

JAN 15 1925

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
George K. Burgess, Director

STANDARD DENSITY
AND
VOLUMETRIC TABLES

CIRCULAR OF THE BUREAU OF STANDARDS, No. 19

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[6th Edition]

October 31, 1924



PRICE, 15 CENTS

Sold only by the Superintendent of Documents, Government Printing Office
Washington, D. C.

WASHINGTON
GOVERNMENT PRINTING OFFICE

1924

STANDARD DENSITY AND VOLUMETRIC TABLES

ABSTRACT

This circular contains standard density tables and others of a similar nature most often required in physical and chemical laboratories. For example, the density of water at all temperatures from 0° C. to 102° C.; the density of various percentages of ethyl alcohol at various temperatures; the density and pounds per gallon of milk and cream, and of American petroleum oils; temperature corrections to the indications of hydrometers in alcohol, sugar, petroleum oil, and sulphuric acid solutions. Tables are also given showing the relation between degreed Baumé and specific gravity for both heavy and light liquids; the relation of degrees A. P. I. and specific gravity; the capacities of glass vessels from the weight of water contained or delivered; and master scales for the graduation of hydrometers (alcoholometers).

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INTRODUCTION

The wide application of hydrometers as measuring instruments in the collection of revenues in commerce and in the industries makes it very important to define the various scales of indication of these instruments in terms of fundamental units.

The confusion and discordance heretofore resulting from the use of various insufficiently defined hydrometer scales, and the lack of opportunity for verifying standards on a uniform basis, led the bureau to investigate the problems connected with hydrometry and to prepare standard density tables for definition of hydrometer scales.

In bureau circular No. 16 the conditions are announced under which the testing of hydrometers will be conducted, and specifications are given as to the construction, standardization, and accuracy required for hydrometers in order that they be approved as precision instruments.

The present circular comprises the density tables which have been adopted for definition of hydrometer scales, auxiliary tables which have been prepared for reduction of hydrometer readings, tables for computation of volumetric capacity, and others of similar nature giving physical constants for which the bureau receives frequent inquiries.

In all tables found in this circular the term *density* is used to represent the mass per unit volume and is expressed in grams per milliliter.

The term *specific gravity* is used to express the relative masses of equal volumes of the liquid in question and of water, each liquid being at a definitely stated temperature. For example, specific gravity at 60° F. means the specific gravity of the liquid at 60° F. referred to water at 60° F. as unity.

The density values in Tables 1, 2, 8, 12, 13, 32, and 33 are numerically the same as specific gravities at the various temperatures referred to water at 4° C. as unity.

For the sake of uniformity the same abbreviation, D, with the proper temperature basis, is used for both density and specific gravity.

GEORGE K. BURGESS,
Director.

Approved:
HERBERT HOOVER,
Secretary.

TABLE 1.—Density¹ (in grams per milliliter) of mixtures of ethyl alcohol and water²

| Per cent alcohol by weight | Temperature | | | | | | |
|----------------------------|-------------|---------|---------|---------|---------|---------|---------|
| | 10° C. | 15° C. | 20° C. | 25° C. | 30° C. | 35° C. | 40° C. |
| 0 | 0.99973 | 0.99913 | 0.99823 | 0.99708 | 0.99568 | 0.99406 | 0.99225 |
| 1 | 785 | 725 | 636 | 520 | 379 | 217 | 034 |
| 2 | 602 | 542 | 453 | 336 | 194 | 031 | .98346 |
| 3 | 426 | 365 | 275 | 157 | 014 | .98349 | 663 |
| 4 | 258 | 195 | 103 | .98984 | .98839 | 672 | 485 |
| 5 | 098 | 032 | .98938 | 817 | 670 | 501 | 311 |
| 6 | .98946 | .98877 | 780 | 656 | 507 | 335 | 142 |
| 7 | 801 | 729 | 627 | 500 | 347 | 172 | .97975 |
| 8 | 660 | 584 | 478 | 346 | 189 | 009 | 808 |
| 9 | 524 | 442 | 331 | 193 | 031 | .97846 | 641 |
| 10 | 393 | 304 | 187 | 043 | .97875 | 685 | 475 |
| 11 | 267 | 171 | 047 | .97897 | 723 | 527 | 312 |
| 12 | 145 | 041 | .97910 | 753 | 573 | 371 | 150 |
| 13 | 026 | .97914 | 775 | 611 | 424 | 216 | .96989 |
| 14 | .97911 | 790 | 643 | 472 | 278 | 063 | 829 |
| 15 | 800 | 669 | 514 | 334 | 133 | .96911 | 670 |
| 16 | 692 | 552 | 387 | 199 | .96990 | 760 | 512 |
| 17 | 583 | 433 | 259 | 062 | 844 | 607 | 352 |
| 18 | 473 | 313 | 129 | .96923 | 697 | 452 | 189 |
| 19 | 363 | 191 | .96907 | 782 | 547 | 294 | 023 |
| 20 | 252 | 068 | 864 | 639 | 395 | 134 | .95856 |
| 21 | 139 | .96944 | 729 | 495 | 242 | .95973 | 687 |
| 22 | 024 | 818 | 592 | 348 | 087 | 309 | 516 |
| 23 | .96907 | 689 | 453 | 199 | .95929 | 643 | 343 |
| 24 | 787 | 558 | 312 | 048 | 769 | 476 | 168 |
| 25 | 665 | 424 | 168 | .95895 | 607 | 306 | .94991 |
| 26 | 539 | 287 | 020 | 738 | 442 | 133 | 810 |
| 27 | 406 | 144 | .95867 | 576 | 272 | .94955 | 625 |
| 28 | 268 | .95996 | 710 | 410 | 098 | 774 | 438 |
| 29 | 125 | 844 | 548 | 241 | .94922 | 590 | 248 |
| 30 | .95977 | 686 | 382 | 067 | 741 | 403 | 055 |
| 31 | 823 | 524 | 212 | .94890 | 557 | 214 | .93860 |
| 32 | 665 | 357 | 038 | 709 | 370 | 021 | 662 |
| 33 | 502 | 186 | .94860 | 525 | 180 | .93825 | 461 |
| 34 | 334 | 011 | 679 | 337 | .93986 | 626 | 257 |
| 35 | 162 | .94832 | 494 | 146 | 790 | 425 | 051 |
| 36 | .94986 | 650 | 306 | .93952 | 591 | 221 | .92843 |
| 37 | 805 | 464 | 114 | 756 | 390 | 016 | 634 |
| 38 | 620 | 273 | .93919 | 556 | 186 | .92808 | 422 |
| 39 | 431 | 079 | 720 | 353 | .92979 | 597 | 208 |
| 40 | 238 | .93882 | 518 | 148 | 770 | 385 | .91992 |
| 41 | 042 | 682 | 314 | .92940 | 558 | 170 | 774 |
| 42 | .93842 | 478 | 107 | 729 | 344 | .91952 | 554 |
| 43 | 639 | 271 | .92897 | 516 | 128 | 733 | 332 |
| 44 | 433 | 062 | 685 | 301 | .91910 | 513 | 108 |
| 45 | 226 | .92852 | 472 | 085 | 692 | 291 | .90884 |
| 46 | 017 | 640 | 257 | .91868 | 472 | 069 | 660 |
| 47 | .92806 | 426 | 041 | 649 | 250 | .90845 | 434 |
| 48 | 593 | 211 | .91823 | 429 | 028 | 621 | 207 |
| 49 | 379 | .91995 | 604 | 208 | .90805 | 396 | .89979 |
| 50 | 162 | 776 | 384 | .90985 | 580 | 168 | 750 |

¹ The density values given in this table are numerically the same as specific gravities at the various temperatures in terms of water at 4° C. as unity.² Tables 1, 2, 3, 4, 5, 6, and 7, of this circular are based on the work done at this bureau and published in the Bulletin of the Bureau of Standards, vol. 9, No. 3. (Reprint No. 197.)

TABLE 1.—Density (in grams per milliliter) of mixtures of ethyl alcohol and water—Continued

| Per cent alcohol by weight | Temperature | | | | | | |
|----------------------------|-------------|---------|---------|---------|---------|---------|---------|
| | 10° C. | 15° C. | 20° C. | 25° C. | 30° C. | 35° C. | 40° C. |
| 50 | 0.92162 | 0.91776 | 0.91384 | 0.90985 | 0.90580 | 0.90168 | 0.89750 |
| 51 | .91943 | 555 | 160 | 760 | 353 | .89940 | 519 |
| 52 | 723 | 333 | .90936 | 534 | 125 | 710 | 288 |
| 53 | 502 | 110 | 711 | 307 | .89896 | 479 | 056 |
| 54 | 279 | .90885 | 485 | 079 | 667 | 248 | .88823 |
| 55 | 055 | 659 | 258 | .89850 | 437 | 016 | 586 |
| 56 | .90831 | 433 | 031 | 621 | 206 | .88784 | 359 |
| 57 | 607 | 207 | .89803 | 392 | .89875 | 552 | 122 |
| 58 | 381 | .89980 | 574 | 162 | 744 | 319 | .87888 |
| 59 | 154 | 752 | 344 | .88931 | 512 | 085 | 653 |
| 60 | .89927 | 523 | 113 | 699 | 278 | .87851 | 417 |
| 61 | 698 | 293 | .88882 | 466 | 044 | 615 | 180 |
| 62 | 468 | 062 | 650 | 233 | .87809 | 379 | .86943 |
| 63 | 237 | .88830 | 417 | .87998 | 574 | 142 | 705 |
| 64 | 006 | 597 | 183 | 763 | 337 | .86905 | 466 |
| 65 | .88774 | 364 | .87948 | 527 | 100 | 667 | 227 |
| 66 | 541 | 130 | 713 | 291 | .86863 | 429 | .85987 |
| 67 | 308 | .87895 | 477 | 054 | 625 | 190 | 747 |
| 68 | 074 | 660 | 241 | .86817 | 387 | .85950 | 507 |
| 69 | .87839 | 424 | 004 | 579 | 148 | 710 | 266 |
| 70 | 602 | 187 | .86766 | 340 | .85908 | 470 | 025 |
| 71 | 365 | .86949 | 527 | 100 | 667 | 228 | .84783 |
| 72 | 127 | 710 | 287 | .85859 | 426 | .84986 | 540 |
| 73 | .86888 | 470 | 047 | 618 | 184 | 743 | 297 |
| 74 | 648 | 229 | .85806 | 376 | .84941 | 500 | 053 |
| 75 | 408 | .85988 | 564 | 134 | 698 | 257 | .83809 |
| 76 | 168 | 747 | 322 | .84891 | 455 | 013 | 564 |
| 77 | .85927 | 505 | 079 | 647 | 211 | .83768 | 319 |
| 78 | 685 | 262 | .84835 | 403 | .83966 | 523 | 074 |
| 79 | 442 | 018 | 590 | 158 | 720 | 277 | .82827 |
| 80 | 197 | .84772 | 344 | .83911 | 473 | 029 | 578 |
| 81 | .84950 | 525 | 096 | 664 | 224 | .82780 | 329 |
| 82 | 702 | 277 | .83848 | 415 | .82974 | 530 | 079 |
| 83 | 453 | 028 | 599 | 164 | 724 | 279 | .81828 |
| 84 | 203 | .83777 | 348 | .82913 | 473 | 027 | 576 |
| 85 | .83951 | 525 | 095 | 660 | 220 | .81774 | 322 |
| 86 | 697 | 271 | .82840 | 405 | .81965 | 519 | 067 |
| 87 | 441 | 014 | 583 | 148 | 708 | 262 | .80811 |
| 88 | 181 | .82754 | 323 | .81888 | 448 | 003 | 552 |
| 89 | .82919 | 492 | 062 | 626 | 186 | .80742 | 291 |
| 90 | 654 | 227 | .81797 | 362 | .80922 | 478 | 028 |
| 91 | 386 | .81959 | 529 | 094 | 655 | 211 | .79761 |
| 92 | 114 | 683 | 257 | .80823 | 384 | .79941 | 491 |
| 93 | .81839 | 413 | .80983 | 549 | 111 | 669 | 220 |
| 94 | 561 | 134 | 705 | 272 | .79835 | 393 | .78947 |
| 95 | 278 | .80852 | 424 | .79991 | 555 | 114 | 670 |
| 96 | .80991 | 566 | 138 | 706 | 271 | .78831 | 388 |
| 97 | 698 | 274 | .79846 | 415 | .78981 | 542 | 100 |
| 98 | 399 | .79975 | 547 | 117 | 684 | 247 | .77806 |
| 99 | 094 | 670 | 243 | .78814 | 382 | .77946 | 507 |
| 100 | .79784 | 360 | .78934 | 506 | 075 | 641 | 203 |

TABLE 2.—Density¹ (in grams per milliliter) of mixtures of ethyl alcohol and water at 20° C.

[* indicates change in first two decimal places. See next line, column 0]

| Per cent alcohol by weight | Tenths of per cent | | | | | | | | | |
|----------------------------|--------------------|-----|------|------|------|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 0.99823 | 804 | 785 | 766 | 748 | 729 | 710 | 692 | 673 | 655 |
| 1 | 636 | 618 | 599 | 581 | 562 | 544 | 525 | 507 | 489 | 471 |
| 2 | 453 | 435 | 417 | 399 | 381 | 363 | 345 | 327 | 310 | 292 |
| 3 | 275 | 257 | 240 | 222 | 205 | 188 | 171 | 154 | 137 | 120 |
| 4 | 103 | 087 | 070 | 053 | 037 | 020 | 003 | *987 | *971 | *954 |
| 5 | .98938 | 922 | 906 | 890 | 874 | 859 | 843 | 827 | 811 | 796 |
| 6 | 780 | 765 | 749 | 734 | 718 | 703 | 688 | 673 | 658 | 642 |
| 7 | 627 | 612 | 597 | 582 | 567 | 553 | 538 | 523 | 508 | 493 |
| 8 | 478 | 463 | 449 | 434 | 419 | 404 | 389 | 374 | 360 | 345 |
| 9 | 331 | 316 | 301 | 287 | 273 | 258 | 244 | 229 | 215 | 201 |
| 10 | 187 | 172 | 158 | 144 | 130 | 117 | 103 | 089 | 075 | 061 |
| 11 | 047 | 033 | 019 | 006 | *992 | *978 | *964 | *951 | *937 | *923 |
| 12 | .97910 | 896 | 883 | 869 | 855 | 842 | 828 | 815 | 801 | 788 |
| 13 | 775 | 761 | 748 | 735 | 722 | 709 | 696 | 683 | 670 | 657 |
| 14 | 643 | 630 | 617 | 604 | 591 | 578 | 565 | 552 | 539 | 526 |
| 15 | 514 | 501 | 488 | 475 | 462 | 450 | 438 | 425 | 412 | 400 |
| 16 | 387 | 374 | 361 | 349 | 336 | 323 | 310 | 297 | 284 | 272 |
| 17 | 259 | 246 | 233 | 220 | 207 | 194 | 181 | 168 | 155 | 142 |
| 18 | 129 | 116 | 103 | 089 | 076 | 063 | 050 | 037 | 024 | 010 |
| 19 | .96997 | 984 | 971 | 957 | 944 | 931 | 917 | 904 | 891 | 877 |
| 20 | 864 | 850 | 837 | 823 | 810 | 796 | 783 | 769 | 756 | 742 |
| 21 | 729 | 716 | 702 | 688 | 675 | 661 | 647 | 634 | 620 | 606 |
| 22 | 592 | 578 | 564 | 551 | 537 | 523 | 509 | 495 | 481 | 467 |
| 23 | 453 | 439 | 425 | 411 | 396 | 382 | 368 | 354 | 340 | 326 |
| 24 | 312 | 297 | 283 | 269 | 254 | 240 | 225 | 211 | 196 | 182 |
| 25 | 168 | 153 | 139 | 124 | 109 | 094 | 080 | 065 | 050 | 035 |
| 26 | 020 | 005 | *990 | *975 | *959 | *944 | *929 | *914 | *898 | *883 |
| 27 | .95867 | 851 | 836 | 820 | 805 | 789 | 773 | 757 | 742 | 726 |
| 28 | 710 | 694 | 678 | 662 | 646 | 630 | 613 | 597 | 581 | 565 |
| 29 | 548 | 532 | 516 | 499 | 483 | 466 | 450 | 433 | 416 | 400 |
| 30 | 382 | 365 | 349 | 332 | 315 | 298 | 281 | 264 | 247 | 230 |
| 31 | 212 | 195 | 178 | 161 | 143 | 126 | 108 | 091 | 074 | 056 |
| 32 | 038 | 020 | 003 | *985 | *967 | *950 | *932 | *914 | *896 | *878 |
| 33 | .94860 | 842 | 824 | 806 | 788 | 770 | 752 | 734 | 715 | 697 |
| 34 | 679 | 660 | 642 | 624 | 605 | 587 | 568 | 550 | 531 | 512 |
| 35 | 494 | 475 | 456 | 438 | 419 | 400 | 382 | 363 | 344 | 325 |
| 36 | 306 | 287 | 268 | 249 | 230 | 211 | 192 | 172 | 153 | 134 |
| 37 | 114 | 095 | 075 | 056 | 036 | 017 | *997 | *978 | *958 | *939 |
| 38 | .93919 | 899 | 879 | 859 | 840 | 820 | 800 | 780 | 760 | 740 |
| 39 | 720 | 700 | 680 | 660 | 640 | 620 | 599 | 579 | 559 | 539 |
| 40 | 518 | 498 | 478 | 458 | 437 | 417 | 396 | 376 | 356 | 335 |
| 41 | 314 | 294 | 273 | 253 | 232 | 212 | 191 | 170 | 149 | 129 |
| 42 | 107 | 086 | 065 | 044 | 023 | 002 | *981 | *960 | *939 | *918 |
| 43 | .92897 | 876 | 855 | 834 | 812 | 791 | 770 | 749 | 728 | 707 |
| 44 | 685 | 664 | 642 | 621 | 600 | 579 | 557 | 536 | 515 | 493 |
| 45 | 472 | 450 | 429 | 408 | 386 | 365 | 343 | 322 | 300 | 279 |
| 46 | 257 | 236 | 214 | 193 | 171 | 150 | 128 | 106 | 085 | 063 |
| 47 | 041 | 019 | *997 | *976 | *954 | *932 | *910 | *889 | *867 | *845 |
| 48 | .91823 | 801 | 780 | 758 | 736 | 714 | 692 | 670 | 648 | 626 |
| 49 | 604 | 582 | 560 | 538 | 516 | 494 | 472 | 450 | 428 | 406 |
| 50 | 384 | 361 | 339 | 317 | 295 | 272 | 250 | 228 | 206 | 183 |

¹ The density values given in this table are numerically the same as specific gravity at 20° C. in terms of water at 4° C. as unity.

TABLE 3.—Specific gravity at 60° F. $\left(\frac{15^{\circ}56}{15^{\circ}56} C.\right)$ of mixtures (by volume) of ethyl alcohol and water

[* indicates change in first two decimal places. See next line, column 0]

| Per cent alcohol by volume at 60° F. | Tenths of per cent | | | | | | | | | |
|---|--------------------|------|------|------|------|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 1.00000 | *985 | *970 | *955 | *940 | *925 | *910 | *895 | *880 | *865 |
| 1 | .99850 | 835 | 820 | 806 | 791 | 776 | 761 | 747 | 732 | 717 |
| 2 | 703 | 688 | 674 | 659 | 645 | 630 | 616 | 602 | 587 | 573 |
| 3 | 559 | 545 | 531 | 516 | 502 | 488 | 474 | 460 | 446 | 432 |
| 4 | 419 | 405 | 391 | 378 | 364 | 350 | 336 | 323 | 309 | 296 |
| 5 | 282 | 269 | 255 | 242 | 228 | 215 | 202 | 189 | 176 | 163 |
| 6 | 150 | 137 | 124 | 111 | 098 | 085 | 073 | 060 | 047 | 035 |
| 7 | 022 | 009 | *997 | *984 | *972 | *960 | *947 | *935 | *923 | *911 |
| 8 | .98899 | 887 | 875 | 863 | 851 | 838 | 826 | 814 | 803 | 791 |
| 9 | 779 | 767 | 755 | 743 | 731 | 720 | 708 | 696 | 684 | 672 |
| 10 | 661 | 649 | 637 | 625 | 614 | 602 | 590 | 579 | 567 | 556 |
| 11 | 544 | 532 | 521 | 509 | 498 | 487 | 475 | 464 | 452 | 441 |
| 12 | 430 | 419 | 408 | 396 | 385 | 374 | 363 | 352 | 341 | 330 |
| 13 | 319 | 308 | 297 | 286 | 275 | 264 | 254 | 243 | 232 | 221 |
| 14 | 210 | 200 | 190 | 179 | 168 | 157 | 147 | 136 | 125 | 115 |
| 15 | 104 | 093 | 083 | 072 | 062 | 051 | 040 | 030 | 019 | 009 |
| 16 | .97998 | 988 | 977 | 967 | 956 | 946 | 936 | 925 | 915 | 905 |
| 17 | 895 | 885 | 875 | 864 | 854 | 844 | 834 | 824 | 814 | 804 |
| 18 | 794 | 784 | 774 | 764 | 754 | 744 | 734 | 724 | 714 | 704 |
| 19 | 694 | 684 | 674 | 664 | 654 | 645 | 635 | 625 | 615 | 605 |
| 20 | 596 | 586 | 576 | 566 | 556 | 546 | 536 | 526 | 516 | 506 |
| 21 | 496 | 486 | 476 | 466 | 456 | 446 | 436 | 425 | 415 | 405 |
| 22 | 395 | 385 | 375 | 365 | 354 | 344 | 334 | 324 | 313 | 303 |
| 23 | 293 | 283 | 272 | 262 | 252 | 241 | 231 | 221 | 210 | 200 |
| 24 | 189 | 179 | 168 | 158 | 147 | 137 | 126 | 116 | 105 | 095 |
| 25 | 084 | 073 | 063 | 052 | 042 | 031 | 020 | 010 | *999 | *988 |
| 26 | .96978 | 967 | 957 | 946 | 935 | 924 | 914 | 903 | 892 | 881 |
| 27 | 870 | 859 | 848 | 837 | 826 | 815 | 804 | 793 | 782 | 771 |
| 28 | 760 | 749 | 738 | 727 | 715 | 704 | 693 | 682 | 671 | 659 |
| 29 | 648 | 637 | 625 | 614 | 603 | 591 | 580 | 568 | 557 | 546 |
| 30 | 534 | 522 | 511 | 499 | 488 | 476 | 464 | 453 | 441 | 429 |
| 31 | 418 | 406 | 394 | 382 | 370 | 358 | 346 | 334 | 321 | 309 |
| 32 | 296 | 284 | 271 | 259 | 246 | 234 | 221 | 209 | 196 | 183 |
| 33 | 170 | 157 | 144 | 132 | 119 | 106 | 093 | 080 | 067 | 054 |
| 34 | 041 | 028 | 015 | 002 | *988 | *975 | *962 | *948 | *935 | *921 |
| 35 | .95908 | 894 | 881 | 867 | 854 | 840 | 826 | 812 | 798 | 784 |
| 36 | 770 | 756 | 742 | 728 | 714 | 700 | 685 | 671 | 657 | 643 |
| 37 | 628 | 614 | 599 | 585 | 570 | 556 | 541 | 526 | 512 | 497 |
| 38 | 482 | 467 | 452 | 437 | 423 | 408 | 393 | 378 | 362 | 347 |
| 39 | 332 | 317 | 302 | 286 | 271 | 256 | 240 | 225 | 209 | 194 |
| 40 | 178 | 162 | 147 | 131 | 115 | 100 | 084 | 068 | 052 | 036 |
| 41 | 020 | 004 | *988 | *972 | *956 | *940 | *923 | *907 | *891 | *875 |
| 42 | .94858 | 842 | 825 | 809 | 792 | 776 | 759 | 743 | 726 | 710 |
| 43 | 693 | 676 | 660 | 643 | 626 | 609 | 592 | 575 | 558 | 541 |
| 44 | 524 | 507 | 490 | 473 | 455 | 438 | 421 | 403 | 386 | 369 |
| 45 | 351 | 334 | 316 | 298 | 281 | 263 | 245 | 228 | 210 | 192 |
| 46 | 174 | 156 | 138 | 120 | 102 | 084 | 066 | 048 | 030 | 011 |
| 47 | .93993 | 975 | 956 | 938 | 920 | 901 | 883 | 864 | 845 | 827 |
| 48 | 808 | 789 | 771 | 752 | 733 | 714 | 695 | 676 | 657 | 638 |
| 49 | 619 | 600 | 581 | 562 | 543 | 523 | 504 | 485 | 465 | 446 |
| 50 | 426 | 407 | 387 | 368 | 348 | 328 | 309 | 289 | 270 | 250 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)

[This table is calculated from the same data on the thermal expansion of ethyl alcohol as that from which Tables 1, 2, 3, 5, 6, and 7 are calculated. The hydrometer is assumed to be of Jena 16^{mm} glass. For the per cents not given between 40 and 80, linear interpolation of the tabulated corrections will give results sufficiently exact for most purposes.]

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | | | |
|--|---|-------|-------|-------|------|------|------|------|------|------|------|------|------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Add to observed per cent alcohol | | | | | | | | | | | | |
| 50 | 0.37 | 0.38 | 0.39 | 0.40 | 0.42 | 0.45 | 0.48 | 0.52 | 0.56 | 0.61 | 0.66 | 0.74 | 0.81 |
| 51 | .34 | .35 | .36 | .37 | .39 | .41 | .44 | .47 | .51 | .56 | .61 | .68 | .75 |
| 52 | .32 | .32 | .33 | .34 | .35 | .38 | .40 | .43 | .47 | .51 | .55 | .62 | .68 |
| 53 | .29 | .30 | .30 | .31 | .32 | .34 | .36 | .39 | .42 | .46 | .49 | .55 | .60 |
| 54 | .26 | .26 | .26 | .27 | .28 | .29 | .32 | .34 | .36 | .40 | .43 | .48 | .52 |
| 55 | .22 | .22 | .23 | .23 | .24 | .25 | .27 | .29 | .31 | .34 | .37 | .40 | .44 |
| 56 | .18 | .18 | .18 | .18 | .19 | .20 | .22 | .24 | .25 | .28 | .30 | .33 | .36 |
| 57 | .14 | .14 | .14 | .14 | .14 | .15 | .17 | .18 | .19 | .21 | .23 | .25 | .27 |
| 58 | .09 | .10 | .10 | .10 | .10 | .10 | .11 | .12 | .13 | .14 | .16 | .16 | .18 |
| 59 | .05 | .05 | .05 | .05 | .05 | .05 | .06 | .06 | .06 | .07 | .08 | .08 | .09 |
| | Subtract from observed per cent alcohol | | | | | | | | | | | | |
| 61 | ----- | 0.05 | 0.05 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 | 0.08 | 0.09 | 0.10 |
| 62 | ----- | .10 | .11 | .12 | .12 | .13 | .14 | .14 | .16 | .16 | .17 | .18 | .20 |
| 63 | ----- | .16 | .17 | .18 | .19 | .20 | .20 | .21 | .23 | .24 | .25 | .27 | .29 |
| 64 | ----- | .22 | .23 | .24 | .25 | .26 | .27 | .29 | .31 | .32 | .34 | .37 | .39 |
| 65 | ----- | .28 | .29 | .30 | .32 | .33 | .34 | .36 | .39 | .41 | .43 | .46 | .49 |
| 66 | ----- | .34 | .35 | .36 | .38 | .40 | .42 | .44 | .47 | .50 | .52 | .56 | .59 |
| 67 | ----- | .41 | .42 | .43 | .45 | .47 | .50 | .52 | .55 | .58 | .61 | .65 | .70 |
| 68 | ----- | .48 | .48 | .50 | .52 | .54 | .57 | .60 | .64 | .67 | .71 | .75 | .80 |
| 69 | ----- | .55 | .56 | .57 | .59 | .62 | .66 | .68 | .73 | .76 | .80 | .85 | .91 |
| 70 | ----- | .62 | .63 | .64 | .67 | .70 | .74 | .77 | .81 | .86 | .90 | .96 | 1.02 |
| 72 | ----- | .77 | .78 | .80 | .83 | .86 | .90 | .94 | .99 | 1.04 | 1.10 | 1.16 | 1.23 |
| 74 | ----- | .93 | .94 | .96 | 1.00 | 1.03 | 1.09 | 1.13 | 1.18 | 1.25 | 1.32 | 1.39 | 1.46 |
| 76 | ----- | ----- | 1.10 | 1.13 | 1.17 | 1.21 | 1.27 | 1.32 | 1.38 | 1.46 | 1.54 | 1.61 | 1.70 |
| 78 | ----- | ----- | 1.28 | 1.31 | 1.35 | 1.40 | 1.46 | 1.52 | 1.59 | 1.67 | 1.76 | 1.84 | 1.94 |
| 80 | ----- | ----- | 1.46 | 1.50 | 1.54 | 1.60 | 1.66 | 1.73 | 1.80 | 1.89 | 1.99 | 2.09 | 2.20 |
| 82 | ----- | ----- | 1.64 | 1.69 | 1.74 | 1.80 | 1.87 | 1.94 | 2.02 | 2.12 | 2.22 | 2.34 | 2.45 |
| 84 | ----- | ----- | 1.84 | 1.89 | 1.94 | 2.00 | 2.08 | 2.16 | 2.25 | 2.35 | 2.47 | 2.59 | 2.71 |
| 86 | ----- | ----- | ----- | 2.09 | 2.15 | 2.22 | 2.30 | 2.39 | 2.49 | 2.60 | 2.72 | 2.84 | 2.97 |
| 88 | ----- | ----- | ----- | 2.30 | 2.37 | 2.44 | 2.53 | 2.62 | 2.73 | 2.85 | 2.98 | 3.10 | 3.23 |
| 90 | ----- | ----- | ----- | 2.52 | 2.59 | 2.66 | 2.76 | 2.86 | 2.98 | 3.11 | 3.24 | 3.36 | 3.50 |
| 92 | ----- | ----- | ----- | 2.74 | 2.82 | 2.89 | 3.00 | 3.11 | 3.24 | 3.37 | 3.51 | 3.64 | 3.78 |
| 94 | ----- | ----- | ----- | 2.97 | 3.04 | 3.12 | 3.24 | 3.36 | 3.50 | 3.63 | 3.78 | 3.92 | 4.07 |
| 96 | ----- | ----- | ----- | ----- | 3.28 | 3.36 | 3.49 | 3.62 | 3.76 | 3.90 | 4.05 | 4.20 | 4.36 |
| 98 | ----- | ----- | ----- | ----- | 3.52 | 3.60 | 3.74 | 3.88 | 4.03 | 4.17 | 4.32 | 4.50 | 4.66 |
| 100 | ----- | ----- | ----- | ----- | 3.76 | 3.85 | 4.00 | 4.15 | 4.30 | 4.45 | 4.60 | 4.78 | 4.95 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)—Continued

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | | |
|--|---|------|------|------|------|------|------|------|------|------|------|------|
| | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | Add to observed per cent alcohol | | | | | | | | | | | |
| 50 | 0.90 | 0.99 | 1.09 | 1.19 | 1.30 | 1.41 | 1.52 | 1.62 | 1.72 | 1.82 | 1.90 | 1.98 |
| 51 | .82 | .90 | .99 | 1.08 | 1.18 | 1.28 | 1.38 | 1.47 | 1.56 | 1.64 | 1.71 | 1.79 |
| 52 | .74 | .80 | .89 | .96 | 1.06 | 1.14 | 1.23 | 1.31 | 1.38 | 1.46 | 1.52 | 1.58 |
| 53 | .65 | .71 | .78 | .85 | .94 | 1.00 | 1.08 | 1.15 | 1.21 | 1.28 | 1.34 | 1.39 |
| 54 | .57 | .62 | .68 | .74 | .81 | .86 | .94 | .99 | 1.04 | 1.10 | 1.15 | 1.20 |
| 55 | .48 | .52 | .57 | .62 | .68 | .72 | .78 | .83 | .87 | .92 | .96 | 1.00 |
| 56 | .38 | .42 | .46 | .49 | .54 | .58 | .63 | .67 | .69 | .74 | .77 | .80 |
| 57 | .29 | .32 | .35 | .37 | .40 | .44 | .47 | .51 | .53 | .56 | .58 | .60 |
| 58 | .19 | .21 | .23 | .24 | .26 | .29 | .32 | .34 | .35 | .38 | .40 | .40 |
| 59 | .10 | .11 | .12 | .12 | .13 | .14 | .16 | .17 | .18 | .19 | .20 | .20 |
| | Subtract from observed per cent alcohol | | | | | | | | | | | |
| 61 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.14 | 0.15 | 0.16 | 0.17 | 0.17 | 0.18 | 0.18 |
| 62 | .21 | .22 | .24 | .26 | .27 | .29 | .30 | .32 | .34 | .36 | .37 | .38 |
| 63 | .31 | .32 | .35 | .38 | .41 | .44 | .46 | .49 | .51 | .53 | .55 | .56 |
| 64 | .42 | .44 | .48 | .52 | .54 | .58 | .62 | .66 | .68 | .71 | .74 | .77 |
| 65 | .52 | .55 | .60 | .65 | .68 | .73 | .78 | .82 | .85 | .90 | .92 | .96 |
| 66 | .63 | .66 | .71 | .77 | .82 | .88 | .94 | .98 | 1.02 | 1.07 | 1.11 | 1.16 |
| 67 | .74 | .78 | .84 | .90 | .96 | 1.03 | 1.10 | 1.15 | 1.20 | 1.25 | 1.30 | 1.35 |
| 68 | .85 | .91 | .97 | 1.03 | 1.10 | 1.18 | 1.26 | 1.33 | 1.38 | 1.44 | 1.49 | 1.54 |
| 69 | .97 | 1.02 | 1.10 | 1.17 | 1.25 | 1.33 | 1.42 | 1.48 | 1.54 | 1.61 | 1.66 | 1.72 |
| 70 | 1.08 | 1.14 | 1.23 | 1.31 | 1.40 | 1.49 | 1.58 | 1.65 | 1.72 | 1.78 | 1.84 | 1.91 |
| 72 | 1.31 | 1.39 | 1.50 | 1.60 | 1.70 | 1.80 | 1.90 | 2.00 | 2.06 | 2.13 | 2.20 | 2.27 |
| 74 | 1.55 | 1.65 | 1.76 | 1.88 | 1.99 | 2.10 | 2.22 | 2.32 | 2.41 | 2.48 | 2.56 | 2.65 |
| 76 | 1.80 | 1.91 | 2.03 | 2.16 | 2.28 | 2.41 | 2.54 | 2.65 | 2.76 | 2.84 | 2.93 | 3.03 |
| 78 | 2.05 | 2.17 | 2.30 | 2.44 | 2.58 | 2.72 | 2.86 | 2.98 | 3.10 | 3.20 | 3.30 | 3.40 |
| 80 | 2.31 | 2.44 | 2.58 | 2.72 | 2.87 | 3.02 | 3.17 | 3.33 | 3.45 | 3.56 | 3.67 | 3.78 |
| 82 | 2.57 | 2.71 | 2.86 | 3.00 | 3.16 | 3.33 | 3.50 | 3.66 | 3.79 | 3.92 | 4.04 | 4.18 |
| 84 | 2.84 | 2.98 | 3.13 | 3.29 | 3.46 | 3.63 | 3.81 | 4.00 | 4.14 | 4.28 | 4.42 | 4.56 |
| 86 | 3.11 | 3.26 | 3.41 | 3.58 | 3.76 | 3.94 | 4.13 | 4.33 | 4.49 | 4.65 | 4.80 | 4.94 |
| 88 | 3.38 | 3.54 | 3.70 | 3.88 | 4.07 | 4.26 | 4.46 | 4.67 | 4.84 | 5.00 | 5.17 | 5.32 |
| 90 | 3.66 | 3.83 | 4.00 | 4.18 | 4.38 | 4.58 | 4.78 | 5.01 | 5.19 | 5.36 | 5.53 | 5.69 |
| 92 | 3.94 | 4.11 | 4.29 | 4.48 | 4.69 | 4.90 | 5.12 | 5.35 | 5.54 | 5.72 | 5.90 | 6.07 |
| 94 | 4.23 | 4.40 | 4.58 | 4.79 | 5.00 | 5.22 | 5.46 | 5.69 | 5.89 | 6.08 | 6.28 | 6.45 |
| 96 | 4.53 | 4.69 | 4.87 | 5.10 | 5.32 | 5.55 | 5.80 | 6.03 | 6.24 | 6.44 | 6.64 | 6.82 |
| 98 | 4.83 | 5.00 | 5.18 | 5.41 | 5.64 | 5.88 | 6.13 | 6.38 | 6.60 | 6.80 | 7.02 | 7.20 |
| 100 | 5.13 | 5.30 | 5.49 | 5.72 | 5.95 | 6.21 | 6.46 | 6.72 | 6.95 | 7.17 | 7.40 | 7.59 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)—Continued

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | |
|--|---|------|------|------|------|------|------|------|------|------|------|
| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| | Add to observed per cent alcohol | | | | | | | | | | |
| 50 | 2.06 | 2.12 | 2.18 | 2.24 | 2.28 | 2.31 | 2.32 | 2.32 | 2.32 | 2.31 | 2.29 |
| 51 | 1.85 | 1.90 | 1.96 | 2.02 | 2.05 | 2.08 | 2.10 | 2.09 | 2.09 | 2.08 | 2.07 |
| 52 | 1.64 | 1.69 | 1.74 | 1.78 | 1.82 | 1.84 | 1.85 | 1.86 | 1.86 | 1.85 | 1.84 |
| 53 | 1.44 | 1.48 | 1.52 | 1.56 | 1.58 | 1.60 | 1.61 | 1.62 | 1.63 | 1.62 | 1.61 |
| 54 | 1.24 | 1.27 | 1.30 | 1.34 | 1.36 | 1.36 | 1.38 | 1.39 | 1.40 | 1.38 | 1.38 |
| 55 | 1.03 | 1.06 | 1.08 | 1.10 | 1.12 | 1.13 | 1.14 | 1.15 | 1.16 | 1.15 | 1.15 |
| 56 | .82 | .85 | .87 | .89 | .90 | .90 | .91 | .92 | .92 | .92 | .92 |
| 57 | .62 | .64 | .65 | .66 | .67 | .67 | .68 | .69 | .70 | .69 | .69 |
| 58 | .41 | .42 | .43 | .44 | .44 | .44 | .45 | .46 | .46 | .46 | .46 |
| 59 | .21 | .21 | .21 | .22 | .22 | .22 | .22 | .22 | .23 | .23 | .23 |
| | Subtract from observed per cent alcohol | | | | | | | | | | |
| 61 | 0.19 | 0.20 | 0.20 | 0.21 | 0.22 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| 62 | .39 | .40 | .41 | .42 | .44 | .46 | .46 | .46 | .46 | .46 | .46 |
| 63 | .59 | .60 | .62 | .64 | .66 | .68 | .68 | .68 | .68 | .68 | .68 |
| 64 | .79 | .80 | .83 | .86 | .88 | .91 | .91 | .91 | .91 | .91 | .91 |
| 65 | .99 | 1.00 | 1.04 | 1.08 | 1.10 | 1.12 | 1.13 | 1.13 | 1.14 | 1.14 | 1.14 |
| 66 | 1.19 | 1.21 | 1.25 | 1.30 | 1.32 | 1.35 | 1.36 | 1.36 | 1.36 | 1.36 | 1.36 |
| 67 | 1.39 | 1.41 | 1.45 | 1.50 | 1.54 | 1.57 | 1.58 | 1.59 | 1.60 | 1.60 | 1.60 |
| 68 | 1.58 | 1.64 | 1.68 | 1.72 | 1.76 | 1.79 | 1.80 | 1.81 | 1.82 | 1.82 | 1.82 |
| 69 | 1.77 | 1.82 | 1.86 | 1.91 | 1.96 | 2.00 | 2.02 | 2.03 | 2.04 | 2.04 | 2.04 |
| 70 | 1.97 | 2.02 | 2.08 | 2.12 | 2.18 | 2.22 | 2.24 | 2.26 | 2.27 | 2.27 | 2.27 |
| 72 | 2.36 | 2.42 | 2.48 | 2.54 | 2.60 | 2.66 | 2.68 | 2.70 | 2.71 | 2.72 | 2.72 |
| 74 | 2.74 | 2.81 | 2.88 | 2.96 | 3.04 | 3.10 | 3.12 | 3.15 | 3.16 | 3.18 | 3.18 |
| 76 | 3.14 | 3.21 | 3.30 | 3.38 | 3.46 | 3.52 | 3.56 | 3.58 | 3.60 | 3.63 | 3.64 |
| 78 | 3.51 | 3.61 | 3.70 | 3.78 | 3.86 | 3.95 | 3.99 | 4.03 | 4.06 | 4.08 | 4.09 |
| 80 | 3.90 | 4.00 | 4.10 | 4.19 | 4.28 | 4.37 | 4.42 | 4.48 | 4.51 | 4.53 | 4.54 |
| 82 | 4.29 | 4.40 | 4.50 | 4.60 | 4.70 | 4.80 | 4.86 | 4.91 | 4.95 | 4.98 | 5.00 |
| 84 | 4.68 | 4.80 | 4.91 | 5.02 | 5.12 | 5.24 | 5.30 | 5.35 | 5.40 | 5.42 | 5.44 |
| 86 | 5.07 | 5.20 | 5.32 | 5.44 | 5.54 | 5.64 | 5.72 | 5.79 | 5.84 | 5.88 | 5.90 |
| 88 | 5.46 | 5.60 | 5.72 | 5.84 | 5.95 | 6.06 | 6.14 | 6.20 | 6.26 | 6.31 | 6.34 |
| 90 | 5.84 | 5.98 | 6.12 | 6.24 | 6.36 | 6.46 | 6.55 | 6.62 | 6.68 | 6.74 | 6.78 |
| 92 | 6.23 | 6.38 | 6.52 | 6.66 | 6.77 | 6.87 | 6.97 | 7.04 | 7.12 | 7.18 | 7.22 |
| 94 | 6.62 | 6.78 | 6.93 | 7.06 | 7.18 | 7.29 | 7.38 | 7.47 | 7.54 | 7.61 | 7.65 |
| 96 | 7.00 | 7.17 | 7.32 | 7.46 | 7.60 | 7.71 | 7.82 | 7.90 | 7.98 | 8.06 | 8.10 |
| 98 | 7.40 | 7.57 | 7.72 | 7.87 | 8.01 | 8.12 | 8.24 | 8.33 | 8.42 | 8.50 | 8.54 |
| 100 | 7.78 | 7.96 | 8.12 | 8.28 | 8.42 | 8.55 | 8.68 | 8.76 | 8.84 | 8.93 | 9.00 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)—Continued

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | |
|--|-------------------------------------|------|------|------|------|------|------|------|------|------|------|
| | 36 | 37 | 38 | 39 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| | Add to observed per cent alcohol | | | | | | | | | | |
| 50 | 2.28 | 2.27 | 2.26 | 2.25 | 2.24 | 2.14 | 2.04 | 1.98 | 1.90 | 1.85 | 1.78 |
| 51 | 2.06 | 2.04 | 2.03 | 2.03 | 2.02 | 1.91 | 1.84 | 1.78 | 1.71 | 1.66 | 1.60 |
| 52 | 1.82 | 1.80 | 1.80 | 1.80 | 1.79 | 1.71 | 1.64 | 1.58 | 1.52 | 1.47 | 1.42 |
| 53 | 1.60 | 1.58 | 1.58 | 1.58 | 1.56 | 1.50 | 1.44 | 1.38 | 1.33 | 1.29 | 1.25 |
| 54 | 1.37 | 1.36 | 1.36 | 1.36 | 1.34 | 1.28 | 1.23 | 1.19 | 1.14 | 1.11 | 1.08 |
| 55 | 1.14 | 1.13 | 1.13 | 1.13 | 1.11 | 1.06 | 1.02 | .99 | .95 | .92 | .90 |
| 56 | .91 | .90 | .90 | .90 | .89 | .85 | .81 | .79 | .76 | .74 | .72 |
| 57 | .68 | .67 | .68 | .68 | .67 | .64 | .61 | .59 | .57 | .55 | .54 |
| 58 | .46 | .46 | .46 | .46 | .45 | .42 | .40 | .39 | .39 | .38 | .36 |
| 59 | .23 | .23 | .23 | .23 | .23 | .21 | .20 | .20 | .19 | .18 | .18 |
| Subtract from observed per cent alcohol | | | | | | | | | | | |
| 61 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.22 | 0.21 | 0.20 | 0.20 | 0.18 | 0.18 |
| 62 | .46 | .46 | .46 | .45 | .45 | .44 | .42 | .40 | .39 | .38 | .36 |
| 63 | .68 | .68 | .68 | .68 | .68 | .66 | .62 | .60 | .58 | .56 | .54 |
| 64 | .92 | .92 | .91 | .90 | .90 | .87 | .84 | .81 | .78 | .75 | .72 |
| 65 | 1.14 | 1.14 | 1.13 | 1.12 | 1.12 | 1.09 | 1.05 | 1.01 | .97 | .94 | .90 |
| 66 | 1.37 | 1.36 | 1.36 | 1.35 | 1.34 | 1.30 | 1.25 | 1.21 | 1.17 | 1.13 | 1.09 |
| 67 | 1.60 | 1.60 | 1.60 | 1.58 | 1.56 | 1.52 | 1.46 | 1.41 | 1.37 | 1.32 | 1.27 |
| 68 | 1.82 | 1.82 | 1.81 | 1.80 | 1.79 | 1.74 | 1.66 | 1.61 | 1.55 | 1.50 | 1.45 |
| 69 | 2.04 | 2.03 | 2.03 | 2.03 | 2.01 | 1.96 | 1.88 | 1.81 | 1.75 | 1.69 | 1.63 |
| 70 | 2.27 | 2.27 | 2.26 | 2.25 | 2.24 | 2.17 | 2.09 | 2.02 | 1.95 | 1.88 | 1.82 |
| 72 | 2.72 | 2.72 | 2.72 | 2.70 | 2.68 | 2.61 | 2.51 | 2.42 | 2.34 | 2.26 | 2.18 |
| 74 | 3.18 | 3.17 | 3.17 | 3.16 | 3.14 | 3.04 | 2.93 | 2.83 | 2.73 | 2.65 | 2.56 |
| 76 | 3.63 | 3.62 | 3.62 | 3.60 | 3.58 | 3.47 | 3.35 | 3.24 | 3.13 | 3.03 | 2.93 |
| 78 | 4.09 | 4.08 | 4.07 | 4.06 | 4.02 | 3.92 | 3.78 | 3.64 | 3.53 | 3.42 | 3.30 |
| 80 | 4.54 | 4.53 | 4.52 | 4.50 | 4.48 | 4.36 | 4.20 | 4.05 | 3.93 | 3.80 | 3.68 |
| 82 | 5.00 | 4.98 | 4.98 | 4.96 | 4.94 | 4.81 | 4.63 | 4.47 | 4.33 | 4.19 | 4.06 |
| 84 | 5.45 | 5.44 | 5.43 | 5.40 | 5.38 | 5.25 | 5.06 | 4.88 | 4.73 | 4.58 | 4.44 |
| 86 | 5.90 | 5.89 | 5.88 | 5.86 | 5.84 | 5.70 | 5.49 | 5.30 | 5.14 | 4.98 | 4.82 |
| 88 | 6.35 | 6.34 | 6.33 | 6.31 | 6.29 | 6.14 | 5.92 | 5.72 | 5.54 | 5.37 | 5.20 |
| 90 | 6.80 | 6.80 | 6.78 | 6.76 | 6.73 | 6.58 | 6.36 | 6.14 | 5.95 | 5.76 | 5.59 |
| 92 | 7.25 | 7.25 | 7.22 | 7.20 | 7.18 | 7.03 | 6.80 | 6.56 | 6.36 | 6.16 | 5.98 |
| 94 | 7.70 | 7.70 | 7.67 | 7.66 | 7.63 | 7.48 | 7.24 | 6.98 | 6.77 | 6.56 | 6.37 |
| 96 | 8.14 | 8.15 | 8.12 | 8.11 | 8.08 | 7.92 | 7.63 | 7.40 | 7.19 | 6.96 | 6.76 |
| 98 | 8.58 | 8.60 | 8.58 | 8.55 | 8.54 | 8.36 | 8.11 | 7.82 | 7.60 | 7.36 | 7.15 |
| 100 | 9.03 | 9.04 | 9.03 | 9.01 | 8.98 | 8.81 | 8.45 | 8.25 | 8.02 | 7.76 | 7.54 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)—Continued

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | |
|--|-------------------------------------|------|------|------|------|------|------|------|------|------|------|
| | 75 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 |
| | Add to observed per cent alcohol | | | | | | | | | | |
| 50 | 1.71 | 1.63 | 1.62 | 1.60 | 1.58 | 1.56 | 1.53 | 1.51 | 1.48 | 1.46 | 1.43 |
| 51 | 1.54 | 1.47 | 1.46 | 1.44 | 1.42 | 1.40 | 1.38 | 1.36 | 1.33 | 1.31 | 1.28 |
| 52 | 1.36 | 1.30 | 1.30 | 1.28 | 1.26 | 1.24 | 1.22 | 1.20 | 1.18 | 1.16 | 1.14 |
| 53 | 1.20 | 1.15 | 1.14 | 1.12 | 1.11 | 1.09 | 1.07 | 1.06 | 1.04 | 1.02 | 1.00 |
| 54 | 1.04 | .98 | .98 | .96 | .95 | .94 | .92 | .91 | .89 | .88 | .86 |
| 55 | .87 | .82 | .81 | .80 | .79 | .78 | .76 | .75 | .74 | .74 | .72 |
| 56 | .70 | .66 | .65 | .64 | .63 | .62 | .61 | .60 | .59 | .58 | .57 |
| 57 | .53 | .49 | .49 | .49 | .48 | .47 | .46 | .46 | .45 | .44 | .43 |
| 58 | .34 | .32 | .32 | .32 | .31 | .30 | .30 | .30 | .30 | .29 | .28 |
| 59 | .17 | .16 | .16 | .16 | .16 | .15 | .15 | .15 | .15 | .15 | .14 |
| Subtract from observed per cent alcohol | | | | | | | | | | | |
| 61 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.15 |
| 62 | .34 | .34 | .34 | .32 | .32 | .32 | .32 | .31 | .31 | .31 | .30 |
| 63 | .52 | .50 | .50 | .48 | .48 | .48 | .48 | .47 | .46 | .46 | .44 |
| 64 | .70 | .68 | .66 | .65 | .65 | .64 | .63 | .62 | .61 | .60 | .59 |
| 65 | .86 | .84 | .82 | .82 | .81 | .80 | .79 | .78 | .77 | .76 | .74 |
| 66 | 1.05 | 1.00 | .99 | .98 | .97 | .96 | .94 | .93 | .92 | .90 | .88 |
| 67 | 1.22 | 1.17 | 1.16 | 1.14 | 1.13 | 1.12 | 1.10 | 1.09 | 1.08 | 1.06 | 1.02 |
| 68 | 1.40 | 1.33 | 1.32 | 1.31 | 1.29 | 1.28 | 1.26 | 1.24 | 1.22 | 1.20 | 1.17 |
| 69 | 1.57 | 1.50 | 1.49 | 1.47 | 1.46 | 1.44 | 1.42 | 1.40 | 1.38 | 1.36 | 1.32 |
| 70 | 1.75 | 1.68 | 1.66 | 1.64 | 1.62 | 1.60 | 1.58 | 1.56 | 1.54 | 1.51 | 1.48 |
| 72 | 2.10 | 2.02 | 2.00 | 1.97 | 1.95 | 1.93 | 1.90 | 1.88 | 1.85 | 1.82 | 1.78 |
| 74 | 2.46 | 2.36 | 2.34 | 2.30 | 2.28 | 2.26 | 2.24 | 2.20 | 2.17 | 2.13 | 2.09 |
| 76 | 2.81 | 2.70 | 2.68 | 2.64 | 2.61 | 2.59 | 2.56 | 2.52 | 2.48 | 2.44 | 2.40 |
| 78 | 3.18 | 3.04 | 3.02 | 2.98 | 2.94 | 2.92 | 2.88 | 2.84 | 2.80 | 2.76 | 2.71 |
| 80 | 3.54 | 3.38 | 3.36 | 3.32 | 3.28 | 3.26 | 3.22 | 3.17 | 3.13 | 3.08 | 3.02 |
| 82 | 3.90 | 3.72 | 3.71 | 3.66 | 3.62 | 3.59 | 3.54 | 3.50 | 3.45 | 3.40 | 3.33 |
| 84 | 4.27 | 4.08 | 4.05 | 4.00 | 3.96 | 3.92 | 3.88 | 3.83 | 3.77 | 3.72 | 3.65 |
| 86 | 4.64 | 4.43 | 4.39 | 4.35 | 4.30 | 4.26 | 4.21 | 4.16 | 4.10 | 4.04 | 3.96 |
| 88 | 5.00 | 4.78 | 4.75 | 4.70 | 4.65 | 4.60 | 4.55 | 4.50 | 4.44 | 4.37 | 4.29 |
| 90 | 5.37 | 5.14 | 5.10 | 5.06 | 5.00 | 4.95 | 4.88 | 4.83 | 4.77 | 4.70 | 4.61 |
| 92 | 5.75 | 5.50 | 5.46 | 5.42 | 5.36 | 5.30 | 5.23 | 5.18 | 5.10 | 5.03 | 4.94 |
| 94 | 6.12 | 5.86 | 5.81 | 5.76 | 5.70 | 5.64 | 5.58 | 5.51 | 5.44 | 5.36 | 5.26 |
| 96 | 6.50 | 6.23 | 6.17 | 6.12 | 6.06 | 5.99 | 5.92 | 5.86 | 5.78 | 5.69 | 5.59 |
| 98 | 6.88 | 6.60 | 6.50 | 6.48 | 6.41 | 6.34 | 6.26 | 6.20 | 6.11 | 6.02 | 5.92 |
| 100 | 7.26 | 6.96 | 6.89 | 6.84 | 6.76 | 6.70 | 6.61 | 6.54 | 6.44 | 6.36 | 6.26 |

TABLE 4.—Temperature corrections to readings of alcoholometers (standard at 60° F.)—Continued

| Observed temperature in degrees Fahrenheit | Observed per cent alcohol by volume | | | | | | | | | | |
|--|---|------|------|------|------|------|------|------|------|------|-------|
| | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| | Add to observed per cent alcohol | | | | | | | | | | |
| 50 | 1.39 | 1.36 | 1.32 | 1.27 | 1.22 | 1.17 | 1.12 | 1.06 | 0.99 | 0.93 | ----- |
| 51 | 1.25 | 1.22 | 1.18 | 1.14 | 1.10 | 1.06 | 1.01 | .85 | .89 | .84 | ----- |
| 52 | 1.12 | 1.09 | 1.06 | 1.02 | .98 | .94 | .90 | .85 | .79 | .74 | ----- |
| 53 | .98 | .96 | .93 | .90 | .86 | .83 | .79 | .74 | .70 | .65 | ----- |
| 54 | .84 | .82 | .80 | .77 | .74 | .72 | .68 | .64 | .60 | .56 | ----- |
| 55 | .70 | .69 | .66 | .64 | .62 | .60 | .57 | .53 | .50 | .47 | ----- |
| 56 | .56 | .55 | .53 | .52 | .49 | .48 | .45 | .43 | .40 | .38 | ----- |
| 57 | .42 | .41 | .40 | .39 | .37 | .36 | .34 | .32 | .30 | .29 | ----- |
| 58 | .28 | .27 | .26 | .26 | .24 | .24 | .23 | .21 | .20 | .19 | ----- |
| 59 | .14 | .14 | .13 | .13 | .12 | .12 | .12 | .11 | .10 | .10 | ----- |
| | Subtract from observed per cent alcohol | | | | | | | | | | |
| 61 | 0.15 | 0.14 | 0.14 | 0.13 | 0.13 | 0.12 | 0.12 | 0.11 | 0.10 | 0.10 | 0.09 |
| 62 | .29 | .28 | .27 | .26 | .25 | .24 | .23 | .22 | .21 | .19 | .18 |
| 63 | .43 | .42 | .41 | .39 | .38 | .36 | .35 | .33 | .31 | .29 | .27 |
| 64 | .58 | .55 | .54 | .52 | .51 | .49 | .46 | .44 | .41 | .39 | .36 |
| 65 | .72 | .70 | .68 | .66 | .64 | .61 | .58 | .55 | .52 | .49 | .46 |
| 66 | .86 | .84 | .82 | .79 | .76 | .73 | .70 | .67 | .63 | .59 | .55 |
| 67 | 1.00 | .98 | .96 | .93 | .90 | .86 | .82 | .78 | .74 | .70 | .64 |
| 68 | 1.15 | 1.12 | 1.09 | 1.06 | 1.02 | .98 | .94 | .90 | .85 | .80 | .74 |
| 69 | 1.30 | 1.26 | 1.23 | 1.20 | 1.16 | 1.10 | 1.06 | 1.02 | .96 | .90 | .84 |
| 70 | 1.45 | 1.41 | 1.37 | 1.34 | 1.29 | 1.23 | 1.19 | 1.14 | 1.07 | 1.00 | .94 |
| 72 | 1.74 | 1.70 | 1.65 | 1.61 | 1.55 | 1.49 | 1.43 | 1.37 | 1.30 | 1.22 | 1.13 |
| 74 | 2.05 | 2.00 | 1.94 | 1.89 | 1.82 | 1.75 | 1.69 | 1.61 | 1.53 | 1.43 | 1.33 |
| 76 | 2.35 | 2.29 | 2.23 | 2.17 | 2.09 | 2.01 | 1.94 | 1.85 | 1.76 | 1.65 | 1.53 |
| 78 | 2.65 | 2.59 | 2.52 | 2.46 | 2.36 | 2.28 | 2.20 | 2.10 | 2.00 | 1.87 | 1.73 |
| 80 | 2.96 | 2.89 | 2.82 | 2.74 | 2.64 | 2.56 | 2.46 | 2.35 | 2.24 | 2.09 | 1.93 |
| 82 | 3.26 | 3.20 | 3.12 | 3.03 | 2.92 | 2.84 | 2.72 | 2.60 | 2.48 | 2.32 | 2.14 |
| 84 | 3.57 | 3.50 | 3.39 | 3.32 | 3.21 | 3.10 | 2.96 | 2.86 | 2.73 | 2.56 | 2.36 |
| 86 | 3.89 | 3.80 | 3.72 | 3.62 | 3.51 | 3.38 | 3.26 | 3.13 | 2.98 | 2.80 | 2.58 |
| 88 | 4.20 | 4.12 | 4.02 | 3.91 | 3.80 | 3.66 | 3.54 | 3.39 | 3.24 | 3.06 | 2.81 |
| 90 | 4.52 | 4.42 | 4.32 | 4.20 | 4.08 | 3.94 | 3.81 | 3.66 | 3.50 | 3.30 | 3.03 |
| 92 | 4.84 | 4.74 | 4.62 | 4.50 | 4.38 | 4.23 | 4.10 | 3.93 | 3.76 | 3.55 | 3.26 |
| 94 | 5.16 | 5.06 | 4.94 | 4.80 | 4.67 | 4.52 | 4.38 | 4.20 | 4.02 | 3.80 | 3.50 |
| 96 | 5.49 | 5.39 | 5.25 | 5.11 | 4.97 | 4.82 | 4.67 | 4.48 | 4.29 | 4.06 | 3.73 |
| 98 | 5.82 | 5.70 | 5.56 | 5.42 | 5.27 | 5.12 | 4.95 | 4.76 | 4.55 | 4.31 | 3.96 |
| 100 | 6.15 | 6.02 | 5.88 | 5.74 | 5.58 | 5.42 | 5.24 | 5.04 | 4.82 | 4.56 | 4.21 |

TABLE 5.—Percentages by volume at 60° F., corresponding to various percentages by weight in mixtures of ethyl alcohol and water

| Per cent alcohol by weight | Tenths of per cent | | | | | | | | | |
|----------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 0.000 | 0.126 | 0.252 | 0.378 | 0.504 | 0.630 | 0.755 | 0.881 | 1.007 | 1.132 |
| 1 | 1.257 | 1.382 | 1.508 | 1.633 | 1.759 | 1.884 | 2.009 | 2.134 | 2.260 | 2.385 |
| 2 | 2.510 | 2.635 | 2.760 | 2.885 | 3.010 | 3.135 | 3.259 | 3.384 | 3.509 | 3.633 |
| 3 | 3.758 | 3.883 | 4.007 | 4.132 | 4.256 | 4.381 | 4.505 | 4.629 | 4.754 | 4.878 |
| 4 | 5.002 | 5.126 | 5.250 | 5.374 | 5.499 | 5.623 | 5.747 | 5.871 | 5.995 | 6.119 |
| 5 | 6.243 | 6.367 | 6.491 | 6.614 | 6.738 | 6.862 | 6.985 | 7.109 | 7.232 | 7.356 |
| 6 | 7.479 | 7.602 | 7.726 | 7.849 | 7.972 | 8.096 | 8.219 | 8.342 | 8.466 | 8.589 |
| 7 | 8.712 | 8.835 | 8.958 | 9.081 | 9.205 | 9.328 | 9.451 | 9.574 | 9.697 | 9.820 |
| 8 | 9.943 | 10.066 | 10.189 | 10.311 | 10.434 | 10.557 | 10.679 | 10.802 | 10.925 | 11.047 |
| 9 | 11.169 | 11.292 | 11.414 | 11.536 | 11.659 | 11.781 | 11.904 | 12.026 | 12.149 | 12.271 |
| 10 | 12.393 | 12.515 | 12.637 | 12.760 | 12.882 | 13.004 | 13.126 | 13.248 | 13.370 | 13.492 |
| 11 | 13.613 | 13.735 | 13.857 | 13.979 | 14.101 | 14.223 | 14.345 | 14.466 | 14.588 | 14.710 |
| 12 | 14.832 | 14.954 | 15.075 | 15.197 | 15.319 | 15.440 | 15.562 | 15.683 | 15.805 | 15.926 |
| 13 | 16.047 | 16.168 | 16.290 | 16.411 | 16.532 | 16.654 | 16.775 | 16.896 | 17.017 | 17.138 |
| 14 | 17.259 | 17.380 | 17.501 | 17.622 | 17.743 | 17.864 | 17.985 | 18.106 | 18.227 | 18.348 |
| 15 | 18.469 | 18.590 | 18.711 | 18.832 | 18.952 | 19.073 | 19.194 | 19.315 | 19.435 | 19.556 |
| 16 | 19.676 | 19.797 | 19.917 | 20.038 | 20.158 | 20.279 | 20.399 | 20.519 | 20.640 | 20.760 |
| 17 | 20.880 | 21.000 | 21.120 | 21.241 | 21.361 | 21.481 | 21.601 | 21.721 | 21.841 | 21.961 |
| 18 | 22.081 | 22.201 | 22.321 | 22.441 | 22.561 | 22.680 | 22.800 | 22.919 | 23.039 | 23.159 |
| 19 | 23.278 | 23.398 | 23.517 | 23.636 | 23.756 | 23.875 | 23.995 | 24.114 | 24.234 | 24.353 |
| 20 | 24.472 | 24.591 | 24.710 | 24.829 | 24.949 | 25.068 | 25.187 | 25.305 | 25.424 | 25.543 |
| 21 | 25.662 | 25.781 | 25.900 | 26.018 | 26.137 | 26.256 | 26.375 | 26.493 | 26.612 | 26.730 |
| 22 | 26.849 | 26.968 | 27.086 | 27.204 | 27.323 | 27.441 | 27.559 | 27.677 | 27.796 | 27.914 |
| 23 | 28.032 | 28.150 | 28.268 | 28.386 | 28.504 | 28.622 | 28.740 | 28.858 | 28.976 | 29.093 |
| 24 | 29.210 | 29.328 | 29.446 | 29.563 | 29.681 | 29.799 | 29.917 | 30.035 | 30.152 | 30.270 |
| 25 | 30.388 | 30.505 | 30.622 | 30.739 | 30.855 | 30.972 | 31.089 | 31.205 | 31.322 | 31.438 |
| 26 | 31.555 | 31.672 | 31.788 | 31.905 | 32.021 | 32.138 | 32.254 | 32.370 | 32.487 | 32.603 |
| 27 | 32.719 | 32.835 | 32.951 | 33.068 | 33.184 | 33.300 | 33.416 | 33.532 | 33.647 | 33.763 |
| 28 | 33.879 | 33.995 | 34.111 | 34.227 | 34.342 | 34.458 | 34.573 | 34.688 | 34.803 | 34.918 |
| 29 | 35.033 | 35.148 | 35.263 | 35.378 | 35.493 | 35.608 | 35.723 | 35.838 | 35.952 | 36.066 |
| 30 | 36.181 | 36.296 | 36.410 | 36.524 | 36.639 | 36.753 | 36.867 | 36.981 | 37.095 | 37.209 |
| 31 | 37.323 | 37.437 | 37.551 | 37.664 | 37.778 | 37.892 | 38.005 | 38.119 | 38.232 | 38.346 |
| 32 | 38.459 | 38.572 | 38.686 | 38.799 | 38.912 | 39.025 | 39.138 | 39.251 | 39.364 | 39.477 |
| 33 | 39.590 | 39.703 | 39.816 | 39.928 | 40.041 | 40.154 | 40.266 | 40.379 | 40.492 | 40.604 |
| 34 | 40.716 | 40.828 | 40.940 | 41.052 | 41.163 | 41.275 | 41.386 | 41.498 | 41.609 | 41.721 |
| 35 | 41.832 | 41.943 | 42.055 | 42.166 | 42.277 | 42.389 | 42.500 | 42.611 | 42.722 | 42.833 |
| 36 | 42.944 | 43.055 | 43.165 | 43.276 | 43.387 | 43.498 | 43.608 | 43.719 | 43.829 | 43.939 |
| 37 | 44.050 | 44.160 | 44.270 | 44.381 | 44.490 | 44.600 | 44.710 | 44.820 | 44.930 | 45.039 |
| 38 | 45.149 | 45.259 | 45.368 | 45.478 | 45.587 | 45.696 | 45.806 | 45.915 | 46.024 | 46.133 |
| 39 | 46.242 | 46.351 | 46.460 | 46.569 | 46.678 | 46.786 | 46.895 | 47.003 | 47.112 | 47.220 |
| 40 | 47.328 | 47.436 | 47.544 | 47.652 | 47.760 | 47.868 | 47.976 | 48.084 | 48.192 | 48.299 |
| 41 | 48.407 | 48.515 | 48.622 | 48.730 | 48.837 | 48.945 | 49.052 | 49.159 | 49.266 | 49.373 |
| 42 | 49.480 | 49.587 | 49.694 | 49.801 | 49.907 | 50.014 | 50.120 | 50.226 | 50.333 | 50.439 |
| 43 | 50.545 | 50.651 | 50.757 | 50.864 | 50.970 | 51.076 | 51.182 | 51.288 | 51.394 | 51.499 |
| 44 | 51.605 | 51.711 | 51.816 | 51.922 | 52.027 | 52.132 | 52.238 | 52.343 | 52.448 | 52.553 |
| 45 | 52.658 | 52.763 | 52.868 | 52.973 | 53.078 | 53.182 | 53.287 | 53.392 | 53.496 | 53.601 |
| 46 | 53.705 | 53.809 | 53.914 | 54.018 | 54.122 | 54.226 | 54.330 | 54.434 | 54.538 | 54.642 |
| 47 | 54.746 | 54.850 | 54.954 | 55.057 | 55.161 | 55.264 | 55.368 | 55.471 | 55.574 | 55.677 |
| 48 | 55.780 | 55.883 | 55.986 | 56.089 | 56.192 | 56.295 | 56.398 | 56.500 | 56.603 | 56.706 |
| 49 | 56.808 | 56.910 | 57.013 | 57.116 | 57.218 | 57.320 | 57.422 | 57.522 | 57.626 | 57.728 |
| 50 | 57.830 | 57.932 | 58.034 | 58.135 | 58.237 | 58.338 | 58.440 | 58.541 | 58.642 | 58.743 |

TABLE 6.—Percentages by weight, corresponding to various percentages by volume at 60° F. in mixtures of ethyl alcohol and water

| Per cent alcohol by volume at 60° F. | Per cent alcohol by weight | Differences | Per cent alcohol by volume at 60° F. | Per cent alcohol by weight | Differences |
|--|-------------------------------|-------------|--|-------------------------------|-------------|
| 0 | 0.000 | ----- | 50 | 42.487 | ----- |
| 1 | 0.795 | 0.795 | 51 | 43.428 | 0.941 |
| 2 | 1.593 | .798 | 52 | 44.374 | .946 |
| 3 | 2.392 | .799 | 53 | 45.326 | .952 |
| 4 | 3.194 | .802 | 54 | 46.283 | .957 |
| | | .804 | | | .962 |
| 5 | 3.998 | | 55 | 47.245 | |
| 6 | 4.804 | .806 | 56 | 48.214 | .969 |
| 7 | 5.612 | .808 | 57 | 49.187 | .973 |
| 8 | 6.422 | .810 | 58 | 50.167 | .980 |
| 9 | 7.234 | .812 | 59 | 51.154 | .987 |
| | | .813 | | | .993 |
| 10 | 8.047 | | 60 | 52.147 | |
| 11 | 8.862 | .815 | 61 | 53.146 | .999 |
| 12 | 9.679 | .817 | 62 | 54.152 | 1.006 |
| 13 | 10.497 | .818 | 63 | 55.165 | 1.013 |
| 14 | 11.317 | .820 | 64 | 56.184 | 1.019 |
| | | .821 | | | 1.024 |
| 15 | 12.138 | | 65 | 57.208 | |
| 16 | 12.961 | .823 | 66 | 58.241 | 1.033 |
| 17 | 13.786 | .825 | 67 | 59.279 | 1.038 |
| 18 | 14.612 | .826 | 68 | 60.325 | 1.046 |
| 19 | 15.440 | .828 | 69 | 61.379 | 1.054 |
| | | .829 | | | 1.062 |
| 20 | 16.269 | | 70 | 62.441 | |
| 21 | 17.100 | .831 | 71 | 63.511 | 1.070 |
| 22 | 17.933 | .833 | 72 | 64.588 | 1.077 |
| 23 | 18.768 | .835 | 73 | 65.674 | 1.086 |
| 24 | 19.604 | .836 | 74 | 66.768 | 1.094 |
| | | .839 | | | 1.102 |
| 25 | 20.443 | | 75 | 67.870 | |
| 26 | 21.285 | .842 | 76 | 68.982 | 1.112 |
| 27 | 22.127 | .842 | 77 | 70.102 | 1.120 |
| 28 | 22.973 | .846 | 78 | 71.234 | 1.132 |
| 29 | 23.820 | .847 | 79 | 72.375 | 1.141 |
| | | .850 | | | 1.151 |
| 30 | 24.670 | | 80 | 73.526 | |
| 31 | 25.524 | .854 | 81 | 74.686 | 1.160 |
| 32 | 26.382 | .858 | 82 | 75.858 | 1.172 |
| 33 | 27.242 | .860 | 83 | 77.039 | 1.181 |
| 34 | 28.104 | .862 | 84 | 78.233 | 1.194 |
| | | .867 | | | 1.208 |
| 35 | 28.971 | | 85 | 79.441 | |
| 36 | 29.842 | .871 | 86 | 80.662 | 1.221 |
| 37 | 30.717 | .875 | 87 | 81.897 | 1.235 |
| 38 | 31.596 | .879 | 88 | 83.144 | 1.247 |
| 39 | 32.478 | .882 | 89 | 84.408 | 1.264 |
| | | .886 | | | 1.281 |
| 40 | 33.364 | | 90 | 85.689 | |
| 41 | 34.254 | .890 | 91 | 86.989 | 1.300 |
| 42 | 35.150 | .896 | 92 | 88.310 | 1.321 |
| 43 | 36.050 | .900 | 93 | 89.652 | 1.342 |
| 44 | 36.955 | .905 | 94 | 91.025 | 1.373 |
| | | .910 | | | 1.398 |
| 45 | 37.865 | | 95 | 92.423 | |
| 46 | 38.778 | .913 | 96 | 93.851 | 1.428 |
| 47 | 39.697 | .919 | 97 | 95.315 | 1.464 |
| 48 | 40.622 | .925 | 98 | 96.820 | 1.505 |
| 49 | 41.551 | .929 | 99 | 98.381 | 1.561 |
| | | .936 | | | 1.619 |
| 50 | 42.487 | ----- | 100 | 100.000 | ----- |

TABLE 8.—Density at 15° C. of mixtures (by weight) of methyl alcohol and water

[Calculated from the specific gravity determinations of Doroshevskii and Rozhdestvenskii at 15° C.]

| Per cent methyl alcohol by weight | D ₄ ^{15° C.} | Differences | Per cent methyl alcohol by weight | D ₄ ^{15° C.} | Differences |
|-----------------------------------|----------------------------------|-------------|-----------------------------------|----------------------------------|-------------|
| 0 | 0.99913 | 0.00186 | 50 | 0.91852 | 0.00199 |
| 1 | .99727 | 184 | 51 | .91653 | 202 |
| 2 | .99543 | 173 | 52 | .91451 | 203 |
| 3 | .99370 | 172 | 53 | .91248 | 204 |
| 4 | .99198 | 169 | 54 | .91044 | 205 |
| 5 | .99029 | 165 | 55 | .90839 | 208 |
| 6 | .98864 | 163 | 56 | .90631 | 210 |
| 7 | .98701 | 154 | 57 | .90421 | 211 |
| 8 | .98547 | 153 | 58 | .90210 | 214 |
| 9 | .98394 | 153 | 59 | .89996 | 215 |
| 10 | .98241 | 148 | 60 | .89781 | 218 |
| 11 | .98093 | 148 | 61 | .89563 | 222 |
| 12 | .97945 | 143 | 62 | .89341 | 224 |
| 13 | .97802 | 142 | 63 | .89117 | 227 |
| 14 | .97660 | 142 | 64 | .88890 | 228 |
| 15 | .97518 | 141 | 65 | .88662 | 229 |
| 16 | .97377 | 140 | 66 | .88433 | 230 |
| 17 | .97237 | 141 | 67 | .88203 | 232 |
| 18 | .97096 | 141 | 68 | .87971 | 232 |
| 19 | .96955 | 141 | 69 | .87739 | 232 |
| 20 | .96814 | 141 | 70 | .87507 | 236 |
| 21 | .96673 | 140 | 71 | .87271 | 238 |
| 22 | .96533 | 141 | 72 | .87033 | 241 |
| 23 | .96392 | 141 | 73 | .86792 | 246 |
| 24 | .96251 | 143 | 74 | .86546 | 246 |
| 25 | .96108 | 145 | 75 | .86300 | 249 |
| 26 | .95963 | 146 | 76 | .86051 | 250 |
| 27 | .95817 | 149 | 77 | .85801 | 250 |
| 28 | .95668 | 150 | 78 | .85551 | 251 |
| 29 | .95518 | 152 | 79 | .85300 | 252 |
| 30 | .95366 | 153 | 80 | .85048 | 254 |
| 31 | .95213 | 157 | 81 | .84794 | 258 |
| 32 | .95056 | 160 | 82 | .84536 | 262 |
| 33 | .94896 | 162 | 83 | .84274 | 265 |
| 34 | .94734 | 164 | 84 | .84009 | 267 |
| 35 | .94570 | 166 | 85 | .83742 | 267 |
| 36 | .94404 | 167 | 86 | .83475 | 268 |
| 37 | .94237 | 170 | 87 | .83207 | 270 |
| 38 | .94067 | 173 | 88 | .82937 | 270 |
| 39 | .93894 | 174 | 89 | .82667 | 271 |
| 40 | .93720 | 177 | 90 | .82396 | 272 |
| 41 | .93543 | 178 | 91 | .82124 | 275 |
| 42 | .93365 | 180 | 92 | .81849 | 281 |
| 43 | .93185 | 184 | 93 | .81568 | 283 |
| 44 | .93001 | 186 | 94 | .81285 | 286 |
| 45 | .92815 | 188 | 95 | .80999 | 286 |
| 46 | .92627 | 191 | 96 | .80713 | 285 |
| 47 | .92436 | 194 | 97 | .80428 | 285 |
| 48 | .92242 | 194 | 98 | .80143 | 284 |
| 49 | .92045 | 196 | 99 | .79859 | 282 |
| 50 | .91852 | ----- | 100 | .79577 | ----- |

¹ J. Russ., Phys. Chem. Soc., 41, pp. 977-996; 1909.

TABLE 9.—Specific gravity at $\frac{15^\circ}{15^\circ}$ C. of mixtures (by volume) of methyl alcohol and water

[Calculated from the same data as Table 8]

| Per cent methyl alcohol by volume at 15° C. | D $\frac{15^\circ}{15^\circ}$ C. | Differences | Per cent methyl alcohol by volume at 15° C. | D $\frac{15^\circ}{15^\circ}$ C. | Differences |
|---|----------------------------------|-------------|---|----------------------------------|-------------|
| 0 | 1.00000 | 0.00149 | 50 | 0.93326 | 0.00171 |
| 1 | .99851 | 148 | 51 | .93155 | 173 |
| 2 | .99703 | 143 | 52 | .92982 | 176 |
| 3 | .99560 | 138 | 53 | .92806 | 180 |
| 4 | .99422 | 139 | 54 | .92626 | 183 |
| 5 | .99283 | 137 | 55 | .92443 | 187 |
| 6 | .99146 | 135 | 56 | .92256 | 189 |
| 7 | .99011 | 134 | 57 | .92067 | 190 |
| 8 | .98877 | 131 | 58 | .91877 | 195 |
| 9 | .98746 | 125 | 59 | .91682 | 199 |
| 10 | .98621 | 125 | 60 | .91483 | 201 |
| 11 | .98496 | 126 | 61 | .91282 | 203 |
| 12 | .98370 | 123 | 62 | .91079 | 206 |
| 13 | .98247 | 122 | 63 | .90873 | 210 |
| 14 | .98125 | 122 | 64 | .90663 | 213 |
| 15 | .98003 | 119 | 65 | .90450 | 216 |
| 16 | .97884 | 118 | 66 | .90234 | 220 |
| 17 | .97766 | 118 | 67 | .90014 | 224 |
| 18 | .97648 | 118 | 68 | .89790 | 229 |
| 19 | .97530 | 117 | 69 | .89561 | 234 |
| 20 | .97413 | 118 | 70 | .89327 | 239 |
| 21 | .97295 | 118 | 71 | .89088 | 244 |
| 22 | .97177 | 119 | 72 | .88844 | 248 |
| 23 | .97058 | 119 | 73 | .88596 | 250 |
| 24 | .96939 | 119 | 74 | .88346 | 254 |
| 25 | .96820 | 120 | 75 | .88092 | 256 |
| 26 | .96700 | 120 | 76 | .87836 | 258 |
| 27 | .96580 | 121 | 77 | .87578 | 266 |
| 28 | .96459 | 121 | 78 | .87312 | 272 |
| 29 | .96338 | 122 | 79 | .87040 | 280 |
| 30 | .96216 | 125 | 80 | .86760 | 286 |
| 31 | .96091 | 125 | 81 | .86474 | 294 |
| 32 | .95966 | 128 | 82 | .86180 | 297 |
| 33 | .95838 | 130 | 83 | .85883 | 301 |
| 34 | .95708 | 132 | 84 | .85582 | 306 |
| 35 | .95576 | 133 | 85 | .85276 | 309 |
| 36 | .95443 | 135 | 86 | .84967 | 321 |
| 37 | .95308 | 138 | 87 | .84646 | 332 |
| 38 | .95170 | 141 | 88 | .84314 | 343 |
| 39 | .95029 | 143 | 89 | .83971 | 348 |
| 40 | .94886 | 145 | 90 | .83623 | 354 |
| 41 | .94741 | 148 | 91 | .83269 | 362 |
| 42 | .94593 | 150 | 92 | .82907 | 369 |
| 43 | .94443 | 152 | 93 | .82538 | 375 |
| 44 | .94291 | 155 | 94 | .82163 | 391 |
| 45 | .94136 | 157 | 95 | .81772 | 409 |
| 46 | .93979 | 159 | 96 | .81363 | 421 |
| 47 | .93820 | 163 | 97 | .80942 | 428 |
| 48 | .93657 | 164 | 98 | .80514 | 432 |
| 49 | .93493 | 167 | 99 | .80082 | 435 |
| 50 | .93326 | ----- | 100 | .79647 | ----- |

TABLE 10.—Percentages by volume at 15° C. corresponding to various percentages by weight in mixtures of methyl alcohol and water

| Per cent by weight. | Per cent by volume at 15° C. | Differences. | Per cent by weight. | Per cent by volume at 15° C. | Differences. |
|---------------------|------------------------------|--------------|---------------------|------------------------------|--------------|
| 0 | 0.000 | 1.253 | 50 | 57.712 | 1.027 |
| 1 | 1.253 | 1.249 | 51 | 58.739 | 1.020 |
| 2 | 2.502 | 1.244 | 52 | 59.759 | 1.014 |
| 3 | 3.746 | 1.240 | 53 | 60.773 | 1.008- |
| 4 | 4.986 | 1.236 | 54 | 61.781 | 1.002 |
| 5 | 6.222 | 1.232 | 55 | 62.783 | .995 |
| 6 | 7.454 | 1.228 | 56 | 63.778 | .989 |
| 7 | 8.682 | 1.225 | 57 | 64.767 | .983 |
| 8 | 9.907 | 1.221 | 58 | 65.750 | .975 |
| 9 | 11.128 | 1.217 | 59 | 66.725 | .968 |
| 10 | 12.345 | 1.214 | 60 | 67.693 | .961 |
| 11 | 13.559 | 1.211 | 61 | 68.654 | .953 |
| 12 | 14.770 | 1.207 | 62 | 69.607 | .945 |
| 13 | 15.977 | 1.204 | 63 | 70.552 | .938 |
| 14 | 17.181 | 1.201 | 64 | 71.490 | .930 |
| 15 | 18.382 | 1.197 | 65 | 72.420 | .924 |
| 16 | 19.579 | 1.194 | 66 | 73.344 | .918 |
| 17 | 20.773 | 1.190 | 67 | 74.262 | .910 |
| 18 | 21.963 | 1.186 | 68 | 75.172 | .905 |
| 19 | 23.149 | 1.183 | 69 | 76.077 | .899 |
| 20 | 24.332 | 1.180 | 70 | 76.976 | .888 |
| 21 | 25.512 | 1.176 | 71 | 77.864 | .882 |
| 22 | 26.688 | 1.172 | 72 | 78.746 | .872 |
| 23 | 27.860 | 1.169 | 73 | 79.618 | .862 |
| 24 | 29.029 | 1.164 | 74 | 80.480 | .856 |
| 25 | 30.193 | 1.161 | 75 | 81.336 | .846 |
| 26 | 31.354 | 1.156 | 76 | 82.182 | .840 |
| 27 | 32.510 | 1.152 | 77 | 83.022 | .833 |
| 28 | 33.662 | 1.147 | 78 | 83.855 | .825 |
| 29 | 34.809 | 1.143 | 79 | 84.680 | .819 |
| 30 | 35.952 | 1.139 | 80 | 85.499 | .811 |
| 31 | 37.091 | 1.133 | 81 | 86.310 | .800 |
| 32 | 38.224 | 1.128 | 82 | 87.110 | .789 |
| 33 | 39.352 | 1.124 | 83 | 87.899 | .778 |
| 34 | 40.476 | 1.118 | 84 | 88.677 | .771 |
| 35 | 41.594 | 1.114 | 85 | 89.448 | .764 |
| 36 | 42.708 | 1.108 | 86 | 90.212 | .756 |
| 37 | 43.816 | 1.103 | 87 | 90.968 | .748 |
| 38 | 44.919 | 1.097 | 88 | 91.716 | .740 |
| 39 | 46.016 | 1.093 | 89 | 92.456 | .732 |
| 40 | 47.109 | 1.086 | 90 | 93.188 | .724 |
| 41 | 48.195 | 1.082 | 91 | 93.912 | .715 |
| 42 | 49.277 | 1.076 | 92 | 94.627 | .699 |
| 43 | 50.353 | 1.069 | 93 | 95.326 | .691 |
| 44 | 51.422 | 1.064 | 94 | 96.017 | .680 |
| 45 | 52.486 | 1.058 | 95 | 96.697 | .673 |
| 46 | 53.544 | 1.051 | 96 | 97.370 | .666 |
| 47 | 54.595 | 1.044 | 97 | 98.036 | .660 |
| 48 | 55.639 | 1.039 | 98 | 98.696 | .655 |
| 49 | 56.678 | 1.034 | 99 | 99.351 | .649 |
| 50 | 57.712 | ----- | 100 | 100.000 | ----- |

TABLE 11.—Temperature corrections to readings of Saccharometers (standard at 20° C.)

[This table is calculated using the data on thermal expansion of sugar solutions by Plato,¹ assuming the instrument to be of Jena 16^{mm} glass. The table should be used with caution and only for approximate results when the temperature differs much from the standard temperature or from the temperature of the surrounding air]

| Temperature in degrees centigrade | Observed per cent of sugar | | | | | | | | | | | | | |
|-----------------------------------|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 70 |
| | Subtract from observed per cent | | | | | | | | | | | | | |
| 0 | 0.30 | 0.49 | 0.65 | 0.77 | 0.89 | 0.99 | 1.08 | 1.16 | 1.24 | 1.31 | 1.37 | 1.41 | 1.44 | 1.49 |
| 5 | .36 | .47 | .56 | .65 | .73 | .80 | .86 | .91 | .97 | 1.01 | 1.05 | 1.08 | 1.10 | 1.14 |
| 10 | .32 | .38 | .43 | .48 | .52 | .57 | .60 | .64 | .67 | .70 | .72 | .74 | .75 | .77 |
| 11 | .31 | .35 | .40 | .44 | .48 | .51 | .55 | .58 | .60 | .63 | .65 | .66 | .68 | .70 |
| 12 | .29 | .32 | .36 | .40 | .43 | .46 | .50 | .52 | .54 | .56 | .58 | .59 | .60 | .62 |
| 13 | .26 | .29 | .32 | .35 | .38 | .41 | .44 | .46 | .48 | .49 | .51 | .52 | .53 | .55 |
| 14 | .24 | .26 | .29 | .31 | .34 | .36 | .38 | .40 | .41 | .42 | .44 | .45 | .46 | .47 |
| 15 | .20 | .22 | .24 | .26 | .28 | .30 | .32 | .33 | .34 | .36 | .36 | .37 | .38 | .39 |
| 16 | .17 | .18 | .20 | .22 | .23 | .25 | .26 | .27 | .28 | .28 | .29 | .30 | .31 | .32 |
| 17 | .13 | .14 | .15 | .16 | .18 | .19 | .20 | .20 | .21 | .21 | .22 | .23 | .23 | .24 |
| 18 | .09 | .10 | .10 | .11 | .12 | .13 | .13 | .14 | .14 | .14 | .15 | .15 | .15 | .16 |
| 19 | .05 | .05 | .05 | .06 | .06 | .06 | .07 | .07 | .07 | .07 | .08 | .08 | .08 | .08 |
| 17.5 | .11 | .12 | .12 | .14 | .15 | .16 | .16 | .17 | .17 | .18 | .18 | .19 | .19 | .20 |
| 15.56 (60° F.) | .18 | .20 | .22 | .24 | .26 | .28 | .29 | .30 | .30 | .32 | .33 | .33 | .34 | .34 |
| | Add to observed per cent | | | | | | | | | | | | | |
| 21 | 0.04 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 | 0.08 | 0.08 | 0.09 |
| 22 | .10 | .10 | .11 | .12 | .12 | .13 | .14 | .14 | .15 | .15 | .16 | .16 | .16 | .16 |
| 23 | .16 | .16 | .17 | .17 | .19 | .20 | .21 | .21 | .22 | .23 | .24 | .24 | .24 | .24 |
| 24 | .21 | .22 | .23 | .24 | .26 | .27 | .28 | .29 | .30 | .31 | .32 | .32 | .32 | .32 |
| 25 | .27 | .28 | .30 | .31 | .32 | .34 | .35 | .36 | .38 | .38 | .39 | .39 | .40 | .39 |
| 26 | .33 | .34 | .36 | .37 | .40 | .40 | .42 | .44 | .46 | .47 | .47 | .48 | .48 | .48 |
| 27 | .40 | .41 | .42 | .44 | .46 | .48 | .50 | .52 | .54 | .54 | .55 | .56 | .56 | .56 |
| 28 | .46 | .47 | .49 | .51 | .54 | .56 | .58 | .60 | .61 | .62 | .63 | .64 | .64 | .64 |
| 29 | .54 | .55 | .56 | .59 | .61 | .63 | .66 | .68 | .70 | .70 | .71 | .72 | .72 | .72 |
| 30 | .61 | .62 | .63 | .66 | .68 | .71 | .73 | .76 | .78 | .78 | .79 | .80 | .80 | .81 |
| 35 | .99 | 1.01 | 1.02 | 1.06 | 1.10 | 1.13 | 1.16 | 1.18 | 1.20 | 1.21 | 1.22 | 1.22 | 1.23 | 1.22 |
| 40 | 1.42 | 1.45 | 1.47 | 1.51 | 1.54 | 1.57 | 1.60 | 1.62 | 1.64 | 1.65 | 1.65 | 1.65 | 1.66 | 1.65 |
| 45 | 1.91 | 1.94 | 1.96 | 2.00 | 2.03 | 2.05 | 2.07 | 2.09 | 2.10 | 2.10 | 2.10 | 2.10 | 2.10 | 2.08 |
| 50 | 2.46 | 2.48 | 2.50 | 2.53 | 2.56 | 2.57 | 2.58 | 2.59 | 2.59 | 2.58 | 2.58 | 2.57 | 2.56 | 2.52 |
| 55 | 3.05 | 3.07 | 3.09 | 3.12 | 3.12 | 3.12 | 3.12 | 3.11 | 3.10 | 3.08 | 3.07 | 3.05 | 3.03 | 2.97 |
| 60 | 3.69 | 3.72 | 3.73 | 3.73 | 3.72 | 3.70 | 3.67 | 3.65 | 3.62 | 3.60 | 3.57 | 3.54 | 3.50 | 3.43 |
| 27.5 | .43 | .44 | .46 | .48 | .50 | .52 | .54 | .56 | .58 | .58 | .59 | .60 | .60 | .60 |

¹ Wiss. Abh. der Kaiserlichen Normal-Eichungs-Kommission, 2, p. 140; 1900.

TABLE 12.—Density¹ of solutions of cane sugar at 20° C.

[This table is the basis for standardizing hydrometers indicating per cent of sugar at 20° C.]

| Per cent sugar | Tenths of per cent | | | | | | | | | |
|----------------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 0.998234 | 0.998522 | 0.999010 | 0.999398 | 0.999786 | 1.000174 | 1.000563 | 1.000952 | 1.001342 | 1.001731 |
| 1 | 1.002120 | 1.002509 | 1.002897 | 1.003286 | 1.003675 | 1.004064 | 1.004453 | 1.004844 | 1.005234 | 1.005624 |
| 2 | 1.006015 | 1.006405 | 1.006796 | 1.007188 | 1.007580 | 1.007972 | 1.008363 | 1.008755 | 1.009148 | 1.009541 |
| 3 | 1.009934 | 1.010327 | 1.010721 | 1.011115 | 1.011510 | 1.011904 | 1.012298 | 1.012694 | 1.013089 | 1.013485 |
| 4 | 1.013881 | 1.014277 | 1.014673 | 1.015070 | 1.015467 | 1.015864 | 1.016261 | 1.016659 | 1.017058 | 1.017456 |
| 5 | 1.017854 | 1.018253 | 1.018652 | 1.019052 | 1.019451 | 1.019851 | 1.020251 | 1.020651 | 1.021053 | 1.021454 |
| 6 | 1.021855 | 1.022257 | 1.022659 | 1.023061 | 1.023463 | 1.023867 | 1.024270 | 1.024673 | 1.025077 | 1.025481 |
| 7 | 1.025885 | 1.026289 | 1.026694 | 1.027099 | 1.027504 | 1.027910 | 1.028316 | 1.028722 | 1.029128 | 1.029535 |
| 8 | 1.029942 | 1.030349 | 1.030757 | 1.031165 | 1.031573 | 1.031982 | 1.032391 | 1.032800 | 1.033209 | 1.033619 |
| 9 | 1.034029 | 1.034439 | 1.034850 | 1.035260 | 1.035671 | 1.036082 | 1.036494 | 1.036906 | 1.037318 | 1.037730 |
| 10 | 1.038143 | 1.038556 | 1.038970 | 1.039383 | 1.039797 | 1.040212 | 1.040626 | 1.041041 | 1.041456 | 1.041872 |
| 11 | 1.042288 | 1.042704 | 1.043121 | 1.043537 | 1.043954 | 1.044370 | 1.044788 | 1.045206 | 1.045625 | 1.046043 |
| 12 | 1.046462 | 1.046881 | 1.047300 | 1.047720 | 1.048140 | 1.048559 | 1.048980 | 1.049401 | 1.049822 | 1.050243 |
| 13 | 1.050665 | 1.051087 | 1.051510 | 1.051933 | 1.052356 | 1.052778 | 1.053202 | 1.053626 | 1.054050 | 1.054475 |
| 14 | 1.054900 | 1.055325 | 1.055751 | 1.056176 | 1.056602 | 1.057027 | 1.057455 | 1.057882 | 1.058310 | 1.058737 |
| 15 | 1.059165 | 1.059593 | 1.060022 | 1.060451 | 1.060880 | 1.061308 | 1.061738 | 1.062168 | 1.062598 | 1.063029 |
| 16 | 1.063460 | 1.063892 | 1.064324 | 1.064756 | 1.065188 | 1.065621 | 1.066054 | 1.066487 | 1.066921 | 1.067355 |
| 17 | 1.067789 | 1.068223 | 1.068658 | 1.069093 | 1.069529 | 1.069964 | 1.070400 | 1.070836 | 1.071273 | 1.071710 |
| 18 | 1.072147 | 1.072585 | 1.073023 | 1.073461 | 1.073900 | 1.074338 | 1.074777 | 1.075217 | 1.075657 | 1.076097 |
| 19 | 1.076537 | 1.076978 | 1.077419 | 1.077860 | 1.078302 | 1.078744 | 1.079187 | 1.079629 | 1.080072 | 1.080515 |
| 20 | 1.080959 | 1.081403 | 1.081848 | 1.082292 | 1.082737 | 1.083182 | 1.083628 | 1.084074 | 1.084520 | 1.084967 |
| 21 | 1.085414 | 1.085861 | 1.086309 | 1.086757 | 1.087205 | 1.087652 | 1.088101 | 1.088550 | 1.089000 | 1.089450 |
| 22 | 1.089900 | 1.090351 | 1.090802 | 1.091253 | 1.091704 | 1.092155 | 1.092607 | 1.093060 | 1.093513 | 1.093966 |
| 23 | 1.094420 | 1.094874 | 1.095328 | 1.095782 | 1.096236 | 1.096691 | 1.097147 | 1.097603 | 1.098058 | 1.098514 |
| 24 | 1.098971 | 1.099428 | 1.099886 | 1.100344 | 1.100802 | 1.101259 | 1.101718 | 1.102177 | 1.102637 | 1.103097 |
| 25 | 1.103557 | 1.104017 | 1.104478 | 1.104938 | 1.105400 | 1.105862 | 1.106324 | 1.106786 | 1.107248 | 1.107711 |
| 26 | 1.108175 | 1.108639 | 1.109103 | 1.109568 | 1.110033 | 1.110497 | 1.110963 | 1.111429 | 1.111895 | 1.112361 |
| 27 | 1.112828 | 1.113295 | 1.113763 | 1.114229 | 1.114697 | 1.115166 | 1.115635 | 1.116104 | 1.116572 | 1.117042 |
| 28 | 1.117512 | 1.117982 | 1.118453 | 1.118923 | 1.119395 | 1.119867 | 1.120339 | 1.120812 | 1.121284 | 1.121757 |
| 29 | 1.122231 | 1.122705 | 1.123179 | 1.123653 | 1.124128 | 1.124603 | 1.125079 | 1.125555 | 1.126030 | 1.126507 |
| 30 | 1.126984 | 1.127461 | 1.127939 | 1.128417 | 1.128896 | 1.129374 | 1.129853 | 1.130332 | 1.130812 | 1.131292 |
| 31 | 1.131773 | 1.132254 | 1.132735 | 1.133216 | 1.133698 | 1.134180 | 1.134663 | 1.135146 | 1.135628 | 1.136112 |
| 32 | 1.136596 | 1.137080 | 1.137565 | 1.138049 | 1.138534 | 1.139020 | 1.139506 | 1.139993 | 1.140479 | 1.140966 |
| 33 | 1.141453 | 1.141941 | 1.142429 | 1.142916 | 1.143405 | 1.143894 | 1.144384 | 1.144874 | 1.145363 | 1.145854 |
| 34 | 1.146345 | 1.146836 | 1.147328 | 1.147820 | 1.148313 | 1.148805 | 1.149298 | 1.149792 | 1.150286 | 1.150780 |
| 35 | 1.151275 | 1.151770 | 1.152265 | 1.152760 | 1.153256 | 1.153752 | 1.154249 | 1.154746 | 1.155242 | 1.155740 |
| 36 | 1.156238 | 1.156736 | 1.157235 | 1.157733 | 1.158233 | 1.158733 | 1.159233 | 1.159733 | 1.160233 | 1.160734 |
| 37 | 1.161236 | 1.161738 | 1.162240 | 1.162742 | 1.163245 | 1.163748 | 1.164252 | 1.164756 | 1.165259 | 1.165764 |
| 38 | 1.166269 | 1.166775 | 1.167281 | 1.167786 | 1.168293 | 1.168800 | 1.169307 | 1.169815 | 1.170322 | 1.170831 |
| 39 | 1.171340 | 1.171849 | 1.172359 | 1.172869 | 1.173379 | 1.173889 | 1.174400 | 1.174911 | 1.175423 | 1.175935 |
| 40 | 1.176447 | 1.176960 | 1.177473 | 1.177987 | 1.178501 | 1.179014 | 1.179527 | 1.180044 | 1.180560 | 1.181076 |
| 41 | 1.181592 | 1.182108 | 1.182625 | 1.183142 | 1.183660 | 1.184178 | 1.184696 | 1.185215 | 1.185734 | 1.186253 |
| 42 | 1.186773 | 1.187293 | 1.187814 | 1.188335 | 1.188856 | 1.189379 | 1.189901 | 1.190423 | 1.190946 | 1.191469 |
| 43 | 1.191993 | 1.192517 | 1.193041 | 1.193565 | 1.194090 | 1.194616 | 1.195141 | 1.195667 | 1.196193 | 1.196720 |
| 44 | 1.197247 | 1.197775 | 1.198303 | 1.198832 | 1.199360 | 1.199890 | 2.000420 | 1.200950 | 1.201480 | 1.202010 |
| 45 | 1.202540 | 1.203071 | 1.203603 | 1.204136 | 1.204668 | 1.205200 | 1.205733 | 1.206266 | 1.206801 | 1.207335 |
| 46 | 1.207870 | 1.208405 | 1.208940 | 1.209477 | 1.210013 | 1.210549 | 1.211086 | 1.211623 | 1.212162 | 1.212700 |
| 47 | 1.213238 | 1.213777 | 1.214317 | 1.214856 | 1.215395 | 1.215936 | 1.216476 | 1.217017 | 1.217559 | 1.218101 |
| 48 | 1.218643 | 1.219185 | 1.219729 | 1.220272 | 1.220815 | 1.221360 | 1.221904 | 1.222449 | 1.222995 | 1.223540 |
| 49 | 1.224086 | 1.224632 | 1.225180 | 1.225727 | 1.226274 | 1.226823 | 1.227371 | 1.227919 | 1.228469 | 1.229018 |
| 50 | 1.229567 | 1.230117 | 1.230668 | 1.231219 | 1.231770 | 1.232322 | 1.232874 | 1.233426 | 1.233979 | 1.234532 |

¹ According to Dr. F. Plato (Wiss. Abh. der Kaiserlichen Normal-Eichungs-Kommission, 2, p. 153; 1900).

TABLE 13.—Density of solutions of sulphuric acid (H_2SO_4) at $20^\circ C$.[Calculated from Dr. J. Domke's table.¹ Adopted as the basis for standardization of hydrometers indicating per cent of sulphuric acid at $20^\circ C$.]

| Per cent H_2SO_4 | $D_{4}^{20}C$ | Per cent H_2SO_4 | $D_{4}^{20}C$ | Per cent H_2SO_4 | $D_{4}^{20}C$ |
|--------------------|---------------|--------------------|---------------|--------------------|---------------|
| 0 | 0.99823 | 50 | 1.39505 | 91.0 | 1.81950 |
| 1 | 1.00506 | 51 | 1.40487 | 91.2 | 1.82045 |
| 2 | 1.01178 | 52 | 1.41481 | 91.4 | 1.82137 |
| 3 | 1.01839 | 53 | 1.42487 | 91.6 | 1.82227 |
| 4 | 1.02500 | 54 | 1.43503 | 91.8 | 1.82315 |
| 5 | 1.03168 | 55 | 1.44530 | 92.0 | 1.82401 |
| 6 | 1.03843 | 56 | 1.45568 | 92.2 | 1.82484 |
| 7 | 1.04527 | 57 | 1.46615 | 92.4 | 1.82564 |
| 8 | 1.05216 | 58 | 1.47673 | 92.6 | 1.82641 |
| 9 | 1.05909 | 59 | 1.48740 | 92.8 | 1.82717 |
| 10 | 1.06609 | 60 | 1.49818 | 93.0 | 1.82790 |
| 11 | 1.07314 | 61 | 1.50904 | 93.2 | 1.82860 |
| 12 | 1.08026 | 62 | 1.51999 | 93.4 | 1.82928 |
| 13 | 1.08744 | 63 | 1.53102 | 93.6 | 1.82993 |
| 14 | 1.09468 | 64 | 1.54213 | 93.8 | 1.83055 |
| 15 | 1.10199 | 65 | 1.55333 | 94.0 | 1.83115 |
| 16 | 1.10936 | 66 | 1.56460 | 94.2 | 1.83172 |
| 17 | 1.11679 | 67 | 1.57595 | 94.4 | 1.83226 |
| 18 | 1.12428 | 68 | 1.58739 | 94.6 | 1.83276 |
| 19 | 1.13183 | 69 | 1.59890 | 94.8 | 1.83324 |
| 20 | 1.13943 | 70 | 1.61048 | 95.0 | 1.83368 |
| 21 | 1.14709 | 71 | 1.62213 | 95.1 | 1.83389 |
| 22 | 1.15480 | 72 | 1.63384 | 95.2 | 1.83410 |
| 23 | 1.16258 | 73 | 1.64560 | 95.3 | 1.83430 |
| 24 | 1.17041 | 74 | 1.65738 | 95.4 | 1.83449 |
| 25 | 1.17830 | 75 | 1.66917 | 95.5 | 1.83469 |
| 26 | 1.18624 | 76 | 1.68095 | 95.6 | 1.83486 |
| 27 | 1.19423 | 77 | 1.69268 | 95.7 | 1.83503 |
| 28 | 1.20227 | 78 | 1.70433 | 95.8 | 1.83520 |
| 29 | 1.21036 | 79 | 1.71585 | 95.9 | 1.83534 |
| 30 | 1.21850 | 80 | 1.72717 | 96.0 | 1.83548 |
| 31 | 1.22669 | 81 | 1.73827 | 96.1 | 1.83560 |
| 32 | 1.23492 | 82 | 1.74904 | 96.2 | 1.83572 |
| 33 | 1.24320 | 83 | 1.75943 | 96.3 | 1.83584 |
| 34 | 1.25154 | 84 | 1.76932 | 96.4 | 1.83594 |
| 35 | 1.25992 | 85 | 1.77860 | 96.5 | 1.83604 |
| 36 | 1.26836 | 85.5 | 1.78300 | 96.6 | 1.83613 |
| 37 | 1.27685 | 86 | 1.78721 | 96.7 | 1.83621 |
| 38 | 1.28543 | 86.5 | 1.79124 | 96.8 | 1.83628 |
| 39 | 1.29407 | 87 | 1.79509 | 96.9 | 1.83634 |
| 40 | 1.30278 | 87.5 | 1.79875 | 97.0 | 1.83637 |
| 41 | 1.31157 | 88 | 1.80223 | 97.1 | 1.83639 |
| 42 | 1.32043 | 88.5 | 1.80552 | 97.2 | 1.83640 |
| 43 | 1.32938 | 89 | 1.80864 | 97.3 | 1.83640 |
| 44 | 1.33843 | 89.5 | 1.81159 | 97.4 | 1.83639 |
| 45 | 1.34759 | 90 | 1.81438 | 97.5 | 1.83637 |
| 46 | 1.35686 | 90.2 | 1.81545 | 97.6 | 1.83634 |
| 47 | 1.36625 | 90.4 | 1.81650 | 97.7 | 1.83629 |
| 48 | 1.37574 | 90.6 | 1.81753 | 97.8 | 1.83623 |
| 49 | 1.38533 | 90.8 | 1.81853 | 97.9 | 1.83615 |
| 50 | 1.39505 | 91.0 | 1.81950 | 98.0 | 1.83605 |

¹ Wiss. Abh. der Kaiserlichen Normal-Eichungs-Kommission, 5, p. 131; 1900.

TABLE 15.—Temperature corrections to readings of specific gravity hydrometers in American petroleum oils at various temperatures

[Standard at 60°/60° F.]

| Observed temperature °F. | Observed specific gravity | | | | | | |
|--------------------------|---|--------|--------|--------|--------|--------|--------|
| | 0.650 | 0.700 | 0.750 | 0.800 | 0.850 | 0.900 | 0.950 |
| | Subtract from observed specific gravity | | | | | | |
| 30 | 0.0158 | 0.0146 | 0.0135 | 0.0121 | 0.0111 | 0.0107 | 0.0107 |
| 32 | .0148 | .0136 | .0126 | .0113 | .0104 | .0100 | .0100 |
| 34 | .0137 | .0126 | .0116 | .0105 | .0097 | .0093 | .0093 |
| 36 | .0126 | .0116 | .0107 | .0097 | .0089 | .0085 | .0086 |
| 38 | .0115 | .0106 | .0098 | .0089 | .0082 | .0078 | .0078 |
| 40 | .0105 | .0097 | .0089 | .0081 | .0074 | .0071 | .0071 |
| 42 | .0094 | .0087 | .0080 | .0072 | .0066 | .0064 | .0064 |
| 44 | .0083 | .0077 | .0071 | .0064 | .0059 | .0057 | .0057 |
| 46 | .0072 | .0067 | .0062 | .0056 | .0052 | .0050 | .0050 |
| 48 | .0062 | .0057 | .0052 | .0048 | .0045 | .0043 | .0043 |
| 50 | .0052 | .0048 | .0044 | .0040 | .0037 | .0036 | .0035 |
| 52 | .0042 | .0038 | .0035 | .0032 | .0030 | .0028 | .0028 |
| 54 | .0031 | .0029 | .0025 | .0024 | .0022 | .0021 | .0021 |
| 56 | .0020 | .0019 | .0017 | .0016 | .0015 | .0014 | .0014 |
| 58 | .0010 | .0010 | .0009 | .0008 | .0007 | .0007 | .0007 |
| | Add to observed specific gravity | | | | | | |
| 60 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 62 | .0010 | .0009 | .0009 | .0008 | .0007 | .0007 | .0007 |
| 64 | .0021 | .0019 | .0018 | .0016 | .0014 | .0014 | .0014 |
| 66 | .0031 | .0028 | .0026 | .0024 | .0022 | .0022 | .0021 |
| 68 | .0041 | .0038 | .0035 | .0031 | .0029 | .0029 | .0028 |
| 70 | .0051 | .0048 | .0043 | .0039 | .0037 | .0036 | .0035 |
| 72 | .0061 | .0057 | .0052 | .0047 | .0044 | .0043 | .0042 |
| 74 | .0071 | .0066 | .0060 | .0055 | .0052 | .0050 | .0049 |
| 76 | .0081 | .0075 | .0069 | .0063 | .0059 | .0057 | .0056 |
| 78 | .0092 | .0085 | .0078 | .0070 | .0066 | .0064 | .0063 |
| 80 | .0102 | .0094 | .0086 | .0078 | .0073 | .0072 | .0070 |
| 82 | .0112 | .0103 | .0094 | .0086 | .0081 | .0079 | .0077 |
| 84 | .0122 | .0113 | .0103 | .0094 | .0088 | .0085 | .0084 |
| 86 | .0132 | .0122 | .0112 | .0101 | .0096 | .0092 | .0091 |
| 88 | .0142 | .0132 | .0120 | .0109 | .0103 | .0099 | .0098 |
| 90 | .0152 | .0141 | .0128 | .0116 | .0110 | .0106 | .0105 |
| 92 | ----- | .0151 | .0136 | .0123 | .0117 | .0114 | .0112 |
| 94 | ----- | .0160 | .0145 | .0131 | .0124 | .0120 | .0118 |
| 96 | ----- | .0169 | .0153 | .0137 | .0130 | .0127 | .0125 |
| 98 | ----- | .0179 | .0162 | .0145 | .0137 | .0133 | .0133 |
| 100 | ----- | .0188 | .0170 | .0153 | .0144 | .0141 | .0139 |
| 102 | ----- | .0196 | .0178 | .0161 | .0152 | .0148 | .0146 |
| 104 | ----- | .0205 | .0186 | .0168 | .0159 | .0155 | .0153 |
| 106 | ----- | .0214 | .0194 | .0176 | .0166 | .0162 | .0159 |
| 108 | ----- | .0223 | .0202 | .0184 | .0173 | .0169 | .0166 |
| 110 | ----- | .0232 | .0210 | .0191 | .0180 | .0176 | .0173 |
| 112 | ----- | .0240 | .0218 | .0198 | .0187 | .0183 | .0180 |
| 114 | ----- | .0250 | .0225 | .0205 | .0194 | .0189 | .0187 |
| 116 | ----- | .0258 | .0233 | .0213 | .0201 | .0196 | .0194 |
| 118 | ----- | .0266 | .0241 | .0220 | .0208 | .0202 | .0200 |
| 120 | ----- | .0275 | .0249 | .0227 | .0215 | .0210 | .0207 |

(This table is calculated from the same data as Table 3, Circular No. 154, Bureau of Standards.)

For complete petroleum oil tables see Circular No. 154, Bureau of Standards.

TABLE 16.—Temperature corrections to readings of A. P. I. hydrometers in American petroleum oils at various temperatures

[Standard at 60° F.; modulus 141.5]

| Observed temperature ° F. | Observed degrees A. P. I. | | | | | | | |
|------------------------------|---|------|------|------|------|-------|-------|-------|
| | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 |
| | Add to observed degrees A. P. I. | | | | | | | |
| 30 | 1.7 | 2.0 | 2.4 | 3.0 | 3.6 | 4.3 | 4.9 | 5.8 |
| 32 | 1.6 | 1.9 | 2.3 | 2.8 | 3.4 | 4.0 | 4.6 | 5.4 |
| 34 | 1.5 | 1.7 | 2.1 | 2.6 | 3.1 | 3.7 | 4.2 | 5.0 |
| 36 | 1.4 | 1.6 | 1.9 | 2.4 | 2.9 | 3.4 | 3.9 | 4.6 |
| 38 | 1.3 | 1.5 | 1.8 | 2.2 | 2.6 | 3.1 | 3.6 | 4.2 |
| 40 | 1.2 | 1.3 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.8 |
| 42 | 1.0 | 1.2 | 1.4 | 1.8 | 2.1 | 2.5 | 2.9 | 3.4 |
| 44 | .9 | 1.0 | 1.3 | 1.6 | 1.9 | 2.2 | 2.6 | 3.0 |
| 46 | .8 | .9 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 | 2.6 |
| 48 | .7 | .8 | 1.0 | 1.2 | 1.4 | 1.7 | 1.9 | 2.2 |
| 50 | .6 | .7 | .8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.9 |
| 52 | .5 | .5 | .6 | .8 | .9 | 1.1 | 1.3 | 1.5 |
| 54 | .3 | .4 | .5 | .6 | .7 | .8 | 1.0 | 1.1 |
| 56 | .2 | .2 | .3 | .4 | .4 | .5 | .6 | .7 |
| 58 | .1 | .1 | .2 | .2 | .2 | .3 | .3 | .3 |
| | Subtract from observed degrees A. P. I. | | | | | | | |
| 60 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 62 | .1 | .1 | .2 | .2 | .2 | .2 | .3 | .3 |
| 64 | .2 | .3 | .3 | .4 | .5 | .5 | .6 | .7 |
| 66 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | 1.1 |
| 68 | .5 | .5 | .6 | .8 | .9 | 1.1 | 1.2 | 1.4 |
| 70 | .6 | .7 | .8 | 1.0 | 1.1 | 1.4 | 1.6 | 1.8 |
| 72 | .7 | .8 | .9 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 |
| 74 | .8 | .9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.2 | 2.5 |
| 76 | .9 | 1.1 | 1.2 | 1.5 | 1.8 | 2.1 | 2.5 | 2.8 |
| 78 | 1.0 | 1.2 | 1.4 | 1.7 | 2.0 | 2.4 | 2.8 | 3.2 |
| 80 | 1.1 | 1.3 | 1.6 | 1.9 | 2.2 | 2.6 | 3.1 | 3.5 |
| 82 | 1.3 | 1.5 | 1.7 | 2.0 | 2.5 | 2.9 | 3.4 | 3.9 |
| 84 | 1.4 | 1.6 | 1.9 | 2.2 | 2.7 | 3.2 | 3.7 | 4.2 |
| 86 | 1.5 | 1.7 | 2.0 | 2.4 | 2.9 | 3.4 | 4.0 | 4.6 |
| 88 | 1.6 | 1.8 | 2.1 | 2.6 | 3.1 | 3.7 | 4.3 | 4.9 |
| 90 | 1.7 | 2.0 | 2.3 | 2.8 | 3.3 | 3.9 | 4.5 | 5.2 |
| 92 | 1.8 | 2.1 | 2.4 | 2.9 | 3.5 | ----- | ----- | ----- |
| 94 | 1.9 | 2.2 | 2.6 | 3.1 | 3.8 | ----- | ----- | ----- |
| 96 | 2.0 | 2.3 | 2.7 | 3.3 | 4.0 | ----- | ----- | ----- |
| 98 | 2.1 | 2.5 | 2.9 | 3.4 | 4.2 | ----- | ----- | ----- |
| 100 | 2.2 | 2.6 | 3.0 | 3.6 | 4.4 | ----- | ----- | ----- |
| 102 | 2.4 | 2.7 | 3.2 | 3.8 | 4.6 | ----- | ----- | ----- |
| 104 | 2.5 | 2.8 | 3.3 | 4.0 | 4.8 | ----- | ----- | ----- |
| 106 | 2.6 | 3.0 | 3.5 | 4.1 | 5.0 | ----- | ----- | ----- |
| 108 | 2.7 | 3.1 | 3.6 | 4.3 | 5.2 | ----- | ----- | ----- |
| 110 | 2.8 | 3.2 | 3.8 | 4.5 | 5.4 | ----- | ----- | ----- |
| 112 | 2.9 | 3.3 | 3.9 | 4.6 | 5.6 | ----- | ----- | ----- |
| 114 | 3.0 | 3.5 | 4.0 | 4.8 | 5.8 | ----- | ----- | ----- |
| 116 | 3.1 | 3.6 | 4.2 | 5.0 | 6.0 | ----- | ----- | ----- |
| 118 | 3.2 | 3.7 | 4.3 | 5.1 | 6.2 | ----- | ----- | ----- |
| 120 | 3.3 | 3.8 | 4.5 | 5.3 | 6.4 | ----- | ----- | ----- |

(This table is calculated from the same data as Table 1, Circular No. 154, Bureau of Standards.)

For complete petroleum oil tables see Circular No. 154, Bureau of Standards.

NOTE.—In order to overcome the confusion that has existed in the petroleum-oil industry by reason of the use of two so-called Baumé scales for light liquids, the American Petroleum Institute, the Bureau of Mines, and the Bureau of Standards in December, 1921, agreed to recommend that in the future only the scale based on the modulus 141.5 be used in the petroleum-oil industry, and that it be known as the A. P. I. scale. The relation of degrees A. P. I. to specific gravity is expressed by the formula

$$\text{Degrees A. P. I.} = \frac{141.5}{\text{Sp. Gr. } 60^\circ/60^\circ \text{ F.}} - 131.5$$

The U. S. Baumé scale based on the modulus 140 will continue to be used for other liquids lighter than water.

(See Tables 24 and 25 of this circular for the relation of degrees A. P. I. to specific gravity.)

TABLE 17.—Degrees Baumé, degrees A. P. I.,¹ pounds per gallon, and gallons per pound corresponding to various specific gravities

| Specific gravity 60°/60° F. | Degrees Baumé (modulus 140) | Degrees A. P. I. (modulus 141.5) | Pounds per gallon | Gallons per pound |
|--------------------------------|--------------------------------|-------------------------------------|-------------------|-------------------|
| 0.600 | 103.33 | 104.33 | 4.993 | 0.2003 |
| .610 | 99.51 | 100.47 | 5.076 | .1970 |
| .620 | 95.81 | 96.73 | 5.160 | .1938 |
| .630 | 92.22 | 93.10 | 5.243 | .1907 |
| .640 | 88.75 | 89.59 | 5.326 | .1877 |
| .650 | 85.38 | 86.19 | 5.410 | .1848 |
| .660 | 82.12 | 82.89 | 5.493 | .1820 |
| .670 | 78.96 | 79.69 | 5.577 | .1793 |
| .680 | 75.88 | 76.59 | 5.660 | .1767 |
| .690 | 72.90 | 73.57 | 5.743 | .1741 |
| .700 | 70.00 | 70.64 | 5.827 | .1716 |
| .710 | 67.18 | 67.80 | 5.910 | .1692 |
| .720 | 64.44 | 65.03 | 5.994 | .1668 |
| .730 | 61.78 | 62.34 | 6.077 | .1646 |
| .740 | 59.19 | 59.72 | 6.160 | .1623 |
| .750 | 56.67 | 57.17 | 6.244 | .1602 |
| .760 | 54.21 | 54.68 | 6.327 | .1580 |
| .770 | 51.82 | 52.27 | 6.410 | .1560 |
| .780 | 49.49 | 49.91 | 6.494 | .1540 |
| .790 | 47.22 | 47.61 | 6.577 | .1520 |
| .800 | 45.00 | 45.38 | 6.661 | .1501 |
| .810 | 42.84 | 43.19 | 6.744 | .1483 |
| .820 | 40.73 | 41.06 | 6.827 | .1465 |
| .830 | 38.68 | 38.98 | 6.911 | .1447 |
| .840 | 36.67 | 36.95 | 6.994 | .1430 |
| .850 | 34.71 | 34.97 | 7.078 | .1413 |
| .860 | 32.79 | 33.03 | 7.161 | .1396 |
| .870 | 30.92 | 31.14 | 7.244 | .1380 |
| .880 | 29.09 | 29.30 | 7.328 | .1365 |
| .890 | 27.30 | 27.49 | 7.411 | .1349 |
| .900 | 25.56 | 25.72 | 7.494 | .1334 |
| .910 | 23.85 | 23.99 | 7.578 | .1320 |
| .920 | 22.17 | 22.30 | 7.661 | .1305 |
| .930 | 20.54 | 20.65 | 7.745 | .1291 |
| .940 | 18.94 | 19.03 | 7.828 | .1278 |
| .950 | 17.37 | 17.45 | 7.911 | .1264 |
| .960 | 15.83 | 15.90 | 7.995 | .1251 |
| .970 | 14.33 | 14.38 | 8.078 | .1238 |
| .980 | 12.86 | 12.89 | 8.162 | .1225 |
| .990 | 11.41 | 11.43 | 8.245 | .1213 |
| 1.000 | 10.00 | 10.00 | 8.328 | .1201 |

¹ See note, p. 29.

For complete petroleum oil tables see Circular No. 154, Bureau of Standards.

TABLE 18.—Specific gravities, pounds per gallon, and gallons per pound corresponding to various degrees Baumé for light liquids

| Degrees Baumé (modulus 140) | Specific gravity 60°/60° F. | Pounds per gallon | Gallons per pound | Degrees Baumé (modulus 140) | Specific gravity 60°/60° F. | Pounds per gallon | Gallons per Pound |
|-----------------------------|-----------------------------|-------------------|-------------------|-----------------------------|-----------------------------|-------------------|-------------------|
| 10.0 | 1.0000 | 8.328 | 0.1201 | 55.0 | 0.7568 | 6.300 | 0.1587 |
| 11.0 | .9929 | 8.269 | .1209 | 56.0 | .7527 | 6.266 | .1596 |
| 12.0 | .9859 | 8.211 | .1218 | 57.0 | .7487 | 6.233 | .1604 |
| 13.0 | .9790 | 8.153 | .1227 | 58.0 | .7447 | 6.199 | .1613 |
| 14.0 | .9722 | 8.096 | .1235 | 59.0 | .7407 | 6.166 | .1622 |
| 15.0 | .9655 | 8.041 | .1244 | 60.0 | .7368 | 6.134 | .1630 |
| 16.0 | .9589 | 7.986 | .1252 | 61.0 | .7330 | 6.102 | .1639 |
| 17.0 | .9524 | 7.931 | .1261 | 62.0 | .7292 | 6.070 | .1647 |
| 18.0 | .9459 | 7.877 | .1270 | 63.0 | .7254 | 6.038 | .1656 |
| 19.0 | .9396 | 7.825 | .1278 | 64.0 | .7216 | 6.007 | .1665 |
| 20.0 | .9333 | 7.772 | .1287 | 65.0 | .7179 | 5.976 | .1673 |
| 21.0 | .9272 | 7.721 | .1295 | 66.0 | .7143 | 5.946 | .1682 |
| 22.0 | .9211 | 7.670 | .1304 | 67.0 | .7107 | 5.916 | .1690 |
| 23.0 | .9150 | 7.620 | .1313 | 68.0 | .7071 | 5.886 | .1699 |
| 24.0 | .9091 | 7.570 | .1321 | 69.0 | .7035 | 5.856 | .1708 |
| 25.0 | .9032 | 7.522 | .1330 | 70.0 | .7000 | 5.827 | .1716 |
| 26.0 | .8974 | 7.473 | .1338 | 71.0 | .6965 | 5.798 | .1725 |
| 27.0 | .8917 | 7.425 | .1347 | 72.0 | .6931 | 5.769 | .1733 |
| 28.0 | .8861 | 7.378 | .1355 | 73.0 | .6897 | 5.741 | .1742 |
| 29.0 | .8805 | 7.332 | .1364 | 74.0 | .6863 | 5.712 | .1751 |
| 30.0 | .8750 | 7.286 | .1373 | 75.0 | .6829 | 5.685 | .1759 |
| 31.0 | .8696 | 7.241 | .1381 | 76.0 | .6796 | 5.657 | .1768 |
| 32.0 | .8642 | 7.196 | .1390 | 77.0 | .6763 | 5.629 | .1776 |
| 33.0 | .8589 | 7.152 | .1398 | 78.0 | .6731 | 5.602 | .1785 |
| 34.0 | .8537 | 7.108 | .1407 | 79.0 | .6699 | 5.576 | .1793 |
| 35.0 | .8485 | 7.065 | .1415 | 80.0 | .6667 | 5.549 | .1802 |
| 36.0 | .8434 | 7.022 | .1424 | 81.0 | .6635 | 5.522 | .1811 |
| 37.0 | .8383 | 6.980 | .1433 | 82.0 | .6604 | 5.497 | .1819 |
| 38.0 | .8333 | 6.939 | .1441 | 83.0 | .6573 | 5.471 | .1828 |
| 39.0 | .8284 | 6.898 | .1450 | 84.0 | .6542 | 5.445 | .1837 |
| 40.0 | .8235 | 6.857 | .1459 | 85.0 | .6512 | 5.420 | .1845 |
| 41.0 | .8187 | 6.817 | .1467 | 86.0 | .6482 | 5.395 | .1854 |
| 42.0 | .8140 | 6.777 | .1476 | 87.0 | .6452 | 5.370 | .1862 |
| 43.0 | .8092 | 6.738 | .1484 | 88.0 | .6422 | 5.345 | .1871 |
| 44.0 | .8046 | 6.699 | .1493 | 89.0 | .6393 | 5.320 | .1880 |
| 45.0 | .8000 | 6.661 | .1501 | 90.0 | .6364 | 5.296 | .1888 |
| 46.0 | .7955 | 6.623 | .1510 | 91.0 | .6335 | 5.272 | .1897 |
| 47.0 | .7910 | 6.586 | .1518 | 92.0 | .6306 | 5.248 | .1905 |
| 48.0 | .7865 | 6.548 | .1527 | 93.0 | .6278 | 5.225 | .1914 |
| 49.0 | .7821 | 6.511 | .1536 | 94.0 | .6250 | 5.201 | .1923 |
| 50.0 | .7778 | 6.476 | .1544 | 95.0 | .6222 | 5.178 | .1931 |
| 51.0 | .7735 | 6.440 | .1553 | 96.0 | .6195 | 5.155 | .1940 |
| 52.0 | .7692 | 6.404 | .1562 | 97.0 | .6167 | 5.132 | .1949 |
| 53.0 | .7650 | 6.369 | .1570 | 98.0 | .6140 | 5.110 | .1957 |
| 54.0 | .7609 | 6.334 | .1579 | 99.0 | .6114 | 5.088 | .1966 |
| 55.0 | .7568 | 6.300 | .1587 | 100.0 | .6087 | 5.066 | .1974 |

TABLE 19.—Specific gravities, pounds per gallon, and gallons per pound corresponding to various degrees A. P. I.¹

| Degrees A. P. I. (modulus 141.5) | Specific gravity 60°/60° F. | Pounds per gallon | Gallons per pound | Degrees A. P. I. (modulus 141.5) | Specific gravity 60°/60° F. | Pounds per gallon | Gallons per pound |
|---|-----------------------------------|-------------------------|-------------------------|---|-----------------------------------|-------------------------|-------------------------|
| 10.0 | 1.0000 | 8.328 | 0.1201 | 55.0 | 0.7587 | 6.316 | 0.1583 |
| 11.0 | .9930 | 8.270 | .1209 | 56.0 | .7547 | 6.283 | .1592 |
| 12.0 | .9861 | 8.212 | .1218 | 57.0 | .7507 | 6.249 | .1600 |
| 13.0 | .9792 | 8.155 | .1226 | 58.0 | .7467 | 6.216 | .1609 |
| 14.0 | .9725 | 8.099 | .1235 | 59.0 | .7428 | 6.184 | .1617 |
| 15.0 | .9659 | 8.044 | .1243 | 60.0 | .7389 | 6.151 | .1626 |
| 16.0 | .9593 | 7.989 | .1252 | 61.0 | .7351 | 6.119 | .1634 |
| 17.0 | .9529 | 7.935 | .1260 | 62.0 | .7313 | 6.087 | .1643 |
| 18.0 | .9465 | 7.882 | .1269 | 63.0 | .7275 | 6.056 | .1651 |
| 19.0 | .9402 | 7.830 | .1277 | 64.0 | .7238 | 6.025 | .1660 |
| 20.0 | .9340 | 7.778 | .1286 | 65.0 | .7201 | 5.994 | .1668 |
| 21.0 | .9279 | 7.727 | .1294 | 66.0 | .7165 | 5.964 | .1677 |
| 22.0 | .9218 | 7.676 | .1303 | 67.0 | .7128 | 5.934 | .1685 |
| 23.0 | .9159 | 7.627 | .1311 | 68.0 | .7093 | 5.904 | .1694 |
| 24.0 | .9100 | 7.578 | .1320 | 69.0 | .7057 | 5.874 | .1702 |
| 25.0 | .9042 | 7.529 | .1328 | 70.0 | .7022 | 5.845 | .1711 |
| 26.0 | .8984 | 7.481 | .1337 | 71.0 | .6988 | 5.817 | .1719 |
| 27.0 | .8927 | 7.434 | .1345 | 72.0 | .6953 | 5.788 | .1728 |
| 28.0 | .8871 | 7.387 | .1354 | 73.0 | .6919 | 5.759 | .1736 |
| 29.0 | .8816 | 7.341 | .1362 | 74.0 | .6886 | 5.731 | .1745 |
| 30.0 | .8762 | 7.296 | .1371 | 75.0 | .6852 | 5.703 | .1753 |
| 31.0 | .8708 | 7.251 | .1379 | 76.0 | .6819 | 5.676 | .1762 |
| 32.0 | .8654 | 7.206 | .1388 | 77.0 | .6787 | 5.649 | .1770 |
| 33.0 | .8602 | 7.163 | .1396 | 78.0 | .6754 | 5.622 | .1779 |
| 34.0 | .8550 | 7.119 | .1405 | 79.0 | .6722 | 5.595 | .1787 |
| 35.0 | .8498 | 7.076 | .1413 | 80.0 | .6690 | 5.568 | .1796 |
| 36.0 | .8448 | 7.034 | .1422 | 81.0 | .6659 | 5.542 | .1804 |
| 37.0 | .8398 | 6.993 | .1430 | 82.0 | .6628 | 5.516 | .1813 |
| 38.0 | .8348 | 6.951 | .1439 | 83.0 | .6597 | 5.491 | .1821 |
| 39.0 | .8299 | 6.910 | .1447 | 84.0 | .6566 | 5.465 | .1830 |
| 40.0 | .8251 | 6.870 | .1456 | 85.0 | .6536 | 5.440 | .1838 |
| 41.0 | .8203 | 6.830 | .1464 | 86.0 | .6506 | 5.415 | .1847 |
| 42.0 | .8155 | 6.790 | .1473 | 87.0 | .6476 | 5.390 | .1855 |
| 43.0 | .8109 | 6.752 | .1481 | 88.0 | .6446 | 5.365 | .1864 |
| 44.0 | .8063 | 6.713 | .1490 | 89.0 | .6417 | 5.341 | .1872 |
| 45.0 | .8017 | 6.675 | .1498 | 90.0 | .6388 | 5.316 | .1881 |
| 46.0 | .7972 | 6.637 | .1507 | 91.0 | .6360 | 5.293 | .1889 |
| 47.0 | .7927 | 6.600 | .1515 | 92.0 | .6331 | 5.269 | .1898 |
| 48.0 | .7883 | 6.563 | .1524 | 93.0 | .6303 | 5.246 | .1906 |
| 49.0 | .7839 | 6.526 | .1532 | 94.0 | .6275 | 5.222 | .1915 |
| 50.0 | .7796 | 6.490 | .1541 | 95.0 | .6247 | 5.199 | .1923 |
| 51.0 | .7753 | 6.455 | .1549 | 96.0 | .6220 | 5.176 | .1932 |
| 52.0 | .7711 | 6.420 | .1558 | 97.0 | .6193 | 5.154 | .1940 |
| 53.0 | .7669 | 6.385 | .1566 | 98.0 | .6166 | 5.131 | .1949 |
| 54.0 | .7628 | 6.350 | .1575 | 99.0 | .6139 | 5.109 | .1957 |
| 55.0 | .7587 | 6.316 | .1583 | 100.0 | .6112 | 5.086 | .1966 |

¹ See note, p. 29.

For complete petroleum oil tables see circular No. 154, Bureau of Standards.

TABLE 20.—Degrees Baumé corresponding to specific gravities at $\frac{60^\circ}{60^\circ}$ F. $\left(\frac{15^\circ 56}{15^\circ 56}$ C.)
for liquids heavier than water

[Calculated from the formula degrees Baumé = $145 - \frac{145}{D_{\frac{60^\circ}{60^\circ} \text{ F.}}}$ which defines the Baumé scale, in general use in the United States, for liquids heavier than water]

| D $\frac{15^\circ 56}{15^\circ 56}$ C. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Diff. |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1.00 | 0.000 | 0.145 | 0.289 | 0.434 | 0.578 | 0.721 | 0.865 | 1.008 | 1.151 | 1.293 | 143 |
| 1.01 | 1.436 | 1.578 | 1.719 | 1.861 | 2.002 | 2.143 | 2.283 | 2.424 | 2.564 | 2.704 | 141 |
| 1.02 | 2.843 | 2.982 | 3.121 | 3.260 | 3.399 | 3.537 | 3.675 | 3.812 | 3.950 | 4.087 | 138 |
| 1.03 | 4.223 | 4.360 | 4.496 | 4.632 | 4.768 | 4.903 | 5.038 | 5.174 | 5.308 | 5.443 | 136 |
| 1.04 | 5.577 | 5.711 | 5.845 | 5.978 | 6.111 | 6.244 | 6.377 | 6.509 | 6.641 | 6.773 | 133 |
| 1.05 | 6.905 | 7.036 | 7.167 | 7.298 | 7.429 | 7.559 | 7.689 | 7.819 | 7.949 | 8.078 | 130 |
| 1.06 | 8.208 | 8.336 | 8.465 | 8.594 | 8.722 | 8.850 | 8.978 | 9.105 | 9.232 | 9.359 | 128 |
| 1.07 | 9.486 | 9.613 | 9.739 | 9.865 | 9.991 | 10.116 | 10.242 | 10.367 | 10.492 | 10.616 | 126 |
| 1.08 | 10.741 | 10.865 | 10.989 | 11.113 | 11.236 | 11.359 | 11.483 | 11.605 | 11.728 | 11.850 | 124 |
| 1.09 | 11.972 | 12.094 | 12.216 | 12.338 | 12.459 | 12.580 | 12.701 | 12.821 | 12.942 | 13.062 | 121 |
| 1.10 | 13.182 | 13.302 | 13.421 | 13.540 | 13.659 | 13.778 | 13.897 | 14.015 | 14.134 | 14.252 | 119 |
| 1.11 | 14.370 | 14.487 | 14.604 | 14.721 | 14.838 | 14.955 | 15.072 | 15.188 | 15.304 | 15.420 | 117 |
| 1.12 | 15.536 | 15.651 | 15.767 | 15.882 | 15.997 | 16.111 | 16.226 | 16.340 | 16.454 | 16.568 | 115 |
| 1.13 | 16.682 | 16.795 | 16.908 | 17.021 | 17.134 | 17.247 | 17.359 | 17.471 | 17.583 | 17.695 | 113 |
| 1.14 | 17.807 | 17.919 | 18.030 | 18.141 | 18.252 | 18.363 | 18.473 | 18.583 | 18.693 | 18.803 | 111 |
| 1.15 | 18.913 | 19.023 | 19.132 | 19.241 | 19.350 | 19.459 | 19.568 | 19.676 | 19.784 | 19.892 | 109 |
| 1.16 | 20.000 | 20.108 | 20.215 | 20.322 | 20.430 | 20.536 | 20.643 | 20.750 | 20.856 | 20.962 | 107 |
| 1.17 | 21.068 | 21.174 | 21.280 | 21.385 | 21.491 | 21.596 | 21.701 | 21.806 | 21.910 | 22.014 | 105 |
| 1.18 | 22.119 | 22.223 | 22.327 | 22.430 | 22.534 | 22.637 | 22.740 | 22.843 | 22.946 | 23.049 | 103 |
| 1.19 | 23.151 | 23.254 | 23.356 | 23.458 | 23.560 | 23.661 | 23.763 | 23.864 | 23.965 | 24.066 | 101 |
| 1.20 | 24.167 | 24.267 | 24.368 | 24.468 | 24.568 | 24.668 | 24.768 | 24.868 | 24.967 | 25.066 | 100 |
| 1.21 | 25.165 | 25.264 | 25.363 | 25.462 | 25.560 | 25.658 | 25.755 | 25.855 | 25.952 | 26.050 | 98 |
| 1.22 | 26.148 | 26.245 | 26.342 | 26.439 | 26.536 | 26.633 | 26.729 | 26.826 | 26.922 | 27.018 | 97 |
| 1.23 | 27.114 | 27.210 | 27.305 | 27.401 | 27.496 | 27.591 | 27.686 | 27.781 | 27.876 | 27.970 | 95 |
| 1.24 | 28.065 | 28.159 | 28.253 | 28.347 | 28.441 | 28.534 | 28.628 | 28.721 | 28.814 | 28.907 | 94 |
| 1.25 | 29.000 | 29.093 | 29.185 | 29.278 | 29.370 | 29.462 | 29.554 | 29.646 | 29.738 | 29.829 | 92 |
| 1.26 | 29.921 | 30.012 | 30.103 | 30.194 | 30.285 | 30.376 | 30.466 | 30.556 | 30.647 | 30.737 | 91 |
| 1.27 | 30.827 | 30.917 | 31.006 | 31.096 | 31.185 | 31.275 | 31.364 | 31.453 | 31.542 | 31.630 | 89 |
| 1.28 | 31.719 | 31.807 | 31.896 | 31.984 | 32.072 | 32.160 | 32.247 | 32.335 | 32.422 | 32.510 | 88 |
| 1.29 | 32.597 | 32.684 | 32.771 | 32.858 | 32.944 | 33.031 | 33.117 | 33.204 | 33.290 | 33.376 | 87 |
| 1.30 | 33.462 | 33.547 | 33.633 | 33.718 | 33.804 | 33.889 | 33.974 | 34.059 | 34.144 | 34.229 | 85 |
| 1.31 | 34.313 | 34.397 | 34.482 | 34.566 | 34.650 | 34.734 | 34.818 | 34.901 | 34.985 | 35.068 | 84 |
| 1.32 | 35.152 | 35.235 | 35.318 | 35.401 | 35.483 | 35.566 | 35.649 | 35.731 | 35.813 | 35.895 | 83 |
| 1.33 | 35.977 | 36.059 | 36.141 | 36.223 | 36.304 | 36.386 | 36.467 | 36.548 | 36.629 | 36.710 | 81 |
| 1.34 | 36.791 | 36.872 | 36.952 | 37.033 | 37.113 | 37.193 | 37.273 | 37.353 | 37.433 | 37.513 | 80 |
| 1.35 | 37.593 | 37.672 | 37.751 | 37.831 | 37.910 | 37.989 | 38.068 | 38.147 | 38.225 | 38.304 | 79 |
| 1.36 | 38.382 | 38.461 | 38.539 | 38.617 | 38.695 | 38.773 | 38.851 | 38.928 | 39.006 | 39.083 | 78 |
| 1.37 | 39.161 | 39.238 | 39.315 | 39.392 | 39.469 | 39.546 | 39.622 | 39.699 | 39.775 | 39.851 | 77 |
| 1.38 | 39.928 | 40.004 | 40.080 | 40.156 | 40.231 | 40.307 | 40.382 | 40.458 | 40.533 | 40.608 | 76 |
| 1.39 | 40.683 | 40.758 | 40.833 | 40.908 | 40.983 | 41.057 | 41.132 | 41.206 | 41.280 | 41.355 | 75 |
| 1.40 | 41.429 | 41.503 | 41.576 | 41.650 | 41.724 | 41.797 | 41.871 | 41.944 | 42.017 | 42.090 | 74 |
| 1.41 | 42.163 | 42.236 | 42.309 | 42.381 | 42.454 | 42.527 | 42.599 | 42.671 | 42.743 | 42.815 | 73 |

TABLE 22.—Degrees Baumé corresponding to specific gravities at $\frac{60^\circ}{60^\circ}$ F. $\left(\frac{15^\circ 56}{15^\circ 56}$ C.)
for liquids lighter than water

[Calculated from the formula degrees Baumé = $\frac{140}{D_{60^\circ F.}} - 130$ which defines the Baumé scale, in general use
in the United States, for liquids lighter than water]

| $D_{\frac{15^\circ 56}{15^\circ 56}} C.$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Diff. |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|-------|
| 0.60 | 103.333 | 102.945 | 102.558 | 102.172 | 101.788 | 101.405 | 101.023 | 100.642 | 100.263 | 99.885 | 382 |
| .61 | 99.508 | 99.133 | 98.758 | 98.385 | 98.013 | 97.642 | 97.273 | 96.904 | 96.537 | 96.171 | 370 |
| .62 | 95.806 | 95.443 | 95.080 | 94.719 | 94.359 | 94.000 | 93.642 | 93.285 | 92.930 | 92.576 | 360 |
| .63 | 92.222 | 91.870 | 91.519 | 91.169 | 90.820 | 90.472 | 90.126 | 89.780 | 89.436 | 89.092 | 348 |
| .64 | 88.750 | 88.409 | 88.068 | 87.729 | 87.391 | 87.054 | 86.718 | 86.383 | 86.049 | 85.716 | 337 |
| .65 | 85.385 | 85.054 | 84.724 | 84.395 | 84.067 | 83.741 | 83.415 | 83.090 | 82.766 | 82.443 | 327 |
| .66 | 82.121 | 81.800 | 81.480 | 81.161 | 80.843 | 80.526 | 80.210 | 79.895 | 79.581 | 79.268 | 317 |
| .67 | 78.955 | 78.644 | 78.333 | 78.024 | 77.715 | 77.407 | 77.101 | 76.795 | 76.490 | 76.186 | 303 |
| .68 | 75.882 | 75.580 | 75.279 | 74.978 | 74.678 | 74.380 | 74.082 | 73.785 | 73.488 | 73.193 | 298 |
| .69 | 72.899 | 72.605 | 72.312 | 72.020 | 71.729 | 71.439 | 71.149 | 70.861 | 70.573 | 70.286 | 290 |
| .70 | 70.000 | 69.715 | 69.430 | 69.146 | 68.864 | 68.582 | 68.300 | 68.020 | 67.740 | 67.461 | 282 |
| .71 | 67.183 | 66.906 | 66.629 | 66.354 | 66.078 | 65.804 | 65.531 | 65.258 | 64.986 | 64.715 | 274 |
| .72 | 64.444 | 64.175 | 63.906 | 63.638 | 63.370 | 63.103 | 62.837 | 62.572 | 62.308 | 62.044 | 266 |
| .73 | 61.781 | 61.518 | 61.257 | 60.996 | 60.736 | 60.476 | 60.217 | 59.959 | 59.702 | 59.445 | 260 |
| .74 | 59.189 | 58.934 | 58.679 | 58.425 | 58.172 | 57.919 | 57.668 | 57.416 | 57.166 | 56.916 | 252 |
| .75 | 56.667 | 56.418 | 56.170 | 55.923 | 55.676 | 55.430 | 55.185 | 54.941 | 54.697 | 54.453 | 246 |
| .76 | 54.210 | 53.968 | 53.727 | 53.486 | 53.246 | 53.007 | 52.768 | 52.529 | 52.292 | 52.055 | 239 |
| .77 | 51.818 | 51.582 | 51.347 | 51.113 | 50.879 | 50.645 | 50.412 | 50.180 | 49.949 | 49.718 | 234 |
| .78 | 49.487 | 49.257 | 49.028 | 48.799 | 48.571 | 48.344 | 48.117 | 47.891 | 47.665 | 47.440 | 227 |
| .79 | 47.215 | 46.991 | 46.768 | 46.545 | 46.322 | 46.101 | 45.879 | 45.659 | 45.439 | 45.219 | 222 |
| .80 | 45.000 | 44.781 | 44.564 | 44.346 | 44.129 | 43.913 | 43.697 | 43.482 | 43.267 | 43.053 | 216 |
| .81 | 42.840 | 42.626 | 42.414 | 42.202 | 41.990 | 41.779 | 41.569 | 41.359 | 41.149 | 40.940 | 210 |
| .82 | 40.732 | 40.524 | 40.316 | 40.109 | 39.903 | 39.697 | 39.492 | 39.287 | 39.082 | 38.878 | 206 |
| .83 | 38.675 | 38.472 | 38.269 | 38.067 | 37.866 | 37.665 | 37.464 | 37.264 | 37.064 | 36.866 | 201 |
| .84 | 36.667 | 36.469 | 36.271 | 36.074 | 35.877 | 35.680 | 35.485 | 35.289 | 35.094 | 34.900 | 196 |
| .85 | 34.706 | 34.512 | 34.319 | 34.127 | 33.934 | 33.743 | 33.551 | 33.361 | 33.170 | 32.980 | 192 |
| .86 | 32.791 | 32.602 | 32.413 | 32.225 | 32.037 | 31.850 | 31.663 | 31.476 | 31.290 | 31.105 | 187 |
| .87 | 30.920 | 30.735 | 30.550 | 30.366 | 30.183 | 30.000 | 29.817 | 29.635 | 29.453 | 29.272 | 183 |
| .88 | 29.091 | 28.910 | 28.730 | 28.550 | 28.371 | 28.192 | 28.014 | 27.835 | 27.658 | 27.480 | 179 |
| .89 | 27.303 | 27.127 | 26.951 | 26.775 | 26.600 | 26.425 | 26.250 | 26.076 | 25.902 | 25.729 | 175 |
| .90 | 25.556 | 25.383 | 25.211 | 25.039 | 24.867 | 24.696 | 24.525 | 24.355 | 24.185 | 24.015 | 171 |
| .91 | 23.846 | 23.677 | 23.509 | 23.341 | 23.173 | 23.005 | 22.838 | 22.672 | 22.506 | 22.339 | 168 |
| .92 | 22.174 | 22.009 | 21.844 | 21.679 | 21.515 | 21.351 | 21.188 | 21.025 | 20.862 | 20.700 | 164 |
| .93 | 20.538 | 20.376 | 20.215 | 20.054 | 19.893 | 19.733 | 19.573 | 19.413 | 19.254 | 19.095 | 160 |
| .94 | 18.936 | 18.778 | 18.620 | 18.462 | 18.305 | 18.148 | 17.991 | 17.835 | 17.679 | 17.524 | 157 |
| .95 | 17.368 | 17.214 | 17.059 | 16.905 | 16.751 | 16.597 | 16.444 | 16.290 | 16.138 | 15.985 | 154 |
| .96 | 15.833 | 15.682 | 15.530 | 15.379 | 15.228 | 15.078 | 14.928 | 14.778 | 14.628 | 14.479 | 150 |
| .97 | 14.330 | 14.181 | 14.033 | 13.885 | 13.737 | 13.590 | 13.443 | 13.297 | 13.149 | 13.003 | 147 |
| .98 | 12.857 | 12.712 | 12.566 | 12.421 | 12.276 | 12.132 | 11.988 | 11.844 | 11.700 | 11.557 | 144 |
| .99 | 11.414 | 11.271 | 11.129 | 10.987 | 10.845 | 10.704 | 10.562 | 10.421 | 10.281 | 10.140 | 142 |
| 1.00 | 10.000 | | | | | | | | | | |

See note, p. 29.

TABLE 23.—Specific gravities at $\frac{60^{\circ}}{60^{\circ}}$ F. ($\frac{15^{\circ}56}{15^{\circ}56}$ C.) corresponding to degrees Baumé for liquids lighter than water

[Calculated from the formula, specific gravity $\frac{60^{\circ}}{60^{\circ}}$ F. = $\frac{140}{130 + \text{Deg. Baumé}}$]

| Degrees Baumé | Tenths of degrees Baumé | | | | | | | | | |
|---------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 1.0000 | 0.9993 | 0.9986 | 0.9979 | 0.9972 | 0.9964 | 0.9957 | 0.9950 | 0.9943 | 0.9936 |
| 11 | .9929 | .9922 | .9915 | .9908 | .9901 | .9894 | .9887 | .9880 | .9873 | .9866 |
| 12 | .9859 | .9852 | .9845 | .9838 | .9831 | .9824 | .9818 | .9811 | .9804 | .9797 |
| 13 | .9790 | .9783 | .9777 | .9770 | .9763 | .9756 | .9749 | .9743 | .9736 | .9729 |
| 14 | .9722 | .9715 | .9709 | .9702 | .9695 | .9689 | .9682 | .9675 | .9669 | .9662 |
| 15 | .9655 | .9649 | .9642 | .9635 | .9629 | .9622 | .9615 | .9609 | .9602 | .9596 |
| 16 | .9589 | .9582 | .9576 | .9569 | .9563 | .9556 | .9550 | .9543 | .9537 | .9530 |
| 17 | .9524 | .9517 | .9511 | .9504 | .9498 | .9492 | .9485 | .9479 | .9472 | .9466 |
| 18 | .9459 | .9453 | .9447 | .9440 | .9434 | .9428 | .9421 | .9415 | .9409 | .9402 |
| 19 | .9396 | .9390 | .9383 | .9377 | .9371 | .9365 | .9358 | .9352 | .9346 | .9340 |
| 20 | .9333 | .9327 | .9321 | .9315 | .9309 | .9302 | .9296 | .9290 | .9284 | .9278 |
| 21 | .9272 | .9265 | .9259 | .9253 | .9247 | .9241 | .9235 | .9229 | .9223 | .9217 |
| 22 | .9211 | .9204 | .9198 | .9192 | .9186 | .9180 | .9174 | .9168 | .9162 | .9156 |
| 23 | .9150 | .9144 | .9138 | .9132 | .9126 | .9121 | .9115 | .9109 | .9103 | .9097 |
| 24 | .9091 | .9085 | .9079 | .9073 | .9067 | .9061 | .9056 | .9050 | .9044 | .9038 |
| 25 | .9032 | .9026 | .9021 | .9015 | .9009 | .9003 | .8997 | .8992 | .8986 | .8980 |
| 26 | .8974 | .8969 | .8963 | .8957 | .8951 | .8946 | .8940 | .8934 | .8929 | .8923 |
| 27 | .8917 | .8912 | .8906 | .8900 | .8895 | .8889 | .8883 | .8878 | .8872 | .8866 |
| 28 | .8861 | .8855 | .8850 | .8844 | .8838 | .8833 | .8827 | .8822 | .8816 | .8811 |
| 29 | .8805 | .8799 | .8794 | .8788 | .8783 | .8777 | .8772 | .8766 | .8761 | .8755 |
| 30 | .8750 | .8745 | .8739 | .8734 | .8728 | .8723 | .8717 | .8712 | .8706 | .8701 |
| 31 | .8696 | .8690 | .8685 | .8679 | .8674 | .8669 | .8663 | .8658 | .8653 | .8647 |
| 32 | .8642 | .8637 | .8631 | .8626 | .8621 | .8615 | .8610 | .8605 | .8600 | .8594 |
| 33 | .8589 | .8584 | .8578 | .8573 | .8568 | .8563 | .8557 | .8552 | .8547 | .8542 |
| 34 | .8537 | .8531 | .8526 | .8521 | .8516 | .8511 | .8505 | .8500 | .8495 | .8490 |
| 35 | .8485 | .8480 | .8475 | .8469 | .8464 | .8459 | .8454 | .8449 | .8444 | .8439 |
| 36 | .8434 | .8429 | .8424 | .8419 | .8413 | .8408 | .8403 | .8398 | .8393 | .8388 |
| 37 | .8383 | .8378 | .8373 | .8368 | .8363 | .8358 | .8353 | .8348 | .8343 | .8338 |
| 38 | .8333 | .8328 | .8323 | .8318 | .8314 | .8309 | .8304 | .8299 | .8294 | .8289 |
| 39 | .8284 | .8279 | .8274 | .8269 | .8264 | .8260 | .8255 | .8250 | .8245 | .8240 |
| 40 | .8235 | .8230 | .8226 | .8221 | .8216 | .8211 | .8206 | .8202 | .8197 | .8192 |
| 41 | .8187 | .8182 | .8178 | .8173 | .8168 | .8163 | .8159 | .8154 | .8149 | .8144 |
| 42 | .8140 | .8135 | .8130 | .8125 | .8121 | .8116 | .8111 | .8107 | .8102 | .8097 |
| 43 | .8092 | .8088 | .8083 | .8078 | .8074 | .8069 | .8065 | .8060 | .8055 | .8051 |
| 44 | .8046 | .8041 | .8037 | .8032 | .8028 | .8023 | .8018 | .8014 | .8009 | .8005 |
| 45 | .8000 | .7995 | .7991 | .7986 | .7982 | .7977 | .7973 | .7968 | .7964 | .7959 |
| 46 | .7955 | .7950 | .7946 | .7941 | .7937 | .7932 | .7928 | .7923 | .7919 | .7914 |
| 47 | .7910 | .7905 | .7901 | .7896 | .7892 | .7887 | .7883 | .7878 | .7874 | .7870 |
| 48 | .7865 | .7861 | .7856 | .7852 | .7848 | .7843 | .7839 | .7834 | .7830 | .7826 |
| 49 | .7821 | .7817 | .7812 | .7808 | .7804 | .7799 | .7795 | .7791 | .7786 | .7782 |
| 50 | .7778 | .7773 | .7769 | .7765 | .7761 | .7756 | .7752 | .7748 | .7743 | .7739 |
| 51 | .7735 | .7731 | .7726 | .7722 | .7718 | .7713 | .7709 | .7705 | .7701 | .7697 |
| 52 | .7692 | .7688 | .7684 | .7680 | .7675 | .7671 | .7667 | .7663 | .7659 | .7654 |
| 53 | .7650 | .7646 | .7642 | .7638 | .7634 | .7629 | .7625 | .7621 | .7617 | .7613 |
| 54 | .7609 | .7605 | .7600 | .7596 | .7592 | .7588 | .7584 | .7580 | .7576 | .7572 |
| 55 | .7568 | .7563 | .7559 | .7555 | .7551 | .7547 | .7543 | .7539 | .7535 | .7531 |

TABLE 23.—Specific gravities at 60° F. $\left(\frac{15^{\circ}56}{15^{\circ}56} C.\right)$ corresponding to degrees Baumé for liquids lighter than water—Continued

$$\left[\text{Calculated from the formula, specific gravity } \frac{60^{\circ}}{60^{\circ}} F. = \frac{140}{130 + \text{Deg. Baumé}} \right]$$

| Degrees Baumé | Tenths of degrees Baumé | | | | | | | | | |
|---------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 55 | 0.7568 | 0.7563 | 0.7559 | 0.7555 | 0.7551 | 0.7547 | 0.7543 | 0.7539 | 0.7535 | 0.7531 |
| 56 | .7527 | .7523 | .7519 | .7515 | .7511 | .7507 | .7503 | .7499 | .7495 | .7491 |
| 57 | .7487 | .7483 | .7479 | .7475 | .7471 | .7467 | .7463 | .7459 | .7455 | .7451 |
| 58 | .7447 | .7443 | .7439 | .7435 | .7431 | .7427 | .7423 | .7419 | .7415 | .7411 |
| 59 | .7407 | .7403 | .7400 | .7396 | .7392 | .7388 | .7384 | .7380 | .7376 | .7372 |
| 60 | .7365 | .7365 | .7361 | .7357 | .7353 | .7349 | .7345 | .7341 | .7338 | .7334 |
| 61 | .7330 | .7326 | .7322 | .7318 | .7315 | .7311 | .7307 | .7303 | .7299 | .7295 |
| 62 | .7292 | .7288 | .7284 | .7280 | .7277 | .7273 | .7269 | .7265 | .7261 | .7258 |
| 63 | .7254 | .7250 | .7246 | .7243 | .7239 | .7235 | .7231 | .7228 | .7224 | .7220 |
| 64 | .7216 | .7213 | .7209 | .7205 | .7202 | .7198 | .7194 | .7191 | .7187 | .7183 |
| 65 | .7179 | .7176 | .7172 | .7168 | .7165 | .7161 | .7157 | .7154 | .7150 | .7147 |
| 66 | .7143 | .7139 | .7136 | .7132 | .7128 | .7125 | .7121 | .7117 | .7114 | .7110 |
| 67 | .7107 | .7103 | .7099 | .7096 | .7092 | .7089 | .7085 | .7081 | .7078 | .7074 |
| 68 | .7071 | .7067 | .7064 | .7060 | .7056 | .7053 | .7049 | .7046 | .7042 | .7039 |
| 69 | .7035 | .7032 | .7028 | .7025 | .7021 | .7018 | .7014 | .7011 | .7007 | .7004 |
| 70 | .7000 | .6997 | .6993 | .6990 | .6986 | .6983 | .6979 | .6976 | .6972 | .6969 |
| 71 | .6965 | .6962 | .6958 | .6955 | .6951 | .6948 | .6944 | .6941 | .6938 | .6934 |
| 72 | .6931 | .6927 | .6924 | .6920 | .6917 | .6914 | .6910 | .6907 | .6903 | .6900 |
| 73 | .6897 | .6893 | .6890 | .6886 | .6883 | .6880 | .6876 | .6873 | .6869 | .6866 |
| 74 | .6863 | .6859 | .6856 | .6853 | .6849 | .6846 | .6843 | .6839 | .6836 | .6833 |
| 75 | .6829 | .6826 | .6823 | .6819 | .6816 | .6813 | .6809 | .6806 | .6803 | .6799 |
| 76 | .6796 | .6793 | .6790 | .6786 | .6783 | .6780 | .6776 | .6773 | .6770 | .6767 |
| 77 | .6763 | .6760 | .6757 | .6753 | .6750 | .6747 | .6744 | .6740 | .6737 | .6734 |
| 78 | .6731 | .6728 | .6724 | .6721 | .6718 | .6715 | .6711 | .6708 | .6705 | .6702 |
| 79 | .6699 | .6695 | .6692 | .6689 | .6686 | .6683 | .6679 | .6676 | .6673 | .6670 |
| 80 | .6667 | .6663 | .6660 | .6657 | .6654 | .6651 | .6648 | .6645 | .6641 | .6638 |
| 81 | .6635 | .6632 | .6629 | .6626 | .6623 | .6619 | .6616 | .6613 | .6610 | .6607 |
| 82 | .6604 | .6601 | .6598 | .6594 | .6591 | .6588 | .6585 | .6582 | .6579 | .6576 |
| 83 | .6573 | .6570 | .6567 | .6564 | .6560 | .6557 | .6554 | .6551 | .6548 | .6545 |
| 84 | .6542 | .6539 | .6536 | .6533 | .6530 | .6527 | .6524 | .6521 | .6518 | .6515 |
| 85 | .6512 | .6509 | .6506 | .6503 | .6500 | .6497 | .6494 | .6490 | .6487 | .6484 |
| 86 | .6482 | .6479 | .6476 | .6473 | .6470 | .6467 | .6464 | .6461 | .6458 | .6455 |
| 87 | .6452 | .6449 | .6446 | .6443 | .6440 | .6437 | .6434 | .6431 | .6428 | .6425 |
| 88 | .6422 | .6419 | .6416 | .6413 | .6410 | .6407 | .6404 | .6401 | .6399 | .6396 |
| 89 | .6393 | .6390 | .6387 | .6384 | .6381 | .6378 | .6375 | .6372 | .6369 | .6367 |
| 90 | .6364 | .6361 | .6358 | .6355 | .6352 | .6349 | .6346 | .6343 | .6341 | .6338 |
| 91 | .6335 | .6332 | .6329 | .6326 | .6323 | .6321 | .6318 | .6315 | .6312 | .6309 |
| 92 | .6306 | .6303 | .6301 | .6298 | .6295 | .6292 | .6289 | .6286 | .6284 | .6281 |
| 93 | .6278 | .6275 | .6272 | .6270 | .6267 | .6264 | .6261 | .6258 | .6256 | .6253 |
| 94 | .6250 | .6247 | .6244 | .6242 | .6239 | .6236 | .6233 | .6231 | .6228 | .6225 |
| 95 | .6222 | .6219 | .6217 | .6214 | .6211 | .6208 | .6206 | .6203 | .6200 | .6197 |
| 96 | .6195 | .6192 | .6189 | .6186 | .6184 | .6181 | .6178 | .6176 | .6173 | .6170 |
| 97 | .6167 | .6165 | .6162 | .6159 | .6157 | .6154 | .6151 | .6148 | .6146 | .6143 |
| 98 | .6140 | .6138 | .6135 | .6132 | .6130 | .6127 | .6124 | .6122 | .6119 | .6116 |
| 99 | .6114 | .6111 | .6108 | .6106 | .6103 | .6100 | .6098 | .6095 | .6092 | .6090 |
| 100 | .6087 | | | | | | | | | |

See note, p. 29.

TABLE 24.—Degrees A. P. I.¹ corresponding to specific gravities at 60°/60° F. $\left(\frac{15.56}{15.56} C.\right)$

$$\left[\text{Calculated from the formula degrees A. P. I.} = \frac{141.5}{\text{specific gravity } 60^{\circ}/60^{\circ} \text{ F.}} - 131.5 \right]$$

| Sp. gr. 60°/60° F. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| .60 | 104.33 | 103.94 | 103.55 | 103.16 | 102.77 | 102.38 | 102.00 | 101.61 | 101.23 | 100.85 |
| .61 | 100.47 | 100.09 | 99.71 | 99.33 | 98.96 | 98.58 | 98.21 | 97.84 | 97.46 | 97.09 |
| .62 | 96.73 | 96.36 | 95.99 | 95.63 | 95.26 | 94.90 | 94.54 | 94.18 | 93.82 | 93.46 |
| .63 | 93.10 | 92.75 | 92.39 | 92.04 | 91.69 | 91.33 | 90.98 | 90.63 | 90.29 | 89.94 |
| .64 | 89.59 | 89.25 | 88.90 | 88.56 | 88.22 | 87.88 | 87.54 | 87.20 | 86.86 | 86.53 |
| .65 | 86.19 | 85.86 | 85.52 | 85.19 | 84.86 | 84.53 | 84.20 | 83.87 | 83.55 | 83.22 |
| .66 | 82.89 | 82.57 | 82.25 | 81.92 | 81.60 | 81.28 | 80.96 | 80.64 | 80.33 | 80.01 |
| .67 | 79.69 | 79.38 | 79.07 | 78.75 | 78.44 | 78.13 | 77.82 | 77.51 | 77.20 | 76.89 |
| .68 | 76.59 | 76.28 | 75.98 | 75.67 | 75.37 | 75.07 | 74.77 | 74.47 | 74.17 | 73.87 |
| .69 | 73.57 | 73.28 | 72.98 | 72.68 | 72.39 | 72.10 | 71.80 | 71.51 | 71.22 | 70.93 |
| .70 | 70.64 | 70.35 | 70.07 | 69.78 | 69.49 | 69.21 | 68.92 | 68.64 | 68.36 | 68.08 |
| .71 | 67.80 | 67.52 | 67.24 | 66.96 | 66.68 | 66.40 | 66.13 | 65.85 | 65.58 | 65.30 |
| .72 | 65.03 | 64.76 | 64.48 | 64.21 | 63.94 | 63.67 | 63.40 | 63.14 | 62.87 | 62.60 |
| .73 | 62.34 | 62.07 | 61.81 | 61.54 | 61.28 | 61.02 | 60.76 | 60.49 | 60.23 | 59.97 |
| .74 | 59.72 | 59.46 | 59.20 | 58.94 | 58.69 | 58.43 | 58.18 | 57.92 | 57.67 | 57.42 |
| .75 | 57.17 | 56.92 | 56.66 | 56.41 | 56.17 | 55.92 | 55.67 | 55.42 | 55.18 | 54.93 |
| .76 | 54.68 | 54.44 | 54.20 | 53.95 | 53.71 | 53.47 | 53.23 | 52.98 | 52.74 | 52.51 |
| .77 | 52.27 | 52.03 | 51.79 | 51.55 | 51.32 | 51.08 | 50.85 | 50.61 | 50.38 | 50.14 |
| .78 | 49.91 | 49.68 | 49.45 | 49.22 | 48.98 | 48.75 | 48.53 | 48.30 | 48.07 | 47.84 |
| .79 | 47.61 | 47.39 | 47.16 | 46.94 | 46.71 | 46.49 | 46.26 | 46.04 | 45.82 | 45.60 |
| .80 | 45.38 | 45.15 | 44.93 | 44.71 | 44.49 | 44.28 | 44.06 | 43.84 | 43.62 | 43.41 |
| .81 | 43.19 | 42.98 | 42.76 | 42.55 | 42.33 | 42.12 | 41.91 | 41.69 | 41.48 | 41.27 |
| .82 | 41.06 | 40.85 | 40.64 | 40.43 | 40.22 | 40.02 | 39.81 | 39.60 | 39.39 | 39.19 |
| .83 | 38.98 | 38.78 | 38.57 | 38.37 | 38.16 | 37.96 | 37.76 | 37.56 | 37.35 | 37.15 |
| .84 | 36.95 | 36.75 | 36.55 | 36.35 | 36.15 | 35.96 | 35.76 | 35.56 | 25.36 | 35.17 |
| .85 | 34.97 | 34.77 | 34.58 | 34.39 | 34.19 | 34.00 | 33.80 | 33.61 | 33.42 | 33.23 |
| .86 | 33.03 | 32.84 | 32.65 | 32.46 | 32.27 | 32.08 | 31.89 | 31.71 | 31.52 | 31.33 |
| .87 | 31.14 | 30.96 | 30.77 | 30.58 | 30.40 | 30.21 | 30.03 | 29.85 | 29.66 | 29.48 |
| .88 | 29.30 | 29.11 | 28.93 | 28.75 | 28.57 | 28.39 | 28.21 | 28.03 | 27.85 | 27.67 |
| .89 | 27.49 | 27.31 | 27.13 | 26.95 | 26.78 | 26.60 | 26.42 | 26.25 | 26.07 | 25.90 |
| .90 | 25.72 | 25.55 | 25.37 | 25.20 | 25.03 | 24.85 | 24.68 | 24.51 | 24.34 | 24.17 |
| .91 | 23.99 | 23.82 | 23.65 | 23.48 | 23.31 | 23.14 | 22.98 | 22.81 | 22.64 | 22.47 |
| .92 | 22.30 | 22.14 | 21.97 | 21.80 | 21.64 | 21.47 | 21.31 | 21.14 | 20.98 | 20.81 |
| .93 | 20.65 | 20.49 | 20.32 | 20.16 | 20.00 | 19.84 | 19.68 | 19.51 | 19.35 | 19.19 |
| .94 | 19.03 | 18.87 | 18.71 | 18.55 | 18.39 | 18.24 | 18.08 | 17.92 | 17.76 | 17.60 |
| .95 | 17.45 | 17.29 | 17.13 | 16.98 | 16.82 | 16.67 | 16.51 | 16.36 | 16.20 | 16.05 |
| .96 | 15.90 | 15.74 | 15.59 | 15.44 | 15.28 | 15.13 | 14.98 | 14.83 | 14.68 | 14.53 |
| .97 | 14.38 | 14.23 | 14.08 | 13.93 | 13.78 | 13.63 | 13.48 | 13.33 | 13.18 | 13.04 |
| .98 | 12.89 | 12.74 | 12.59 | 12.45 | 12.30 | 12.15 | 12.01 | 11.86 | 11.72 | 11.57 |
| .99 | 11.43 | 11.29 | 11.14 | 11.00 | 10.85 | 10.71 | 10.57 | 10.43 | 10.28 | 10.14 |
| 1.00 | 10.00 | | | | | | | | | |

¹ See note, p. 29.

TABLE 25.—Specific gravity at 60°/60° F. $\left(\frac{15^{\circ}56}{15^{\circ}56} C.\right)$ corresponding to degreesA. P. I.¹[Calculated from the formula, specific gravity $\frac{60^{\circ}}{60^{\circ}} F. = \frac{141.5}{131.5 + \text{degrees A. P. I.}}$]

| Degrees A. P. I. | Tenths of degrees | | | | | | | | | |
|---------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 1.0000 | .9993 | .9986 | .9979 | .9972 | .9965 | .9958 | .9951 | .9944 | .9937 |
| 11 | .9930 | .9923 | .9916 | .9909 | .9902 | .9895 | .9888 | .9881 | .9874 | .9868 |
| 12 | .9861 | .9854 | .9847 | .9840 | .9833 | .9826 | .9820 | .9813 | .9806 | .9799 |
| 13 | .9792 | .9786 | .9779 | .9772 | .9765 | .9759 | .9752 | .9745 | .9738 | .9732 |
| 14 | .9725 | .9718 | .9712 | .9705 | .9698 | .9692 | .9685 | .9679 | .9672 | .9665 |
| 15 | .9659 | .9652 | .9646 | .9639 | .9632 | .9626 | .9619 | .9613 | .9606 | .9600 |
| 16 | .9593 | .9587 | .9580 | .9574 | .9567 | .9561 | .9554 | .9548 | .9541 | .9535 |
| 17 | .9529 | .9522 | .9516 | .9509 | .9503 | .9497 | .9490 | .9484 | .9478 | .9471 |
| 18 | .9465 | .9459 | .9452 | .9446 | .9440 | .9433 | .9427 | .9421 | .9415 | .9408 |
| 19 | .9402 | .9396 | .9390 | .9383 | .9377 | .9371 | .9365 | .9358 | .9352 | .9346 |
| 20 | .9340 | .9334 | .9328 | .9321 | .9315 | .9309 | .9303 | .9297 | .9291 | .9285 |
| 21 | .9279 | .9273 | .9267 | .9260 | .9254 | .9248 | .9242 | .9236 | .9230 | .9224 |
| 22 | .9218 | .9212 | .9206 | .9200 | .9194 | .9188 | .9182 | .9176 | .9170 | .9165 |
| 23 | .9159 | .9153 | .9147 | .9141 | .9135 | .9129 | .9123 | .9117 | .9111 | .9106 |
| 24 | .9100 | .9094 | .9088 | .9082 | .9076 | .9071 | .9065 | .9059 | .9053 | .9047 |
| 25 | .9042 | .9036 | .9030 | .9024 | .9018 | .9013 | .9007 | .9001 | .8996 | .8990 |
| 26 | .8984 | .8978 | .8973 | .8967 | .8961 | .8956 | .8950 | .8944 | .8939 | .8933 |
| 27 | .8927 | .8922 | .8916 | .8911 | .8905 | .8899 | .8894 | .8888 | .8883 | .8877 |
| 28 | .8871 | .8866 | .8860 | .8855 | .8849 | .8844 | .8838 | .8833 | .8827 | .8822 |
| 29 | .8816 | .8811 | .8805 | .8800 | .8794 | .8789 | .8783 | .8778 | .8772 | .8767 |
| 30 | .8762 | .8756 | .8751 | .8745 | .8740 | .8735 | .8729 | .8724 | .8718 | .8713 |
| 31 | .8708 | .8702 | .8697 | .8692 | .8686 | .8681 | .8676 | .8670 | .8665 | .8660 |
| 32 | .8654 | .8649 | .8644 | .8639 | .8633 | .8628 | .8623 | .8618 | .8612 | .8607 |
| 33 | .8602 | .8597 | .8591 | .8586 | .8581 | .8576 | .8571 | .8565 | .8560 | .8555 |
| 34 | .8550 | .8545 | .8540 | .8534 | .8529 | .8524 | .8519 | .8514 | .8509 | .8504 |
| 35 | .8498 | .8493 | .8488 | .8483 | .8478 | .8473 | .8468 | .8463 | .8458 | .8453 |
| 36 | .8448 | .8443 | .8438 | .8433 | .8428 | .8423 | .8418 | .8413 | .8408 | .8403 |
| 37 | .8398 | .8393 | .8388 | .8383 | .8378 | .8373 | .8368 | .8363 | .8358 | .8353 |
| 38 | .8348 | .8343 | .8338 | .8333 | .8328 | .8324 | .8319 | .8314 | .8309 | .8304 |
| 39 | .8299 | .8294 | .8289 | .8285 | .8280 | .8275 | .8270 | .8265 | .8260 | .8256 |
| 40 | .8251 | .8246 | .8241 | .8236 | .8232 | .8227 | .8222 | .8217 | .8212 | .8208 |
| 41 | .8203 | .8198 | .8193 | .8189 | .8184 | .8179 | .8174 | .8170 | .8165 | .8160 |
| 42 | .8155 | .8151 | .8146 | .8142 | .8137 | .8132 | .8128 | .8123 | .8118 | .8114 |
| 43 | .8109 | .8104 | .8100 | .8095 | .8090 | .8086 | .8081 | .8076 | .8072 | .8067 |
| 44 | .8063 | .8058 | .8054 | .8049 | .8044 | .8040 | .8035 | .8031 | .8026 | .8022 |
| 45 | .8017 | .8012 | .8008 | .8003 | .7999 | .7994 | .7990 | .7985 | .7981 | .7976 |
| 46 | .7972 | .7967 | .7963 | .7958 | .7954 | .7949 | .7945 | .7941 | .7936 | .7932 |
| 47 | .7927 | .7923 | .7918 | .7914 | .7909 | .7905 | .7901 | .7896 | .7892 | .7887 |
| 48 | .7883 | .7879 | .7874 | .7870 | .7865 | .7861 | .7857 | .7852 | .7848 | .7844 |
| 49 | .7839 | .7835 | .7831 | .7826 | .7822 | .7818 | .7813 | .7809 | .7805 | .7800 |
| 50 | .7796 | .7792 | .7788 | .7783 | .7779 | .7775 | .7770 | .7766 | .7762 | .7758 |
| 51 | .7753 | .7749 | .7745 | .7741 | .7736 | .7732 | .7728 | .7724 | .7720 | .7715 |
| 52 | .7711 | .7707 | .7703 | .7699 | .7694 | .7690 | .7686 | .7682 | .7678 | .7674 |
| 53 | .7669 | .7665 | .7661 | .7657 | .7653 | .7649 | .7645 | .7640 | .7636 | .7632 |
| 54 | .7628 | .7624 | .7620 | .7616 | .7612 | .7608 | .7603 | .7599 | .7595 | .7591 |

¹ See note, p. 29.

TABLE 26.—*Specific gravity and weight per gallon of milk and cream*

[The specific gravities and weights per gallon given below are based on the values of specific gravity and coefficient of expansion determined by the Bureau of Standards and published in the Journ. Agric. Research, Vol. III, No. 3 (U. S. Department of Agriculture), Table II, p. 257]

| Percentage of fat (by weight) | Specific gravity 20°/4° C. | Specific gravity 10°/4° C. | Pounds per gallon at 20° C. (68° F.) | Pounds per gallon at 10° C. (50° F.) |
|----------------------------------|-------------------------------|-------------------------------|---|---|
| 0.025 | 1.035 | 1.037 | 8.63 | 8.65 |
| 1 | 1.034 | 1.036 | 8.62 | 8.64 |
| 2 | 1.033 | 1.035 | 8.61 | 8.63 |
| 3 | 1.032 | 1.034 | 8.60 | 8.62 |
| 4 | 1.031 | 1.033 | 8.59 | 8.61 |
| 5 | 1.029 | 1.032 | 8.58 | 8.60 |
| 6 | 1.028 | 1.031 | 8.57 | 8.59 |
| 7 | 1.027 | 1.030 | 8.56 | 8.59 |
| 8 | 1.026 | 1.029 | 8.55 | 8.58 |
| 9 | 1.024 | 1.028 | 8.54 | 8.57 |
| 10 | 1.023 | 1.027 | 8.53 | 8.56 |
| 11 | 1.022 | 1.026 | 8.52 | 8.55 |
| 12 | 1.020 | 1.025 | 8.50 | 8.54 |
| 13 | 1.019 | 1.024 | 8.49 | 8.54 |
| 14 | 1.017 | 1.023 | 8.48 | 8.53 |
| 15 | 1.016 | 1.022 | 8.47 | 8.52 |
| 16 | 1.015 | 1.021 | 8.46 | 8.51 |
| 17 | 1.014 | 1.020 | 8.45 | 8.50 |
| 18 | 1.013 | 1.019 | 8.44 | 8.49 |
| 19 | 1.012 | 1.018 | 8.44 | 8.49 |
| 20 | 1.011 | 1.017 | 8.43 | 8.48 |
| 21 | 1.010 | 1.017 | 8.42 | 8.48 |
| 22 | 1.009 | 1.016 | 8.41 | 8.47 |
| 23 | 1.008 | 1.015 | 8.40 | 8.46 |
| 24 | 1.007 | 1.014 | 8.40 | 8.46 |
| 25 | 1.007 | 1.014 | 8.39 | 8.45 |
| 26 | 1.006 | 1.013 | 8.39 | 8.45 |
| 27 | 1.005 | 1.012 | 8.38 | 8.44 |
| 28 | 1.004 | 1.012 | 8.37 | 8.44 |
| 29 | 1.003 | 1.011 | 8.36 | 8.43 |
| 30 | 1.002 | 1.011 | 8.36 | 8.43 |
| 31 | 1.001 | 1.010 | 8.34 | 8.42 |
| 32 | 1.000 | 1.010 | 8.34 | 8.42 |
| 33 | .999 | 1.009 | 8.33 | 8.41 |
| 34 | .998 | 1.008 | 8.32 | 8.40 |
| 35 | .998 | 1.008 | 8.31 | 8.40 |
| 36 | .997 | 1.007 | 8.31 | 8.40 |
| 37 | .996 | 1.007 | 8.30 | 8.39 |
| 38 | .995 | 1.006 | 8.30 | 8.39 |
| 39 | .994 | 1.005 | 8.29 | 8.38 |
| 40 | .993 | 1.005 | 8.28 | 8.38 |

Specific gravity 20°/4° C. means the specific gravity at 20° C. (68° F.) in terms of water at its maximum density as unity, and specific gravity 10°/4° C. means the specific gravity at 10° C. (50° F.) in terms of the same unit. These specific gravity values are numerically the same as density at 20 and 10° C., respectively, in grams per milliliter.

NOTE.—The specific gravity at 20°/20° C. (68°/68° F.) corresponding to any percentage of fat can be obtained by dividing the specific gravity at 20°/4° C. by the density of water at 20° C. (0.9982343).

TABLE 27.—Volume ¹ of milk and cream at various temperatures occupied by unit volume at 68° F. (20° C.)

| Percent- age of butter fat | Temperature (° F.) | | | | | | | | | |
|----------------------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 |
| | Volume | | | | | | | | | |
| 0.025 | 0.9980 | 0.9990 | 1.0000 | 1.0015 | 1.0035 | 1.0060 | 1.0085 | 1.0110 | 1.0140 | 1.0175 |
| 1 | .9980 | .9990 | 1.0000 | 1.0015 | 1.0035 | 1.0060 | 1.0085 | 1.0110 | 1.0140 | 1.0175 |
| 2 | .9975 | .9990 | 1.0000 | 1.0020 | 1.0040 | 1.0060 | 1.0085 | 1.0115 | 1.0140 | 1.0175 |
| 3 | .9975 | .9990 | 1.0000 | 1.0020 | 1.0040 | 1.0065 | 1.0085 | 1.0115 | 1.0140 | 1.0175 |
| 4 | .9975 | .9985 | 1.0000 | 1.0020 | 1.0040 | 1.0065 | 1.0085 | 1.0115 | 1.0140 | 1.0175 |
| 5 | .9975 | .9985 | 1.0000 | 1.0020 | 1.0045 | 1.0065 | 1.0085 | 1.0115 | 1.0140 | 1.0175 |
| 6 | .9970 | .9985 | 1.0000 | 1.0020 | 1.0045 | 1.0065 | 1.0090 | 1.0115 | 1.0140 | 1.0175 |
| 7 | .9970 | .9985 | 1.0000 | 1.0025 | 1.0045 | 1.0070 | 1.0090 | 1.0120 | 1.0145 | 1.0175 |
| 8 | .9970 | .9985 | 1.0005 | 1.0025 | 1.0045 | 1.0070 | 1.0095 | 1.0120 | 1.0145 | 1.0175 |
| 9 | .9965 | .9985 | 1.0005 | 1.0025 | 1.0050 | 1.0070 | 1.0095 | 1.0120 | 1.0150 | 1.0180 |
| 10 | .9965 | .9985 | 1.0005 | 1.0025 | 1.0050 | 1.0075 | 1.0095 | 1.0120 | 1.0150 | 1.0180 |
| 11 | .9965 | .9985 | 1.0005 | 1.0025 | 1.0055 | 1.0075 | 1.0095 | 1.0120 | 1.0150 | 1.0180 |
| 12 | .9955 | .9980 | 1.0005 | 1.0030 | 1.0055 | 1.0080 | 1.0105 | 1.0130 | 1.0155 | 1.0180 |
| 13 | .9955 | .9980 | 1.0005 | 1.0030 | 1.0055 | 1.0080 | 1.0105 | 1.0130 | 1.0155 | 1.0180 |
| 14 | .9950 | .9980 | 1.0005 | 1.0030 | 1.0055 | 1.0085 | 1.0110 | 1.0135 | 1.0160 | 1.0185 |
| 15 | .9950 | .9980 | 1.0005 | 1.0030 | 1.0060 | 1.0085 | 1.0110 | 1.0135 | 1.0160 | 1.0185 |
| 16 | .9950 | .9980 | 1.0005 | 1.0035 | 1.0060 | 1.0090 | 1.0115 | 1.0140 | 1.0165 | 1.0190 |
| 17 | .9945 | .9980 | 1.0005 | 1.0035 | 1.0060 | 1.0090 | 1.0120 | 1.0145 | 1.0170 | 1.0190 |
| 18 | .9940 | .9980 | 1.0005 | 1.0035 | 1.0065 | 1.0095 | 1.0125 | 1.0150 | 1.0175 | 1.0195 |
| 19 | .9940 | .9975 | 1.0005 | 1.0035 | 1.0065 | 1.0095 | 1.0125 | 1.0150 | 1.0175 | 1.0195 |
| 20 | .9930 | .9975 | 1.0005 | 1.0035 | 1.0070 | 1.0100 | 1.0130 | 1.0155 | 1.0180 | 1.0205 |
| 21 | .9930 | .9975 | 1.0005 | 1.0040 | 1.0070 | 1.0100 | 1.0130 | 1.0160 | 1.0185 | 1.0205 |
| 22 | .9930 | .9975 | 1.0010 | 1.0040 | 1.0075 | 1.0105 | 1.0135 | 1.0165 | 1.0190 | 1.0210 |
| 23 | .9930 | .9975 | 1.0010 | 1.0040 | 1.0075 | 1.0105 | 1.0140 | 1.0165 | 1.0190 | 1.0210 |
| 24 | .9925 | .9975 | 1.0010 | 1.0040 | 1.0080 | 1.0110 | 1.0145 | 1.0170 | 1.0200 | 1.0220 |
| 25 | .9925 | .9970 | 1.0010 | 1.0045 | 1.0080 | 1.0115 | 1.0145 | 1.0175 | 1.0200 | 1.0225 |
| 26 | .9925 | .9970 | 1.0010 | 1.0045 | 1.0085 | 1.0120 | 1.0155 | 1.0185 | 1.0210 | 1.0235 |
| 27 | .9925 | .9970 | 1.0010 | 1.0045 | 1.0085 | 1.0120 | 1.0155 | 1.0185 | 1.0210 | 1.0235 |
| 28 | .9915 | .9965 | 1.0010 | 1.0045 | 1.0090 | 1.0125 | 1.0160 | 1.0190 | 1.0220 | 1.0245 |
| 29 | .9915 | .9965 | 1.0010 | 1.0050 | 1.0090 | 1.0130 | 1.0160 | 1.0195 | 1.0220 | 1.0245 |
| 30 | .9915 | .9965 | 1.0010 | 1.0050 | 1.0095 | 1.0130 | 1.0165 | 1.0195 | 1.0220 | 1.0250 |
| 31 | .9915 | .9965 | 1.0010 | 1.0050 | 1.0095 | 1.0135 | 1.0170 | 1.0200 | 1.0225 | 1.0250 |
| 32 | .9910 | .9960 | 1.0010 | 1.0055 | 1.0100 | 1.0135 | 1.0170 | 1.0205 | 1.0230 | 1.0255 |
| 33 | .9910 | .9960 | 1.0010 | 1.0055 | 1.0100 | 1.0140 | 1.0170 | 1.0205 | 1.0230 | 1.0255 |
| 34 | .9910 | .9960 | 1.0010 | 1.0055 | 1.0105 | 1.0140 | 1.0175 | 1.0210 | 1.0240 | 1.0260 |
| 35 | .9900 | .9960 | 1.0010 | 1.0060 | 1.0105 | 1.0145 | 1.0180 | 1.0210 | 1.0240 | 1.0260 |
| 36 | .9900 | .9955 | 1.0010 | 1.0060 | 1.0110 | 1.0145 | 1.0185 | 1.0215 | 1.0245 | 1.0270 |
| 37 | .9890 | .9955 | 1.0010 | 1.0060 | 1.0110 | 1.0150 | 1.0185 | 1.0215 | 1.0245 | 1.0270 |
| 38 | .9890 | .9955 | 1.0010 | 1.0065 | 1.0115 | 1.0155 | 1.0190 | 1.0220 | 1.0250 | 1.0280 |
| 39 | .9890 | .9955 | 1.0010 | 1.0065 | 1.0115 | 1.0160 | 1.0195 | 1.0225 | 1.0255 | 1.0280 |
| 40 | .9890 | .9950 | 1.0010 | 1.0065 | 1.0115 | 1.0165 | 1.0200 | 1.0235 | 1.0265 | 1.0290 |

¹ The tabulated values are given to the nearest 0.0005.

TABLE 28.—Conversion of density basis

Prepared for use in reducing readings of a hydrometer graduated to indicate density or specific gravity at a specified standard temperature, T , referred to water at a specified temperature, T' , as unity, to the basis of another standard temperature, t , and reference temperature, t' .

The factor Δ (given in units of the sixth decimal place), multiplied by the density or specific-gravity reading, gives the correction to be applied to the reading to reduce it to the required basis.

Suppose a hydrometer indicates specific gravity at $\frac{20^\circ}{4^\circ}$ C., and it is required to know the correction in order that it shall indicate specific gravity at $\frac{15.56}{15.56}$ C., then,

$$D_{\frac{15.56}{15.56}} = D_{\frac{20^\circ}{4^\circ}} + \Delta D_{\frac{20^\circ}{4^\circ}}$$

That is, if the hydrometer indicates correctly a specific gravity of 1.5760 at $\frac{20^\circ}{4^\circ}$, then at $\frac{15.56}{15.56}$ the reading of the instrument will be too low by $1.5760 \times 0.001062 = 0.0017$. A correction of 0.0017 must therefore be added to the indication of the hydrometer.

Or, if a maker using standards indicating $D_{\frac{20^\circ}{4^\circ}}$ C. wishes to graduate a hydrometer to indicate density at 15.56 C. referred to water at 15.56 C. ($D_{\frac{15.56}{15.56}}$ C.) the readings of the standard must be corrected as follows:

| | |
|---|---------|
| Suppose the standard correct at $20^\circ/4^\circ$ C. reads | 1.5760 |
| The correction to be applied is | + .0017 |

Corresponding reading on instrument to be correct at $15.56/15.56$ C. is 1.5777
 The table is calculated for Jena 16th glass.

| Given basis of density | Required basis of density | | | | | | | | | |
|---|--|--------------------|----------------------|-----------------------|--------------------|---------------------|---------------------------|-------------------------|---------------------|---------------------|
| | $\frac{t}{t'}$ | | | | | | | | | |
| | $D_{\frac{25^\circ}{4^\circ} \text{ C.}}$ | $D_{\frac{20}{4}}$ | $D_{\frac{17.5}{4}}$ | $D_{\frac{15.56}{4}}$ | $D_{\frac{15}{4}}$ | $D_{\frac{15}{15}}$ | $D_{\frac{15.56}{15.56}}$ | $D_{\frac{17.5}{17.5}}$ | $D_{\frac{20}{20}}$ | $D_{\frac{25}{25}}$ |
| $\frac{T}{T'}$ | Δ (In units of the sixth decimal place) | | | | | | | | | |
| $D_{\frac{25^\circ}{4^\circ} \text{ C.}}$ | 0 | +115 | +172 | +217 | +230 | +1104 | +1177 | +1459 | +1884 | +2931 |
| $D_{\frac{20}{4}}$ | -115 | 0 | +58 | +102 | +115 | +989 | +1062 | +1345 | +1769 | +2816 |
| $D_{\frac{17.5}{4}}$ | -172 | -58 | 0 | +45 | +58 | +932 | +1005 | +1287 | +1711 | +2758 |
| $D_{\frac{15.56}{4}}$ | -217 | -102 | -45 | 0 | +13 | +887 | +960 | +1242 | +1667 | +2713 |
| $D_{\frac{15}{4}}$ | -230 | -115 | -58 | -13 | 0 | +874 | +947 | +1229 | +1654 | +2700 |
| $D_{\frac{15}{15}}$ | -1103 | -988 | -931 | -886 | -873 | 0 | +73 | +354 | +779 | +1826 |
| $D_{\frac{15.56}{15.56}}$ | -1176 | -1061 | -1004 | -960 | -947 | -73 | 0 | +281 | +706 | +1752 |
| $D_{\frac{17.5}{17.5}}$ | -1457 | -1343 | -1285 | -1240 | -1227 | -354 | -281 | 0 | +424 | +1471 |
| $D_{\frac{20}{20}}$ | -1881 | -1766 | -1708 | -1664 | -1651 | -778 | -705 | -423 | 0 | +1046 |
| $D_{\frac{25}{25}}$ | -2923 | -2808 | -2751 | -2707 | -2694 | -1821 | -1748 | -1468 | -1044 |) |

NOTE.—This table can not be used to make changes of density basis involving the expansion of liquids other than water.

TABLE 29.—Weight (in grams), at various pressures and temperatures, of 1 liter of dry air containing 0.04 per cent of CO₂

[Computed from the formula $C = \frac{1.293052}{1 + 0.00367t} \times \frac{h}{760}$, where h is pressure in mm of mercury at 0° C., and standard gravity, and t is temperature in degrees centigrade]

| Temperature in Deg. C. | Pressure in mm of Hg (0° C., standard gravity) | | | | | | | | | | | |
|------------------------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 720 | 725 | 730 | 735 | 740 | 745 | 750 | 755 | 760 | 765 | 770 | 775 |
| 15 | 1.1611 | 1.1691 | 1.1772 | 1.1853 | 1.1933 | 1.2014 | 1.2095 | 1.2175 | 1.2256 | 1.2336 | 1.2417 | 1.2498 |
| 16 | 1.1571 | 1.1651 | 1.1731 | 1.1812 | 1.1892 | 1.1972 | 1.2053 | 1.2133 | 1.2213 | 1.2294 | 1.2374 | 1.2454 |
| 17 | 1.1531 | 1.1611 | 1.1691 | 1.1771 | 1.1851 | 1.1931 | 1.2011 | 1.2091 | 1.2171 | 1.2251 | 1.2331 | 1.2411 |
| 18 | 1.1491 | 1.1571 | 1.1650 | 1.1730 | 1.1810 | 1.1890 | 1.1970 | 1.2049 | 1.2129 | 1.2209 | 1.2289 | 1.2369 |
| 19 | 1.1451 | 1.1531 | 1.1611 | 1.1690 | 1.1770 | 1.1849 | 1.1929 | 1.2008 | 1.2088 | 1.2167 | 1.2247 | 1.2326 |
| 20 | 1.1412 | 1.1492 | 1.1571 | 1.1650 | 1.1729 | 1.1809 | 1.1888 | 1.1967 | 1.2046 | 1.2126 | 1.2205 | 1.2284 |
| 21 | 1.1373 | 1.1452 | 1.1531 | 1.1610 | 1.1689 | 1.1768 | 1.1847 | 1.1926 | 1.2005 | 1.2084 | 1.2163 | 1.2242 |
| 22 | 1.1335 | 1.1414 | 1.1492 | 1.1571 | 1.1650 | 1.1728 | 1.1807 | 1.1886 | 1.1965 | 1.2043 | 1.2122 | 1.2201 |
| 23 | 1.1296 | 1.1375 | 1.1453 | 1.1532 | 1.1610 | 1.1689 | 1.1767 | 1.1846 | 1.1924 | 1.2002 | 1.2081 | 1.2159 |
| 24 | 1.1258 | 1.1337 | 1.1415 | 1.1493 | 1.1571 | 1.1649 | 1.1727 | 1.1806 | 1.1884 | 1.1962 | 1.2040 | 1.2118 |
| 25 | 1.1220 | 1.1298 | 1.1376 | 1.1454 | 1.1532 | 1.1610 | 1.1688 | 1.1766 | 1.1844 | 1.1922 | 1.2000 | 1.2078 |
| 26 | 1.1183 | 1.1261 | 1.1338 | 1.1416 | 1.1494 | 1.1571 | 1.1649 | 1.1727 | 1.1804 | 1.1882 | 1.1959 | 1.2037 |
| 27 | 1.1146 | 1.1223 | 1.1300 | 1.1378 | 1.1455 | 1.1533 | 1.1610 | 1.1687 | 1.1765 | 1.1842 | 1.1920 | 1.1997 |
| 28 | 1.1108 | 1.1186 | 1.1263 | 1.1340 | 1.1417 | 1.1494 | 1.1571 | 1.1648 | 1.1726 | 1.1803 | 1.1880 | 1.1957 |
| 29 | 1.1072 | 1.1149 | 1.1225 | 1.1302 | 1.1379 | 1.1456 | 1.1533 | 1.1610 | 1.1687 | 1.1764 | 1.1840 | 1.1917 |
| 30 | 1.1035 | 1.1112 | 1.1188 | 1.1265 | 1.1342 | 1.1418 | 1.1495 | 1.1571 | 1.1648 | 1.1725 | 1.1801 | 1.1878 |
| 31 | 1.0999 | 1.1075 | 1.1151 | 1.1228 | 1.1304 | 1.1381 | 1.1457 | 1.1533 | 1.1610 | 1.1686 | 1.1762 | 1.1839 |

TABLE 30.—Buoyancy constants (mg/ml)

[Difference in milligrams between the mass and the apparent weight of 1 milliliter of water weighed with brass weights (d=8.4) in air at various temperatures and barometer readings (unreduced). A humidity of 50 per cent saturation is assumed. To find the weight of 1 milliliter of air under the conditions assumed in this table, multiply the buoyancy constant by 1.135 (42/37)]

| Observed pressure in millimeters | Temperature in degrees centigrade | | | |
|----------------------------------|-----------------------------------|-------|-------|-------|
| | 15 | 20 | 25 | 30 |
| 640 | 0.904 | 0.886 | 0.869 | 0.852 |
| 650 | .915 | .900 | .883 | .866 |
| 660 | .932 | .914 | .897 | .879 |
| 670 | .946 | .928 | .911 | .893 |
| 680 | .960 | .942 | .924 | .906 |
| 690 | .975 | .956 | .938 | .920 |
| 700 | .989 | .970 | .952 | .933 |
| 705 | .996 | .977 | .958 | .940 |
| 710 | 1.003 | .984 | .965 | .947 |
| 715 | 1.010 | .991 | .972 | .953 |
| 720 | 1.017 | .998 | .979 | .960 |
| 725 | 1.024 | 1.004 | .985 | .967 |
| 730 | 1.031 | 1.011 | .992 | .973 |
| 735 | 1.038 | 1.018 | .999 | .980 |
| 740 | 1.045 | 1.025 | 1.006 | .987 |
| 745 | 1.052 | 1.032 | 1.013 | .994 |
| 750 | 1.059 | 1.039 | 1.020 | 1.000 |
| 755 | 1.067 | 1.046 | 1.027 | 1.007 |
| 760 | 1.074 | 1.053 | 1.034 | 1.014 |
| 765 | 1.081 | 1.060 | 1.040 | 1.020 |
| 770 | 1.088 | 1.067 | 1.047 | 1.027 |
| 775 | 1.095 | 1.074 | 1.054 | 1.034 |
| 780 | 1.102 | 1.081 | 1.061 | 1.041 |

TABLE 31.—Density (in grams per milliliter) of water at temperatures from 0 to 102° C.¹

| Temperature, °C. | Density | Temperature, °C. | Density | Temperature, °C. | Density |
|---------------------|---------|---------------------|---------|---------------------|---------|
| 0 | 0.99987 | 35 | 0.99406 | 70 | 0.97781 |
| 1 | .99993 | 36 | .99371 | 71 | .97723 |
| 2 | .99997 | 37 | .99336 | 72 | .97666 |
| 3 | .99999 | 38 | .99299 | 73 | .97607 |
| 4 | 1.00000 | 39 | .99262 | 74 | .97548 |
| 5 | .99999 | 40 | .99224 | 75 | .97489 |
| 6 | .99997 | 41 | .99186 | 76 | .97428 |
| 7 | .99993 | 42 | .99147 | 77 | .97368 |
| 8 | .99988 | 43 | .99107 | 78 | .97307 |
| 9 | .99981 | 44 | .99066 | 79 | .97245 |
| 10 | .99973 | 45 | .99024 | 80 | .97183 |
| 11 | .99963 | 46 | .98982 | 81 | .97120 |
| 12 | .99952 | 47 | .98940 | 82 | .97057 |
| 13 | .99940 | 48 | .98896 | 83 | .96994 |
| 14 | .99927 | 49 | .98852 | 84 | .96930 |
| 15 | .99913 | 50 | .98807 | 85 | .96865 |
| 16 | .99897 | 51 | .98762 | 86 | .96800 |
| 17 | .99880 | 52 | .98715 | 87 | .96734 |
| 18 | .99862 | 53 | .98669 | 88 | .96668 |
| 19 | .99843 | 54 | .98621 | 89 | .96601 |
| 20 | .99823 | 55 | .98573 | 90 | .96534 |
| 21 | .99802 | 56 | .98524 | 91 | .96467 |
| 22 | .99780 | 57 | .98478 | 92 | .96399 |
| 23 | .99756 | 58 | .98425 | 93 | .96330 |
| 24 | .99732 | 59 | .98375 | 94 | .96261 |
| 25 | .99707 | 60 | .98324 | 95 | .96192 |
| 26 | .99681 | 61 | .98272 | 96 | .96122 |
| 27 | .99654 | 62 | .98220 | 97 | .96051 |
| 28 | .99626 | 63 | .98167 | 98 | .95981 |
| 29 | .99597 | 64 | .98113 | 99 | .95909 |
| 30 | .99567 | 65 | .98059 | 100 | .95838 |
| 31 | .99537 | 66 | .98005 | 101 | .95765 |
| 32 | .99505 | 67 | .97950 | 102 | .95693 |
| 33 | .99473 | 68 | .97894 | | |
| 34 | .99440 | 69 | .97838 | | |
| 35 | .99406 | 70 | .97781 | | |

According to M. Thiesen, *Wiss. Abh. der Physikalisch-Technischen Reichsanstalt*, 4, No. 1; 1904.

TABLE 32.—Density of pure water free from air

[Under standard pressure (76 cm), at every tenth part of a degree of the international hydrogen scale from 0 to 41° C. in grams per milliliter.]

[*Indicates change in first two decimal places. See next line, column 0]

| De- grees centi- grade | Tenths of degrees | | | | | | | | | Mean differ- ences | |
|---------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------|------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 |
| 0 | 0.999 8681 | 8747 | 8812 | 8875 | 8936 | 8996 | 9053 | 9109 | 9163 | 9216 | + 59 |
| 1 | | 9267 | 9315 | 9363 | 9408 | 9452 | 9494 | 9534 | 9573 | 9610 | + 41 |
| 2 | | 9679 | 9711 | 9741 | 9769 | 9796 | 9821 | 9844 | 9866 | 9887 | + 24 |
| 3 | | 9922 | 9937 | 9951 | 9962 | 9973 | 9981 | 9988 | 9994 | 9998 | *0000 + 8 |
| 4 | 1.000 0000 | *9999 | *9996 | *9992 | *9986 | *9979 | *9970 | *9960 | *9947 | *9934 | — 8 |
| 5 | .999 9919 | 9902 | 9884 | 9864 | 9842 | 9819 | 9795 | 9769 | 9742 | 9713 | — 24 |
| 6 | | 9682 | 9650 | 9617 | 9582 | 9545 | 9507 | 9468 | 9427 | 9385 | — 39 |
| 7 | | 9296 | 9249 | 9201 | 9151 | 9100 | 9048 | 8994 | 8938 | 8881 | — 53 |
| 8 | | 8764 | 8703 | 8641 | 8577 | 8512 | 8445 | 8377 | 8308 | 8237 | — 67 |
| 9 | | 8091 | 8017 | 7940 | 7863 | 7784 | 7704 | 7622 | 7539 | 7455 | — 81 |
| 10 | | 7282 | 7194 | 7105 | 7014 | 6921 | 6826 | 6729 | 6632 | 6533 | — 95 |
| 11 | | 6331 | 6228 | 6124 | 6020 | 5913 | 5805 | 5696 | 5586 | 5474 | —108 |
| 12 | | 5248 | 5132 | 5016 | 4898 | 4780 | 4660 | 4538 | 4415 | 4291 | —121 |
| 13 | | 4040 | 3912 | 3784 | 3654 | 3523 | 3391 | 3257 | 3122 | 2986 | —133 |
| 14 | | 2712 | 2572 | 2431 | 2289 | 2147 | 2003 | 1858 | 1711 | 1564 | —145 |
| 15 | | 1266 | 1114 | 0962 | 0809 | 0655 | 0499 | 0343 | 0185 | 0026 | *9865 —156 |
| 16 | .998 9705 | 9542 | 9378 | 9214 | 9048 | 8881 | 8713 | 8544 | 8373 | 8202 | *8245 —168 |
| 17 | | 8029 | 7856 | 7681 | 7505 | 7328 | 7150 | 6971 | 6791 | 6610 | 6427 —178 |
| 18 | | 6244 | 6058 | 5873 | 5686 | 5498 | 5309 | 5119 | 4927 | 4735 | 4541 —190 |
| 19 | | 4347 | 4152 | 3955 | 3757 | 3558 | 3358 | 3158 | 2955 | 2752 | 2549 —200 |
| 20 | | 2343 | 2137 | 1930 | 1722 | 1511 | 1301 | 1090 | 0878 | 0663 | 0449 —211 |
| 21 | | 0233 | 0016 | *9799 | *9580 | *9359 | *9139 | *8917 | *8694 | *8470 | *8245 —221 |
| 22 | .997 8019 | 7792 | 7564 | 7335 | 7104 | 6873 | 6641 | 6408 | 6173 | 5938 | —232 |
| 23 | | 5702 | 5466 | 5227 | 4988 | 4747 | 4506 | 4264 | 4021 | 3777 | 3531 —242 |
| 24 | | 3286 | 3039 | 2790 | 2541 | 2291 | 2040 | 1788 | 1535 | 1280 | 1026 —252 |
| 25 | | 0770 | 0513 | 0255 | *9997 | *9736 | *9476 | *9214 | *8951 | *8688 | *8423 —261 |
| 26 | .996 8158 | 7892 | 7624 | 7356 | 7087 | 6817 | 6545 | 6273 | 6000 | 5726 | —271 |
| 27 | | 5451 | 5176 | 4898 | 4620 | 4342 | 4062 | 3782 | 3500 | 3218 | 2935 —280 |
| 28 | | 2652 | 2366 | 2080 | 1793 | 1505 | 1217 | 0928 | 0637 | 0346 | 0053 —289 |
| 29 | .995 9761 | 9466 | 9171 | 8876 | 8579 | 8282 | 7983 | 7684 | 7383 | 7083 | —298 |
| 30 | | 6780 | 6478 | 6174 | 5869 | 5564 | 5258 | 4950 | 4642 | 4334 | 4024 —307 |
| 31 | | 3714 | 3401 | 3089 | 2776 | 2462 | 2147 | 1832 | 1515 | 1198 | 0880 —315 |
| 32 | | 0561 | 0241 | *9920 | *9599 | *9276 | *8954 | *8630 | *8304 | *7979 | *7653 —324 |
| 33 | .994 7325 | 6997 | 6668 | 6338 | 6007 | 5676 | 5345 | 5011 | 4678 | 4343 | —332 |
| 34 | | 4007 | 3671 | 3335 | 2997 | 2659 | 2318 | 1978 | 1638 | 1296 | 0953 —340 |
| 35 | | 0610 | 0267 | *9922 | *9576 | *9230 | *8883 | *8534 | *8186 | *7837 | *7486 —347 |
| 36 | .993 7136 | 6784 | 6432 | 6078 | 5725 | 5369 | 5014 | 4658 | 4301 | 3943 | —355 |
| 37 | | 3585 | 3226 | 2866 | 2505 | 2144 | 1782 | 1419 | 1055 | 0691 | 0326 —362 |
| 38 | .992 9960 | 9593 | 9227 | 8859 | 8490 | 8120 | 7751 | 7380 | 7008 | 6636 | —370 |
| 39 | | 6263 | 5890 | 5516 | 5140 | 4765 | 4389 | 4011 | 3634 | 3255 | 2876 —377 |
| 40 | | 2497 | 2116 | 1734 | 1352 | 0971 | 0587 | 0203 | *9818 | *9433 | *9047 —384 |
| 41 | .991 8661 | | | | | | | | | | |

¹ According to P. Chappuis, Bureau international des Poids et Mesures, Travaux et Mémoires, XIII: 1907.

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TABLE 33.—Weight of 1 gallon of water

[This table is based on the water densities of P. Chappuis (Bureau International des Poids et Mesures. Travaux et Mémoires, XIII; 1907) for 0 to 40° C., and of M. Thiesen (Wiss. Abh. der Physikalisch-Technischen Reichsanstalt, 4, No. 1; 1904) for 41 to 100° C. The weights in air are for dry air at the same temperature as the water up to 40° C. and at a (corrected) barometric pressure of 760 mm and against brass weights of 8.4 density at 0° C. Above 40° C. the temperature of the air is assumed to be 20° C., i. e., the water is allowed to cool to 20° C. before the weighings are made. The volumetric computations are based on the relation that 1 liter=1.000027 cubic decimeters and 1 cubic decimeter=61.023378 cubic inches. The weights corresponding to 15 $\frac{1}{2}$ ° C. (60° F.) and 16 $\frac{1}{2}$ ° C. (62° F.) have been included in the table because of the frequent use of these temperatures in engineering and industrial work]

| Temperature, °C. | Weight in vacuo | | Weight in air | |
|----------------------------|-----------------|-----------|---------------|-----------|
| | Grams | Pounds | Grams | Pounds |
| 0 | 3784.833 | 8.34412 | 3780.520 | 8.33461 |
| 1 | 5.055 | .34461 | 0.758 | .33613 |
| 2 | 5.211 | .34495 | 0.930 | .33551 |
| 3 | 5.303 | .34515 | 1.037 | .33575 |
| 4 | 5.332 | .34522 | 1.082 | .33585 |
| 5 | 5.302 | .34515 | 1.067 | .33582 |
| 6 | 5.212 | .34495 | 0.992 | .33565 |
| 7 | 5.066 | .34463 | 0.861 | .33536 |
| 8 | 4.864 | .34419 | 0.675 | .33495 |
| 9 | 4.610 | .34363 | 0.435 | .33442 |
| 10 | 4.303 | .34295 | 0.144 | .33378 |
| 11 | 3.943 | .34216 | 3779.798 | .33302 |
| 12 | 3.534 | .34125 | 9.403 | .33215 |
| 13 | 3.076 | .34025 | 8.960 | .33117 |
| 14 | 2.574 | .33914 | 8.472 | .33009 |
| 15 | 2.026 | .33793 | 7.939 | .32892 |
| (15 $\frac{1}{2}$) 60° F. | (3781.703) | (8.33722) | (3777.623) | (8.32823) |
| 16 | 1.435 | .33663 | 7.362 | .32765 |
| (16 $\frac{1}{2}$) 62° F. | (3781.017) | (8.33571) | (3776.953) | (8.32675) |
| 17 | 0.801 | .33523 | 6.741 | .32628 |
| 18 | 0.125 | .33374 | 6.080 | .32482 |
| 19 | 3779.407 | .33216 | 5.375 | .32327 |
| 20 | 8.649 | .33049 | 4.630 | .32162 |
| 21 | 7.850 | .32872 | 3.845 | .31989 |
| 22 | 7.012 | .32688 | 3.021 | .31808 |
| 23 | 6.135 | .32494 | 2.157 | .31617 |
| 24 | 5.220 | .32293 | 1.256 | .31419 |
| 25 | 4.268 | .32083 | 0.317 | .31212 |
| 26 | 3.279 | .31865 | 3769.341 | .30996 |
| 27 | 2.254 | .31639 | 8.329 | .30773 |
| 28 | 1.195 | .31405 | 7.283 | .30543 |
| 29 | 0.100 | .31164 | 6.201 | .30304 |
| 30 | 3768.972 | .30915 | 5.086 | .30058 |
| 31 | 7.812 | .30659 | 3.933 | .29805 |
| 32 | 6.618 | .30396 | 2.757 | .29545 |
| 33 | 5.393 | .30126 | 1.545 | .29278 |
| 34 | 4.137 | .29849 | 0.301 | .29003 |
| 35 | 2.851 | .29566 | 3759.027 | .28723 |
| 36 | 1.536 | .29276 | 7.725 | .28436 |
| 37 | 0.192 | .28979 | 6.393 | .28142 |
| 38 | 3758.820 | .28677 | 5.033 | .27842 |
| 39 | 7.420 | .28368 | 3.645 | .27536 |
| 40 | 5.995 | .28054 | 2.232 | .27225 |
| 41 | 4.52 | .2773 | 0.53 | .2685 |
| 42 | 3.04 | .2740 | 3749.05 | .2652 |
| 43 | 1.53 | .2707 | 7.54 | .2619 |
| 44 | 3749.98 | .2673 | 5.99 | .2585 |
| 45 | 8.39 | .2638 | 4.40 | .2550 |
| 46 | 6.80 | .2603 | 2.81 | .2515 |
| 47 | 5.21 | .2568 | 1.23 | .2480 |
| 48 | 3.54 | .2531 | 3739.56 | .2443 |
| 49 | 1.88 | .2494 | 7.90 | .2407 |

TABLE 33.—Weight of 1 gallon of water—Continued

| Temperature, °C. | Weight in vacuo | | Weight in air | |
|---------------------|-----------------|--------|---------------|--------|
| | Grams | Pounds | Grams | Pounds |
| 50 | 3740.17 | 8.2457 | 3736.20 | 8.2369 |
| 51 | 3738.47 | .2419 | 4.50 | .2332 |
| 52 | 6.69 | .2380 | 2.72 | .2292 |
| 53 | 4.95 | .2341 | 0.98 | .2254 |
| 54 | 3.13 | .2301 | 3729.16 | .2214 |
| 55 | 1.32 | .2261 | 7.35 | .2174 |
| 56 | 3729.46 | .2220 | 5.50 | .2133 |
| 57 | 7.72 | .2182 | 3.76 | .2095 |
| 58 | 5.71 | .2138 | 1.75 | .2051 |
| 59 | 3.82 | .2096 | 3719.86 | .2009 |
| 60 | 1.89 | .2054 | 7.93 | .1966 |
| 61 | 3719.92 | .2010 | 5.97 | .1923 |
| 62 | 7.95 | .1967 | 4.00 | .1880 |
| 63 | 5.95 | .1923 | 2.00 | .1835 |
| 64 | 3.90 | .1877 | 3709.95 | .1790 |
| 65 | 1.86 | .1832 | 7.91 | .1745 |
| 66 | 3709.82 | .1787 | 5.87 | .1700 |
| 67 | 7.73 | .1741 | 3.79 | .1655 |
| 68 | 5.61 | .1695 | 1.67 | .1608 |
| 69 | 3.49 | .1648 | 3699.56 | .1561 |
| 70 | 1.33 | .1600 | 7.40 | .1514 |
| 71 | 3699.14 | .1552 | 5.21 | .1465 |
| 72 | 6.98 | .1504 | 3.05 | .1418 |
| 73 | 4.75 | .1455 | 0.82 | .1369 |
| 74 | 2.52 | .1406 | 3688.59 | .1319 |
| 75 | 0.28 | .1357 | 6.36 | .1270 |
| 76 | 3687.97 | .1306 | 4.05 | .1219 |
| 77 | 5.70 | .1256 | 1.78 | .1169 |
| 78 | 3.39 | .1205 | 3679.48 | .1119 |
| 79 | 1.05 | .1153 | 7.13 | .1067 |
| 80 | 3678.70 | .1101 | 4.79 | .1015 |
| 81 | 6.32 | .1049 | 2.41 | .0963 |
| 82 | 3.93 | .0996 | 0.02 | .0910 |
| 83 | 1.54 | .0944 | 3667.64 | .0858 |
| 84 | 3669.12 | .0890 | 5.22 | .0804 |
| 85 | 6.66 | .0836 | 2.76 | .0750 |
| 86 | 4.20 | .0782 | 0.31 | .0696 |
| 87 | 1.70 | .0727 | 3657.81 | .0641 |
| 88 | 3659.21 | .0672 | 5.31 | .0586 |
| 89 | 6.67 | .0616 | 2.78 | .0530 |
| 90 | 4.13 | .0560 | 0.25 | .0474 |
| 91 | 1.60 | .0504 | 3647.71 | .0418 |
| 92 | 3649.02 | .0447 | 5.14 | .0362 |
| 93 | 6.41 | .0390 | 2.53 | .0304 |
| 94 | 3.80 | .0332 | 3639.92 | .0247 |
| 95 | 1.19 | .0274 | 7.32 | .0189 |
| 96 | 3638.54 | .0216 | 4.67 | .0131 |
| 97 | 5.85 | .0157 | 1.98 | .0072 |
| 98 | 3.20 | .0098 | 3629.34 | .0013 |
| 99 | 0.47 | .0038 | 6.61 | 7.9953 |
| 100 | 3627.79 | 7.9979 | 3.93 | .9894 |

TABLE 34.—Weight of 1 cubic foot of water

[This table is based on the water densities of P. Chappuis (Bureau International des Poids et Mesures, Travaux et Mémoires, XIII; 1907) for 0 to 40° C. and of M. Thiesen (Wiss. Abh. der Physikalisch-Technischen Reichsanstalt, 4, No. 1; 1904) for 41 to 100° C. The weights in air are for dry air at the same temperature as the water up to 40° C. and at a (corrected) barometric pressure of 760 mm and against brass weights of 8.4 density at 0° C. Above 40° C. the temperature of the air is assumed to be 20° C., i. e., the water is allowed to cool to 20° C. before the weighings are made. The volumetric computations are based on the relation that 1 liter=1.000027 cubic decimeters and 1 cubic decimeter=61.023378 cubic inches. The weights corresponding to 15 $\frac{1}{2}$ ° C. (60° F.) and 16 $\frac{1}{2}$ ° C. (62° F.) have been included in the table because of the frequent use of these temperatures in engineering and industrial work]

| Temperature, °C. | Weight in vacuo | | Weight in air | |
|----------------------------|-----------------|-----------|---------------|-----------|
| | Grams | Pounds | Grams | Pounds |
| 0 | 28312.517 | 62.4183 | 28280.254 | 62.3472 |
| 1 | 14.178 | .4220 | 82.033 | .3511 |
| 2 | 15.345 | .4246 | 83.321 | .3540 |
| 3 | 16.053 | .4261 | 84.121 | .3557 |
| 4 | 16.250 | .4266 | 84.458 | .3565 |
| 5 | 16.025 | .4261 | 84.345 | .3562 |
| 6 | 15.352 | .4246 | 83.784 | .3550 |
| 7 | 14.260 | .4222 | 82.804 | .3528 |
| 8 | 12.749 | .4189 | 81.413 | .3498 |
| 9 | 10.849 | .4147 | 79.618 | .3458 |
| 10 | 08.552 | .4096 | 77.441 | .3410 |
| 11 | 05.859 | .4037 | 74.853 | .3353 |
| 12 | 02.800 | .3969 | 71.898 | .3288 |
| 13 | 28299.374 | .3894 | 68.584 | .3215 |
| 14 | 95.619 | .3811 | 64.933 | .3134 |
| 15 | 91.519 | .3720 | 60.946 | .3046 |
| (15 $\frac{1}{2}$) 60° F. | (28289.103) | (62.3667) | (28258.58) | (62.2994) |
| 16 | 87.098 | .3623 | 56.630 | .2951 |
| (16 $\frac{1}{2}$) 62° F. | (28283.971) | (62.3554) | (28253.57) | (62.2884) |
| 17 | 82.356 | .3518 | 51.985 | .2849 |
| 18 | 77.299 | .3407 | 47.040 | .2740 |
| 19 | 71.928 | .3289 | 41.766 | .2624 |
| 20 | 66.258 | .3164 | 36.193 | .2501 |
| 21 | 60.281 | .3032 | 30.321 | .2371 |
| 22 | 54.012 | .2894 | 24.157 | .2235 |
| 23 | 47.452 | .2749 | 17.694 | .2093 |
| 24 | 40.607 | .2598 | 10.954 | .1944 |
| 25 | 33.485 | .2441 | 03.930 | .1789 |
| 26 | 26.087 | .2278 | 28196.629 | .1629 |
| 27 | 18.420 | .2109 | 89.059 | .1462 |
| 28 | 10.500 | .1934 | 81.234 | .1289 |
| 29 | 02.307 | .1754 | 73.140 | .1111 |
| 30 | 28193.869 | .1568 | 64.799 | .0927 |
| 31 | 85.191 | .1376 | 56.212 | .0737 |
| 32 | 76.259 | .1179 | 47.377 | .0543 |
| 33 | 67.096 | .0977 | 38.311 | .0343 |
| 34 | 57.700 | .0770 | 29.005 | .0138 |
| 35 | 48.080 | .0558 | 19.475 | 61.9926 |
| 36 | 38.243 | .0341 | 09.735 | .9713 |
| 37 | 28.190 | .0120 | 28099.771 | .9493 |
| 38 | 17.926 | 61.9893 | 89.596 | .9269 |
| 39 | 07.454 | .0663 | 79.215 | .9040 |
| 40 | 28096.794 | .9428 | 68.645 | .8807 |
| 41 | 85.76 | .918 | 55.90 | .853 |
| 42 | 74.71 | .894 | 44.86 | .828 |
| 43 | 63.39 | .869 | 33.55 | .803 |
| 44 | 51.78 | .844 | 21.94 | .778 |

TABLE 34.—Weight of 1 cubic foot of water—Continued

| Temperature, °C. | Weight in vacuo | | Weight in air | |
|---------------------|-----------------|--------|---------------|--------|
| | Grams | Pounds | Grams | Pounds |
| 45 | 28039.88 | 61.817 | 28010.06 | 61.752 |
| 46 | 28.00 | .791 | 27998.19 | .725 |
| 47 | 16.10 | .765 | 86.31 | .699 |
| 48 | 03.64 | .737 | 73.86 | .672 |
| 49 | 27991.18 | .710 | 61.42 | .644 |
| 50 | 78.44 | .682 | 48.69 | .616 |
| 51 | 65.70 | .654 | 35.96 | .588 |
| 52 | 52.39 | .624 | 22.67 | .559 |
| 53 | 39.37 | .596 | 09.65 | .530 |
| 54 | 25.77 | .566 | 27896.08 | .500 |
| 55 | 12.18 | .536 | 82.50 | .470 |
| 56 | 27898.31 | .505 | 68.64 | .440 |
| 57 | 85.28 | .476 | 55.63 | .411 |
| 58 | 70.27 | .443 | 40.63 | .378 |
| 59 | 56.12 | .412 | 26.49 | .347 |
| 60 | 41.67 | .380 | 12.06 | .315 |
| 61 | 26.95 | .348 | 27797.36 | .283 |
| 62 | 12.22 | .315 | 82.65 | .250 |
| 63 | 27797.21 | .282 | 67.66 | .217 |
| 64 | 81.92 | .249 | 52.38 | .184 |
| 65 | 66.63 | .215 | 37.11 | .150 |
| 66 | 51.34 | .181 | 21.83 | .116 |
| 67 | 35.77 | .147 | 06.27 | .082 |
| 68 | 19.91 | .112 | 27690.44 | .047 |
| 69 | 04.05 | .077 | 74.59 | .012 |
| 70 | 27687.92 | .041 | 58.47 | 60.976 |
| 71 | 71.49 | .005 | 42.07 | .940 |
| 72 | 55.35 | 60.970 | 25.95 | .905 |
| 73 | 38.64 | .933 | 09.25 | .868 |
| 74 | 21.94 | .896 | 27592.57 | .831 |
| 75 | 05.23 | .859 | 75.88 | .794 |
| 76 | 27587.96 | .821 | 58.62 | .756 |
| 77 | 70.97 | .784 | 41.65 | .719 |
| 78 | 53.69 | .745 | 24.39 | .681 |
| 79 | 36.14 | .707 | 06.86 | .642 |
| 80 | 18.58 | .668 | 27489.32 | .604 |
| 81 | 00.75 | .629 | 71.50 | .564 |
| 82 | 27482.90 | .589 | 53.68 | .525 |
| 83 | 65.06 | .550 | 35.86 | .486 |
| 84 | 46.95 | .510 | 17.76 | .446 |
| 85 | 28.54 | .470 | 27399.37 | .405 |
| 86 | 10.13 | .429 | 80.99 | .365 |
| 87 | 27391.44 | .388 | 62.31 | .324 |
| 88 | 72.75 | .347 | 43.65 | .282 |
| 89 | 53.78 | .305 | 24.70 | .241 |
| 90 | 34.81 | .263 | 05.74 | .199 |
| 91 | 15.84 | .221 | 27286.80 | .157 |
| 92 | 27296.58 | .179 | 67.56 | .115 |
| 93 | 77.05 | .136 | 48.05 | .072 |
| 94 | 57.51 | .093 | 28.52 | .029 |
| 95 | 37.97 | .049 | 09.01 | 59.986 |
| 96 | 18.15 | .006 | 27189.20 | .942 |
| 97 | 27198.05 | 59.961 | 69.13 | .898 |
| 98 | 78.22 | .918 | 49.33 | .854 |
| 99 | 57.83 | .873 | 28.96 | .809 |
| 100 | 37.73 | .828 | 08.87 | .765 |

TABLE 35.—*Apparent weight (in grams) of water in air*

[This table gives the apparent weight, for temperatures between 15 and 30° C., humidity 50 per cent, un-reduced barometer reading 76 cm of certain volumes of water weighed with brass weights. This table is based on the data given in Tables 30 and 32, and may be conveniently employed to determine definite volumes of water for calibrating instruments. The table assumes the air to be at the same temperature as the water]

| Temp. in degrees C. | 2,000 ml | 1,000 ml | 500 ml | 400 ml | 300 ml | 250 ml | 150 ml |
|---------------------|------------|----------|---------|---------|---------|---------|---------|
| 15 | 1, 996. 11 | 998. 05 | 499. 03 | 399. 22 | 299. 42 | 249. 51 | 149. 71 |
| 16 | 1, 995. 80 | 997. 90 | 498. 95 | 399. 16 | 299. 37 | 249. 48 | 149. 68 |
| 17 | 1, 995. 48 | 997. 74 | 498. 87 | 399. 10 | 299. 32 | 249. 43 | 149. 66 |
| 18 | 1, 995. 13 | 997. 56 | 498. 78 | 399. 03 | 299. 27 | 249. 39 | 149. 63 |
| 19 | 1, 994. 76 | 997. 38 | 498. 69 | 398. 95 | 299. 21 | 259. 34 | 149. 61 |
| 20 | 1, 994. 36 | 997. 18 | 498. 59 | 398. 87 | 299. 15 | 249. 30 | 149. 58 |
| 21 | 1, 993. 95 | 996. 97 | 498. 49 | 398. 79 | 299. 09 | 249. 24 | 149. 55 |
| 22 | 1, 993. 51 | 996. 76 | 498. 38 | 398. 70 | 299. 03 | 249. 19 | 149. 51 |
| 23 | 1, 993. 06 | 996. 53 | 498. 26 | 398. 61 | 298. 96 | 249. 13 | 149. 48 |
| 24 | 1, 992. 58 | 996. 29 | 498. 15 | 398. 52 | 298. 89 | 249. 07 | 149. 44 |
| 25 | 1, 992. 09 | 996. 04 | 498. 02 | 398. 42 | 298. 81 | 249. 01 | 149. 41 |
| 26 | 1, 991. 57 | 995. 79 | 497. 89 | 398. 31 | 298. 74 | 248. 95 | 149. 37 |
| 27 | 1, 991. 04 | 995. 52 | 497. 76 | 398. 21 | 298. 66 | 248. 88 | 149. 33 |
| 28 | 1, 990. 49 | 995. 24 | 497. 62 | 398. 10 | 298. 57 | 248. 81 | 149. 29 |
| 29 | 1, 989. 92 | 994. 96 | 497. 48 | 397. 98 | 298. 49 | 248. 74 | 149. 24 |
| 30 | 1, 989. 33 | 994. 66 | 497. 33 | 397. 87 | 298. 40 | 248. 67 | 149. 20 |

TABLE 36.—*Temperature correction for glass volumetric apparatus*

[This table gives the correction to be added to actual capacity (determined at certain temperatures) to give the capacity at the standard temperature, 20° C. Conversely, by subtracting the corrections from the indicated capacity of an instrument standard at 20° C. the corresponding capacity at other temperatures is obtained. The table assumes for the cubical coefficient of expansion of glass 0.000025 per degree centigrade. The coefficients of expansion of glasses used for volumetric instruments vary from 0.000023 to 0.000028]

| Temp. in degrees C. | 2,000 ml | 1,000 ml | 500 ml | 400 ml | 300 ml | 250 ml |
|---------------------|----------|----------|--------|--------|--------|---------|
| 15 | +0. 25 | +0. 12 | +0. 06 | +0. 05 | +0. 04 | +0. 031 |
| 16 | + . 20 | + . 10 | + . 05 | + . 04 | + . 03 | + . 025 |
| 17 | + . 15 | + . 08 | + . 04 | + . 03 | + . 02 | + . 019 |
| 18 | + . 10 | + . 05 | + . 02 | + . 02 | + . 02 | + . 012 |
| 19 | + . 05 | + . 02 | + . 01 | + . 01 | + . 01 | + . 006 |
| 21 | — . 05 | — . 02 | — . 01 | — . 01 | — . 01 | — . 006 |
| 22 | — . 10 | — . 05 | — . 02 | — . 02 | — . 02 | — . 012 |
| 23 | — . 15 | — . 08 | — . 04 | — . 03 | — . 02 | — . 019 |
| 24 | — . 20 | — . 10 | — . 05 | — . 04 | — . 03 | — . 025 |
| 25 | — . 25 | — . 12 | — . 06 | — . 05 | — . 04 | — . 031 |
| 26 | — . 30 | — . 15 | — . 08 | — . 06 | — . 04 | — . 038 |
| 27 | — . 35 | — . 18 | — . 09 | — . 07 | — . 05 | — . 044 |
| 28 | — . 40 | — . 20 | — . 10 | — . 08 | — . 06 | — . 050 |
| 29 | — . 45 | — . 22 | — . 11 | — . 09 | — . 07 | — . 056 |
| 30 | — . 50 | — . 25 | — . 12 | — . 10 | — . 08 | — . 062 |

TABLE 37.—Apparent weight (in grams) of water in air

[This table gives the apparent weight of certain volumes of water weighed against brass weights in air, humidity 50 per cent, barometer reading 76 cm (unreduced), weighings being made at 20° C., the water and air being at the same temperature. It differs from Table 30 only in its greater temperature range and in the fact that the water is allowed to come to a temperature of 20° C. before the weighings are made. The weighings may be made at any temperature between 18 and 22° without introducing errors greater than 1 mg. per 100 cc.]

| Temp. in de- grees C. | 2,000 ml | 1,000 ml | 500 ml | 400 ml | 300 ml | 250 ml | 150 ml |
|-----------------------------|------------|----------|---------|---------|---------|---------|---------|
| 15 | 1, 996. 14 | 998. 07 | 499. 04 | 399. 23 | 299. 42 | 249. 52 | 149. 71 |
| 16 | 1, 995. 83 | 997. 92 | 498. 96 | 399. 17 | 299. 38 | 249. 48 | 149. 69 |
| 17 | 1, 995. 50 | 997. 75 | 498. 87 | 399. 10 | 299. 32 | 249. 44 | 149. 66 |
| 18 | 1, 995. 14 | 997. 57 | 498. 79 | 399. 03 | 299. 27 | 249. 39 | 149. 64 |
| 19 | 1, 994. 76 | 997. 38 | 498. 69 | 398. 95 | 299. 21 | 249. 35 | 149. 61 |
| 20 | 1, 994. 36 | 997. 18 | 498. 59 | 398. 87 | 299. 15 | 249. 30 | 149. 58 |
| 21 | 1, 993. 94 | 996. 97 | 498. 49 | 398. 79 | 299. 09 | 249. 24 | 149. 55 |
| 22 | 1, 993. 50 | 996. 75 | 498. 37 | 398. 70 | 299. 02 | 249. 19 | 149. 51 |
| 23 | 1, 993. 04 | 996. 52 | 498. 26 | 398. 61 | 298. 96 | 249. 13 | 149. 48 |
| 24 | 1, 992. 55 | 996. 28 | 498. 14 | 398. 51 | 298. 88 | 249. 07 | 149. 44 |
| 25 | 1, 992. 05 | 996. 03 | 498. 01 | 398. 41 | 298. 81 | 249. 01 | 149. 40 |
| 26 | 1, 991. 53 | 995. 76 | 497. 88 | 398. 31 | 298. 73 | 248. 94 | 149. 36 |
| 27 | 1, 990. 99 | 995. 49 | 497. 75 | 398. 20 | 298. 65 | 248. 87 | 149. 32 |
| 28 | 1, 990. 43 | 995. 21 | 497. 61 | 398. 09 | 298. 56 | 248. 80 | 149. 28 |
| 29 | 1, 989. 85 | 994. 93 | 497. 46 | 397. 97 | 298. 48 | 248. 73 | 149. 24 |
| 30 | 1, 989. 26 | 994. 63 | 497. 31 | 397. 85 | 298. 39 | 248. 66 | 149. 19 |
| 35 | 1, 986. 02 | 993. 01 | 496. 51 | 397. 20 | 297. 90 | 248. 25 | 148. 95 |
| 40 | 1, 982. 41 | 991. 20 | 495. 60 | 396. 48 | 297. 36 | 247. 80 | 148. 68 |
| 45 | 1, 978. 4 | 989. 2 | 494. 6 | 395. 7 | 296. 8 | 247. 3 | 148. 4 |
| 50 | 1, 974. 1 | 987. 0 | 493. 5 | 394. 8 | 296. 1 | 246. 8 | 148. 1 |
| 55 | 1, 969. 4 | 984. 7 | 492. 3 | 393. 9 | 295. 4 | 246. 2 | 147. 7 |
| 60 | 1, 964. 4 | 982. 2 | 491. 1 | 392. 9 | 294. 7 | 245. 6 | 147. 3 |
| 65 | 1, 959. 1 | 979. 6 | 489. 8 | 391. 8 | 293. 9 | 244. 9 | 146. 9 |
| 70 | 1, 953. 6 | 976. 8 | 488. 4 | 390. 7 | 293. 0 | 244. 2 | 146. 5 |
| 75 | 1, 947. 7 | 973. 9 | 486. 9 | 389. 5 | 292. 2 | 243. 5 | 146. 1 |
| 80 | 1, 941. 6 | 970. 8 | 485. 4 | 388. 3 | 291. 2 | 242. 7 | 145. 6 |
| 85 | 1, 935. 3 | 967. 6 | 483. 8 | 387. 1 | 290. 3 | 241. 9 | 145. 1 |
| 90 | 1, 928. 6 | 964. 3 | 482. 2 | 385. 7 | 289. 3 | 241. 1 | 144. 6 |
| 95 | 1, 921. 8 | 960. 9 | 480. 5 | 384. 4 | 288. 3 | 240. 2 | 144. 1 |
| 100 | 1, 914. 7 | 957. 4 | 478. 7 | 382. 9 | 287. 2 | 239. 3 | 143. 6 |

TABLE 38.—Temperature correction for volumetric solutions

[This table gives the correction to various observed volumes of water, measured at the designated temperatures, to give the volume at the standard temperature, 20° C. Conversely, by subtracting the corrections from the volume desired at 20° C., the volume that must be measured out at the designated temperatures in order to give the desired volume at 20° C., will be obtained. It is assumed that the volumes are measured in glass apparatus having a coefficient of cubical expansion of 0.000025 per degree centigrade. The table is applicable to dilute aqueous solutions having the same coefficient of expansion as water.]

| Temperature of measurement, °C. | Capacity of apparatus in milliliters at 20° C. | | | | | | |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|
| | 2,000 | 1,000 | 500 | 400 | 300 | 250 | 150 |
| | Correction in milliliters to give volume of water at 20° C. | | | | | | |
| 15 | +1.54 | +0.77 | +0.38 | +0.31 | +0.23 | +0.19 | +0.12 |
| 16 | +1.28 | +0.64 | +0.32 | +0.26 | +0.19 | +0.16 | +0.10 |
| 17 | +0.99 | +0.50 | +0.25 | +0.20 | +0.15 | +0.12 | +0.07 |
| 18 | +0.68 | +0.34 | +0.17 | +0.14 | +0.10 | +0.08 | +0.05 |
| 19 | +0.35 | +0.18 | +0.09 | +0.07 | +0.05 | +0.04 | +0.03 |
| 21 | -.37 | -.18 | -.09 | -.07 | -.06 | -.05 | -.03 |
| 22 | -.77 | -.38 | -.19 | -.15 | -.12 | -.10 | -.06 |
| 23 | -1.18 | -.59 | -.30 | -.24 | -.18 | -.15 | -.09 |
| 24 | -1.61 | -.81 | -.40 | -.32 | -.24 | -.20 | -.12 |
| 25 | -2.07 | -1.03 | -.52 | -.41 | -.31 | -.26 | -.15 |
| 26 | -2.54 | -1.27 | -.64 | -.51 | -.38 | -.32 | -.19 |
| 27 | -3.03 | -1.52 | -.76 | -.61 | -.46 | -.38 | -.23 |
| 28 | -3.55 | -1.77 | -.89 | -.71 | -.53 | -.44 | -.27 |
| 29 | -4.08 | -2.04 | -1.02 | -.82 | -.61 | -.51 | -.31 |
| 30 | -4.62 | -2.31 | -1.16 | -.92 | -.69 | -.58 | -.35 |

In using the above table to correct the volume of certain standard solutions to 20° C. more accurate results will be obtained if the numerical values of the corrections are increased by the percentages given below:

| Solution | Normality | | |
|--------------------------------------|-----------|-----|------|
| | N | N/2 | N/10 |
| HNO ₃ | 50 | 25 | 6 |
| H ₂ SO ₄ | 45 | 25 | 5 |
| NaOH..... | 40 | 25 | 5 |
| KOH..... | 40 | 20 | 4 |

TABLE 39.—Reduction of weighings to vacuo

The weight of a body in vacuo is determined by adding to its apparent weight in air a buoyancy correction equal to the weight of the air displaced by the difference in volume of the body weighed and the weights required to balance it on an equal arm balance.

$$M = W + \rho \left(\frac{M}{d_1} - \frac{W}{d_2} \right) = W \frac{d_1}{d_2} \left(\frac{d_2 - \rho}{d_1 - \rho} \right) = W \frac{d_1}{d_1 - \rho} \left(1 - \frac{\rho}{d_2} \right) =$$

$$W \left[1 + \frac{\rho}{d_2} \left(\frac{d_2 - d_1}{d_1 - \rho} \right) \right] = W + k W/1,000$$

M = weight in vacuo; W = apparent weight in air; ρ = density of air; d_1 = density of body; d_2 = density of weights.

The following table has been computed for $\rho = 0.0012$:

| Density of body weighed g/cm ³ | Correction factor, k | | | Density of body weighed, g/cm ³ | Correction factor, k | | |
|--|---|----------------------|----------------------------|---|---|----------------------|----------------------------|
| | Pt. Ir. weights d=21.5 g/cm ³ | Brass weights 8.4 | Quartz or Al. Wts. 2.65 | | Pt. Ir. weights d=21.5 g/cm ³ | Brass weights 8.4 | Quartz or Al. Wts. 2.65 |
| 0.5 | +2.35 | +2.26 | +1.95 | 5.0 | +0.18 | +0.10 | -0.21 |
| .6 | +1.95 | +1.86 | +1.55 | 6.0 | + .15 | + .06 | - .25 |
| .7 | +1.66 | +1.57 | +1.26 | 7.0 | + .12 | + .03 | - .28 |
| .8 | +1.45 | +1.36 | +1.05 | 8.0 | + .10 | + .01 | - .30 |
| .9 | +1.28 | +1.19 | + .88 | 9.0 | + .08 | - .01 | - .32 |
| 1.0 | +1.14 | +1.06 | + .75 | 10.0 | + .06 | - .02 | - .33 |
| 1.1 | +1.04 | + .95 | + .64 | 11.0 | + .05 | - .03 | - .34 |
| 1.2 | + .94 | + .86 | + .55 | 12.0 | + .04 | - .04 | - .35 |
| 1.3 | + .87 | + .78 | + .47 | 13.0 | + .04 | - .05 | - .36 |
| 1.4 | + .80 | + .72 | + .40 | 14.0 | + .03 | - .06 | - .37 |
| 1.5 | + .74 | + .66 | + .35 | 15.0 | + .02 | - .06 | - .37 |
| 1.6 | + .69 | + .61 | + .30 | 16.0 | + .02 | - .07 | - .38 |
| 1.7 | + .65 | + .56 | + .25 | 17.0 | + .01 | - .07 | - .38 |
| 1.8 | + .61 | + .52 | + .21 | 18.0 | + .01 | - .08 | - .39 |
| 1.9 | + .58 | + .49 | + .18 | 19.0 | + .01 | - .08 | - .39 |
| 2.0 | + .54 | + .46 | + .15 | 20.0 | .00 | - .08 | - .39 |
| 2.5 | + .42 | + .34 | + .03 | 21.0 | .00 | - .09 | - .40 |
| 3.0 | + .34 | + .26 | - .05 | 22.0 | .00 | - .09 | - .40 |
| 3.5 | + .29 | + .20 | - .11 | 23.0 | .00 | - .09 | - .40 |
| 4.0 | + .24 | + .16 | - .15 | 24.0 | - .01 | - .09 | - .40 |

TABLES OF CORRECTIONS FOR DETERMINING THE TRUE CAPACITIES OF GLASS VESSELS FROM THE WEIGHT OF WATER IN AIR—Contd.

[Amounts to be added to apparent weight of water in grams to obtain actual capacity in milliliters at 20° C.]

TABLE 41.—Indicated capacity 200 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.414 | 0.417 | 0.419 | 0.422 | 0.424 | 0.427 | 0.430 | 0.432 | 0.435 | 0.437 |
| 16 | .440 | .443 | .445 | .448 | .451 | .454 | .456 | .459 | .462 | .465 |
| 17 | .468 | .470 | .473 | .477 | .479 | .482 | .485 | .488 | .491 | .494 |
| 18 | .497 | .501 | .504 | .507 | .510 | .513 | .516 | .519 | .523 | .526 |
| 19 | .529 | .533 | .536 | .540 | .543 | .546 | .550 | .553 | .557 | .560 |
| 20 | .564 | .567 | .571 | .574 | .578 | .582 | .585 | .589 | .593 | .596 |
| 21 | .600 | .604 | .608 | .612 | .615 | .619 | .623 | .627 | .631 | .635 |
| 22 | .639 | .643 | .647 | .650 | .655 | .659 | .663 | .667 | .671 | .675 |
| 23 | .679 | .683 | .688 | .692 | .696 | .700 | .705 | .709 | .713 | .717 |
| 24 | .722 | .726 | .731 | .735 | .739 | .744 | .748 | .753 | .757 | .762 |
| 25 | .766 | .771 | .775 | .780 | .785 | .789 | .794 | .799 | .803 | .808 |
| 26 | .813 | .818 | .822 | .827 | .832 | .837 | .842 | .846 | .851 | .856 |
| 27 | .861 | .866 | .871 | .876 | .881 | .886 | .891 | .896 | .901 | .906 |
| 28 | .911 | .917 | .922 | .927 | .932 | .937 | .942 | .947 | .953 | .958 |
| 29 | .963 | .969 | .974 | | | | | | | |

TABLE 42.—Indicated capacity 150 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 |
| 16 | .330 | .332 | .334 | .336 | .338 | .340 | .342 | .344 | .346 | .349 |
| 17 | .351 | .353 | .355 | .357 | .359 | .362 | .364 | .366 | .368 | .371 |
| 18 | .373 | .375 | .378 | .380 | .383 | .385 | .387 | .390 | .392 | .395 |
| 19 | .397 | .400 | .402 | .405 | .408 | .410 | .412 | .415 | .418 | .420 |
| 20 | .423 | .425 | .428 | .431 | .433 | .436 | .439 | .442 | .445 | .448 |
| 21 | .450 | .453 | .456 | .459 | .461 | .464 | .467 | .470 | .473 | .476 |
| 22 | .479 | .483 | .485 | .488 | .491 | .494 | .497 | .500 | .503 | .506 |
| 23 | .509 | .512 | .516 | .519 | .522 | .525 | .529 | .532 | .535 | .538 |
| 24 | .541 | .545 | .548 | .551 | .554 | .558 | .562 | .565 | .568 | .571 |
| 25 | .575 | .578 | .581 | .585 | .588 | .592 | .596 | .599 | .602 | .606 |
| 26 | .610 | .613 | .617 | .620 | .624 | .628 | .631 | .635 | .638 | .642 |
| 27 | .645 | .649 | .653 | .657 | .661 | .664 | .668 | .672 | .676 | .680 |
| 28 | .684 | .688 | .691 | .695 | .699 | .703 | .707 | .711 | .715 | .719 |
| 29 | .722 | .726 | .730 | | | | | | | |

TABLE 43.—Indicated capacity 100 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.207 | 0.208 | 0.210 | 0.211 | 0.212 | 0.213 | 0.215 | 0.216 | 0.217 | 0.219 |
| 16 | .220 | .221 | .223 | .224 | .225 | .227 | .228 | .230 | .231 | .232 |
| 17 | .234 | .235 | .237 | .238 | .240 | .241 | .243 | .244 | .246 | .247 |
| 18 | .249 | .250 | .252 | .253 | .255 | .257 | .258 | .260 | .261 | .263 |
| 19 | .265 | .266 | .268 | .270 | .272 | .273 | .275 | .277 | .278 | .280 |
| 20 | .282 | .284 | .285 | .287 | .289 | .291 | .293 | .294 | .296 | .298 |
| 21 | .300 | .302 | .304 | .306 | .308 | .310 | .312 | .314 | .315 | .317 |
| 22 | .319 | .321 | .323 | .325 | .327 | .329 | .331 | .333 | .336 | .338 |
| 23 | .340 | .342 | .344 | .346 | .348 | .350 | .352 | .354 | .357 | .359 |
| 24 | .361 | .363 | .365 | .368 | .370 | .372 | .374 | .376 | .379 | .381 |
| 25 | .383 | .386 | .388 | .390 | .392 | .395 | .397 | .399 | .402 | .404 |
| 26 | .406 | .409 | .411 | .414 | .416 | .418 | .421 | .423 | .426 | .428 |
| 27 | .431 | .433 | .436 | .438 | .440 | .443 | .446 | .448 | .451 | .453 |
| 28 | .456 | .458 | .461 | .463 | .466 | .469 | .471 | .474 | .476 | .479 |
| 29 | .482 | .484 | .487 | | | | | | | |

TABLES OF CORRECTIONS FOR DETERMINING THE TRUE CAPACITIES
OF GLASS VESSELS FROM THE WEIGHT OF WATER IN AIR—Contd.

[Amounts to be added to apparent weight of water in grams to obtain actual capacity in milliliters at 20° C.]

TABLE 44.—Indicated capacity 90 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.186 | 0.188 | 0.189 | 0.190 | 0.191 | 0.192 | 0.193 | 0.194 | 0.196 | 0.197 |
| 16 | .198 | .199 | .200 | .202 | .203 | .204 | .205 | .207 | .208 | .209 |
| 17 | .210 | .212 | .213 | .214 | .216 | .217 | .218 | .220 | .221 | .222 |
| 18 | .224 | .225 | .227 | .228 | .230 | .231 | .232 | .234 | .235 | .237 |
| 19 | .238 | .240 | .241 | .243 | .244 | .246 | .247 | .249 | .251 | .252 |
| 20 | .254 | .255 | .257 | .258 | .260 | .262 | .263 | .265 | .267 | .268 |
| 21 | .270 | .272 | .273 | .275 | .277 | .278 | .280 | .282 | .284 | .286 |
| 22 | .287 | .289 | .291 | .293 | .295 | .296 | .298 | .300 | .302 | .304 |
| 23 | .306 | .308 | .309 | .311 | .313 | .315 | .317 | .319 | .321 | .323 |
| 24 | .325 | .327 | .329 | .331 | .333 | .335 | .337 | .339 | .341 | .343 |
| 25 | .345 | .347 | .349 | .351 | .353 | .355 | .357 | .359 | .362 | .364 |
| 26 | .366 | .368 | .370 | .372 | .374 | .377 | .379 | .381 | .383 | .385 |
| 27 | .388 | .390 | .392 | .394 | .396 | .399 | .401 | .403 | .406 | .408 |
| 28 | .410 | .412 | .415 | .417 | .419 | .422 | .424 | .426 | .429 | .431 |
| 29 | .434 | .436 | .438 | | | | | | | |

TABLE 45.—Indicated capacity 80 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.166 | 0.167 | 0.168 | 0.169 | 0.170 | 0.171 | 0.172 | 0.173 | 0.174 | 0.175 |
| 16 | .176 | .177 | .178 | .179 | .180 | .181 | .183 | .184 | .185 | .186 |
| 17 | .187 | .188 | .189 | .191 | .192 | .193 | .194 | .195 | .196 | .198 |
| 18 | .199 | .200 | .201 | .203 | .204 | .205 | .206 | .208 | .209 | .210 |
| 19 | .212 | .213 | .214 | .216 | .217 | .218 | .220 | .221 | .223 | .224 |
| 20 | .226 | .227 | .228 | .230 | .231 | .233 | .234 | .236 | .237 | .239 |
| 21 | .240 | .241 | .243 | .245 | .246 | .248 | .249 | .251 | .252 | .254 |
| 22 | .255 | .257 | .259 | .260 | .262 | .264 | .265 | .267 | .268 | .270 |
| 23 | .272 | .273 | .275 | .277 | .278 | .280 | .282 | .284 | .285 | .287 |
| 24 | .289 | .290 | .292 | .294 | .296 | .298 | .299 | .301 | .303 | .305 |
| 25 | .306 | .308 | .310 | .312 | .314 | .316 | .318 | .320 | .321 | .323 |
| 26 | .325 | .327 | .329 | .331 | .333 | .335 | .337 | .339 | .341 | .342 |
| 27 | .344 | .346 | .348 | .350 | .352 | .354 | .356 | .358 | .360 | .362 |
| 28 | .365 | .367 | .369 | .371 | .373 | .375 | .377 | .379 | .381 | .383 |
| 29 | .385 | .387 | .390 | | | | | | | |

TABLE 46.—Indicated capacity 70 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.145 | 0.146 | 0.147 | 0.148 | 0.148 | 0.149 | 0.150 | 0.151 | 0.152 | 0.153 |
| 16 | .154 | .155 | .156 | .157 | .158 | .159 | .160 | .161 | .162 | .163 |
| 17 | .164 | .165 | .166 | .167 | .168 | .169 | .170 | .171 | .172 | .173 |
| 18 | .174 | .175 | .176 | .177 | .178 | .180 | .181 | .182 | .183 | .184 |
| 19 | .185 | .186 | .188 | .189 | .190 | .191 | .192 | .194 | .195 | .196 |
| 20 | .197 | .199 | .200 | .201 | .202 | .204 | .205 | .206 | .207 | .209 |
| 21 | .210 | .211 | .213 | .214 | .216 | .217 | .218 | .220 | .221 | .222 |
| 22 | .224 | .225 | .226 | .228 | .229 | .230 | .232 | .233 | .235 | .236 |
| 23 | .238 | .239 | .241 | .242 | .244 | .245 | .247 | .248 | .250 | .251 |
| 24 | .253 | .254 | .256 | .257 | .259 | .260 | .262 | .263 | .265 | .267 |
| 25 | .268 | .270 | .271 | .273 | .274 | .276 | .278 | .280 | .281 | .283 |
| 26 | .284 | .286 | .288 | .289 | .291 | .293 | .294 | .296 | .298 | .299 |
| 27 | .301 | .303 | .305 | .307 | .308 | .310 | .312 | .314 | .315 | .317 |
| 28 | .319 | .321 | .323 | .324 | .326 | .328 | .330 | .332 | .333 | .335 |
| 29 | .337 | .339 | .341 | | | | | | | |

TABLES OF CORRECTIONS FOR DETERMINING THE TRUE CAPACITIES OF GLASS VESSELS FROM THE WEIGHT OF WATER IN AIR—Contd.

[Amounts to be added to apparent weight of water in grams to obtain actual capacity in milliliters.]

TABLE 47.—Indicated capacity 60 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.124 | 0.125 | 0.126 | 0.127 | 0.127 | 0.128 | 0.129 | 0.130 | 0.130 | 0.131 |
| 16 | .132 | .133 | .134 | .134 | .135 | .136 | .137 | .138 | .139 | .140 |
| 17 | .140 | .141 | .142 | .143 | .144 | .145 | .146 | .147 | .147 | .148 |
| 18 | .149 | .150 | .151 | .152 | .153 | .154 | .155 | .156 | .157 | .158 |
| 19 | .159 | .160 | .161 | .162 | .163 | .164 | .165 | .166 | .167 | .168 |
| 20 | .169 | .170 | .171 | .172 | .173 | .175 | .176 | .177 | .178 | .179 |
| 21 | .180 | .181 | .182 | .183 | .185 | .186 | .187 | .188 | .189 | .190 |
| 22 | .192 | .193 | .194 | .195 | .196 | .198 | .199 | .200 | .201 | .202 |
| 23 | .204 | .205 | .206 | .208 | .209 | .210 | .211 | .213 | .214 | .215 |
| 24 | .216 | .218 | .219 | .220 | .222 | .223 | .225 | .226 | .227 | .228 |
| 25 | .230 | .231 | .232 | .234 | .235 | .237 | .238 | .240 | .241 | .242 |
| 26 | .244 | .245 | .247 | .248 | .250 | .251 | .253 | .254 | .255 | .257 |
| 27 | .258 | .260 | .261 | .263 | .264 | .266 | .267 | .269 | .270 | .272 |
| 28 | .273 | .275 | .276 | .278 | .280 | .281 | .283 | .284 | .286 | .288 |
| 29 | .289 | .291 | .292 | | | | | | | |

TABLE 48.—Indicated capacity 50 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.104 | 0.104 | 0.105 | 0.106 | 0.106 | 0.107 | 0.107 | 0.108 | 0.109 | 0.109 |
| 16 | .110 | .111 | .111 | .112 | .113 | .113 | .114 | .115 | .116 | .116 |
| 17 | .117 | .118 | .118 | .119 | .120 | .121 | .121 | .122 | .123 | .124 |
| 18 | .124 | .125 | .126 | .127 | .128 | .128 | .129 | .130 | .131 | .132 |
| 19 | .132 | .133 | .134 | .135 | .136 | .137 | .137 | .138 | .139 | .140 |
| 20 | .141 | .142 | .143 | .144 | .144 | .145 | .146 | .147 | .148 | .149 |
| 21 | .150 | .151 | .152 | .153 | .154 | .155 | .156 | .157 | .158 | .159 |
| 22 | .160 | .161 | .162 | .163 | .164 | .165 | .166 | .167 | .168 | .169 |
| 23 | .170 | .171 | .172 | .173 | .174 | .175 | .176 | .177 | .178 | .179 |
| 24 | .180 | .182 | .183 | .184 | .185 | .186 | .187 | .188 | .189 | .190 |
| 25 | .192 | .193 | .194 | .195 | .196 | .197 | .199 | .200 | .201 | .202 |
| 26 | .203 | .204 | .206 | .207 | .208 | .209 | .210 | .212 | .213 | .214 |
| 27 | .215 | .216 | .218 | .219 | .220 | .222 | .223 | .224 | .225 | .226 |
| 28 | .228 | .229 | .230 | .232 | .233 | .234 | .236 | .237 | .238 | .240 |
| 29 | .241 | .242 | .244 | | | | | | | |

TABLE 49.—Indicated capacity 45 ml

| Temperature in degrees C. | Tenths of degrees | | | | | | | | | |
|---------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.093 | 0.094 | 0.094 | 0.095 | 0.095 | 0.096 | 0.097 | 0.097 | 0.098 | 0.098 |
| 16 | .099 | .100 | .100 | .101 | .101 | .102 | .103 | .103 | .104 | .105 |
| 17 | .105 | .106 | .107 | .107 | .108 | .108 | .109 | .110 | .111 | .111 |
| 18 | .112 | .113 | .113 | .114 | .115 | .115 | .116 | .117 | .118 | .118 |
| 19 | .119 | .120 | .121 | .121 | .122 | .123 | .124 | .124 | .125 | .126 |
| 20 | .127 | .128 | .128 | .129 | .130 | .131 | .132 | .132 | .133 | .134 |
| 21 | .135 | .136 | .137 | .138 | .138 | .139 | .140 | .141 | .142 | .143 |
| 22 | .144 | .145 | .145 | .146 | .147 | .148 | .149 | .150 | .151 | .152 |
| 23 | .153 | .154 | .155 | .155 | .157 | .158 | .159 | .160 | .160 | .161 |
| 24 | .162 | .163 | .164 | .165 | .166 | .167 | .168 | .169 | .170 | .171 |
| 25 | .172 | .173 | .174 | .176 | .177 | .178 | .179 | .180 | .181 | .182 |
| 26 | .183 | .184 | .185 | .186 | .187 | .188 | .189 | .190 | .192 | .193 |
| 27 | .194 | .195 | .196 | .197 | .198 | .199 | .201 | .202 | .203 | .204 |
| 28 | .205 | .206 | .207 | .209 | .210 | .211 | .212 | .213 | .214 | .216 |
| 29 | .217 | .218 | .219 | | | | | | | |

**TABLES OF CORRECTIONS FOR DETERMINING THE TRUE CAPACITIES
OF GLASS VESSELS FROM THE WEIGHT OF WATER IN AIR—Contd.**

[Amounts to be added to apparent weight of water in grams to obtain actual capacity in milliliters at 20° C.]

TABLE 50.—Indicated capacity 40 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.083 | 0.083 | 0.084 | 0.084 | 0.085 | 0.085 | 0.086 | 0.086 | 0.087 | 0.087 |
| 16 | .088 | .089 | .089 | .090 | .090 | .091 | .091 | .092 | .092 | .093 |
| 17 | .094 | .094 | .095 | .095 | .096 | .096 | .097 | .098 | .098 | .099 |
| 18 | .099 | .100 | .101 | .101 | .102 | .102 | .103 | .104 | .105 | .105 |
| 19 | .106 | .107 | .107 | .108 | .109 | .109 | .110 | .111 | .111 | .112 |
| 20 | .113 | .113 | .114 | .115 | .116 | .116 | .117 | .118 | .119 | .119 |
| 21 | .120 | .121 | .122 | .122 | .123 | .124 | .125 | .125 | .126 | .127 |
| 22 | .128 | .129 | .129 | .130 | .131 | .132 | .133 | .133 | .134 | .135 |
| 23 | .136 | .137 | .138 | .138 | .139 | .140 | .141 | .142 | .143 | .143 |
| 24 | .144 | .145 | .146 | .147 | .148 | .149 | .150 | .151 | .151 | .152 |
| 25 | .153 | .154 | .155 | .156 | .157 | .158 | .159 | .160 | .161 | .162 |
| 26 | .163 | .164 | .164 | .165 | .166 | .167 | .168 | .169 | .170 | .171 |
| 27 | .172 | .173 | .174 | .175 | .176 | .177 | .178 | .179 | .180 | .181 |
| 28 | .182 | .183 | .184 | .185 | .186 | .187 | .188 | .189 | .191 | .192 |
| 29 | .193 | .194 | .195 | | | | | | | |

TABLE 51.—Indicated capacity 35 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.073 | 0.073 | 0.073 | 0.074 | 0.074 | 0.075 | .075 | 0.076 | 0.076 | 0.076 |
| 16 | .077 | .078 | .078 | .078 | .079 | .079 | .080 | .080 | .081 | .081 |
| 17 | .082 | .082 | .083 | .083 | .084 | .084 | .085 | .085 | .086 | .086 |
| 18 | .087 | .088 | .088 | .089 | .089 | .090 | .090 | .091 | .091 | .092 |
| 19 | .092 | .093 | .094 | .094 | 0.95 | .096 | .096 | .097 | .097 | .098 |
| 20 | .099 | .099 | .100 | .100 | .101 | .102 | .102 | .103 | .104 | .104 |
| 21 | .105 | .106 | .106 | .107 | .108 | .108 | .109 | .110 | .110 | .111 |
| 22 | .112 | .113 | .113 | .114 | .115 | .115 | .116 | .117 | .117 | .118 |
| 23 | .119 | .120 | .120 | .121 | .122 | .122 | .123 | .124 | .125 | .126 |
| 24 | .126 | .127 | .128 | .129 | .129 | .130 | .131 | .132 | .133 | .133 |
| 25 | .134 | .135 | .136 | .137 | .137 | .238 | .139 | .140 | .141 | .141 |
| 26 | .142 | .143 | .144 | .145 | .146 | .146 | .147 | .148 | .149 | .150 |
| 27 | .151 | .152 | .152 | .153 | .154 | .155 | .156 | .157 | .158 | .159 |
| 28 | .159 | .160 | .161 | .162 | .163 | .164 | .165 | .166 | .167 | .168 |
| 29 | .169 | .170 | .170 | | | | | | | |

TABLE 52.—Indicated capacity 30 ml

| Tempera- ture in degrees C. | Tenths of degrees | | | | | | | | | |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15 | 0.062 | 0.063 | 0.063 | 0.063 | 0.064 | 0.064 | 0.064 | 0.065 | 0.065 | 0.066 |
| 16 | .066 | .066 | .067 | .067 | .068 | .068 | .068 | .069 | .069 | .070 |
| 17 | .070 | .071 | .071 | .071 | .072 | .072 | .073 | .073 | .074 | .074 |
| 18 | .075 | .075 | .076 | .076 | .077 | .077 | .078 | .077 | .078 | .079 |
| 19 | .079 | .080 | .080 | .081 | .081 | .082 | .082 | .083 | .084 | .084 |
| 20 | .085 | .085 | .086 | .086 | .087 | .087 | .088 | .088 | .089 | .089 |
| 21 | .090 | .091 | .091 | .092 | .092 | .093 | .093 | .094 | .094 | .095 |
| 22 | .096 | .096 | .097 | .098 | .098 | .099 | .099 | .100 | .101 | .101 |
| 23 | .102 | .103 | .103 | .104 | .104 | .105 | .106 | .106 | .107 | .108 |
| 24 | .108 | .109 | .110 | .110 | .111 | .112 | .112 | .113 | .114 | .114 |
| 25 | .115 | .116 | .116 | .117 | .118 | .118 | .119 | .120 | .121 | .121 |
| 26 | .122 | .123 | .123 | .124 | .125 | .126 | .126 | .127 | .128 | .128 |
| 27 | .129 | .130 | .131 | .131 | .132 | .133 | .134 | .134 | .135 | .136 |
| 29 | .137 | .137 | .138 | .139 | .140 | .141 | .141 | .142 | .143 | .144 |
| 29 | .145 | .145 | .146 | | | | | | | |

MASTER SCALES FOR THE GRADUATION OF HYDROMETERS

The accompanying tables were prepared for the use of hydrometer makers in the graduation of hydrometer scales to indicate percentages of ethyl alcohol by weight at 20° C or by volume at 60° F, and they give the proportional length of any part of the hydrometer scale, assuming that the entire scale has a length of 1000 mm.¹ and that the hydrometer stem is of uniform cross section. For example, if it is required to construct a hydrometer scale having a certain range the spacing of the graduations of the scale should be made proportional to the differences of the lengths shown in the table for that range.

These tables were prepared from the alcoholometric tables published in this circular (Tables 2 and 3). The original work on which the tables are based is described in detail in the Bulletin of the Bureau of Standards, vol. 9, p. 328 (Reprint No. 197). The indications of hydrometers graduated in accordance with these master scales will be on the basis officially adopted by the Bureau of Standards. Hydrometers may also be graduated to indicate percentages of "proof spirit," according to the official tables of the United States Bureau of Internal Revenue (adopted 1913), by the use of the accompanying master scale intended for the graduation of hydrometers to indicate percentages of alcohol by volume at 60° F. The percentage of proof spirit is in every case twice the percentage of alcohol by volume. For example, 25 per cent alcohol by volume is equivalent to 50 per cent proof spirit; 50 per cent alcohol by volume is equivalent to 100 per cent proof spirit. The spacing of the graduations for proof spirit hydrometers can, therefore, be taken directly from Table 54, the per cent alcohol by volume being multiplied by 2 in each case to give the equivalent per cent proof spirit.

¹ Any other convenient unit may be employed; the tabulated lengths will then be in that unit.

TABLE 53.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by weight at 20° C.

[Total length of scale 1,000 mm]

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 0.0 | 0.00 | 5.0 | 33.78 | 10.0 | 62.96 | 15.0 | 89.50 | 20.0 | 115.45 |
| .1 | .71 | .1 | 34.40 | .1 | 63.51 | .1 | 90.00 | .1 | 115.99 |
| .2 | 1.42 | .2 | 35.02 | .2 | 64.06 | .2 | 90.50 | .2 | 116.53 |
| .3 | 2.13 | .3 | 35.64 | .3 | 64.61 | .3 | 91.00 | .3 | 117.07 |
| .4 | 2.84 | .4 | 36.26 | .4 | 65.16 | .4 | 91.50 | .4 | 117.61 |
| .5 | 3.55 | .5 | 36.87 | .5 | 65.71 | .5 | 91.99 | .5 | 118.15 |
| .6 | 4.26 | .6 | 37.48 | .6 | 66.26 | .6 | 92.48 | .6 | 118.69 |
| .7 | 4.97 | .7 | 38.05 | .7 | 66.81 | .7 | 92.93 | .7 | 119.23 |
| .8 | 5.68 | .8 | 38.68 | .8 | 67.36 | .8 | 93.48 | .8 | 119.73 |
| .9 | 6.38 | .9 | 39.28 | .9 | 67.91 | .9 | 93.98 | .9 | 120.33 |
| 1.0 | 7.08 | 6.0 | 39.88 | 11.0 | 68.45 | 16.0 | 94.49 | 21.0 | 120.88 |
| .1 | 7.78 | .1 | 40.48 | .1 | 68.99 | .1 | 95.00 | .1 | 121.43 |
| .2 | 8.48 | .2 | 41.08 | .2 | 69.53 | .2 | 95.51 | .2 | 121.98 |
| .3 | 9.18 | .3 | 41.68 | .3 | 70.07 | .3 | 96.02 | .3 | 122.53 |
| .4 | 9.88 | .4 | 42.28 | .4 | 70.61 | .4 | 96.53 | .4 | 123.08 |
| .5 | 10.58 | .5 | 42.88 | .5 | 71.15 | .5 | 97.04 | .5 | 123.63 |
| .6 | 11.28 | .6 | 43.47 | .6 | 71.69 | .6 | 97.55 | .6 | 124.18 |
| .7 | 11.97 | .7 | 44.06 | .7 | 72.23 | .7 | 98.06 | .7 | 124.73 |
| .8 | 12.66 | .8 | 44.65 | .8 | 72.77 | .8 | 98.57 | .8 | 125.28 |
| .9 | 13.35 | .9 | 45.24 | .9 | 73.31 | .9 | 99.08 | .9 | 125.83 |
| 2.0 | 14.04 | 7.0 | 45.82 | 12.0 | 73.84 | 17.0 | 99.60 | 22.0 | 126.38 |
| .1 | 14.73 | .1 | 46.40 | .1 | 74.37 | .1 | 100.12 | .1 | 126.94 |
| .2 | 15.42 | .2 | 46.98 | .2 | 74.90 | .2 | 100.64 | .2 | 127.50 |
| .3 | 16.11 | .3 | 47.56 | .3 | 75.43 | .3 | 101.16 | .3 | 128.06 |
| .4 | 16.80 | .4 | 48.14 | .4 | 75.96 | .4 | 101.68 | .4 | 128.62 |
| .5 | 17.49 | .5 | 48.72 | .5 | 76.49 | .5 | 102.20 | .5 | 129.19 |
| .6 | 18.18 | .6 | 49.30 | .6 | 77.02 | .6 | 102.72 | .6 | 129.76 |
| .7 | 18.87 | .7 | 49.88 | .7 | 77.55 | .7 | 103.24 | .7 | 130.33 |
| .8 | 19.55 | .8 | 50.46 | .8 | 78.08 | .8 | 103.76 | .8 | 130.90 |
| .9 | 20.22 | .9 | 51.04 | .9 | 78.61 | .9 | 104.28 | .9 | 131.47 |
| 3.0 | 20.89 | 8.0 | 51.62 | 13.0 | 79.13 | 18.0 | 104.80 | 23.0 | 132.04 |
| .1 | 21.56 | .1 | 52.19 | .1 | 79.65 | .1 | 105.32 | .1 | 132.61 |
| .2 | 22.22 | .2 | 52.76 | .2 | 80.17 | .2 | 105.85 | .2 | 133.18 |
| .3 | 22.88 | .3 | 53.33 | .3 | 80.69 | .3 | 106.38 | .3 | 133.75 |
| .4 | 23.54 | .4 | 53.90 | .4 | 81.21 | .4 | 106.91 | .4 | 134.32 |
| .5 | 24.20 | .5 | 54.47 | .5 | 81.73 | .5 | 107.44 | .5 | 134.89 |
| .6 | 24.85 | .6 | 55.04 | .6 | 82.25 | .6 | 107.97 | .6 | 135.46 |
| .7 | 25.50 | .7 | 55.61 | .7 | 82.77 | .7 | 108.50 | .7 | 136.03 |
| .8 | 26.15 | .8 | 56.18 | .8 | 83.29 | .8 | 109.03 | .8 | 136.60 |
| .9 | 26.80 | .9 | 56.75 | .9 | 83.81 | .9 | 109.56 | .9 | 137.18 |
| 4.0 | 27.45 | 9.0 | 57.32 | 14.0 | 84.33 | 19.0 | 110.09 | 24.0 | 137.76 |
| .1 | 28.09 | .1 | 57.89 | .1 | 84.85 | .1 | 110.62 | .1 | 138.34 |
| .2 | 28.73 | .2 | 58.46 | .2 | 85.37 | .2 | 111.15 | .2 | 138.92 |
| .3 | 29.37 | .3 | 59.03 | .3 | 85.89 | .3 | 111.68 | .3 | 139.50 |
| .4 | 30.01 | .4 | 59.60 | .4 | 86.41 | .4 | 112.21 | .4 | 140.09 |
| .5 | 30.64 | .5 | 60.17 | .5 | 86.93 | .5 | 112.75 | .5 | 140.68 |
| .6 | 31.27 | .6 | 60.73 | .6 | 87.45 | .6 | 113.29 | .6 | 141.27 |
| .7 | 31.90 | .7 | 61.29 | .7 | 87.97 | .7 | 113.83 | .7 | 141.86 |
| .8 | 32.53 | .8 | 61.85 | .8 | 88.49 | .8 | 114.37 | .8 | 142.45 |
| .9 | 33.16 | .9 | 62.41 | .9 | 89.00 | .9 | 114.91 | .9 | 143.04 |
| 5.0 | 33.78 | 10.0 | 62.96 | 15.0 | 89.50 | 20.0 | 115.45 | 25.0 | 143.63 |

TABLE 53.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by weight at 20° C.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 25.0 | 143.63 | 30.0 | 175.93 | 35.0 | 213.09 | 40.0 | 254.74 | 45.0 | 300.41 |
| .1 | 144.22 | .1 | 176.63 | .1 | 213.88 | .1 | 255.62 | .1 | 301.85 |
| .2 | 144.82 | .2 | 177.33 | .2 | 214.67 | .2 | 256.50 | .2 | 302.29 |
| .3 | 145.42 | .3 | 178.03 | .3 | 215.46 | .3 | 257.38 | .3 | 303.23 |
| .4 | 146.02 | .4 | 178.73 | .4 | 216.26 | .4 | 258.26 | .4 | 304.17 |
| .5 | 146.62 | .5 | 179.43 | .5 | 217.06 | .5 | 259.14 | .5 | 305.12 |
| .6 | 147.23 | .6 | 180.13 | .6 | 217.86 | .6 | 260.02 | .6 | 306.07 |
| .7 | 147.84 | .7 | 180.84 | .7 | 218.66 | .7 | 260.90 | .7 | 307.02 |
| .8 | 148.45 | .8 | 181.55 | .8 | 219.46 | .8 | 261.79 | .8 | 307.97 |
| .9 | 149.06 | .9 | 182.26 | .9 | 220.26 | .9 | 262.68 | .9 | 308.92 |
| 26.0 | 149.67 | 31.0 | 182.97 | 36.0 | 221.06 | 41.0 | 263.57 | 46.0 | 309.88 |
| .1 | 150.28 | .1 | 183.68 | .1 | 221.86 | .1 | 264.46 | .1 | 310.84 |
| .2 | 150.90 | .2 | 184.40 | .2 | 222.67 | .2 | 265.35 | .2 | 311.80 |
| .3 | 151.52 | .3 | 185.12 | .3 | 223.48 | .3 | 266.24 | .3 | 312.76 |
| .4 | 152.14 | .4 | 185.85 | .4 | 224.29 | .4 | 267.14 | .4 | 313.72 |
| .5 | 152.77 | .5 | 186.58 | .5 | 225.10 | .5 | 268.04 | .5 | 314.68 |
| .6 | 153.40 | .6 | 187.31 | .6 | 225.91 | .6 | 268.94 | .6 | 315.64 |
| .7 | 154.03 | .7 | 188.04 | .7 | 226.73 | .7 | 269.84 | .7 | 316.60 |
| .8 | 154.66 | .8 | 188.77 | .8 | 227.55 | .8 | 270.74 | .8 | 317.56 |
| .9 | 155.29 | .9 | 189.51 | .9 | 228.37 | .9 | 271.64 | .9 | 318.52 |
| 27.0 | 155.93 | 32.0 | 190.25 | 37.0 | 229.19 | 42.0 | 272.55 | 47.0 | 319.49 |
| .1 | 156.57 | .1 | 190.99 | .1 | 230.01 | .1 | 273.46 | .1 | 320.46 |
| .2 | 157.21 | .2 | 191.73 | .2 | 230.84 | .2 | 274.37 | .2 | 321.43 |
| .3 | 157.85 | .3 | 192.47 | .3 | 231.67 | .3 | 275.28 | .3 | 322.40 |
| .4 | 158.49 | .4 | 193.21 | .4 | 232.50 | .4 | 276.19 | .4 | 323.37 |
| .5 | 159.14 | .5 | 193.95 | .5 | 233.34 | .5 | 277.11 | .5 | 324.34 |
| .6 | 159.79 | .6 | 194.69 | .6 | 234.18 | .6 | 278.03 | .6 | 325.31 |
| .7 | 160.44 | .7 | 195.44 | .7 | 235.02 | .7 | 278.95 | .7 | 326.28 |
| .8 | 161.09 | .8 | 196.19 | .8 | 235.86 | .8 | 279.87 | .8 | 327.25 |
| .9 | 161.74 | .9 | 196.94 | .9 | 236.70 | .9 | 280.79 | .9 | 328.22 |
| 28.0 | 162.40 | 33.0 | 197.69 | 38.0 | 237.54 | 43.0 | 281.71 | 48.0 | 329.19 |
| .1 | 163.06 | .1 | 198.45 | .1 | 238.38 | .1 | 282.63 | .1 | 330.16 |
| .2 | 163.72 | .2 | 199.21 | .2 | 239.23 | .2 | 283.55 | .2 | 331.14 |
| .3 | 164.38 | .3 | 199.97 | .3 | 240.08 | .3 | 284.48 | .3 | 332.12 |
| .4 | 165.04 | .4 | 200.73 | .4 | 240.93 | .4 | 285.41 | .4 | 333.10 |
| .5 | 165.70 | .5 | 201.49 | .5 | 241.78 | .5 | 286.34 | .5 | 334.09 |
| .6 | 166.37 | .6 | 202.25 | .6 | 242.63 | .6 | 287.27 | .6 | 335.08 |
| .7 | 167.04 | .7 | 203.01 | .7 | 243.49 | .7 | 288.20 | .7 | 336.07 |
| .8 | 167.71 | .8 | 203.77 | .8 | 244.35 | .8 | 289.13 | .8 | 337.06 |
| .9 | 168.38 | .9 | 204.53 | .9 | 245.21 | .9 | 290.07 | .9 | 338.05 |
| 29.0 | 169.06 | 34.0 | 205.30 | 39.0 | 246.07 | 44.0 | 291.01 | 49.0 | 339.04 |
| .1 | 169.74 | .1 | 206.07 | .1 | 246.93 | .1 | 291.95 | .1 | 340.03 |
| .2 | 170.42 | .2 | 206.84 | .2 | 247.79 | .2 | 292.89 | .2 | 341.02 |
| .3 | 171.10 | .3 | 207.61 | .3 | 248.65 | .3 | 293.83 | .3 | 342.01 |
| .4 | 171.78 | .4 | 208.38 | .4 | 249.51 | .4 | 294.77 | .4 | 343.00 |
| .5 | 172.47 | .5 | 209.16 | .5 | 250.38 | .5 | 295.71 | .5 | 343.99 |
| .6 | 173.16 | .6 | 209.94 | .6 | 251.25 | .6 | 296.65 | .6 | 344.98 |
| .7 | 173.85 | .7 | 210.72 | .7 | 252.12 | .7 | 297.59 | .7 | 345.97 |
| .8 | 174.54 | .8 | 211.51 | .8 | 252.99 | .8 | 298.53 | .8 | 346.96 |
| .9 | 175.23 | .9 | 212.30 | .9 | 253.86 | .9 | 299.47 | .9 | 347.96 |
| 30.0 | 175.93 | 35.0 | 213.09 | 40.0 | 254.74 | 45.0 | 300.41 | 50.0 | 348.96 |

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TABLE 53.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by weight at 20° C.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 50.0 | 348.96 | 55.0 | 400.41 | 60.0 | 454.11 | 65.0 | 510.19 | 70.0 | 568.65 |
| .1 | 349.96 | .1 | 401.46 | .1 | 455.21 | .1 | 511.34 | .1 | 569.85 |
| .2 | 350.96 | .2 | 402.52 | .2 | 456.31 | .2 | 512.49 | .2 | 571.05 |
| .3 | 351.96 | .3 | 403.58 | .3 | 457.41 | .3 | 513.64 | .3 | 572.25 |
| .4 | 352.96 | .4 | 404.64 | .4 | 458.51 | .4 | 514.79 | .4 | 573.45 |
| .5 | 353.97 | .5 | 405.70 | .5 | 459.61 | .5 | 515.94 | .5 | 574.65 |
| .6 | 354.98 | .6 | 406.76 | .6 | 460.71 | .6 | 517.09 | .6 | 575.85 |
| .7 | 355.99 | .7 | 407.82 | .7 | 461.82 | .7 | 518.24 | .7 | 577.05 |
| .8 | 357.01 | .8 | 408.88 | .8 | 462.93 | .8 | 519.39 | .8 | 578.25 |
| .9 | 358.03 | .9 | 409.94 | .9 | 464.04 | .9 | 520.54 | .9 | 579.45 |
| 51.0 | 359.05 | 56.0 | 411.00 | 61.0 | 465.15 | 66.0 | 521.70 | 71.0 | 580.67 |
| .1 | 360.07 | .1 | 412.06 | .1 | 466.26 | .1 | 522.86 | .1 | 581.88 |
| .2 | 361.09 | .2 | 413.12 | .2 | 467.37 | .2 | 524.02 | .2 | 583.09 |
| .3 | 362.11 | .3 | 414.18 | .3 | 468.48 | .3 | 525.18 | .3 | 584.30 |
| .4 | 363.13 | .4 | 415.24 | .4 | 469.59 | .4 | 526.34 | .4 | 585.51 |
| .5 | 364.15 | .5 | 416.31 | .5 | 470.70 | .5 | 527.50 | .5 | 586.72 |
| .6 | 365.17 | .6 | 417.38 | .6 | 471.81 | .6 | 528.66 | .6 | 587.93 |
| .7 | 366.19 | .7 | 418.45 | .7 | 472.92 | .7 | 529.82 | .7 | 589.14 |
| .8 | 367.22 | .8 | 419.52 | .8 | 474.03 | .8 | 530.98 | .8 | 590.35 |
| .9 | 368.25 | .9 | 420.59 | .9 | 475.14 | .9 | 532.14 | .9 | 591.56 |
| 52.0 | 369.28 | 57.0 | 421.66 | 62.0 | 476.25 | 67.0 | 533.30 | 72.0 | 592.77 |
| .1 | 370.31 | .1 | 422.73 | .1 | 477.37 | .1 | 534.46 | .1 | 593.99 |
| .2 | 371.34 | .2 | 423.80 | .2 | 478.49 | .2 | 535.62 | .2 | 595.21 |
| .3 | 372.37 | .3 | 424.87 | .3 | 479.61 | .3 | 536.79 | .3 | 596.43 |
| .4 | 373.40 | .4 | 425.94 | .4 | 480.73 | .4 | 537.96 | .4 | 597.65 |
| .5 | 374.43 | .5 | 427.01 | .5 | 481.85 | .5 | 539.13 | .5 | 598.87 |
| .6 | 375.46 | .6 | 428.08 | .6 | 482.97 | .6 | 540.30 | .6 | 600.09 |
| .7 | 376.49 | .7 | 429.15 | .7 | 484.09 | .7 | 541.47 | .7 | 601.31 |
| .8 | 377.52 | .8 | 430.22 | .8 | 485.21 | .8 | 542.64 | .8 | 602.53 |
| .9 | 378.55 | .9 | 431.29 | .9 | 486.33 | .9 | 543.81 | .9 | 603.75 |
| 53.0 | 379.58 | 58.0 | 432.37 | 63.0 | 487.46 | 68.0 | 544.98 | 73.0 | 604.98 |
| .1 | 380.61 | .1 | 433.45 | .1 | 488.59 | .1 | 546.15 | .1 | 606.21 |
| .2 | 381.64 | .2 | 434.53 | .2 | 489.72 | .2 | 547.32 | .2 | 607.44 |
| .3 | 382.67 | .3 | 435.61 | .3 | 490.85 | .3 | 548.49 | .3 | 608.67 |
| .4 | 383.70 | .4 | 436.69 | .4 | 491.98 | .4 | 549.66 | .4 | 609.90 |
| .5 | 384.73 | .5 | 437.77 | .5 | 493.11 | .5 | 550.84 | .5 | 611.13 |
| .6 | 385.76 | .6 | 438.85 | .6 | 494.24 | .6 | 552.02 | .6 | 612.36 |
| .7 | 386.80 | .7 | 439.93 | .7 | 495.37 | .7 | 553.20 | .7 | 613.59 |
| .8 | 387.84 | .8 | 441.02 | .8 | 496.50 | .8 | 554.38 | .8 | 614.82 |
| .9 | 388.88 | .9 | 442.11 | .9 | 497.64 | .9 | 555.56 | .9 | 616.05 |
| 54.0 | 389.92 | 59.0 | 443.20 | 64.0 | 498.78 | 69.0 | 556.74 | 74.0 | 617.29 |
| .1 | 390.96 | .1 | 444.29 | .1 | 499.92 | .1 | 557.92 | .1 | 618.53 |
| .2 | 392.01 | .2 | 445.38 | .2 | 501.06 | .2 | 559.10 | .2 | 619.77 |
| .3 | 393.06 | .3 | 446.47 | .3 | 502.20 | .3 | 560.29 | .3 | 621.01 |
| .4 | 394.11 | .4 | 447.56 | .4 | 503.34 | .4 | 561.48 | .4 | 622.25 |
| .5 | 395.16 | .5 | 448.65 | .5 | 504.48 | .5 | 562.67 | .5 | 623.49 |
| .6 | 396.21 | .6 | 449.74 | .6 | 505.62 | .6 | 563.86 | .6 | 624.73 |
| .7 | 397.26 | .7 | 450.83 | .7 | 506.76 | .7 | 565.05 | .7 | 625.98 |
| .8 | 398.31 | .8 | 451.92 | .8 | 507.90 | .8 | 566.25 | .8 | 627.23 |
| .9 | 399.36 | .9 | 453.01 | .9 | 509.04 | .9 | 567.45 | .9 | 628.48 |
| 55.0 | 400.41 | 60.0 | 454.11 | 65.0 | 510.19 | 70.0 | 568.65 | 75.0 | 629.73 |

TABLE 53.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by weight at 20° C.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 75.0 | 629.73 | 80.0 | 693.50 | 85.0 | 760.69 | 90.0 | 832.76 | 95.0 | 911.46 |
| .1 | 630.98 | .1 | 694.81 | .1 | 762.08 | .1 | 834.26 | .1 | 913.12 |
| .2 | 632.23 | .2 | 696.12 | .2 | 763.47 | .2 | 835.76 | .2 | 914.78 |
| .3 | 633.48 | .3 | 697.43 | .3 | 764.86 | .3 | 837.27 | .3 | 916.44 |
| .4 | 634.73 | .4 | 698.74 | .4 | 766.25 | .4 | 838.78 | .4 | 918.11 |
| .5 | 635.98 | .5 | 700.06 | .5 | 767.65 | .5 | 840.29 | .5 | 919.79 |
| .6 | 637.23 | .6 | 701.38 | .6 | 769.05 | .6 | 841.80 | .6 | 921.47 |
| .7 | 638.48 | .7 | 702.70 | .7 | 770.45 | .7 | 843.32 | .7 | 923.16 |
| .8 | 639.73 | .8 | 704.02 | .8 | 771.85 | .8 | 844.84 | .8 | 924.85 |
| .9 | 640.98 | .9 | 705.34 | .9 | 773.25 | .9 | 846.37 | .9 | 926.54 |
| 76.0 | 642.23 | 81.0 | 706.66 | 86.0 | 774.66 | 91.0 | 847.90 | 96.0 | 928.24 |
| .1 | 643.48 | .1 | 707.98 | .1 | 776.07 | .1 | 849.43 | .1 | 929.94 |
| .2 | 644.73 | .2 | 709.30 | .2 | 777.48 | .2 | 850.96 | .2 | 931.64 |
| .3 | 645.99 | .3 | 710.62 | .3 | 778.89 | .3 | 852.50 | .3 | 933.35 |
| .4 | 647.25 | .4 | 711.95 | .4 | 780.30 | .4 | 854.04 | .4 | 935.06 |
| .5 | 648.51 | .5 | 713.28 | .5 | 781.72 | .5 | 855.58 | .5 | 936.78 |
| .6 | 649.77 | .6 | 714.61 | .6 | 783.14 | .6 | 857.12 | .6 | 938.50 |
| .7 | 651.03 | .7 | 715.94 | .7 | 784.56 | .7 | 858.67 | .7 | 940.22 |
| .8 | 652.29 | .8 | 717.27 | .8 | 785.98 | .8 | 860.22 | .8 | 941.95 |
| .9 | 653.55 | .9 | 718.60 | .9 | 787.40 | .9 | 861.77 | .9 | 943.68 |
| 77.0 | 654.81 | 82.0 | 719.94 | 87.0 | 788.83 | 92.0 | 863.33 | 97.0 | 945.42 |
| .1 | 656.08 | .1 | 721.28 | .1 | 790.26 | .1 | 864.89 | .1 | 947.17 |
| .2 | 657.35 | .2 | 722.62 | .2 | 791.70 | .2 | 866.46 | .2 | 948.92 |
| .3 | 658.62 | .3 | 723.96 | .3 | 793.14 | .3 | 868.03 | .3 | 950.68 |
| .4 | 659.90 | .4 | 725.30 | .4 | 794.58 | .4 | 869.61 | .4 | 952.44 |
| .5 | 661.18 | .5 | 726.64 | .5 | 796.02 | .5 | 871.19 | .5 | 954.21 |
| .6 | 662.46 | .6 | 727.98 | .6 | 797.46 | .6 | 872.77 | .6 | 955.98 |
| .7 | 663.74 | .7 | 729.32 | .7 | 798.91 | .7 | 874.35 | .7 | 957.76 |
| .8 | 665.02 | .8 | 730.66 | .8 | 800.36 | .8 | 875.93 | .8 | 959.55 |
| .9 | 666.30 | .9 | 732.00 | .9 | 801.81 | .9 | 877.52 | .9 | 961.34 |
| 78.0 | 667.58 | 83.0 | 733.35 | 88.0 | 803.26 | 93.0 | 879.11 | 98.0 | 963.14 |
| .1 | 668.86 | .1 | 734.70 | .1 | 804.71 | .1 | 880.70 | .1 | 964.94 |
| .2 | 670.14 | .2 | 736.05 | .2 | 806.16 | .2 | 882.29 | .2 | 966.75 |
| .3 | 671.43 | .3 | 737.40 | .3 | 807.61 | .3 | 883.88 | .3 | 968.56 |
| .4 | 672.72 | .4 | 738.76 | .4 | 809.07 | .4 | 885.48 | .4 | 970.38 |
| .5 | 674.01 | .5 | 740.12 | .5 | 810.53 | .5 | 887.08 | .5 | 972.20 |
| .6 | 675.30 | .6 | 741.48 | .6 | 811.99 | .6 | 888.68 | .6 | 974.02 |
| .7 | 676.59 | .7 | 742.84 | .7 | 813.45 | .7 | 890.29 | .7 | 975.85 |
| .8 | 677.88 | .8 | 744.20 | .8 | 814.92 | .8 | 891.90 | .8 | 977.58 |
| .9 | 679.17 | .9 | 745.56 | .9 | 816.39 | .9 | 893.51 | .9 | 979.51 |
| 79.0 | 680.47 | 84.0 | 746.92 | 89.0 | 817.86 | 94.0 | 895.12 | 99.0 | 981.35 |
| .1 | 681.77 | .1 | 748.29 | .1 | 819.34 | .1 | 896.74 | .1 | 983.19 |
| .2 | 683.07 | .2 | 749.66 | .2 | 820.82 | .2 | 898.36 | .2 | 985.03 |
| .3 | 684.37 | .3 | 751.03 | .3 | 822.30 | .3 | 899.98 | .3 | 986.88 |
| .4 | 685.67 | .4 | 752.40 | .4 | 823.79 | .4 | 901.61 | .4 | 988.74 |
| .5 | 686.97 | .5 | 753.78 | .5 | 825.28 | .5 | 903.24 | .5 | 990.60 |
| .6 | 688.27 | .6 | 755.16 | .6 | 826.77 | .6 | 904.88 | .6 | 992.47 |
| .7 | 689.57 | .7 | 756.54 | .7 | 828.26 | .7 | 906.52 | .7 | 994.35 |
| .8 | 690.88 | .8 | 757.92 | .8 | 829.76 | .8 | 908.16 | .8 | 996.23 |
| .9 | 692.19 | .9 | 759.30 | .9 | 831.26 | .9 | 909.81 | .9 | 998.11 |
| 80.0 | 693.50 | 85.0 | 760.69 | 90.0 | 832.76 | 95.0 | 911.46 | 100.0 | 1,000.00 |

TABLE 54.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by volume at 60° F.

[Total length of scale 1,000 mm]

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 0.0 | 0.00 | 5.0 | 27.84 | 10.0 | 52.30 | 15.0 | 74.47 | 20.0 | 94.90 |
| .1 | 0.58 | .1 | 28.37 | .1 | 52.76 | .1 | 74.89 | .1 | 95.30 |
| .2 | 1.16 | .2 | 28.90 | .2 | 53.22 | .2 | 75.31 | .2 | 95.70 |
| .3 | 1.73 | .3 | 29.43 | .3 | 53.68 | .3 | 75.73 | .3 | 96.10 |
| .4 | 2.31 | .4 | 29.96 | .4 | 54.14 | .4 | 76.15 | .4 | 96.50 |
| .5 | 2.89 | .5 | 30.48 | .5 | 54.60 | .5 | 76.57 | .5 | 96.90 |
| .6 | 3.47 | .6 | 31.00 | .6 | 55.06 | .6 | 76.99 | .6 | 97.30 |
| .7 | 4.04 | .7 | 31.51 | .7 | 55.52 | .7 | 77.41 | .7 | 97.70 |
| .8 | 4.62 | .8 | 32.02 | .8 | 55.98 | .8 | 77.83 | .8 | 98.11 |
| .9 | 5.20 | .9 | 32.53 | .9 | 56.44 | .9 | 78.25 | .9 | 98.51 |
| 1.0 | 5.78 | 6.0 | 33.04 | 11.0 | 56.90 | 16.0 | 78.67 | 21.0 | 98.92 |
| .1 | 6.36 | .1 | 33.55 | .1 | 57.36 | .1 | 79.09 | .1 | 99.33 |
| .2 | 6.93 | .2 | 34.05 | .2 | 57.82 | .2 | 79.51 | .2 | 99.74 |
| .3 | 7.50 | .3 | 34.55 | .3 | 58.28 | .3 | 79.93 | .3 | 100.15 |
| .4 | 8.07 | .4 | 35.05 | .4 | 58.74 | .4 | 80.35 | .4 | 100.56 |
| .5 | 8.64 | .5 | 35.55 | .5 | 59.20 | .5 | 80.77 | .5 | 100.97 |
| .6 | 9.21 | .6 | 36.05 | .6 | 59.65 | .6 | 81.19 | .6 | 101.38 |
| .7 | 9.78 | .7 | 36.55 | .7 | 60.10 | .7 | 81.60 | .7 | 101.79 |
| .8 | 10.35 | .8 | 37.05 | .8 | 60.55 | .8 | 82.01 | .8 | 102.20 |
| .9 | 10.92 | .9 | 37.55 | .9 | 61.00 | .9 | 82.42 | .9 | 102.61 |
| 2.0 | 11.49 | 7.0 | 38.05 | 12.0 | 61.45 | 17.0 | 82.83 | 22.0 | 103.02 |
| .1 | 12.05 | .1 | 38.54 | .1 | 61.90 | .1 | 83.24 | .1 | 103.43 |
| .2 | 12.61 | .2 | 39.03 | .2 | 62.35 | .2 | 83.65 | .2 | 103.84 |
| .3 | 13.17 | .3 | 39.52 | .3 | 62.79 | .3 | 84.06 | .3 | 104.25 |
| .4 | 13.73 | .4 | 40.01 | .4 | 63.23 | .4 | 84.47 | .4 | 104.66 |
| .5 | 14.29 | .5 | 40.50 | .5 | 63.67 | .5 | 84.88 | .5 | 105.08 |
| .6 | 14.85 | .6 | 40.98 | .6 | 64.11 | .6 | 85.28 | .6 | 105.50 |
| .7 | 15.41 | .7 | 41.46 | .7 | 64.55 | .7 | 85.69 | .7 | 105.92 |
| .8 | 15.97 | .8 | 41.94 | .8 | 64.99 | .8 | 86.09 | .8 | 106.34 |
| .9 | 16.52 | .9 | 42.42 | .9 | 65.43 | .9 | 86.49 | .9 | 106.76 |
| 3.0 | 17.07 | 8.0 | 42.89 | 13.0 | 65.87 | 18.0 | 86.89 | 23.0 | 107.18 |
| .1 | 17.62 | .1 | 43.36 | .1 | 66.31 | .1 | 87.29 | .1 | 107.60 |
| .2 | 18.17 | .2 | 43.83 | .2 | 66.74 | .2 | 87.69 | .2 | 108.02 |
| .3 | 18.72 | .3 | 44.30 | .3 | 67.17 | .3 | 88.09 | .3 | 108.44 |
| .4 | 19.27 | .4 | 44.77 | .4 | 67.60 | .4 | 88.50 | .4 | 108.86 |
| .5 | 19.82 | .5 | 45.24 | .5 | 68.03 | .5 | 88.90 | .5 | 109.28 |
| .6 | 20.37 | .6 | 45.72 | .6 | 68.46 | .6 | 89.30 | .6 | 109.70 |
| .7 | 20.91 | .7 | 46.20 | .7 | 68.89 | .7 | 89.70 | .7 | 110.12 |
| .8 | 21.45 | .8 | 46.67 | .8 | 69.32 | .8 | 90.10 | .8 | 110.54 |
| .9 | 21.99 | .9 | 47.14 | .9 | 69.75 | .9 | 90.50 | .9 | 110.96 |
| 4.0 | 22.53 | 9.0 | 47.61 | 14.0 | 70.18 | 19.0 | 90.90 | 24.0 | 111.38 |
| .1 | 23.07 | .1 | 48.08 | .1 | 70.61 | .1 | 91.30 | .1 | 111.81 |
| .2 | 23.60 | .2 | 48.55 | .2 | 71.04 | .2 | 91.70 | .2 | 112.24 |
| .3 | 24.13 | .3 | 49.02 | .3 | 71.47 | .3 | 92.10 | .3 | 112.67 |
| .4 | 24.66 | .4 | 49.49 | .4 | 71.90 | .4 | 92.50 | .4 | 113.10 |
| .5 | 25.19 | .5 | 49.96 | .5 | 72.33 | .5 | 92.90 | .5 | 113.53 |
| .6 | 25.72 | .6 | 50.43 | .6 | 72.76 | .6 | 93.30 | .6 | 113.96 |
| .7 | 26.25 | .7 | 50.90 | .7 | 73.19 | .7 | 93.70 | .7 | 114.39 |
| .8 | 26.78 | .8 | 51.37 | .8 | 73.62 | .8 | 94.10 | .8 | 114.82 |
| .9 | 27.31 | .9 | 51.84 | .9 | 74.05 | .9 | 94.50 | .9 | 115.25 |
| 5.0 | 27.84 | 10.0 | 52.30 | 15.0 | 74.47 | 20.0 | 94.90 | 25.0 | 115.68 |

NOTE.—See page 62 for relation to proof spirit.

TABLE 54.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by volume at 60° F.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 25.0 | 115.68 | 30.0 | 138.27 | 35.0 | 164.35 | 40.0 | 195.12 | 45.0 | 230.59 |
| .1 | 116.11 | .1 | 138.75 | .1 | 164.92 | .1 | 195.79 | .1 | 231.35 |
| .2 | 116.54 | .2 | 139.23 | .2 | 165.49 | .2 | 196.46 | .2 | 232.11 |
| .3 | 116.97 | .3 | 139.71 | .3 | 166.06 | .3 | 197.13 | .3 | 232.87 |
| .4 | 117.40 | .4 | 140.20 | .4 | 166.63 | .4 | 197.80 | .4 | 233.63 |
| .5 | 117.83 | .5 | 140.69 | .5 | 167.20 | .5 | 198.47 | .5 | 234.39 |
| .6 | 118.27 | .6 | 141.18 | .6 | 167.78 | .6 | 199.14 | .6 | 235.16 |
| .7 | 118.71 | .7 | 141.67 | .7 | 168.36 | .7 | 199.82 | .7 | 235.93 |
| .8 | 119.15 | .8 | 142.16 | .8 | 168.94 | .8 | 200.50 | .8 | 236.71 |
| .9 | 119.59 | .9 | 142.65 | .9 | 169.53 | .9 | 201.18 | .9 | 237.49 |
| 26.0 | 120.03 | 31.0 | 143.14 | 36.0 | 170.12 | 41.0 | 201.86 | 46.0 | 238.28 |
| .1 | 120.47 | .1 | 143.63 | .1 | 170.71 | .1 | 202.55 | .1 | 239.06 |
| .2 | 120.91 | .2 | 144.12 | .2 | 171.30 | .2 | 203.24 | .2 | 239.84 |
| .3 | 121.35 | .3 | 144.61 | .3 | 171.89 | .3 | 203.93 | .3 | 240.62 |
| .4 | 121.79 | .4 | 145.10 | .4 | 172.48 | .4 | 204.62 | .4 | 241.40 |
| .5 | 122.23 | .5 | 145.59 | .5 | 173.08 | .5 | 205.31 | .5 | 242.18 |
| .6 | 122.67 | .6 | 146.09 | .6 | 173.68 | .6 | 206.00 | .6 | 242.97 |
| .7 | 123.12 | .7 | 146.59 | .7 | 174.28 | .7 | 206.70 | .7 | 243.76 |
| .8 | 123.57 | .8 | 147.11 | .8 | 174.88 | .8 | 207.40 | .8 | 244.55 |
| .9 | 124.02 | .9 | 147.63 | .9 | 175.48 | .9 | 208.10 | .9 | 245.34 |
| 27.0 | 124.47 | 32.0 | 148.15 | 37.0 | 176.08 | 42.0 | 208.80 | 47.0 | 246.14 |
| .1 | 124.92 | .1 | 148.67 | .1 | 176.69 | .1 | 209.50 | .1 | 246.94 |
| .2 | 125.37 | .2 | 149.19 | .2 | 177.30 | .2 | 210.20 | .2 | 247.74 |
| .3 | 125.82 | .3 | 149.71 | .3 | 177.91 | .3 | 210.90 | .3 | 248.54 |
| .4 | 126.27 | .4 | 150.23 | .4 | 178.52 | .4 | 211.60 | .4 | 249.35 |
| .5 | 126.72 | .5 | 150.75 | .5 | 179.13 | .5 | 212.31 | .5 | 250.16 |
| .6 | 127.17 | .6 | 151.27 | .6 | 179.75 | .6 | 213.02 | .6 | 250.97 |
| .7 | 127.62 | .7 | 151.79 | .7 | 180.37 | .7 | 213.73 | .7 | 251.79 |
| .8 | 128.07 | .8 | 152.31 | .8 | 180.99 | .8 | 214.44 | .8 | 252.61 |
| .9 | 128.52 | .9 | 152.84 | .9 | 181.62 | .9 | 215.15 | .9 | 253.43 |
| 28.0 | 128.98 | 33.0 | 153.37 | 38.0 | 182.25 | 43.0 | 215.87 | 48.0 | 254.25 |
| .1 | 129.44 | .1 | 153.90 | .1 | 182.88 | .1 | 216.59 | .1 | 255.07 |
| .2 | 129.90 | .2 | 154.43 | .2 | 183.51 | .2 | 217.31 | .2 | 255.89 |
| .3 | 130.36 | .3 | 154.96 | .3 | 184.14 | .3 | 218.03 | .3 | 256.71 |
| .4 | 130.82 | .4 | 155.50 | .4 | 184.77 | .4 | 218.75 | .4 | 257.53 |
| .5 | 131.28 | .5 | 156.04 | .5 | 185.40 | .5 | 219.48 | .5 | 258.36 |
| .6 | 131.74 | .6 | 156.58 | .6 | 186.03 | .6 | 220.21 | .6 | 259.19 |
| .7 | 132.20 | .7 | 157.12 | .7 | 186.67 | .7 | 220.94 | .7 | 260.02 |
| .8 | 132.66 | .8 | 157.66 | .8 | 187.31 | .8 | 221.67 | .8 | 260.85 |
| .9 | 133.12 | .9 | 158.21 | .9 | 187.95 | .9 | 222.40 | .9 | 261.69 |
| 29.0 | 133.58 | 34.0 | 158.76 | 39.0 | 188.59 | 44.0 | 223.14 | 49.0 | 262.53 |
| .1 | 134.04 | .1 | 159.31 | .1 | 189.23 | .1 | 223.88 | .1 | 263.37 |
| .2 | 134.51 | .2 | 159.86 | .2 | 189.88 | .2 | 224.62 | .2 | 264.21 |
| .3 | 134.98 | .3 | 160.42 | .3 | 190.53 | .3 | 225.36 | .3 | 265.05 |
| .4 | 135.45 | .4 | 160.98 | .4 | 191.18 | .4 | 226.10 | .4 | 265.89 |
| .5 | 135.92 | .5 | 161.54 | .5 | 191.83 | .5 | 226.84 | .5 | 266.74 |
| .6 | 136.39 | .6 | 162.10 | .6 | 192.48 | .6 | 227.59 | .6 | 267.59 |
| .7 | 136.86 | .7 | 162.66 | .7 | 193.13 | .7 | 228.34 | .7 | 268.44 |
| .8 | 137.33 | .8 | 163.22 | .8 | 193.79 | .8 | 229.09 | .8 | 269.30 |
| .9 | 137.80 | .9 | 163.78 | .9 | 194.45 | .9 | 229.84 | .9 | 270.16 |
| 30.0 | 138.27 | 35.0 | 164.35 | 40.0 | 195.12 | 45.0 | 230.59 | 50.0 | 271.02 |

TABLE 54.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by volume at 60° F.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 50.0 | 271.02 | 55.0 | 315.94 | 60.0 | 365.01 | 65.0 | 418.40 | 70.0 | 476.10 |
| .1 | 271.88 | .1 | 316.88 | .1 | 366.04 | .1 | 419.50 | .1 | 477.31 |
| .2 | 272.74 | .2 | 317.82 | .2 | 367.07 | .2 | 420.60 | .2 | 478.52 |
| .3 | 273.60 | .3 | 318.76 | .3 | 368.10 | .3 | 421.71 | .3 | 479.73 |
| .4 | 274.47 | .4 | 319.70 | .4 | 369.13 | .4 | 422.82 | .4 | 480.94 |
| .5 | 275.34 | .5 | 320.65 | .5 | 370.16 | .5 | 423.93 | .5 | 482.15 |
| .6 | 276.21 | .6 | 321.60 | .6 | 371.20 | .6 | 425.05 | .6 | 483.36 |
| .7 | 277.08 | .7 | 322.55 | .7 | 372.24 | .7 | 426.17 | .7 | 484.57 |
| .8 | 277.95 | .8 | 323.50 | .8 | 373.28 | .8 | 427.29 | .8 | 485.78 |
| .9 | 278.82 | .9 | 324.45 | .9 | 374.32 | .9 | 428.41 | .9 | 487.00 |
| 51.0 | 279.70 | 56.0 | 325.40 | 61.0 | 375.36 | 66.0 | 429.54 | 71.0 | 488.22 |
| .1 | 280.58 | .1 | 326.35 | .1 | 376.40 | .1 | 430.67 | .1 | 489.45 |
| .2 | 281.46 | .2 | 327.31 | .2 | 377.44 | .2 | 431.80 | .2 | 490.68 |
| .3 | 282.34 | .3 | 328.27 | .3 | 378.49 | .3 | 432.93 | .3 | 491.91 |
| .4 | 283.22 | .4 | 329.23 | .4 | 379.54 | .4 | 434.06 | .4 | 493.14 |
| .5 | 284.10 | .5 | 330.19 | .5 | 380.60 | .5 | 435.19 | .5 | 494.37 |
| .6 | 284.98 | .6 | 331.15 | .6 | 381.66 | .6 | 436.32 | .6 | 495.60 |
| .7 | 285.87 | .7 | 332.11 | .7 | 382.72 | .7 | 437.46 | .7 | 496.84 |
| .8 | 286.76 | .8 | 333.07 | .8 | 383.78 | .8 | 438.60 | .8 | 498.08 |
| .9 | 287.65 | .9 | 334.03 | .9 | 384.84 | .9 | 439.75 | .9 | 499.32 |
| 52.0 | 288.54 | 57.0 | 334.99 | 62.0 | 385.91 | 67.0 | 440.90 | 72.0 | 500.56 |
| .1 | 289.43 | .1 | 335.95 | .1 | 386.98 | .1 | 442.05 | .1 | 501.80 |
| .2 | 290.32 | .2 | 336.92 | .2 | 388.05 | .2 | 443.20 | .2 | 503.05 |
| .3 | 291.21 | .3 | 337.89 | .3 | 389.12 | .3 | 444.35 | .3 | 504.30 |
| .4 | 292.10 | .4 | 338.87 | .4 | 390.19 | .4 | 445.50 | .4 | 505.56 |
| .5 | 292.99 | .5 | 339.85 | .5 | 391.26 | .5 | 446.65 | .5 | 506.82 |
| .6 | 293.89 | .6 | 340.83 | .6 | 392.33 | .6 | 447.80 | .6 | 508.08 |
| .7 | 294.79 | .7 | 341.81 | .7 | 393.40 | .7 | 448.95 | .7 | 509.34 |
| .8 | 295.69 | .8 | 342.79 | .8 | 394.47 | .8 | 450.11 | .8 | 510.60 |
| .9 | 296.59 | .9 | 343.78 | .9 | 395.55 | .9 | 451.26 | .9 | 511.86 |
| 53.0 | 297.50 | 58.0 | 344.78 | 63.0 | 396.63 | 68.0 | 452.42 | 73.0 | 513.13 |
| .1 | 298.41 | .1 | 345.78 | .1 | 397.71 | .1 | 453.58 | .1 | 514.40 |
| .2 | 299.32 | .2 | 346.78 | .2 | 398.79 | .2 | 454.74 | .2 | 515.67 |
| .3 | 300.23 | .3 | 347.78 | .3 | 399.87 | .3 | 455.91 | .3 | 516.94 |
| .4 | 301.14 | .4 | 348.78 | .4 | 400.95 | .4 | 457.08 | .4 | 518.21 |
| .5 | 302.05 | .5 | 349.78 | .5 | 402.03 | .5 | 458.25 | .5 | 519.48 |
| .6 | 302.96 | .6 | 350.78 | .6 | 403.11 | .6 | 459.43 | .6 | 520.76 |
| .7 | 303.87 | .7 | 351.78 | .7 | 404.19 | .7 | 460.61 | .7 | 522.04 |
| .8 | 304.78 | .8 | 352.78 | .8 | 405.27 | .8 | 461.79 | .8 | 523.32 |
| .9 | 305.70 | .9 | 353.79 | .9 | 406.36 | .9 | 462.98 | .9 | 524.60 |
| 54.0 | 306.62 | 59.0 | 354.80 | 64.0 | 407.45 | 69.0 | 464.17 | 74.0 | 525.89 |
| .1 | 307.55 | .1 | 355.81 | .1 | 408.54 | .1 | 465.36 | .1 | 527.18 |
| .2 | 308.48 | .2 | 356.82 | .2 | 409.63 | .2 | 466.55 | .2 | 528.47 |
| .3 | 309.41 | .3 | 357.84 | .3 | 410.72 | .3 | 467.74 | .3 | 529.76 |
| .4 | 310.34 | .4 | 358.86 | .4 | 411.81 | .4 | 468.93 | .4 | 531.05 |
| .5 | 311.27 | .5 | 359.88 | .5 | 412.90 | .5 | 470.12 | .5 | 532.34 |
| .6 | 312.20 | .6 | 360.90 | .6 | 414.00 | .6 | 471.31 | .6 | 533.63 |
| .7 | 313.13 | .7 | 361.92 | .7 | 415.10 | .7 | 472.50 | .7 | 534.92 |
| .8 | 314.06 | .8 | 362.95 | .8 | 416.20 | .8 | 473.70 | .8 | 536.21 |
| .9 | 315.00 | .9 | 363.98 | .9 | 417.30 | .9 | 474.90 | .9 | 537.51 |
| 55.0 | 315.94 | 60.0 | 365.01 | 65.0 | 418.40 | 70.0 | 476.10 | 75.0 | 538.81 |

TABLE 54.—Master scale for the graduation of hydrometers to indicate percentages of ethyl alcohol by volume at 60° F.—Continued

| Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length | Per cent alcohol | Length |
|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> | | <i>mm</i> |
| 75.0 | 538.81 | 80.0 | 607.33 | 85.0 | 682.71 | 90.0 | 767.67 | 95.0 | 868.34 |
| .1 | 540.12 | .1 | 608.77 | .1 | 684.31 | .1 | 769.50 | .1 | 870.60 |
| .2 | 541.43 | .2 | 610.21 | .2 | 685.91 | .2 | 771.33 | .2 | 872.87 |
| .3 | 542.74 | .3 | 611.65 | .3 | 687.52 | .3 | 773.16 | .3 | 875.15 |
| .4 | 544.05 | .4 | 613.09 | .4 | 689.13 | .4 | 774.99 | .4 | 877.44 |
| .5 | 545.37 | .5 | 614.53 | .5 | 690.74 | .5 | 776.83 | .5 | 879.74 |
| .6 | 546.69 | .6 | 615.97 | .6 | 692.36 | .6 | 778.68 | .6 | 882.05 |
| .7 | 548.01 | .7 | 617.42 | .7 | 693.98 | .7 | 780.54 | .7 | 884.37 |
| .8 | 549.33 | .8 | 618.87 | .8 | 695.60 | .8 | 782.41 | .8 | 886.71 |
| .9 | 550.66 | .9 | 620.33 | .9 | 697.23 | .9 | 784.29 | .9 | 889.06 |
| 76.0 | 552.00 | 81.0 | 621.79 | 86.0 | 698.86 | 91.0 | 786.18 | 96.0 | 891.43 |
| .1 | 553.34 | .1 | 623.26 | .1 | 700.50 | .1 | 788.08 | .1 | 893.82 |
| .2 | 554.68 | .2 | 624.73 | .2 | 702.14 | .2 | 789.98 | .2 | 896.22 |
| .3 | 556.02 | .3 | 626.20 | .3 | 703.79 | .3 | 791.88 | .3 | 898.62 |
| .4 | 557.36 | .4 | 627.67 | .4 | 705.44 | .4 | 793.78 | .4 | 901.03 |
| .5 | 558.70 | .5 | 629.14 | .5 | 707.10 | .5 | 795.69 | .5 | 903.45 |
| .6 | 560.05 | .6 | 630.62 | .6 | 708.76 | .6 | 797.62 | .6 | 905.89 |
| .7 | 561.40 | .7 | 632.10 | .7 | 710.42 | .7 | 799.57 | .7 | 908.34 |
| .8 | 562.75 | .8 | 633.58 | .8 | 712.08 | .8 | 801.52 | .8 | 910.80 |
| .9 | 564.10 | .9 | 635.07 | .9 | 713.74 | .9 | 803.49 | .9 | 913.27 |
| 77.0 | 565.45 | 82.0 | 636.56 | 87.0 | 715.41 | 92.0 | 805.46 | 97.0 | 915.75 |
| .1 | 566.81 | .1 | 638.05 | .1 | 717.08 | .1 | 807.44 | .1 | 918.25 |
| .2 | 568.17 | .2 | 639.54 | .2 | 718.75 | .2 | 809.42 | .2 | 920.77 |
| .3 | 569.53 | .3 | 641.03 | .3 | 720.43 | .3 | 811.40 | .3 | 923.31 |
| .4 | 570.89 | .4 | 642.53 | .4 | 722.11 | .4 | 813.39 | .4 | 925.88 |
| .5 | 572.25 | .5 | 644.03 | .5 | 723.80 | .5 | 815.38 | .5 | 928.46 |
| .6 | 573.62 | .6 | 645.54 | .6 | 725.50 | .6 | 817.38 | .6 | 931.05 |
| .7 | 574.99 | .7 | 647.05 | .7 | 727.20 | .7 | 819.40 | .7 | 933.66 |
| .8 | 576.37 | .8 | 648.57 | .8 | 728.90 | .8 | 821.42 | .8 | 936.28 |
| .9 | 577.75 | .9 | 650.09 | .9 | 730.60 | .9 | 823.45 | .9 | 938.93 |
| 78.0 | 579.13 | 83.0 | 651.61 | 88.0 | 732.31 | 93.0 | 825.49 | 98.0 | 941.61 |
| .1 | 580.52 | .1 | 653.13 | .1 | 734.02 | .1 | 827.54 | .1 | 944.33 |
| .2 | 581.92 | .2 | 654.65 | .2 | 735.74 | .2 | 829.60 | .2 | 947.06 |
| .3 | 583.32 | .3 | 656.18 | .3 | 737.46 | .3 | 831.67 | .3 | 949.80 |
| .4 | 584.72 | .4 | 657.71 | .4 | 739.19 | .4 | 833.74 | .4 | 952.56 |
| .5 | 586.12 | .5 | 659.24 | .5 | 740.93 | .5 | 835.82 | .5 | 955.35 |
| .6 | 587.52 | .6 | 660.77 | .6 | 742.68 | .6 | 837.90 | .6 | 958.16 |
| .7 | 588.92 | .7 | 662.31 | .7 | 744.43 | .7 | 840.00 | .7 | 961.00 |
| .8 | 590.32 | .8 | 663.85 | .8 | 746.19 | .8 | 842.12 | .8 | 963.86 |
| .9 | 591.72 | .9 | 665.40 | .9 | 747.95 | .9 | 844.25 | .9 | 966.74 |
| 79.0 | 593.12 | 84.0 | 666.96 | 89.0 | 749.72 | 94.0 | 846.40 | 99.0 | 969.64 |
| .1 | 594.53 | .1 | 668.52 | .1 | 751.49 | .1 | 848.56 | .1 | 972.56 |
| .2 | 595.94 | .2 | 670.08 | .2 | 753.27 | .2 | 850.73 | .2 | 975.52 |
| .3 | 597.35 | .3 | 671.64 | .3 | 755.05 | .3 | 852.90 | .3 | 978.50 |
| .4 | 598.77 | .4 | 673.21 | .4 | 756.84 | .4 | 855.08 | .4 | 981.50 |
| .5 | 600.19 | .5 | 674.79 | .5 | 758.64 | .5 | 857.26 | .5 | 984.52 |
| .6 | 601.61 | .6 | 676.37 | .6 | 760.45 | .6 | 859.46 | .6 | 987.55 |
| .7 | 603.04 | .7 | 677.95 | .7 | 762.25 | .7 | 861.67 | .7 | 990.61 |
| .8 | 604.47 | .8 | 679.53 | .8 | 764.05 | .8 | 863.88 | .8 | 993.71 |
| .9 | 605.90 | .9 | 681.12 | .9 | 765.86 | .9 | 866.10 | .9 | 996.84 |
| 80.0 | 607.33 | 85.0 | 682.71 | 90.0 | 767.67 | 95.0 | 868.34 | 100.0 | 1,000.00 |

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