## Table 250: Muons in Skin (ICRP)

| $\langle Z/A \rangle$ | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|
| 0.54932 | 1.100 | 72.7 | 0.09459 | 3.4643 | 0.2019 | 2.7526 | 3.3546 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 7.914 | | | | 7.914 | $6.982 \times 10^{-1}$ |
| 14.0 MeV | $5.616 \times 10^1$ | 6.172 | | | | 6.172 | $1.277 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 4.820 | | | | 4.820 | $2.389 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 3.738 | | | | 3.739 | $4.778 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 3.192 | | | | 3.192 | $7.692 \times 10^0$ |
| 80.0 MeV | $1.527 \times 10^2$ | 2.396 | | | | 2.396 | $2.262 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 2.250 | | | | 2.250 | $3.125 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 2.095 | | | | 2.095 | $4.976 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 2.005 | | | | 2.005 | $7.916 \times 10^1$ |
| 300. MeV | $3.917 \times 10^2$ | 1.970 | | | 0.000 | 1.970 | $1.296 \times 10^2$ |
| 318. MeV | $4.105 \times 10^2$ | 1.969 | | | 0.000 | 1.970 | *Minimum ionization* |
| 400. MeV | $4.945 \times 10^2$ | 1.976 | | | 0.000 | 1.976 | $1.803 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 2.049 | 0.000 | | 0.000 | 2.050 | $3.792 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 2.083 | 0.000 | | 0.000 | 2.084 | $4.759 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 2.138 | 0.000 | | 0.001 | 2.139 | $6.653 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 2.199 | 0.001 | 0.000 | 0.001 | 2.201 | $9.416 \times 10^2$ |
| 3.00 GeV | $3.104 \times 10^3$ | 2.268 | 0.001 | 0.001 | 0.001 | 2.271 | $1.388 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 2.316 | 0.001 | 0.001 | 0.002 | 2.321 | $1.824 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 2.426 | 0.003 | 0.003 | 0.004 | 2.437 | $3.500 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 2.460 | 0.005 | 0.005 | 0.005 | 2.474 | $4.315 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.509 | 0.007 | 0.008 | 0.007 | 2.530 | $5.913 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.558 | 0.011 | 0.012 | 0.009 | 2.590 | $8.255 \times 10^3$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.611 | 0.018 | 0.022 | 0.014 | 2.664 | $1.206 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.647 | 0.025 | 0.032 | 0.018 | 2.722 | $1.577 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.730 | 0.058 | 0.077 | 0.034 | 2.899 | $2.999 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.756 | 0.075 | 0.102 | 0.042 | 2.975 | $3.679 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.794 | 0.110 | 0.153 | 0.059 | 3.117 | $4.992 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.834 | 0.166 | 0.235 | 0.084 | 3.319 | $6.857 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.880 | 0.262 | 0.373 | 0.125 | 3.641 | $9.732 \times 10^4$ |
| 400. GeV | $4.001 \times 10^5$ | 2.912 | 0.362 | 0.518 | 0.167 | 3.959 | $1.237 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.991 | 0.777 | 1.118 | 0.338 | 5.224 | $2.113 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 3.016 | 0.992 | 1.429 | 0.424 | 5.862 | $2.474 \times 10^5$ |
| 1.06 TeV | $1.059 \times 10^6$ | 3.023 | 1.054 | 1.518 | 0.450 | 6.046 | *Muon critical energy* |
| 1.40 TeV | $1.400 \times 10^6$ | 3.055 | 1.424 | 2.046 | 0.602 | 7.128 | $3.092 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 3.097 | 2.089 | 2.993 | 0.871 | 9.051 | $3.838 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 3.145 | 3.203 | 4.570 | 1.335 | 12.253 | $4.784 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 3.180 | 4.336 | 6.168 | 1.807 | 15.492 | $5.508 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 3.265 | 8.926 | 12.607 | 3.773 | 28.571 | $7.381 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 3.293 | 11.248 | 15.850 | 4.785 | 35.176 | $8.011 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 3.336 | 15.881 | 22.312 | 6.871 | 48.400 | $8.976 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 3.382 | 22.891 | 32.058 | 10.077 | 68.408 | $1.001 \times 10^6$ |
| 30.0 TeV | $3.000 \times 10^7$ | 3.435 | 34.564 | 48.274 | 15.641 | 101.915 | $1.120 \times 10^6$ |
| 40.0 TeV | $4.000 \times 10^7$ | 3.474 | 46.300 | 64.543 | 21.353 | 135.670 | $1.205 \times 10^6$ |
| 80.0 TeV | $8.000 \times 10^7$ | 3.568 | 93.370 | 129.672 | 45.326 | 271.936 | $1.409 \times 10^6$ |
| 100. TeV | $1.000 \times 10^8$ | 3.600 | 116.972 | 162.275 | 57.754 | 340.600 | $1.475 \times 10^6$ |