## Muons in carbon tetrafluoride ($CF_4$)

| $\langle Z/A \rangle$ | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|
| 0.47721 | $3.780 \times 10^{-3}$ | 115.0 | 0.18551 | 3.0000 | 1.7000 | 4.0000 | 10.0858 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 6.469 | | | | 6.469 | $8.580 \times 10^{-1}$ |
| 14.0 MeV | $5.616 \times 10^1$ | 5.057 | | | | 5.057 | $1.565 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.958 | | | | 3.958 | $2.921 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 3.077 | | | | 3.077 | $5.827 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.631 | | | | 2.631 | $9.364 \times 10^0$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.982 | | | | 1.982 | $2.743 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.866 | | | | 1.866 | $3.786 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.753 | | | | 1.753 | $6.007 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.697 | | | | 1.698 | $9.498 \times 10^1$ |
| 252. MeV | $3.421 \times 10^2$ | 1.688 | | | 0.000 | 1.689 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.693 | | | 0.000 | 1.693 | $1.541 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.718 | | | 0.000 | 1.718 | $2.128 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.837 | 0.000 | | 0.000 | 1.838 | $4.377 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.887 | 0.000 | | 0.000 | 1.888 | $5.450 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.969 | 0.000 | 0.000 | 0.001 | 1.970 | $7.522 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 2.061 | 0.001 | 0.000 | 0.001 | 2.063 | $1.049 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 2.169 | 0.001 | 0.001 | 0.001 | 2.173 | $1.521 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 2.247 | 0.002 | 0.001 | 0.002 | 2.252 | $1.973 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 2.410 | 0.004 | 0.004 | 0.004 | 2.421 | $3.675 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 2.454 | 0.005 | 0.005 | 0.005 | 2.469 | $4.492 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.517 | 0.008 | 0.009 | 0.006 | 2.540 | $6.088 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.579 | 0.012 | 0.014 | 0.009 | 2.615 | $8.414 \times 10^3$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.644 | 0.020 | 0.025 | 0.013 | 2.702 | $1.217 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.686 | 0.029 | 0.036 | 0.017 | 2.769 | $1.583 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.778 | 0.065 | 0.088 | 0.033 | 2.965 | $2.976 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.805 | 0.084 | 0.116 | 0.041 | 3.047 | $3.641 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.844 | 0.124 | 0.174 | 0.058 | 3.200 | $4.921 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.883 | 0.187 | 0.266 | 0.082 | 3.418 | $6.735 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.926 | 0.295 | 0.421 | 0.123 | 3.765 | $9.521 \times 10^4$ |
| 400. GeV | $4.001 \times 10^5$ | 2.955 | 0.407 | 0.583 | 0.163 | 4.109 | $1.206 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 3.024 | 0.871 | 1.257 | 0.330 | 5.483 | $2.046 \times 10^5$ |
| 974. GeV | $9.744 \times 10^5$ | 3.044 | 1.080 | 1.560 | 0.404 | 6.088 | *Muon critical energy* |
| 1.00 TeV | $1.000 \times 10^6$ | 3.046 | 1.111 | 1.605 | 0.415 | 6.178 | $2.390 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 3.080 | 1.593 | 2.296 | 0.589 | 7.559 | $2.974 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 3.117 | 2.334 | 3.355 | 0.853 | 9.658 | $3.675 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 3.158 | 3.574 | 5.117 | 1.306 | 13.156 | $4.559 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 3.188 | 4.835 | 6.903 | 1.767 | 16.694 | $5.232 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 3.263 | 9.935 | 14.094 | 3.686 | 30.977 | $6.964 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 3.287 | 12.512 | 17.714 | 4.674 | 38.187 | $7.544 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 3.324 | 17.653 | 24.930 | 6.707 | 52.615 | $8.433 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 3.364 | 25.426 | 35.809 | 9.831 | 74.431 | $9.387 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 3.410 | 38.368 | 53.915 | 15.249 | 110.942 | $1.048 \times 10^6$ |
| 40.0 TeV | $4.000 \times 10^7$ | 3.444 | 51.373 | 72.076 | 20.808 | 147.701 | $1.126 \times 10^6$ |
| 80.0 TeV | $8.000 \times 10^7$ | 3.526 | 103.515 | 144.786 | 44.113 | 295.940 | $1.314 \times 10^6$ |
| 100. TeV | $1.000 \times 10^8$ | 3.553 | 129.652 | 181.183 | 56.186 | 370.574 | $1.374 \times 10^6$ |