

Table I contains the data used to obtain the calibration curve of Fig. 2. Kerosene, a light mineral oil, and a series of four graded oils of viscosity S.A.E. No. 10, No. 20, No. 30, and No. 40, respectively, were used as calibrating liquids. The values of the kinematic viscosities of these liquids were directly determined at 100°F by Mr. C. E. Fink of our Petroleum Refining Laboratory. The author is indebted to him for carefully checking the viscosities in the standard viscometers of that laboratory. The density of the ball and the densities of the calibrating oils were determined in a conventional manner by weighing in specific gravity bottles.

Table II summarizes the data that were derived by computation. They were obtained graphically by plotting on a large scale the computed values of μ against pressure, drawing smooth curves through the plotted points, and then reading from the curves the values of μ corresponding to every one or two thousand units of pressure. The principal sources of error in these data are in the determination of the pressures and the roll times. The average inaccuracy of the former amounts to about 1 percent, while the latter, expressed in the unit of coefficient of viscosity, may be as high as 3 percent when the roll time is as low as 2 or 3 seconds. Another way of estimating the erratic error in the determinations is to consider the deviations of the computed values of μ from the curves that were

TABLE II. Viscosity-pressure data.

| PRESSURE (lb./in. ²) | VISCOSITY IN CENTIPOISES | | |
|----------------------------------|--------------------------|-------|------|
| | Penn. | Okla. | Cal. |
| 100°F | | | |
| 14.2 | 83 | 94 | 114 |
| 1000 | 91 | 119 | 146 |
| 2000 | 106 | 145 | 183 |
| 3000 | 123 | 175 | 225 |
| 4000 | 145 | 209 | 278 |
| 5000 | 169 | 247 | 346 |
| 6000 | 198 | 293 | 433 |
| 7000 | 232 | 344 | 533 |
| 8000 | 268 | 405 | 655 |
| 9000 | 310 | 475 | 811 |
| 10×10 ³ | 357 | 557 | 995 |
| 12 | 485 | 775 | 1540 |
| 14 | 654 | 1060 | 2200 |
| 16 | 850 | 1430 | |
| 18 | 1100 | 1940 | |
| 20 | 1420 | | |
| 22 | 1830 | | |

TABLE II (Continued).

| PRESSURE (lb./in. ²) | VISCOSITY IN CENTIPOISES | | |
|----------------------------------|--------------------------|-------|------|
| | Penn. | Okla. | Cal. |
| 130°F | | | |
| 14.2 | 41 | 43 | 42 |
| 1000 | 51 | 54 | 57 |
| 2000 | 60 | 66 | 68 |
| 3000 | 64 | 75 | 80 |
| 4000 | 73 | 85 | 99 |
| 5000 | 82 | 95 | 124 |
| 6000 | 91 | 102 | 154 |
| 7000 | 100 | 118 | 190 |
| 8000 | 111 | 131 | 232 |
| 9000 | 124 | 149 | 281 |
| 10×10 ³ | 143 | 170 | 340 |
| 12 | 191 | 231 | 490 |
| 14 | 249 | 318 | 692 |
| 16 | 315 | 428 | 960 |
| 18 | 408 | 564 | 1320 |
| 20 | 524 | 740 | 1830 |
| 22 | 663 | 940 | 2510 |
| 24 | 830 | 1170 | 3400 |
| 26 | 1030 | 1500 | 4540 |
| 28 | 1260 | 2030 | |
| 30 | 1560 | 2840 | |
| 32 | 1960 | | |
| 34 | 2460 | | |
| 210.2°F | | | |
| 14.2 | 7 | 10 | 13 |
| 1000 | 9 | 12 | 15 |
| 2000 | 10 | 14 | 17 |
| 3000 | 13 | 16 | 19 |
| 4000 | 15 | 18 | 21 |
| 5000 | 17 | 20 | 24 |
| 6000 | 19 | 22 | 25 |
| 7000 | 20 | 24 | 27 |
| 8000 | 22 | 27 | 30 |
| 9000 | 24 | 30 | 33 |
| 10×10 ³ | 26 | 33 | 37 |
| 12 | 31 | 40 | 45 |
| 14 | 36 | 50 | 55 |
| 16 | 44 | 59 | 70 |
| 18 | 52 | 71 | 90 |
| 20 | 62 | 85 | 116 |
| 22 | 73 | 104 | 153 |
| 24 | 87 | 128 | 202 |
| 26 | 103 | 154 | 260 |
| 28 | 123 | 185 | 327 |
| 30 | 145 | 219 | 408 |
| 32 | 171 | 262 | 510 |
| 34 | 202 | 314 | 655 |
| 36 | 242 | 375 | 846 |
| 38 | 287 | 454 | 1080 |
| 40 | 337 | 549 | 1400 |
| 42 | 393 | 654 | 1790 |
| 44 | 457 | 770 | 2270 |
| 46 | 535 | 890 | 2890 |
| 48 | 627 | 1010 | |
| 50 | 732 | 1150 | |
| 52 | 846 | 1290 | |
| 54 | 973 | 1430 | |