## Muons in nickel (Ni)

| Z | $A$ [g/mol] | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|---|
| 28 (Ni) | 58.6934(4) | 8.902 | 311.0 | 0.16496 | 2.8430 | −0.0566 | 3.1851 | 4.3115 | 0.10 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 5.551 | | | | 5.551 | $1.016 \times 10^0$ |
| 14.0 MeV | $5.616 \times 10^1$ | 4.369 | | | | 4.369 | $1.836 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.439 | | | | 3.439 | $3.401 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.687 | | | | 2.687 | $6.736 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.302 | | | | 2.303 | $1.078 \times 10^1$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.737 | | | | 1.737 | $3.141 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.634 | | | | 1.634 | $4.331 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.533 | | | | 1.533 | $6.869 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.480 | | | | 1.480 | $1.087 \times 10^2$ |
| 267. MeV | $3.577 \times 10^2$ | 1.468 | | | 0.000 | 1.468 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.469 | | | 0.000 | 1.470 | $1.767 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.484 | 0.000 | | 0.000 | 1.485 | $2.444 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.567 | 0.000 | | 0.000 | 1.568 | $5.063 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.602 | 0.001 | | 0.000 | 1.603 | $6.324 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.658 | 0.001 | 0.000 | 0.001 | 1.660 | $8.774 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.718 | 0.002 | 0.001 | 0.001 | 1.722 | $1.232 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.787 | 0.003 | 0.002 | 0.001 | 1.794 | $1.800 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.835 | 0.005 | 0.004 | 0.002 | 1.845 | $2.349 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 1.943 | 0.011 | 0.011 | 0.003 | 1.970 | $4.440 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 1.976 | 0.015 | 0.016 | 0.004 | 2.012 | $5.444 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.023 | 0.023 | 0.026 | 0.006 | 2.078 | $7.399 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.070 | 0.036 | 0.042 | 0.008 | 2.156 | $1.023 \times 10^4$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.120 | 0.059 | 0.073 | 0.012 | 2.264 | $1.475 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.153 | 0.083 | 0.107 | 0.016 | 2.359 | $1.908 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.227 | 0.188 | 0.255 | 0.031 | 2.702 | $3.489 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.250 | 0.243 | 0.336 | 0.038 | 2.868 | $4.208 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.284 | 0.357 | 0.501 | 0.053 | 3.196 | $5.529 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.319 | 0.535 | 0.764 | 0.076 | 3.694 | $7.274 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.358 | 0.840 | 1.204 | 0.114 | 4.517 | $9.718 \times 10^4$ |
| 326. GeV | $3.262 \times 10^5$ | 2.366 | 0.921 | 1.322 | 0.123 | 4.734 | *Muon critical energy* |
| 400. GeV | $4.001 \times 10^5$ | 2.386 | 1.155 | 1.661 | 0.151 | 5.354 | $1.175 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.455 | 2.459 | 3.536 | 0.306 | 8.757 | $1.754 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.477 | 3.130 | 4.496 | 0.385 | 10.489 | $1.962 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.511 | 4.476 | 6.414 | 0.545 | 13.946 | $2.292 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.547 | 6.537 | 9.342 | 0.788 | 19.215 | $2.657 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.589 | 9.982 | 14.209 | 1.206 | 27.986 | $3.086 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.619 | 13.475 | 19.130 | 1.631 | 36.856 | $3.396 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.693 | 27.573 | 38.923 | 3.393 | 72.583 | $4.155 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.717 | 34.683 | 48.876 | 4.299 | 90.576 | $4.401 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 2.754 | 48.865 | 68.732 | 6.160 | 126.512 | $4.773 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 2.794 | 70.276 | 98.650 | 9.014 | 180.735 | $5.168 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 2.841 | 105.920 | 148.430 | 13.951 | 271.143 | $5.617 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 2.874 | 141.705 | 198.338 | 19.008 | 361.926 | $5.935 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 2.956 | 285.101 | 398.120 | 40.151 | 726.329 | $6.700 \times 10^5$ |
| 100. TeV | $1.000 \times 10^8$ | 2.983 | 356.940 | 498.110 | 51.080 | 909.114 | $6.945 \times 10^5$ |