

# C Properties of the U.S. Standard Atmosphere

■ Table C.1

Properties of the U.S. Standard Atmosphere (BG Units)<sup>a</sup>

| Altitude<br>(ft) | Temperature<br>(°F) | Acceleration<br>of Gravity,<br>$g$ (ft/s <sup>2</sup> ) | Pressure, $p$<br>[lb/in. <sup>2</sup> (abs)] | Density,<br>$\rho$<br>(slugs/ft <sup>3</sup> ) | Dynamic<br>Viscosity,<br>$\mu$<br>(lb·s/ft <sup>2</sup> ) |
|------------------|---------------------|---------------------------------------------------------|----------------------------------------------|------------------------------------------------|-----------------------------------------------------------|
| −5,000           | 76.84               | 32.189                                                  | 17.554                                       | 2.745 E − 3                                    | 3.836 E − 7                                               |
| 0                | 59.00               | 32.174                                                  | 14.696                                       | 2.377 E − 3                                    | 3.737 E − 7                                               |
| 5,000            | 41.17               | 32.159                                                  | 12.228                                       | 2.048 E − 3                                    | 3.637 E − 7                                               |
| 10,000           | 23.36               | 32.143                                                  | 10.108                                       | 1.756 E − 3                                    | 3.534 E − 7                                               |
| 15,000           | 5.55                | 32.128                                                  | 8.297                                        | 1.496 E − 3                                    | 3.430 E − 7                                               |
| 20,000           | −12.26              | 32.112                                                  | 6.759                                        | 1.267 E − 3                                    | 3.324 E − 7                                               |
| 25,000           | −30.05              | 32.097                                                  | 5.461                                        | 1.066 E − 3                                    | 3.217 E − 7                                               |
| 30,000           | −47.83              | 32.082                                                  | 4.373                                        | 8.907 E − 4                                    | 3.107 E − 7                                               |
| 35,000           | −65.61              | 32.066                                                  | 3.468                                        | 7.382 E − 4                                    | 2.995 E − 7                                               |
| 40,000           | −69.70              | 32.051                                                  | 2.730                                        | 5.873 E − 4                                    | 2.969 E − 7                                               |
| 45,000           | −69.70              | 32.036                                                  | 2.149                                        | 4.623 E − 4                                    | 2.969 E − 7                                               |
| 50,000           | −69.70              | 32.020                                                  | 1.692                                        | 3.639 E − 4                                    | 2.969 E − 7                                               |
| 60,000           | −69.70              | 31.990                                                  | 1.049                                        | 2.256 E − 4                                    | 2.969 E − 7                                               |
| 70,000           | −67.42              | 31.959                                                  | 0.651                                        | 1.392 E − 4                                    | 2.984 E − 7                                               |
| 80,000           | −61.98              | 31.929                                                  | 0.406                                        | 8.571 E − 5                                    | 3.018 E − 7                                               |
| 90,000           | −56.54              | 31.897                                                  | 0.255                                        | 5.610 E − 5                                    | 3.052 E − 7                                               |
| 100,000          | −51.10              | 31.868                                                  | 0.162                                        | 3.318 E − 5                                    | 3.087 E − 7                                               |
| 150,000          | 19.40               | 31.717                                                  | 0.020                                        | 3.658 E − 6                                    | 3.511 E − 7                                               |
| 200,000          | −19.78              | 31.566                                                  | 0.003                                        | 5.328 E − 7                                    | 3.279 E − 7                                               |
| 250,000          | −88.77              | 31.415                                                  | 0.000                                        | 6.458 E − 8                                    | 2.846 E − 7                                               |

<sup>a</sup>Data abridged from *U.S. Standard Atmosphere*, 1976, U.S. Government Printing Office, Washington, D.C.

■ Table C.2

Properties of the U.S. Standard Atmosphere (SI Units)<sup>a</sup>

| Altitude<br>(m) | Temperature<br>(°C) | Acceleration<br>of Gravity,<br>$g$ (m/s <sup>2</sup> ) | Pressure, $p$<br>[N/m <sup>2</sup> (abs)] |       | Density,<br>$\rho$<br>(kg/m <sup>3</sup> ) |       | Dynamic<br>Viscosity,<br>$\mu$<br>(N·s/m <sup>2</sup> ) |       |
|-----------------|---------------------|--------------------------------------------------------|-------------------------------------------|-------|--------------------------------------------|-------|---------------------------------------------------------|-------|
| −1,000          | 21.50               | 9.810                                                  | 1.139                                     | E + 5 | 1.347                                      | E + 0 | 1.821                                                   | E − 5 |
| 0               | 15.00               | 9.807                                                  | 1.013                                     | E + 5 | 1.225                                      | E + 0 | 1.789                                                   | E − 5 |
| 1,000           | 8.50                | 9.804                                                  | 8.988                                     | E + 4 | 1.112                                      | E + 0 | 1.758                                                   | E − 5 |
| 2,000           | 2.00                | 9.801                                                  | 7.950                                     | E + 4 | 1.007                                      | E + 0 | 1.726                                                   | E − 5 |
| 3,000           | −4.49               | 9.797                                                  | 7.012                                     | E + 4 | 9.093                                      | E − 1 | 1.694                                                   | E − 5 |
| 4,000           | −10.98              | 9.794                                                  | 6.166                                     | E + 4 | 8.194                                      | E − 1 | 1.661                                                   | E − 5 |
| 5,000           | −17.47              | 9.791                                                  | 5.405                                     | E + 4 | 7.364                                      | E − 1 | 1.628                                                   | E − 5 |
| 6,000           | −23.96              | 9.788                                                  | 4.722                                     | E + 4 | 6.601                                      | E − 1 | 1.595                                                   | E − 5 |
| 7,000           | −30.45              | 9.785                                                  | 4.111                                     | E + 4 | 5.900                                      | E − 1 | 1.561                                                   | E − 5 |
| 8,000           | −36.94              | 9.782                                                  | 3.565                                     | E + 4 | 5.258                                      | E − 1 | 1.527                                                   | E − 5 |
| 9,000           | −43.42              | 9.779                                                  | 3.080                                     | E + 4 | 4.671                                      | E − 1 | 1.493                                                   | E − 5 |
| 10,000          | −49.90              | 9.776                                                  | 2.650                                     | E + 4 | 4.135                                      | E − 1 | 1.458                                                   | E − 5 |
| 15,000          | −56.50              | 9.761                                                  | 1.211                                     | E + 4 | 1.948                                      | E − 1 | 1.422                                                   | E − 5 |
| 20,000          | −56.50              | 9.745                                                  | 5.529                                     | E + 3 | 8.891                                      | E − 2 | 1.422                                                   | E − 5 |
| 25,000          | −51.60              | 9.730                                                  | 2.549                                     | E + 3 | 4.008                                      | E − 2 | 1.448                                                   | E − 5 |
| 30,000          | −46.64              | 9.715                                                  | 1.197                                     | E + 3 | 1.841                                      | E − 2 | 1.475                                                   | E − 5 |
| 40,000          | −22.80              | 9.684                                                  | 2.871                                     | E + 2 | 3.996                                      | E − 3 | 1.601                                                   | E − 5 |
| 50,000          | −2.50               | 9.654                                                  | 7.978                                     | E + 1 | 1.027                                      | E − 3 | 1.704                                                   | E − 5 |
| 60,000          | −26.13              | 9.624                                                  | 2.196                                     | E + 1 | 3.097                                      | E − 4 | 1.584                                                   | E − 5 |
| 70,000          | −53.57              | 9.594                                                  | 5.221                                     | E + 0 | 8.283                                      | E − 5 | 1.438                                                   | E − 5 |
| 80,000          | −74.51              | 9.564                                                  | 1.052                                     | E + 0 | 1.846                                      | E − 5 | 1.321                                                   | E − 5 |

<sup>a</sup>Data abridged from *U.S. Standard Atmosphere*, 1976, U.S. Government Printing Office, Washington, D.C.