.1 | 35 | 406.6 | 1.41E+04 | 0.02881 | 1.45E+06 |
| 32 | 252 | 35 | 419.9 | 1.47E+04 | 0.0286 | 1.57E+06 |
| 33 | 260.1 | 35 | 433.2 | 1.53E+04 | 0.02841 | 1.69E+06 |
| 34 | 268.1 | 35 | 446.5 | 1.59E+04 | 0.02817 | 1.82E+06 |
| 35 | 276 | 35 | 459.8 | 1.65E+04 | 0.02792 | 1.95E+06 |
| 36 | 284.1 | 35 | 473.2 | 1.71E+04 | 0.02764 | 2.09E+06 |
| 37 | 292.1 | 35 | 486.6 | 1.77E+04 | 0.02749 | 2.23E+06 |
| 38 | 300 | 35 | 499.9 | 1.83E+04 | 0.0273 | 2.37E+06 |
| 39 | 308.1 | 35 | 513.5 | 1.89E+04 | 0.02712 | 2.53E+06 |
| 40 | 316.1 | 35 | 526.5 | 1.95E+04 | 0.02695 | 2.68E+06 |
| 41 | 324 | 35 | 539.8 | 2.02E+04 | 0.02669 | 2.84E+06 |
| 42 | 332.1 | 35 | 553.2 | 2.09E+04 | 0.02652 | 3.01E+06 |
| 43 | 340.1 | 35 | 566.5 | 2.15E+04 | 0.02637 | 3.18E+06 |
| 44 | 348 | 35 | 579.8 | 2.21E+04 | 0.02619 | 3.36E+06 |
| 45 | 356.1 | 35 | 593.4 | 2.28E+04 | 0.02598 | 3.54E+06 |
| 46 | 364.1 | 35 | 606.7 | 2.35E+04 | 0.0258 | 3.73E+06 |
| 47 | 372 | 35 | 619.7 | 2.42E+04 | 0.02561 | 3.92E+06 |
| 48 | 380.1 | 35 | 633.4 | 2.49E+04 | 0.02542 | 4.12E+06 |
| 49 | 388.1 | 35 | 646.7 | 2.56E+04 | 0.02525 | 4.33E+06 |
| 50 | 396 | 35 | 660 | 2.64E+04 | 0.02505 | 4.54E+06 |
| 51 | 404 | 35 | 673.4 | 2.71E+04 | 0.02486 | 4.76E+06 |
| 52 | 412.1 | 35 | 686.4 | 2.78E+04 | 0.02469 | 4.98E+06 |
| 53 | 420 | 35 | 699.8 | 2.86E+04 | 0.0245 | 5.21E+06 |
| 54 | 428.1 | 35 | 713.2 | 2.93E+04 | 0.02433 | 5.44E+06 |
| 55 | 436.1 | 35 | 726.6 | 3.00E+04 | 0.02421 | 5.68E+06 |
| 56 | 444 | 35 | 740 | 3.07E+04 | 0.02411 | 5.93E+06 |
| 57 | 452.1 | 35 | 753.3 | 3.14E+04 | 0.024 | 6.18E+06 |
| 58 | 460.1 | 35 | 766.6 | 3.21E+04 | 0.0239 | 6.44E+06 |
| 59 | 468 | 35 | 779.9 | 3.27E+04 | 0.02384 | 6.70E+06 |
| 60 | 476.1 | 35 | 793.2 | 3.34E+04 | 0.02377 | 6.97E+06 |
| 61 | 484.1 | 35 | 793.2 | 3.38E+04 | 0.0235 | 7.24E+06 |
| 62 | 492.2 | 35 | 779.6 | 3.33E+04 | 0.02343 | 7.51E+06 |
| 63 | 500.2 | 35 | 766.6 | 3.27E+04 | 0.02343 | 7.77E+06 |
| 64 | 508.2 | 35 | 753.3 | 3.21E+04 | 0.02345 | 8.02E+06 |
| 65 | 516.2 | 35 | 739.7 | 3.14E+04 | 0.02353 | 8.28E+06 |
| 66 | 524.2 | 35 | 726.4 | 3.08E+04 | 0.02356 | 8.52E+06 |
| 67 | 532.2 | 35 | 713.1 | 3.02E+04 | 0.02362 | 8.76E+06 |
| 68 | 540.2 | 35 | 699.8 | 2.96E+04 | 0.02366 | 9.00E+06 |
| 69 | 548.2 | 35 | 686.5 | 2.89E+04 | 0.02373 | 9.23E+06 |
| 70 | 556.2 | 35 | 673.2 | 2.83E+04 | 0.02378 | 9.46E+06 |
| 71 | 564.2 | 35 | 659.8 | 2.77E+04 | 0.02385 | 9.68E+06 |
| 72 | 572.2 | 35 | 646.6 | 2.70E+04 | 0.02391 | 9.89E+06 |
| 73 | 580.2 | 35 | 633 | 2.64E+04 | 0.024 | 1.01E+07 |
| 74 | 588.2 | 35 | 619.7 | 2.57E+04 | 0.02409 | 1.03E+07 |
| 75 | 596.2 | 35 | 606.6 | 2.51E+04 | 0.02416 | 1.05E+07 |
| 76 | 604.2 | 35 | 593.3 | 2.45E+04 | 0.02425 | 1.07E+07 |
| 77 | 612.2 | 35 | 579.6 | 2.38E+04 | 0.02434 | 1.09E+07 |
| 78 | 620.2 | 35 | 566.6 | 2.32E+04 | 0.02446 | 1.11E+07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 79 | 628.2 | 35 | 553 | 2.25E+04 | 0.02458 | 1.13E+07 |
| 80 | 636.2 | 35 | 539.7 | 2.19E+04 | 0.02469 | 1.14E+07 |
| 81 | 644.2 | 35 | 526.4 | 2.12E+04 | 0.02484 | 1.16E+07 |
| 82 | 652.2 | 35 | 513.1 | 2.06E+04 | 0.02497 | 1.18E+07 |
| 83 | 660.2 | 35 | 499.8 | 1.98E+04 | 0.02519 | 1.19E+07 |
| 84 | 668.2 | 35 | 486.7 | 1.92E+04 | 0.02539 | 1.21E+07 |
| 85 | 676.2 | 35 | 473.1 | 1.85E+04 | 0.02562 | 1.22E+07 |
| 86 | 684.2 | 35 | 459.8 | 1.78E+04 | 0.02584 | 1.24E+07 |
| 87 | 692.2 | 35 | 446.5 | 1.71E+04 | 0.02609 | 1.25E+07 |
| 88 | 700.2 | 35 | 433.2 | 1.64E+04 | 0.02636 | 1.26E+07 |
| 89 | 708.2 | 35 | 419.9 | 1.57E+04 | 0.02668 | 1.28E+07 |
| 90 | 716.2 | 35 | 406.5 | 1.51E+04 | 0.02697 | 1.29E+07 |
| 91 | 724.2 | 35 | 393.2 | 1.44E+04 | 0.02731 | 1.30E+07 |
| 92 | 732.2 | 35 | 379.9 | 1.37E+04 | 0.02767 | 1.31E+07 |
| 93 | 740.2 | 35 | 366.5 | 1.31E+04 | 0.02806 | 1.32E+07 |
| 94 | 748.2 | 35 | 353.3 | 1.24E+04 | 0.02848 | 1.33E+07 |
| 95 | 756.2 | 35 | 339.9 | 1.17E+04 | 0.02897 | 1.34E+07 |
| 96 | 764.2 | 35 | 326.6 | 1.11E+04 | 0.02953 | 1.35E+07 |
| 97 | 772.2 | 35 | 313.2 | 1.04E+04 | 0.03015 | 1.36E+07 |
| 98 | 780.2 | 35 | 299.8 | 9722 | 0.03084 | 1.37E+07 |
| 99 | 788.2 | 35 | 286.5 | 9046 | 0.03167 | 1.37E+07 |
| 100 | 796.2 | 35 | 273.1 | 8377 | 0.03261 | 1.38E+07 |
| 101 | 804.2 | 35 | 259.8 | 7715 | 0.03367 | 1.39E+07 |
| 102 | 812.2 | 35 | 246.4 | 7070 | 0.03485 | 1.39E+07 |
| 103 | 820.2 | 35 | 233.1 | 6457 | 0.0361 | 1.40E+07 |
| 104 | 828.2 | 35 | 219.8 | 5878 | 0.03739 | 1.40E+07 |
| 105 | 836.2 | 35 | 206.5 | 5335 | 0.0387 | 1.41E+07 |
| 106 | 844.2 | 35 | 193.1 | 4822 | 0.04005 | 1.41E+07 |
| 107 | 852.2 | 35 | 179.8 | 4337 | 0.04146 | 1.41E+07 |
| 108 | 860.2 | 35 | 166.4 | 3875 | 0.04295 | 1.42E+07 |
| 109 | 868.2 | 35 | 153.1 | 3437 | 0.04454 | 1.42E+07 |
| 110 | 876.2 | 35 | 139.8 | 3021 | 0.04625 | 1.42E+07 |
| 111 | 884.2 | 35 | 126.4 | 2631 | 0.04805 | 1.42E+07 |
| 112 | 892.2 | 35 | 113.1 | 2266 | 0.04994 | 1.43E+07 |
| 113 | 900.2 | 35 | 99.84 | 1921 | 0.05198 | 1.43E+07 |
| 114 | 908.2 | 35 | 86.5 | 1595 | 0.05424 | 1.43E+07 |
| 115 | 916.2 | 35 | 73.19 | 1286 | 0.05693 | 1.43E+07 |
| 116 | 924.2 | 35 | 59.6 | 984.4 | 0.06054 | 1.43E+07 |
| 117 | 932.2 | 35 | 46.57 | 704.3 | 0.06612 | 1.43E+07 |
| 118 | 940.2 | 35 | 33.24 | 429.6 | 0.07736 | 1.43E+07 |
| 119 | 948.2 | 35 | 19.64 | 164.6 | 0.1193 | 1.43E+07 |
| 120 | 956.2 | 35 | 6.525 | 3.512 | 1.858 | 1.43E+07 |

**C4.2.4 Abu untreated with 20% Sertica**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 4.054 | 35 | 6.824 | 0.000302 | 2.26E+04 | -0.00506 |
| 2 | 12.07 | 35 | 19.97 | 0.000381 | 5.25E+04 | -0.0024 |
| 3 | 20.04 | 35 | 33.26 | 0.000423 | 7.87E+04 | 0.000932 |
| 4 | 28.08 | 35 | 46.6 | 0.000505 | 9.23E+04 | 0.00506 |
| 5 | 36.06 | 35 | 59.91 | 0.000554 | 1.08E+05 | 0.00972 |
| 6 | 44.04 | 35 | 73.23 | 0.000602 | 1.22E+05 | 0.01465 |
| 7 | 52.08 | 35 | 86.62 | 0.000664 | 1.31E+05 | 0.01957 |
| 8 | 60.07 | 35 | 99.99 | 0.000758 | 1.32E+05 | 0.02557 |
| 9 | 68.04 | 35 | 113.3 | 0.00083 | 1.37E+05 | 0.03249 |
| 10 | 76.08 | 35 | 126.7 | 0.000918 | 1.38E+05 | 0.03955 |
| 11 | 84.07 | 35 | 139.9 | 0.001007 | 1.39E+05 | 0.04767 |
| 12 | 92.04 | 35 | 153.2 | 0.001141 | 1.34E+05 | 0.05712 |
| 13 | 100.1 | 35 | 166.5 | 0.001275 | 1.31E+05 | 0.06738 |
| 14 | 108.1 | 35 | 179.8 | 0.001416 | 1.27E+05 | 0.07883 |
| 15 | 116 | 35 | 193.1 | 0.001661 | 1.16E+05 | 0.09241 |
| 16 | 124.1 | 35 | 206.7 | 0.001897 | 1.09E+05 | 0.1067 |
| 17 | 132.1 | 35 | 220 | 0.002274 | 9.67E+04 | 0.1254 |
| 18 | 140 | 35 | 233.1 | 0.002743 | 8.50E+04 | 0.1475 |
| 19 | 148.1 | 35 | 246.7 | 0.003558 | 6.94E+04 | 0.1754 |
| 20 | 156.1 | 35 | 259.7 | 0.005007 | 5.19E+04 | 0.216 |
| 21 | 164 | 35 | 273.3 | 0.6459 | 423.2 | 122.5 |
| 22 | 172.1 | 35 | 286.7 | 9764 | 0.02936 | 7.77E+04 |
| 23 | 180.1 | 35 | 299.9 | 1.68E+04 | 0.01781 | 2.11E+05 |
| 24 | 188 | 35 | 313.2 | 2.01E+04 | 0.01559 | 3.72E+05 |
| 25 | 196.1 | 35 | 326.5 | 2.22E+04 | 0.01472 | 5.52E+05 |
| 26 | 204.1 | 35 | 339.9 | 2.39E+04 | 0.0142 | 7.41E+05 |
| 27 | 212 | 35 | 353.2 | 2.52E+04 | 0.01404 | 9.43E+05 |
| 28 | 220.1 | 35 | 366.6 | 2.65E+04 | 0.01385 | 1.16E+06 |
| 29 | 228.1 | 35 | 379.9 | 2.79E+04 | 0.01364 | 1.38E+06 |
| 30 | 236 | 35 | 393.2 | 2.91E+04 | 0.01349 | 1.61E+06 |
| 31 | 244.1 | 35 | 406.7 | 3.04E+04 | 0.01337 | 1.86E+06 |
| 32 | 252.1 | 35 | 419.8 | 3.16E+04 | 0.01327 | 2.11E+06 |
| 33 | 260 | 35 | 433.1 | 3.28E+04 | 0.01321 | 2.37E+06 |
| 34 | 268.1 | 35 | 446.7 | 3.41E+04 | 0.01312 | 2.65E+06 |
| 35 | 276.1 | 35 | 460 | 3.51E+04 | 0.01309 | 2.92E+06 |
| 36 | 284 | 35 | 473.3 | 3.63E+04 | 0.01306 | 3.21E+06 |
| 37 | 292.1 | 35 | 486.6 | 3.73E+04 | 0.01304 | 3.52E+06 |
| 38 | 300.1 | 35 | 499.9 | 3.83E+04 | 0.01304 | 3.82E+06 |
| 39 | 308 | 35 | 513.2 | 3.92E+04 | 0.01309 | 4.13E+06 |
| 40 | 316.1 | 35 | 526.5 | 4.01E+04 | 0.01312 | 4.46E+06 |
| 41 | 324.1 | 35 | 539.9 | 4.11E+04 | 0.01315 | 4.78E+06 |
| 42 | 332 | 35 | 553.3 | 4.19E+04 | 0.0132 | 5.12E+06 |
| 43 | 340.1 | 35 | 566.5 | 4.28E+04 | 0.01324 | 5.46E+06 |
| 44 | 348.1 | 35 | 579.9 | 4.19E+04 | 0.01386 | 5.80E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 45 | 356 | 35 | 593.1 | 4.22E+04 | 0.01406 | 6.13E+06 |
| 46 | 364.1 | 35 | 606.7 | 4.31E+04 | 0.01409 | 6.48E+06 |
| 47 | 372.1 | 35 | 620 | 4.40E+04 | 0.0141 | 6.83E+06 |
| 48 | 380 | 35 | 633.3 | 4.48E+04 | 0.01414 | 7.19E+06 |
| 49 | 388.1 | 35 | 646.6 | 4.56E+04 | 0.01418 | 7.55E+06 |
| 50 | 396.1 | 35 | 659.9 | 4.64E+04 | 0.01423 | 7.92E+06 |
| 51 | 404 | 35 | 673.2 | 4.71E+04 | 0.01429 | 8.30E+06 |
| 52 | 412.1 | 35 | 686.5 | 4.78E+04 | 0.01436 | 8.68E+06 |
| 53 | 420.1 | 35 | 699.9 | 4.85E+04 | 0.01442 | 9.07E+06 |
| 54 | 428 | 35 | 713.2 | 4.92E+04 | 0.01449 | 9.46E+06 |
| 55 | 436.1 | 35 | 726.5 | 4.99E+04 | 0.01456 | 9.87E+06 |
| 56 | 444.1 | 35 | 739.9 | 5.05E+04 | 0.01464 | 1.03E+07 |
| 57 | 452 | 35 | 753.3 | 5.18E+04 | 0.01454 | 1.07E+07 |
| 58 | 460.1 | 35 | 766.6 | 5.19E+04 | 0.01478 | 1.11E+07 |
| 59 | 468.1 | 35 | 779.9 | 5.25E+04 | 0.01486 | 1.15E+07 |
| 60 | 472 | 35 | 781 | 5.25E+04 | 0.01487 | 1.16E+07 |

**C4.3 (T=40°C)**

**C4.3.1 Abu untreated**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.263 | 40 | 2.077 | 0.000451 | 4603 | 0.01292 |
| 1, 2 | 3.807 | 40 | 6.344 | 0.000684 | 9270 | 0.01438 |
| 1, 3 | 6.308 | 40 | 10.4 | 0.000971 | 1.07E+04 | 0.01665 |
| 1, 4 | 8.783 | 40 | 14.53 | 0.000954 | 1.52E+04 | 0.01891 |
| 1, 5 | 11.33 | 40.1 | 18.81 | 0.001127 | 1.67E+04 | 0.02144 |
| 1, 6 | 13.82 | 40.1 | 22.85 | 0.00119 | 1.92E+04 | 0.02397 |
| 1, 7 | 16.28 | 40 | 27.02 | 0.00141 | 1.92E+04 | 0.02783 |
| 1, 8 | 18.81 | 40 | 31.35 | 0.001557 | 2.01E+04 | 0.03222 |
| 1, 9 | 21.31 | 40 | 35.35 | 0.001581 | 2.24E+04 | 0.03609 |
| 1, 10 | 23.79 | 40 | 39.54 | 0.001796 | 2.20E+04 | 0.04088 |
| 1, 11 | 26.33 | 40 | 43.86 | 0.002109 | 2.08E+04 | 0.0458 |
| 1, 12 | 28.83 | 40 | 47.91 | 0.00226 | 2.12E+04 | 0.05233 |
| 1, 13 | 31.28 | 40 | 52 | 0.002542 | 2.05E+04 | 0.05819 |
| 1, 14 | 33.82 | 40 | 56.34 | 0.002941 | 1.92E+04 | 0.06685 |
| 1, 15 | 36.32 | 40 | 60.41 | 0.00318 | 1.90E+04 | 0.07404 |
| 1, 16 | 38.79 | 40 | 64.55 | 0.003792 | 1.70E+04 | 0.08322 |
| 1, 17 | 41.32 | 40 | 68.82 | 0.004463 | 1.54E+04 | 0.09508 |
| 1, 18 | 43.83 | 40 | 72.92 | 0.005019 | 1.45E+04 | 0.1079 |
| 1, 19 | 46.3 | 40 | 77.1 | 0.006513 | 1.18E+04 | 0.123 |
| 1, 20 | 48.82 | 40 | 81.34 | 0.008751 | 9296 | 0.1462 |
| 1, 21 | 51.32 | 40 | 85.41 | 0.01357 | 6292 | 0.1808 |
| 1, 22 | 53.78 | 40 | 89.57 | 0.02882 | 3108 | 0.2579 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 23 | 56.31 | 40 | 93.84 | 186.4 | 0.5035 | 621.9 |
| 1, 24 | 58.81 | 40 | 97.87 | 1541 | 0.06353 | 4535 |
| 1, 25 | 61.28 | 40 | 102.1 | 2803 | 0.03641 | 1.17E+04 |
| 1, 26 | 63.81 | 40 | 106.3 | 3685 | 0.02885 | 2.12E+04 |
| 1, 27 | 66.33 | 40 | 110.4 | 4284 | 0.02577 | 3.18E+04 |
| 1, 28 | 68.8 | 40 | 114.5 | 4751 | 0.02411 | 4.35E+04 |
| 1, 29 | 71.31 | 40 | 118.8 | 5142 | 0.02311 | 5.68E+04 |
| 1, 30 | 73.81 | 40 | 122.9 | 5468 | 0.02247 | 7.01E+04 |
| 1, 31 | 76.29 | 40 | 127.1 | 5795 | 0.02193 | 8.46E+04 |
| 1, 32 | 78.82 | 40 | 131.3 | 6108 | 0.0215 | 1.00E+05 |
| 1, 33 | 81.32 | 40 | 135.4 | 6409 | 0.02112 | 1.16E+05 |
| 1, 34 | 83.78 | 40 | 139.6 | 6718 | 0.02078 | 1.33E+05 |
| 1, 35 | 86.31 | 40 | 143.8 | 7018 | 0.02049 | 1.51E+05 |
| 1, 36 | 88.81 | 40 | 147.9 | 7301 | 0.02026 | 1.69E+05 |
| 1, 37 | 91.3 | 40 | 152.1 | 7599 | 0.02002 | 1.88E+05 |
| 1, 38 | 93.83 | 40 | 156.4 | 7898 | 0.0198 | 2.08E+05 |
| 1, 39 | 96.32 | 40 | 160.3 | 8188 | 0.01958 | 2.28E+05 |
| 1, 40 | 98.78 | 40 | 164.5 | 8478 | 0.01941 | 2.49E+05 |
| 1, 41 | 101.3 | 40 | 168.8 | 8782 | 0.01922 | 2.72E+05 |
| 1, 42 | 103.8 | 40 | 172.9 | 9071 | 0.01906 | 2.94E+05 |
| 1, 43 | 106.3 | 40 | 177.1 | 9356 | 0.01893 | 3.17E+05 |
| 1, 44 | 108.8 | 40 | 181.2 | 9644 | 0.01879 | 3.42E+05 |
| 1, 45 | 111.3 | 40 | 185.4 | 9945 | 0.01864 | 3.66E+05 |
| 1, 46 | 113.8 | 40 | 189.6 | 1.02E+04 | 0.01852 | 3.92E+05 |
| 1, 47 | 116.3 | 40 | 193.8 | 1.05E+04 | 0.01841 | 4.19E+05 |
| 1, 48 | 118.8 | 40 | 197.9 | 1.08E+04 | 0.01829 | 4.45E+05 |
| 1, 49 | 121.3 | 40 | 202.1 | 1.11E+04 | 0.01814 | 4.73E+05 |
| 1, 50 | 123.8 | 40 | 206.3 | 1.14E+04 | 0.01808 | 5.02E+05 |
| 1, 51 | 126.3 | 40 | 210.4 | 1.17E+04 | 0.01794 | 5.31E+05 |
| 1, 52 | 128.8 | 40 | 214.5 | 1.20E+04 | 0.01785 | 5.61E+05 |
| 1, 53 | 131.3 | 40 | 218.8 | 1.23E+04 | 0.01776 | 5.93E+05 |
| 1, 54 | 133.8 | 40 | 222.9 | 1.26E+04 | 0.01765 | 6.24E+05 |
| 1, 55 | 136.3 | 40 | 227 | 1.29E+04 | 0.01758 | 6.56E+05 |
| 1, 56 | 138.8 | 40 | 231.3 | 1.32E+04 | 0.01749 | 6.90E+05 |
| 1, 57 | 141.3 | 40 | 235.3 | 1.35E+04 | 0.01741 | 7.23E+05 |
| 1, 58 | 143.8 | 40 | 239.6 | 1.38E+04 | 0.01733 | 7.58E+05 |
| 1, 59 | 146.3 | 40 | 243.8 | 1.41E+04 | 0.01727 | 7.94E+05 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.44E+04 | 0.01718 | 8.29E+05 |
| 1, 61 | 151.4 | 40 | 247.7 | 1.47E+04 | 0.01685 | 8.68E+05 |
| 1, 62 | 153.9 | 40 | 243.6 | 1.47E+04 | 0.01653 | 9.04E+05 |
| 1, 63 | 156.4 | 40 | 239.4 | 1.46E+04 | 0.01636 | 9.40E+05 |
| 1, 64 | 158.9 | 40 | 235.2 | 1.45E+04 | 0.01627 | 9.77E+05 |
| 1, 65 | 161.4 | 40 | 231.1 | 1.43E+04 | 0.01621 | 1.01E+06 |
| 1, 66 | 163.9 | 40 | 226.9 | 1.40E+04 | 0.01618 | 1.05E+06 |
| 1, 67 | 166.4 | 40 | 222.7 | 1.38E+04 | 0.01617 | 1.08E+06 |
| 1, 68 | 168.9 | 40 | 218.7 | 1.35E+04 | 0.01616 | 1.12E+06 |
| 1, 69 | 171.4 | 40 | 214.4 | 1.33E+04 | 0.01617 | 1.15E+06 |
| 1, 70 | 173.9 | 40 | 210.2 | 1.30E+04 | 0.01618 | 1.18E+06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1, 71 | 176.4 | 40 | 206.1 | 1.27E+04 | 0.01622 | 1.21E+06 |
| 1, 72 | 178.9 | 40 | 202 | 1.24E+04 | 0.01625 | 1.24E+06 |
| 1, 73 | 181.4 | 40 | 197.8 | 1.22E+04 | 0.01628 | 1.28E+06 |
| 1, 74 | 183.9 | 40 | 193.6 | 1.19E+04 | 0.0163 | 1.30E+06 |
| 1, 75 | 186.4 | 40 | 189.5 | 1.16E+04 | 0.01635 | 1.33E+06 |
| 1, 76 | 188.9 | 40 | 185.2 | 1.13E+04 | 0.01638 | 1.36E+06 |
| 1, 77 | 191.4 | 40 | 181.1 | 1.10E+04 | 0.01646 | 1.39E+06 |
| 1, 78 | 193.9 | 40 | 176.9 | 1.07E+04 | 0.0165 | 1.42E+06 |
| 1, 79 | 196.4 | 40 | 172.7 | 1.04E+04 | 0.01657 | 1.44E+06 |
| 1, 80 | 198.9 | 40 | 168.6 | 1.01E+04 | 0.01665 | 1.47E+06 |
| 1, 81 | 201.4 | 40 | 164.5 | 9850 | 0.0167 | 1.49E+06 |
| 1, 82 | 203.9 | 40 | 160.2 | 9553 | 0.01676 | 1.52E+06 |
| 1, 83 | 206.4 | 40 | 156.1 | 9268 | 0.01684 | 1.54E+06 |
| 1, 84 | 208.9 | 40 | 152 | 8985 | 0.01691 | 1.56E+06 |
| 1, 85 | 211.4 | 40 | 147.7 | 8691 | 0.017 | 1.58E+06 |
| 1, 86 | 213.9 | 40 | 143.6 | 8402 | 0.01709 | 1.60E+06 |
| 1, 87 | 216.4 | 40 | 139.5 | 8118 | 0.01718 | 1.62E+06 |
| 1, 88 | 218.9 | 40 | 135.2 | 7828 | 0.01727 | 1.64E+06 |
| 1, 89 | 221.4 | 40 | 131.1 | 7545 | 0.01738 | 1.66E+06 |
| 1, 90 | 223.9 | 40 | 126.9 | 7242 | 0.01753 | 1.68E+06 |
| 1, 91 | 226.4 | 40 | 122.7 | 6955 | 0.01764 | 1.70E+06 |
| 1, 92 | 228.9 | 40 | 118.6 | 6680 | 0.01776 | 1.71E+06 |
| 1, 93 | 231.4 | 40 | 114.4 | 6396 | 0.01789 | 1.73E+06 |
| 1, 94 | 233.9 | 40 | 110.3 | 6119 | 0.01802 | 1.75E+06 |
| 1, 95 | 236.4 | 40 | 106.1 | 5844 | 0.01815 | 1.76E+06 |
| 1, 96 | 238.9 | 40 | 102 | 5575 | 0.01829 | 1.77E+06 |
| 1, 97 | 241.4 | 40 | 97.72 | 5289 | 0.01848 | 1.79E+06 |
| 1, 98 | 243.9 | 40 | 93.61 | 5020 | 0.01865 | 1.80E+06 |
| 1, 99 | 246.4 | 40 | 89.41 | 4741 | 0.01886 | 1.81E+06 |
| 1, 100 | 248.9 | 40 | 85.19 | 4452 | 0.01914 | 1.82E+06 |
| 1, 101 | 251.4 | 40 | 81.12 | 4179 | 0.01941 | 1.83E+06 |
| 1, 102 | 253.9 | 40 | 76.94 | 3900 | 0.01973 | 1.84E+06 |
| 1, 103 | 256.4 | 40 | 72.7 | 3629 | 0.02004 | 1.85E+06 |
| 1, 104 | 258.9 | 40 | 68.62 | 3378 | 0.02031 | 1.86E+06 |
| 1, 105 | 261.4 | 40 | 64.41 | 3115 | 0.02068 | 1.87E+06 |
| 1, 106 | 263.9 | 40 | 60.24 | 2853 | 0.02111 | 1.88E+06 |
| 1, 107 | 266.4 | 40 | 56.16 | 2599 | 0.02161 | 1.88E+06 |
| 1, 108 | 268.9 | 40 | 51.94 | 2342 | 0.02218 | 1.89E+06 |
| 1, 109 | 271.4 | 40 | 47.66 | 2084 | 0.02287 | 1.89E+06 |
| 1, 110 | 273.9 | 40 | 43.58 | 1845 | 0.02361 | 1.90E+06 |
| 1, 111 | 276.4 | 40 | 39.44 | 1606 | 0.02456 | 1.90E+06 |
| 1, 112 | 278.9 | 40 | 35.16 | 1366 | 0.02573 | 1.91E+06 |
| 1, 113 | 281.4 | 40 | 31.15 | 1148 | 0.02714 | 1.91E+06 |
| 1, 114 | 283.9 | 40 | 26.88 | 922.2 | 0.02915 | 1.91E+06 |
| 1, 115 | 286.4 | 40 | 22.71 | 710.2 | 0.03198 | 1.91E+06 |
| 1, 116 | 288.9 | 40 | 18.64 | 512.1 | 0.03641 | 1.91E+06 |
| 1, 117 | 291.4 | 40 | 14.38 | 322.5 | 0.0446 | 1.91E+06 |
| 1, 118 | 293.9 | 40 | 10.23 | 163.5 | 0.06256 | 1.91E+06 |

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|---|---|---|---|---|---|---|
| 1, 119 | 296.4 | 40 | 6.139 | 46.6 | 0.1317 | 1.91E+06 |
| 1, 120 | 298.9 | 40 | 1.996 | 1.167 | 1.712 | 1.91E+06 |

**C4.3.2 Abu treated with 500PPM ROA**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1 | 1.293 | 40 | 2.12 | 0.04084 | 51.92 | 0.1141 |
| 2 | 3.813 | 40 | 6.2 | 0.2 | 31 | 0.8566 |
| 3 | 6.286 | 40 | 10.39 | 29.79 | 0.3488 | 89.29 |
| 4 | 8.8 | 40 | 14.58 | 188.2 | 0.07746 | 594.8 |
| 5 | 11.3 | 40 | 18.68 | 445.3 | 0.04195 | 1738 |
| 6 | 13.78 | 40 | 22.85 | 753.6 | 0.03033 | 3642 |
| 7 | 16.3 | 40 | 27.13 | 1063 | 0.02551 | 6373 |
| 8 | 18.81 | 40 | 31.21 | 1353 | 0.02307 | 9746 |
| 9 | 21.28 | 40 | 35.4 | 1645 | 0.02152 | 1.39E+04 |
| 10 | 23.81 | 40 | 39.66 | 1939 | 0.02046 | 1.88E+04 |
| 11 | 26.32 | 40 | 43.76 | 2216 | 0.01975 | 2.43E+04 |
| 12 | 28.8 | 40 | 47.93 | 2497 | 0.0192 | 3.06E+04 |
| 13 | 31.31 | 40 | 52.16 | 2781 | 0.01876 | 3.77E+04 |
| 14 | 33.81 | 40 | 56.23 | 3054 | 0.01841 | 4.52E+04 |
| 15 | 36.28 | 40 | 60.41 | 3334 | 0.01812 | 5.35E+04 |
| 16 | 38.8 | 40 | 64.59 | 3616 | 0.01786 | 6.27E+04 |
| 17 | 41.3 | 40 | 68.7 | 3891 | 0.01766 | 7.23E+04 |
| 18 | 43.78 | 40 | 72.82 | 4169 | 0.01747 | 8.28E+04 |
| 19 | 46.31 | 40 | 77.11 | 4457 | 0.0173 | 9.41E+04 |
| 20 | 48.8 | 40 | 81.2 | 4732 | 0.01716 | 1.06E+05 |
| 21 | 51.28 | 40 | 85.41 | 5016 | 0.01703 | 1.18E+05 |
| 22 | 53.8 | 40 | 89.64 | 5290 | 0.01695 | 1.32E+05 |
| 23 | 56.3 | 40 | 93.7 | 5560 | 0.01685 | 1.46E+05 |
| 24 | 58.78 | 40 | 97.88 | 5830 | 0.01679 | 1.60E+05 |
| 25 | 61.3 | 40 | 102.1 | 6102 | 0.01674 | 1.76E+05 |
| 26 | 63.8 | 40 | 106.2 | 6348 | 0.01673 | 1.91E+05 |
| 27 | 66.28 | 40 | 110.4 | 6616 | 0.01668 | 2.08E+05 |
| 28 | 68.8 | 40 | 114.6 | 6881 | 0.01666 | 2.25E+05 |
| 29 | 71.31 | 40 | 118.7 | 7133 | 0.01664 | 2.43E+05 |
| 30 | 73.78 | 40 | 122.9 | 7412 | 0.01658 | 2.62E+05 |
| 31 | 76.31 | 40 | 127.2 | 7694 | 0.01653 | 2.81E+05 |
| 32 | 78.81 | 40 | 131.2 | 7958 | 0.01648 | 3.01E+05 |
| 33 | 81.29 | 40 | 135.4 | 8250 | 0.01642 | 3.21E+05 |
| 34 | 83.8 | 40 | 139.6 | 8535 | 0.01636 | 3.43E+05 |
| 35 | 86.3 | 40 | 143.7 | 8818 | 0.0163 | 3.65E+05 |
| 36 | 88.79 | 40 | 147.9 | 9110 | 0.01623 | 3.88E+05 |
| 37 | 91.31 | 40 | 152.2 | 9404 | 0.01618 | 4.11E+05 |
| 38 | 93.8 | 40 | 156.1 | 9703 | 0.01609 | 4.35E+05 |
| 39 | 96.29 | 40 | 160.4 | 1.00E+04 | 0.01604 | 4.60E+05 |
| 40 | 98.82 | 40 | 164.7 | 1.03E+04 | 0.01597 | 4.87E+05 |
| 41 | 101.3 | 40 | 168.7 | 1.06E+04 | 0.01594 | 5.13E+05 |

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|---|---|---|---|---|---|---|
| 42 | 103.8 | 40 | 172.9 | 1.09E+04 | 0.01586 | 5.40E+05 |
| 43 | 106.3 | 40 | 177.1 | 1.12E+04 | 0.01581 | 5.69E+05 |
| 44 | 108.8 | 40 | 181.2 | 1.15E+04 | 0.01575 | 5.97E+05 |
| 45 | 111.3 | 40 | 185.4 | 1.18E+04 | 0.0157 | 6.26E+05 |
| 46 | 113.8 | 40 | 189.6 | 1.21E+04 | 0.01563 | 6.57E+05 |
| 47 | 116.3 | 40 | 193.7 | 1.24E+04 | 0.01559 | 6.88E+05 |
| 48 | 118.8 | 40 | 197.8 | 1.28E+04 | 0.01551 | 7.20E+05 |
| 49 | 121.3 | 40 | 202.2 | 1.31E+04 | 0.01549 | 7.53E+05 |
| 50 | 123.8 | 40 | 206.1 | 1.33E+04 | 0.01546 | 7.86E+05 |
| 51 | 126.3 | 40 | 210.3 | 1.37E+04 | 0.01539 | 8.20E+05 |
| 52 | 128.8 | 40 | 214.7 | 1.40E+04 | 0.01532 | 8.56E+05 |
| 53 | 131.3 | 40 | 218.8 | 1.43E+04 | 0.01528 | 8.91E+05 |
| 54 | 133.8 | 40 | 222.9 | 1.46E+04 | 0.01524 | 9.27E+05 |
| 55 | 136.3 | 40 | 227.1 | 1.50E+04 | 0.01519 | 9.65E+05 |
| 56 | 138.8 | 40 | 231.2 | 1.53E+04 | 0.01516 | 1.00E+06 |
| 57 | 141.3 | 40 | 235.4 | 1.56E+04 | 0.0151 | 1.04E+06 |
| 58 | 143.8 | 40 | 239.6 | 1.59E+04 | 0.01506 | 1.08E+06 |
| 59 | 146.3 | 40 | 243.7 | 1.62E+04 | 0.01504 | 1.12E+06 |
| 60 | 148.8 | 40 | 247.9 | 1.65E+04 | 0.01499 | 1.16E+06 |
| 61 | 151.3 | 40 | 247.8 | 1.68E+04 | 0.01473 | 1.21E+06 |
| 62 | 153.9 | 40 | 243.6 | 1.69E+04 | 0.01446 | 1.25E+06 |
| 63 | 156.4 | 40 | 239.4 | 1.68E+04 | 0.01429 | 1.29E+06 |
| 64 | 158.9 | 40 | 235.2 | 1.66E+04 | 0.01421 | 1.33E+06 |
| 65 | 161.5 | 40 | 231 | 1.64E+04 | 0.01413 | 1.38E+06 |
| 66 | 164 | 40 | 226.9 | 1.61E+04 | 0.0141 | 1.41E+06 |
| 67 | 166.4 | 40 | 222.8 | 1.59E+04 | 0.01404 | 1.45E+06 |
| 68 | 168.9 | 40 | 218.4 | 1.56E+04 | 0.01399 | 1.49E+06 |
| 69 | 171.4 | 40 | 214.4 | 1.53E+04 | 0.01397 | 1.53E+06 |
| 70 | 173.9 | 40 | 210.3 | 1.51E+04 | 0.01395 | 1.57E+06 |
| 71 | 176.4 | 40 | 206.1 | 1.48E+04 | 0.01394 | 1.61E+06 |
| 72 | 178.9 | 40 | 201.9 | 1.45E+04 | 0.01392 | 1.64E+06 |
| 73 | 181.4 | 40 | 197.8 | 1.42E+04 | 0.01392 | 1.68E+06 |
| 74 | 183.9 | 40 | 193.5 | 1.39E+04 | 0.0139 | 1.71E+06 |
| 75 | 186.4 | 40 | 189.4 | 1.36E+04 | 0.01389 | 1.75E+06 |
| 76 | 188.9 | 40 | 185.3 | 1.33E+04 | 0.0139 | 1.78E+06 |
| 77 | 191.4 | 40 | 181.2 | 1.30E+04 | 0.0139 | 1.81E+06 |
| 78 | 193.9 | 40 | 176.9 | 1.27E+04 | 0.01389 | 1.84E+06 |
| 79 | 196.4 | 40 | 172.8 | 1.24E+04 | 0.01391 | 1.88E+06 |
| 80 | 198.9 | 40 | 168.5 | 1.21E+04 | 0.01391 | 1.91E+06 |
| 81 | 201.4 | 40 | 164.4 | 1.18E+04 | 0.01392 | 1.94E+06 |
| 82 | 203.9 | 40 | 160.3 | 1.15E+04 | 0.01392 | 1.96E+06 |
| 83 | 206.4 | 40 | 156.1 | 1.12E+04 | 0.01393 | 1.99E+06 |
| 84 | 208.9 | 40 | 151.8 | 1.09E+04 | 0.01395 | 2.02E+06 |
| 85 | 211.4 | 40 | 147.8 | 1.06E+04 | 0.01394 | 2.05E+06 |
| 86 | 213.9 | 40 | 143.6 | 1.03E+04 | 0.014 | 2.07E+06 |
| 87 | 216.4 | 40 | 139.3 | 9936 | 0.01402 | 2.10E+06 |
| 88 | 218.9 | 40 | 135.3 | 9652 | 0.01401 | 2.12E+06 |
| 89 | 221.4 | 40 | 131.1 | 9319 | 0.01407 | 2.14E+06 |

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|---|---|---|---|---|---|---|
| 90 | 223.9 | 40 | 126.9 | 9003 | 0.0141 | 2.17E+06 |
| 91 | 226.4 | 40 | 122.8 | 8696 | 0.01412 | 2.19E+06 |
| 92 | 228.9 | 40 | 118.6 | 8392 | 0.01413 | 2.21E+06 |
| 93 | 231.4 | 40 | 114.4 | 8066 | 0.01418 | 2.23E+06 |
| 94 | 233.9 | 40 | 110.3 | 7749 | 0.01423 | 2.25E+06 |
| 95 | 236.4 | 40 | 106 | 7431 | 0.01427 | 2.27E+06 |
| 96 | 238.9 | 40 | 101.9 | 7120 | 0.01431 | 2.28E+06 |
| 97 | 241.4 | 40 | 97.76 | 6799 | 0.01438 | 2.30E+06 |
| 98 | 243.9 | 40 | 93.45 | 6475 | 0.01443 | 2.32E+06 |
| 99 | 246.4 | 40 | 89.37 | 6173 | 0.01448 | 2.33E+06 |
| 100 | 248.9 | 40 | 85.3 | 5867 | 0.01454 | 2.35E+06 |
| 101 | 251.4 | 40 | 80.98 | 5543 | 0.01461 | 2.36E+06 |
| 102 | 253.9 | 40 | 76.89 | 5237 | 0.01468 | 2.37E+06 |
| 103 | 256.4 | 40 | 72.78 | 4932 | 0.01476 | 2.39E+06 |
| 104 | 258.9 | 40 | 68.48 | 4615 | 0.01484 | 2.40E+06 |
| 105 | 261.4 | 40 | 64.46 | 4316 | 0.01494 | 2.41E+06 |
| 106 | 263.9 | 40 | 60.29 | 4012 | 0.01503 | 2.42E+06 |
| 107 | 266.4 | 40 | 55.96 | 3699 | 0.01513 | 2.43E+06 |
| 108 | 268.9 | 40 | 51.9 | 3404 | 0.01525 | 2.44E+06 |
| 109 | 271.4 | 40 | 47.74 | 3105 | 0.01537 | 2.44E+06 |
| 110 | 273.9 | 40 | 43.65 | 2813 | 0.01552 | 2.45E+06 |
| 111 | 276.4 | 40 | 39.39 | 2511 | 0.01569 | 2.46E+06 |
| 112 | 278.9 | 40 | 35.23 | 2219 | 0.01588 | 2.46E+06 |
| 113 | 281.4 | 40 | 30.97 | 1924 | 0.0161 | 2.47E+06 |
| 114 | 283.9 | 40 | 26.89 | 1645 | 0.01634 | 2.47E+06 |
| 115 | 286.4 | 40 | 22.75 | 1367 | 0.01664 | 2.48E+06 |
| 116 | 288.9 | 40 | 18.6 | 1095 | 0.01699 | 2.48E+06 |
| 117 | 291.4 | 40 | 14.47 | 831.6 | 0.0174 | 2.48E+06 |
| 118 | 293.9 | 40 | 10.25 | 573.3 | 0.01787 | 2.48E+06 |
| 119 | 296.4 | 40 | 5.986 | 325.8 | 0.01837 | 2.48E+06 |
| 120 | 298.9 | 40 | 1.856 | 116.9 | 0.01588 | 2.48E+06 |

### C4.3.3 Abu treated with 1000PPM ROA

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.273 | 40 | 2.112 | 0.004429 | 476.8 | 0.01385 |
| 1, 2 | 3.825 | 40 | 6.339 | 0.008348 | 759.3 | 0.03529 |
| 1, 3 | 6.321 | 40 | 10.42 | 0.01278 | 815.6 | 0.06658 |
| 1, 4 | 8.787 | 40 | 14.51 | 0.0221 | 656.8 | 0.1242 |
| 1, 5 | 11.32 | 40 | 18.85 | 0.06809 | 276.8 | 0.3565 |
| 1, 6 | 13.82 | 40 | 22.88 | 45.16 | 0.5066 | 150.8 |
| 1, 7 | 16.29 | 40 | 27.06 | 343.2 | 0.07885 | 1047 |
| 1, 8 | 18.81 | 40 | 31.33 | 771.3 | 0.04062 | 3037 |
| 1, 9 | 21.31 | 40 | 35.39 | 1212 | 0.0292 | 6031 |
| 1, 10 | 23.8 | 40 | 39.57 | 1611 | 0.02457 | 1.01E+04 |
| 1, 11 | 26.33 | 40 | 43.83 | 1958 | 0.02239 | 1.52E+04 |
| 1, 12 | 28.82 | 40 | 47.92 | 2254 | 0.02126 | 2.06E+04 |

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|---|---|---|---|---|---|---|
| 1, 13 | 31.29 | 40 | 52.09 | 2530 | 0.02059 | 2.70E+04 |
| 1, 14 | 33.82 | 40 | 56.33 | 2793 | 0.02016 | 3.42E+04 |
| 1, 15 | 36.32 | 40 | 60.42 | 3034 | 0.01991 | 4.16E+04 |
| 1, 16 | 38.78 | 40 | 64.58 | 3276 | 0.01971 | 4.98E+04 |
| 1, 17 | 41.32 | 40 | 68.84 | 3518 | 0.01957 | 5.89E+04 |
| 1, 18 | 43.82 | 40 | 72.91 | 3747 | 0.01946 | 6.79E+04 |
| 1, 19 | 46.28 | 40 | 77.07 | 3981 | 0.01936 | 7.80E+04 |
| 1, 20 | 48.82 | 40 | 81.41 | 4224 | 0.01928 | 8.88E+04 |
| 1, 21 | 51.33 | 40 | 85.39 | 4448 | 0.0192 | 9.97E+04 |
| 1, 22 | 53.79 | 40 | 89.56 | 4685 | 0.01912 | 1.12E+05 |
| 1, 23 | 56.32 | 40 | 93.8 | 4927 | 0.01904 | 1.24E+05 |
| 1, 24 | 58.82 | 40 | 97.86 | 5166 | 0.01894 | 1.37E+05 |
| 1, 25 | 61.29 | 40 | 102 | 5412 | 0.01886 | 1.50E+05 |
| 1, 26 | 63.82 | 40 | 106.3 | 5671 | 0.01875 | 1.65E+05 |
| 1, 27 | 66.31 | 40 | 110.4 | 5916 | 0.01866 | 1.79E+05 |
| 1, 28 | 68.78 | 40 | 114.6 | 6167 | 0.01858 | 1.95E+05 |
| 1, 29 | 71.31 | 40 | 118.8 | 6442 | 0.01845 | 2.11E+05 |
| 1, 30 | 73.82 | 40 | 123 | 6692 | 0.01837 | 2.28E+05 |
| 1, 31 | 76.29 | 40 | 127.1 | 6959 | 0.01827 | 2.45E+05 |
| 1, 32 | 78.8 | 40 | 131.3 | 7226 | 0.01817 | 2.64E+05 |
| 1, 33 | 81.31 | 40 | 135.4 | 7499 | 0.01805 | 2.82E+05 |
| 1, 34 | 83.78 | 40 | 139.6 | 7778 | 0.01794 | 3.01E+05 |
| 1, 35 | 86.31 | 40 | 143.8 | 8078 | 0.0178 | 3.22E+05 |
| 1, 36 | 88.82 | 40 | 147.9 | 8346 | 0.01772 | 3.42E+05 |
| 1, 37 | 91.29 | 40 | 152.1 | 8646 | 0.01759 | 3.64E+05 |
| 1, 38 | 93.81 | 40 | 156.3 | 8941 | 0.01748 | 3.87E+05 |
| 1, 39 | 96.32 | 40 | 160.4 | 9241 | 0.01736 | 4.09E+05 |
| 1, 40 | 98.78 | 40 | 164.6 | 9527 | 0.01727 | 4.33E+05 |
| 1, 41 | 101.3 | 40 | 168.9 | 9840 | 0.01716 | 4.59E+05 |
| 1, 42 | 103.8 | 40 | 172.9 | 1.01E+04 | 0.01705 | 4.83E+05 |
| 1, 43 | 106.3 | 40 | 177 | 1.05E+04 | 0.01694 | 5.09E+05 |
| 1, 44 | 108.8 | 40 | 181.3 | 1.08E+04 | 0.0168 | 5.37E+05 |
| 1, 45 | 111.3 | 40 | 185.4 | 1.11E+04 | 0.01671 | 5.64E+05 |
| 1, 46 | 113.8 | 40 | 189.5 | 1.14E+04 | 0.01661 | 5.93E+05 |
| 1, 47 | 116.3 | 40 | 193.8 | 1.18E+04 | 0.01649 | 6.23E+05 |
| 1, 48 | 118.8 | 40 | 197.9 | 1.21E+04 | 0.01639 | 6.52E+05 |
| 1, 49 | 121.3 | 40 | 202 | 1.24E+04 | 0.01628 | 6.83E+05 |
| 1, 50 | 123.8 | 40 | 206.3 | 1.28E+04 | 0.01617 | 7.16E+05 |
| 1, 51 | 126.3 | 40 | 210.4 | 1.31E+04 | 0.01608 | 7.48E+05 |
| 1, 52 | 128.8 | 40 | 214.6 | 1.34E+04 | 0.01602 | 7.82E+05 |
| 1, 53 | 131.3 | 40 | 218.8 | 1.37E+04 | 0.01593 | 8.17E+05 |
| 1, 54 | 133.8 | 40 | 222.9 | 1.41E+04 | 0.01584 | 8.51E+05 |
| 1, 55 | 136.3 | 40 | 227.1 | 1.44E+04 | 0.01577 | 8.87E+05 |
| 1, 56 | 138.8 | 40 | 231.3 | 1.47E+04 | 0.01569 | 9.25E+05 |
| 1, 57 | 141.3 | 40 | 235.4 | 1.51E+04 | 0.01561 | 9.62E+05 |
| 1, 58 | 143.8 | 40 | 239.6 | 1.54E+04 | 0.01553 | 1.00E+06 |
| 1, 59 | 146.3 | 40 | 243.8 | 1.58E+04 | 0.01548 | 1.04E+06 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.61E+04 | 0.01541 | 1.08E+06 |

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|---|---|---|---|---|---|---|
| 1, 61 | 151.4 | 40 | 247.6 | 1.64E+04 | 0.01515 | 1.12E+06 |
| 1, 62 | 153.9 | 40 | 243.6 | 1.64E+04 | 0.01481 | 1.16E+06 |
| 1, 63 | 156.4 | 40 | 239.4 | 1.63E+04 | 0.01466 | 1.21E+06 |
| 1, 64 | 158.9 | 40 | 235.1 | 1.62E+04 | 0.01453 | 1.25E+06 |
| 1, 65 | 161.4 | 40 | 231.1 | 1.59E+04 | 0.0145 | 1.29E+06 |
| 1, 66 | 164 | 40 | 226.7 | 1.57E+04 | 0.01443 | 1.33E+06 |
| 1, 67 | 166.5 | 40 | 222.8 | 1.55E+04 | 0.01441 | 1.36E+06 |
| 1, 68 | 168.9 | 40 | 218.6 | 1.52E+04 | 0.01438 | 1.40E+06 |
| 1, 69 | 171.5 | 40 | 214.3 | 1.49E+04 | 0.01437 | 1.44E+06 |
| 1, 70 | 174 | 40 | 210.2 | 1.46E+04 | 0.01436 | 1.48E+06 |
| 1, 71 | 176.4 | 40 | 206 | 1.43E+04 | 0.01436 | 1.51E+06 |
| 1, 72 | 179 | 40 | 201.7 | 1.40E+04 | 0.01437 | 1.55E+06 |
| 1, 73 | 181.5 | 40 | 197.7 | 1.37E+04 | 0.0144 | 1.58E+06 |
| 1, 74 | 183.9 | 40 | 193.6 | 1.34E+04 | 0.0144 | 1.61E+06 |
| 1, 75 | 186.5 | 40 | 189.2 | 1.31E+04 | 0.01442 | 1.65E+06 |
| 1, 76 | 189 | 40 | 185.2 | 1.28E+04 | 0.01445 | 1.68E+06 |
| 1, 77 | 191.4 | 40 | 181.1 | 1.25E+04 | 0.01447 | 1.71E+06 |
| 1, 78 | 194 | 40 | 176.7 | 1.22E+04 | 0.01451 | 1.74E+06 |
| 1, 79 | 196.5 | 40 | 172.7 | 1.19E+04 | 0.01455 | 1.77E+06 |
| 1, 80 | 198.9 | 40 | 168.5 | 1.16E+04 | 0.01458 | 1.80E+06 |
| 1, 81 | 201.5 | 40 | 164.3 | 1.12E+04 | 0.01464 | 1.83E+06 |
| 1, 82 | 204 | 40 | 160.2 | 1.09E+04 | 0.01469 | 1.85E+06 |
| 1, 83 | 206.4 | 40 | 156 | 1.06E+04 | 0.01475 | 1.88E+06 |
| 1, 84 | 209 | 40 | 151.8 | 1.03E+04 | 0.01479 | 1.91E+06 |
| 1, 85 | 211.5 | 40 | 147.7 | 9943 | 0.01485 | 1.93E+06 |
| 1, 86 | 213.9 | 40 | 143.5 | 9616 | 0.01493 | 1.96E+06 |
| 1, 87 | 216.5 | 40 | 139.2 | 9294 | 0.01498 | 1.98E+06 |
| 1, 88 | 219 | 40 | 135.2 | 8981 | 0.01505 | 2.00E+06 |
| 1, 89 | 221.4 | 40 | 131.1 | 8662 | 0.01513 | 2.02E+06 |
| 1, 90 | 224 | 40 | 126.8 | 8333 | 0.01522 | 2.04E+06 |
| 1, 91 | 226.5 | 40 | 122.7 | 8032 | 0.01528 | 2.06E+06 |
| 1, 92 | 228.9 | 40 | 118.6 | 7731 | 0.01534 | 2.08E+06 |
| 1, 93 | 231.5 | 40 | 114.2 | 7401 | 0.01543 | 2.10E+06 |
| 1, 94 | 234 | 40 | 110.2 | 7091 | 0.01554 | 2.12E+06 |
| 1, 95 | 236.4 | 40 | 106.1 | 6787 | 0.01563 | 2.14E+06 |
| 1, 96 | 239 | 40 | 101.8 | 6472 | 0.01573 | 2.15E+06 |
| 1, 97 | 241.5 | 40 | 97.65 | 6168 | 0.01583 | 2.17E+06 |
| 1, 98 | 243.9 | 40 | 93.56 | 5864 | 0.01595 | 2.18E+06 |
| 1, 99 | 246.5 | 40 | 89.31 | 5555 | 0.01608 | 2.20E+06 |
| 1, 100 | 249 | 40 | 85.16 | 5260 | 0.01619 | 2.21E+06 |
| 1, 101 | 251.4 | 40 | 81.07 | 4962 | 0.01634 | 2.22E+06 |
| 1, 102 | 254 | 40 | 76.8 | 4656 | 0.01649 | 2.23E+06 |
| 1, 103 | 256.5 | 40 | 72.7 | 4365 | 0.01666 | 2.24E+06 |
| 1, 104 | 258.9 | 40 | 68.57 | 4081 | 0.0168 | 2.25E+06 |
| 1, 105 | 261.5 | 40 | 64.23 | 3774 | 0.01702 | 2.26E+06 |
| 1, 106 | 264 | 40 | 60.21 | 3495 | 0.01723 | 2.27E+06 |
| 1, 107 | 266.4 | 40 | 56.03 | 3209 | 0.01746 | 2.28E+06 |
| 1, 108 | 269 | 40 | 51.76 | 2918 | 0.01774 | 2.29E+06 |

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|---|---|---|---|---|---|---|
| 1, 109 | 271.5 | 40 | 47.69 | 2646 | 0.01803 | 2.29E+06 |
| 1, 110 | 273.9 | 39.9 | 43.54 | 2371 | 0.01836 | 2.30E+06 |
| 1, 111 | 276.5 | 40 | 39.29 | 2093 | 0.01877 | 2.31E+06 |
| 1, 112 | 279 | 40 | 35.18 | 1830 | 0.01923 | 2.31E+06 |
| 1, 113 | 281.4 | 40 | 31.05 | 1569 | 0.0198 | 2.31E+06 |
| 1, 114 | 284 | 40 | 26.72 | 1300 | 0.02055 | 2.32E+06 |
| 1, 115 | 286.5 | 40 | 22.75 | 1060 | 0.02146 | 2.32E+06 |
| 1, 116 | 288.9 | 40 | 18.55 | 815 | 0.02276 | 2.32E+06 |
| 1, 117 | 291.5 | 40 | 14.27 | 576 | 0.02477 | 2.32E+06 |
| 1, 118 | 294 | 40 | 10.27 | 366.3 | 0.02804 | 2.32E+06 |
| 1, 119 | 296.4 | 40 | 6.071 | 169.7 | 0.03577 | 2.32E+06 |
| 1, 120 | 299 | 40 | 1.756 | 17.37 | 0.1011 | 2.32E+06 |

### C4.3.4 Abu treated with 1000PPM PPD

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.269 | 40 | 2.107 | 0.003345 | 629.7 | 0.006658 |
| 1, 2 | 3.836 | 40 | 6.39 | 0.00423 | 1511 | 0.01771 |
| 1, 3 | 6.343 | 40 | 10.42 | 0.005488 | 1899 | 0.03143 |
| 1, 4 | 8.797 | 40 | 14.6 | 0.007304 | 1999 | 0.04967 |
| 1, 5 | 11.33 | 40 | 18.9 | 0.01044 | 1810 | 0.07657 |
| 1, 6 | 13.84 | 40 | 22.88 | 0.01653 | 1384 | 0.1184 |
| 1, 7 | 16.3 | 40 | 27.11 | 0.06068 | 446.8 | 0.4786 |
| 1, 8 | 18.83 | 40 | 31.37 | 315.1 | 0.09958 | 870.5 |
| 1, 9 | 21.34 | 40 | 35.46 | 1036 | 0.03422 | 3480 |
| 1, 10 | 23.81 | 40 | 39.53 | 1604 | 0.02464 | 7497 |
| 1, 11 | 26.33 | 40.1 | 43.87 | 2072 | 0.02118 | 1.29E+04 |
| 1, 12 | 28.83 | 40.1 | 47.85 | 2423 | 0.01975 | 1.88E+04 |
| 1, 13 | 31.29 | 40.1 | 52.1 | 2750 | 0.01895 | 2.57E+04 |
| 1, 14 | 33.83 | 40 | 56.33 | 3047 | 0.01849 | 3.36E+04 |
| 1, 15 | 36.33 | 40 | 60.35 | 3315 | 0.0182 | 4.16E+04 |
| 1, 16 | 38.79 | 40.1 | 64.54 | 3587 | 0.01799 | 5.05E+04 |
| 1, 17 | 41.32 | 40 | 68.81 | 3860 | 0.01783 | 6.05E+04 |
| 1, 18 | 43.83 | 40 | 72.84 | 4118 | 0.01769 | 7.06E+04 |
| 1, 19 | 46.29 | 40 | 77.05 | 4386 | 0.01757 | 8.16E+04 |
| 1, 20 | 48.83 | 40 | 81.38 | 4668 | 0.01743 | 9.36E+04 |
| 1, 21 | 51.34 | 40 | 85.46 | 4938 | 0.01731 | 1.06E+05 |
| 1, 22 | 53.81 | 40 | 89.62 | 5213 | 0.01719 | 1.19E+05 |
| 1, 23 | 56.35 | 40 | 93.88 | 5506 | 0.01705 | 1.33E+05 |
| 1, 24 | 58.84 | 40 | 97.87 | 5781 | 0.01693 | 1.47E+05 |
| 1, 25 | 61.29 | 40 | 102 | 6073 | 0.0168 | 1.62E+05 |
| 1, 26 | 63.83 | 40 | 106.4 | 6384 | 0.01666 | 1.79E+05 |
| 1, 27 | 66.33 | 40 | 110.4 | 6673 | 0.01654 | 1.95E+05 |
| 1, 28 | 68.79 | 40 | 114.5 | 6971 | 0.01643 | 2.12E+05 |
| 1, 29 | 71.33 | 40 | 118.8 | 7295 | 0.01629 | 2.31E+05 |
| 1, 30 | 73.84 | 40 | 122.9 | 7592 | 0.01619 | 2.50E+05 |
| 1, 31 | 76.3 | 40 | 127 | 7901 | 0.01608 | 2.69E+05 |

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|---|---|---|---|---|---|---|
| 1, 32 | 78.84 | 40 | 131.4 | 8233 | 0.01596 | 2.91E+05 |
| 1, 33 | 81.33 | 40 | 135.5 | 8542 | 0.01586 | 3.11E+05 |
| 1, 34 | 83.79 | 40 | 139.6 | 8858 | 0.01576 | 3.33E+05 |
| 1, 35 | 86.32 | 40 | 143.8 | 9210 | 0.01562 | 3.57E+05 |
| 1, 36 | 88.83 | 40 | 147.9 | 9506 | 0.01556 | 3.80E+05 |
| 1, 37 | 91.28 | 40 | 152.1 | 9843 | 0.01545 | 4.05E+05 |
| 1, 38 | 93.82 | 40 | 156.4 | 1.02E+04 | 0.01534 | 4.31E+05 |
| 1, 39 | 96.33 | 40 | 160.4 | 1.05E+04 | 0.01527 | 4.57E+05 |
| 1, 40 | 98.79 | 40 | 164.5 | 1.08E+04 | 0.01517 | 4.84E+05 |
| 1, 41 | 101.3 | 40.1 | 168.9 | 1.12E+04 | 0.01507 | 5.13E+05 |
| 1, 42 | 103.8 | 40.1 | 172.9 | 1.16E+04 | 0.01497 | 5.41E+05 |
| 1, 43 | 106.3 | 40 | 177 | 1.19E+04 | 0.01489 | 5.70E+05 |
| 1, 44 | 108.8 | 40 | 181.3 | 1.23E+04 | 0.0148 | 6.02E+05 |
| 1, 45 | 111.3 | 40 | 185.4 | 1.26E+04 | 0.01471 | 6.33E+05 |
| 1, 46 | 113.8 | 40 | 189.5 | 1.29E+04 | 0.01464 | 6.65E+05 |
| 1, 47 | 116.3 | 40 | 193.8 | 1.33E+04 | 0.01456 | 6.99E+05 |
| 1, 48 | 118.8 | 40 | 197.9 | 1.37E+04 | 0.01449 | 7.32E+05 |
| 1, 49 | 121.3 | 40 | 202.1 | 1.40E+04 | 0.01442 | 7.68E+05 |
| 1, 50 | 123.8 | 40 | 206.4 | 1.44E+04 | 0.01435 | 8.05E+05 |
| 1, 51 | 126.3 | 40 | 210.4 | 1.47E+04 | 0.01429 | 8.41E+05 |
| 1, 52 | 128.8 | 40 | 214.6 | 1.51E+04 | 0.01422 | 8.78E+05 |
| 1, 53 | 131.3 | 40 | 218.9 | 1.54E+04 | 0.01418 | 9.18E+05 |
| 1, 54 | 133.8 | 40 | 222.8 | 1.58E+04 | 0.01414 | 9.56E+05 |
| 1, 55 | 136.3 | 40 | 227.1 | 1.61E+04 | 0.0141 | 9.97E+05 |
| 1, 56 | 138.8 | 40 | 231.3 | 1.64E+04 | 0.01408 | 1.04E+06 |
| 1, 57 | 141.3 | 40 | 235.4 | 1.68E+04 | 0.014 | 1.08E+06 |
| 1, 58 | 143.8 | 40 | 239.5 | 1.72E+04 | 0.01397 | 1.12E+06 |
| 1, 59 | 146.3 | 40 | 243.9 | 1.75E+04 | 0.0139 | 1.17E+06 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.79E+04 | 0.01385 | 1.21E+06 |
| 1, 61 | 151.4 | 40 | 247.6 | 1.83E+04 | 0.01357 | 1.26E+06 |
| 1, 62 | 154 | 40 | 243.5 | 1.83E+04 | 0.01329 | 1.31E+06 |
| 1, 63 | 156.4 | 40 | 239.3 | 1.83E+04 | 0.01311 | 1.35E+06 |
| 1, 64 | 159 | 40 | 235.1 | 1.81E+04 | 0.01299 | 1.40E+06 |
| 1, 65 | 161.5 | 40 | 231 | 1.79E+04 | 0.01291 | 1.44E+06 |
| 1, 66 | 163.9 | 40 | 226.8 | 1.77E+04 | 0.01283 | 1.49E+06 |
| 1, 67 | 166.5 | 40 | 222.6 | 1.74E+04 | 0.0128 | 1.53E+06 |
| 1, 68 | 168.9 | 40 | 218.6 | 1.71E+04 | 0.01278 | 1.57E+06 |
| 1, 69 | 171.4 | 40 | 214.4 | 1.68E+04 | 0.01274 | 1.61E+06 |
| 1, 70 | 174 | 40 | 210.1 | 1.66E+04 | 0.01267 | 1.66E+06 |
| 1, 71 | 176.5 | 40 | 206.1 | 1.63E+04 | 0.01264 | 1.70E+06 |
| 1, 72 | 178.9 | 40 | 201.9 | 1.60E+04 | 0.01262 | 1.74E+06 |
| 1, 73 | 181.5 | 40 | 197.6 | 1.57E+04 | 0.0126 | 1.78E+06 |
| 1, 74 | 184 | 40 | 193.6 | 1.54E+04 | 0.01257 | 1.81E+06 |
| 1, 75 | 186.4 | 40 | 189.3 | 1.51E+04 | 0.01256 | 1.85E+06 |
| 1, 76 | 189 | 40 | 185.1 | 1.48E+04 | 0.01253 | 1.89E+06 |
| 1, 77 | 191.5 | 40 | 181.1 | 1.45E+04 | 0.01252 | 1.92E+06 |
| 1, 78 | 193.9 | 40 | 176.9 | 1.42E+04 | 0.0125 | 1.96E+06 |
| 1, 79 | 196.4 | 40 | 172.7 | 1.38E+04 | 0.0125 | 1.99E+06 |

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|---|---|---|---|---|---|---|
| 1, 80 | 198.9 | 40 | 168.6 | 1.35E+04 | 0.01248 | 2.03E+06 |
| 1, 81 | 201.4 | 40 | 164.4 | 1.32E+04 | 0.01246 | 2.06E+06 |
| 1, 82 | 204 | 40 | 160.1 | 1.28E+04 | 0.01247 | 2.09E+06 |
| 1, 83 | 206.5 | 40 | 156.1 | 1.25E+04 | 0.01248 | 2.12E+06 |
| 1, 84 | 208.9 | 40 | 151.8 | 1.22E+04 | 0.01247 | 2.15E+06 |
| 1, 85 | 211.5 | 40 | 147.6 | 1.18E+04 | 0.01247 | 2.18E+06 |
| 1, 86 | 214 | 40 | 143.6 | 1.15E+04 | 0.01246 | 2.21E+06 |
| 1, 87 | 216.4 | 40 | 139.4 | 1.12E+04 | 0.01248 | 2.24E+06 |
| 1, 88 | 219 | 40 | 135.1 | 1.08E+04 | 0.01247 | 2.27E+06 |
| 1, 89 | 221.5 | 40 | 131.1 | 1.05E+04 | 0.01248 | 2.29E+06 |
| 1, 90 | 223.9 | 40 | 126.9 | 1.02E+04 | 0.01248 | 2.32E+06 |
| 1, 91 | 226.4 | 40 | 122.6 | 9821 | 0.01249 | 2.34E+06 |
| 1, 92 | 228.9 | 40 | 118.5 | 9495 | 0.01249 | 2.37E+06 |
| 1, 93 | 231.4 | 40 | 114.4 | 9140 | 0.01252 | 2.39E+06 |
| 1, 94 | 234 | 40 | 110.2 | 8802 | 0.01251 | 2.41E+06 |
| 1, 95 | 236.5 | 40 | 106.1 | 8472 | 0.01252 | 2.43E+06 |
| 1, 96 | 238.9 | 40 | 101.9 | 8135 | 0.01253 | 2.45E+06 |
| 1, 97 | 241.4 | 40 | 97.67 | 7786 | 0.01254 | 2.47E+06 |
| 1, 98 | 243.9 | 40 | 93.56 | 7448 | 0.01256 | 2.49E+06 |
| 1, 99 | 246.4 | 40 | 89.4 | 7111 | 0.01257 | 2.51E+06 |
| 1, 100 | 248.9 | 40 | 85.07 | 6747 | 0.01261 | 2.53E+06 |
| 1, 101 | 251.4 | 40 | 81.08 | 6422 | 0.01262 | 2.54E+06 |
| 1, 102 | 253.9 | 40 | 76.82 | 6069 | 0.01266 | 2.56E+06 |
| 1, 103 | 256.5 | 40 | 72.66 | 5733 | 0.01268 | 2.57E+06 |
| 1, 104 | 259 | 40 | 68.57 | 5395 | 0.01271 | 2.59E+06 |
| 1, 105 | 261.4 | 40 | 64.38 | 5052 | 0.01274 | 2.60E+06 |
| 1, 106 | 263.9 | 40 | 60.15 | 4706 | 0.01278 | 2.61E+06 |
| 1, 107 | 266.4 | 40 | 56.06 | 4377 | 0.01281 | 2.62E+06 |
| 1, 108 | 268.9 | 40 | 51.94 | 4044 | 0.01284 | 2.63E+06 |
| 1, 109 | 271.5 | 40 | 47.58 | 3690 | 0.0129 | 2.64E+06 |
| 1, 110 | 274 | 40 | 43.58 | 3367 | 0.01294 | 2.65E+06 |
| 1, 111 | 276.4 | 40 | 39.4 | 3033 | 0.01299 | 2.66E+06 |
| 1, 112 | 279 | 40 | 35.12 | 2691 | 0.01305 | 2.66E+06 |
| 1, 113 | 281.4 | 40 | 31.01 | 2367 | 0.0131 | 2.67E+06 |
| 1, 114 | 283.9 | 40 | 26.9 | 2044 | 0.01316 | 2.67E+06 |
| 1, 115 | 286.4 | 40 | 22.65 | 1714 | 0.01321 | 2.68E+06 |
| 1, 116 | 288.9 | 40 | 18.56 | 1401 | 0.01325 | 2.68E+06 |
| 1, 117 | 291.4 | 40 | 14.44 | 1091 | 0.01323 | 2.68E+06 |
| 1, 118 | 293.9 | 40 | 10.23 | 782.2 | 0.01308 | 2.69E+06 |
| 1, 119 | 296.4 | 40 | 6.088 | 490.8 | 0.0124 | 2.69E+06 |
| 1, 120 | 298.9 | 40 | 1.893 | 215.4 | 0.008788 | 2.69E+06 |

**C4.3.5 Abu untreated with 20% Sertica**

| | Time s | Temperature °C | Shear Stress Pa | Shear Rate 1/s | Instantaneous Viscosity Pas | Strain |
|---|---|---|---|---|---|---|
| 1, 1 | 1.294 | 40 | 2.147 | 0.00184 | 1167 | -0.00626 |
| 1, 2 | 3.813 | 40 | 6.265 | 0.002929 | 2139 | 0.001065 |
| 1, 3 | 6.289 | 40 | 10.41 | 0.003811 | 2732 | 0.01092 |
| 1, 4 | 8.797 | 40 | 14.59 | 0.004789 | 3047 | 0.0229 |
| 1, 5 | 11.3 | 40 | 18.68 | 0.006212 | 3007 | 0.03848 |
| 1, 6 | 13.79 | 40 | 22.86 | 0.007874 | 2904 | 0.05872 |
| 1, 7 | 16.3 | 40 | 27.12 | 0.01075 | 2522 | 0.08602 |
| 1, 8 | 18.8 | 40 | 31.22 | 0.01601 | 1950 | 0.1272 |
| 1, 9 | 21.28 | 40 | 35.32 | 0.03613 | 977.8 | 0.2228 |
| 1, 10 | 23.81 | 40 | 39.69 | 19.61 | 2.024 | 87.17 |
| 1, 11 | 26.31 | 40 | 43.71 | 401.3 | 0.1089 | 1155 |
| 1, 12 | 28.79 | 40 | 47.89 | 945.9 | 0.05063 | 3571 |
| 1, 13 | 31.31 | 40 | 52.13 | 1407 | 0.03704 | 7167 |
| 1, 14 | 33.81 | 40 | 56.21 | 1785 | 0.03149 | 1.16E+04 |
| 1, 15 | 36.29 | 40 | 60.38 | 2132 | 0.02832 | 1.69E+04 |
| 1, 16 | 38.8 | 40 | 64.56 | 2452 | 0.02632 | 2.32E+04 |
| 1, 17 | 41.31 | 40 | 68.73 | 2751 | 0.02498 | 3.00E+04 |
| 1, 18 | 43.79 | 40 | 72.83 | 3041 | 0.02395 | 3.76E+04 |
| 1, 19 | 46.3 | 40 | 77.1 | 3339 | 0.02309 | 4.61E+04 |
| 1, 20 | 48.81 | 40 | 81.23 | 3626 | 0.02241 | 5.51E+04 |
| 1, 21 | 51.33 | 40 | 85.57 | 3929 | 0.02178 | 6.53E+04 |
| 1, 22 | 53.86 | 40 | 89.58 | 4222 | 0.02122 | 7.56E+04 |
| 1, 23 | 56.31 | 40 | 93.75 | 4530 | 0.0207 | 8.68E+04 |
| 1, 24 | 58.79 | 40 | 97.91 | 4836 | 0.02024 | 9.90E+04 |
| 1, 25 | 61.3 | 40 | 102 | 5148 | 0.01982 | 1.12E+05 |
| 1, 26 | 63.8 | 40 | 106.2 | 5454 | 0.01947 | 1.26E+05 |
| 1, 27 | 66.28 | 40 | 110.4 | 5765 | 0.01914 | 1.40E+05 |
| 1, 28 | 68.79 | 40 | 114.6 | 6074 | 0.01887 | 1.55E+05 |
| 1, 29 | 71.3 | 40 | 118.7 | 6387 | 0.01858 | 1.71E+05 |
| 1, 30 | 73.78 | 40 | 122.9 | 6706 | 0.01832 | 1.88E+05 |
| 1, 31 | 76.31 | 40 | 127.1 | 7045 | 0.01804 | 2.06E+05 |
| 1, 32 | 78.81 | 40 | 131.2 | 7346 | 0.01786 | 2.24E+05 |
| 1, 33 | 81.28 | 40 | 135.4 | 7668 | 0.01765 | 2.43E+05 |
| 1, 34 | 83.8 | 40 | 139.6 | 7990 | 0.01747 | 2.64E+05 |
| 1, 35 | 86.3 | 40 | 143.7 | 8310 | 0.01729 | 2.84E+05 |
| 1, 36 | 88.78 | 40 | 147.8 | 8639 | 0.01711 | 3.06E+05 |
| 1, 37 | 91.3 | 40 | 152.1 | 8960 | 0.01697 | 3.28E+05 |
| 1, 38 | 93.8 | 40 | 156.2 | 9274 | 0.01684 | 3.51E+05 |
| 1, 39 | 96.28 | 40 | 160.3 | 9598 | 0.01671 | 3.75E+05 |
| 1, 40 | 98.81 | 40 | 164.7 | 9940 | 0.01657 | 4.01E+05 |
| 1, 41 | 101.3 | 40 | 168.8 | 1.03E+04 | 0.01647 | 4.26E+05 |
| 1, 42 | 103.8 | 40 | 173.1 | 1.06E+04 | 0.01636 | 4.53E+05 |
| 1, 43 | 106.3 | 40 | 177.1 | 1.09E+04 | 0.01625 | 4.80E+05 |
| 1, 44 | 108.8 | 40 | 181.2 | 1.12E+04 | 0.01617 | 5.07E+05 |

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|---|---|---|---|---|---|---|
| 1, 45 | 111.3 | 40 | 185.4 | 1.15E+04 | 0.0161 | 5.36E+05 |
| 1, 46 | 113.8 | 40 | 189.6 | 1.19E+04 | 0.016 | 5.66E+05 |
| 1, 47 | 116.3 | 40 | 193.8 | 1.22E+04 | 0.01592 | 5.97E+05 |
| 1, 48 | 118.8 | 40 | 198 | 1.25E+04 | 0.01582 | 6.29E+05 |
| 1, 49 | 121.3 | 40 | 202.1 | 1.28E+04 | 0.01575 | 6.60E+05 |
| 1, 50 | 123.8 | 40 | 206.2 | 1.31E+04 | 0.01571 | 6.93E+05 |
| 1, 51 | 126.3 | 40 | 210.4 | 1.35E+04 | 0.01562 | 7.26E+05 |
| 1, 52 | 128.8 | 40 | 214.6 | 1.38E+04 | 0.01557 | 7.61E+05 |
| 1, 53 | 131.3 | 40 | 218.7 | 1.41E+04 | 0.01551 | 7.96E+05 |
| 1, 54 | 133.8 | 40 | 222.9 | 1.44E+04 | 0.01543 | 8.32E+05 |
| 1, 55 | 136.3 | 40 | 227 | 1.48E+04 | 0.01537 | 8.69E+05 |
| 1, 56 | 138.8 | 40 | 231.2 | 1.51E+04 | 0.01532 | 9.07E+05 |
| 1, 57 | 141.3 | 40 | 235.3 | 1.54E+04 | 0.01528 | 9.45E+05 |
| 1, 58 | 143.8 | 40 | 239.6 | 1.57E+04 | 0.01523 | 9.86E+05 |
| 1, 59 | 146.3 | 40 | 243.7 | 1.61E+04 | 0.01516 | 1.03E+06 |
| 1, 60 | 148.8 | 40 | 247.9 | 1.64E+04 | 0.01513 | 1.07E+06 |
| 1, 61 | 151.3 | 40 | 247.8 | 1.67E+04 | 0.01487 | 1.11E+06 |
| 1, 62 | 154 | 40 | 243.4 | 1.67E+04 | 0.01456 | 1.15E+06 |
| 1, 63 | 156.5 | 40 | 239.3 | 1.66E+04 | 0.0144 | 1.19E+06 |
| 1, 64 | 158.9 | 40 | 235.2 | 1.64E+04 | 0.01431 | 1.23E+06 |
| 1, 65 | 161.4 | 40 | 230.9 | 1.62E+04 | 0.01423 | 1.28E+06 |
| 1, 66 | 163.9 | 40 | 226.9 | 1.60E+04 | 0.0142 | 1.32E+06 |
| 1, 67 | 166.4 | 40 | 222.7 | 1.58E+04 | 0.01414 | 1.35E+06 |
| 1, 68 | 169 | 40 | 218.4 | 1.55E+04 | 0.01412 | 1.39E+06 |
| 1, 69 | 171.5 | 40 | 214.3 | 1.52E+04 | 0.01409 | 1.43E+06 |
| 1, 70 | 173.9 | 40 | 210.3 | 1.50E+04 | 0.01405 | 1.47E+06 |
| 1, 71 | 176.5 | 40 | 205.8 | 1.47E+04 | 0.01401 | 1.51E+06 |
| 1, 72 | 179 | 40 | 201.9 | 1.44E+04 | 0.01402 | 1.54E+06 |
| 1, 73 | 181.4 | 40 | 197.8 | 1.41E+04 | 0.01401 | 1.58E+06 |
| 1, 74 | 183.9 | 40 | 193.4 | 1.38E+04 | 0.01399 | 1.61E+06 |
| 1, 75 | 186.5 | 40 | 189.4 | 1.36E+04 | 0.01397 | 1.65E+06 |
| 1, 76 | 188.9 | 40 | 185.2 | 1.33E+04 | 0.01396 | 1.68E+06 |
| 1, 77 | 191.5 | 40 | 180.9 | 1.30E+04 | 0.01396 | 1.71E+06 |
| 1, 78 | 194 | 40 | 176.9 | 1.27E+04 | 0.01395 | 1.74E+06 |
| 1, 79 | 196.4 | 40 | 172.8 | 1.24E+04 | 0.01397 | 1.77E+06 |
| 1, 80 | 198.9 | 40 | 168.5 | 1.21E+04 | 0.01396 | 1.80E+06 |
| 1, 81 | 201.5 | 40 | 164.4 | 1.18E+04 | 0.01395 | 1.83E+06 |
| 1, 82 | 203.9 | 40 | 160.2 | 1.15E+04 | 0.01396 | 1.86E+06 |
| 1, 83 | 206.4 | 40 | 156 | 1.12E+04 | 0.01397 | 1.89E+06 |
| 1, 84 | 208.9 | 40 | 151.9 | 1.09E+04 | 0.01397 | 1.92E+06 |
| 1, 85 | 211.4 | 40 | 147.8 | 1.06E+04 | 0.01398 | 1.94E+06 |
| 1, 86 | 213.9 | 40 | 143.4 | 1.03E+04 | 0.01399 | 1.97E+06 |
| 1, 87 | 216.4 | 40 | 139.4 | 9950 | 0.01401 | 1.99E+06 |
| 1, 88 | 218.9 | 40 | 135.2 | 9651 | 0.01401 | 2.02E+06 |
| 1, 89 | 221.4 | 40 | 130.9 | 9324 | 0.01404 | 2.04E+06 |
| 1, 90 | 224 | 40 | 126.9 | 9029 | 0.01405 | 2.06E+06 |
| 1, 91 | 226.4 | 40 | 122.7 | 8728 | 0.01406 | 2.09E+06 |
| 1, 92 | 229 | 40 | 118.4 | 8421 | 0.01406 | 2.11E+06 |

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|---|---|---|---|---|---|---|
| 1, 93 | 231.5 | 40 | 114.4 | 8109 | 0.0141 | 2.13E+06 |
| 1, 94 | 233.9 | 40 | 110.2 | 7798 | 0.01413 | 2.15E+06 |
| 1, 95 | 236.4 | 40 | 106 | 7485 | 0.01416 | 2.17E+06 |
| 1, 96 | 239 | 40 | 101.9 | 7177 | 0.0142 | 2.18E+06 |
| 1, 97 | 241.4 | 40 | 97.71 | 6857 | 0.01425 | 2.20E+06 |
| 1, 98 | 243.9 | 40 | 93.44 | 6548 | 0.01427 | 2.22E+06 |
| 1, 99 | 246.5 | 40 | 89.36 | 6249 | 0.0143 | 2.23E+06 |
| 1, 100 | 248.9 | 40 | 85.26 | 5942 | 0.01435 | 2.25E+06 |
| 1, 101 | 251.5 | 40 | 80.92 | 5629 | 0.01438 | 2.26E+06 |
| 1, 102 | 254 | 40 | 76.91 | 5331 | 0.01443 | 2.27E+06 |
| 1, 103 | 256.4 | 40 | 72.73 | 5030 | 0.01446 | 2.29E+06 |
| 1, 104 | 259 | 40 | 68.42 | 4710 | 0.01453 | 2.30E+06 |
| 1, 105 | 261.5 | 40 | 64.43 | 4424 | 0.01457 | 2.31E+06 |
| 1, 106 | 263.9 | 40 | 60.25 | 4116 | 0.01464 | 2.32E+06 |
| 1, 107 | 266.5 | 40 | 55.91 | 3792 | 0.01474 | 2.33E+06 |
| 1, 108 | 269 | 40 | 51.91 | 3499 | 0.01483 | 2.34E+06 |
| 1, 109 | 271.4 | 40 | 47.71 | 3194 | 0.01494 | 2.35E+06 |
| 1, 110 | 274 | 40 | 43.41 | 2880 | 0.01507 | 2.35E+06 |
| 1, 111 | 276.5 | 40 | 39.42 | 2591 | 0.01521 | 2.36E+06 |
| 1, 112 | 278.9 | 40 | 35.22 | 2288 | 0.01539 | 2.36E+06 |
| 1, 113 | 281.4 | 40 | 30.96 | 1983 | 0.01562 | 2.37E+06 |
| 1, 114 | 283.9 | 40 | 26.9 | 1693 | 0.01589 | 2.37E+06 |
| 1, 115 | 286.4 | 40 | 22.71 | 1402 | 0.0162 | 2.38E+06 |
| 1, 116 | 288.9 | 40 | 18.54 | 1115 | 0.01663 | 2.38E+06 |
| 1, 117 | 291.5 | 40 | 14.39 | 838.6 | 0.01716 | 2.38E+06 |
| 1, 118 | 293.9 | 40 | 10.22 | 569 | 0.01796 | 2.38E+06 |
| 1, 119 | 296.5 | 40 | 5.891 | 308.1 | 0.01912 | 2.38E+06 |
| 1, 120 | 299 | 40 | 1.896 | 94.36 | 0.0201 | 2.38E+06 |