## Table 044: Muons in Ruthenium

| Z | $A$ [g/mol] | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|---|
| 44 (Ru) | 101.07 (2) | 12.410 | 441.0 | 0.19342 | 2.8707 | 0.0599 | 3.0834 | 4.7694 | 0.14 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 4.772 | | | | 4.772 | $1.191 \times 10^0$ |
| 14.0 MeV | $5.616 \times 10^1$ | 3.770 | | | | 3.770 | $2.143 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 2.977 | | | | 2.977 | $3.954 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.334 | | | | 2.334 | $7.798 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.005 | | | | 2.005 | $1.245 \times 10^1$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.524 | | | | 1.524 | $3.604 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.439 | | | | 1.439 | $4.958 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.355 | | | | 1.355 | $7.835 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.314 | | | | 1.314 | $1.235 \times 10^2$ |
| 253. MeV | $3.431 \times 10^2$ | 1.307 | | | | 1.307 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.310 | 0.000 | | 0.000 | 1.310 | $1.999 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.327 | 0.000 | | 0.000 | 1.327 | $2.757 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.408 | 0.001 | | 0.000 | 1.409 | $5.679 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.441 | 0.001 | | 0.000 | 1.443 | $7.081 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.494 | 0.002 | 0.000 | 0.001 | 1.496 | $9.800 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.551 | 0.003 | 0.001 | 0.001 | 1.555 | $1.373 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.615 | 0.004 | 0.003 | 0.001 | 1.623 | $2.001 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.659 | 0.006 | 0.005 | 0.002 | 1.672 | $2.608 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 1.759 | 0.016 | 0.016 | 0.003 | 1.794 | $4.909 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 1.789 | 0.021 | 0.022 | 0.004 | 1.836 | $6.011 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 1.831 | 0.032 | 0.035 | 0.005 | 1.904 | $8.149 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 1.874 | 0.049 | 0.057 | 0.008 | 1.989 | $1.123 \times 10^4$ |
| 30.0 GeV | $3.011 \times 10^4$ | 1.919 | 0.081 | 0.099 | 0.011 | 2.112 | $1.611 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 1.949 | 0.114 | 0.146 | 0.015 | 2.225 | $2.072 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.017 | 0.258 | 0.349 | 0.030 | 2.654 | $3.715 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.037 | 0.334 | 0.458 | 0.037 | 2.867 | $4.440 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.068 | 0.490 | 0.684 | 0.051 | 3.294 | $5.741 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.100 | 0.735 | 1.041 | 0.073 | 3.949 | $7.402 \times 10^4$ |
| 225. GeV | $2.254 \times 10^5$ | 2.110 | 0.839 | 1.190 | 0.082 | 4.222 | *Muon critical energy* |
| 300. GeV | $3.001 \times 10^5$ | 2.136 | 1.153 | 1.639 | 0.109 | 5.038 | $9.640 \times 10^4$ |
| 400. GeV | $4.001 \times 10^5$ | 2.162 | 1.585 | 2.258 | 0.145 | 6.151 | $1.143 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.224 | 3.370 | 4.799 | 0.293 | 10.687 | $1.631 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.244 | 4.287 | 6.099 | 0.369 | 13.000 | $1.800 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.275 | 6.127 | 8.692 | 0.522 | 17.618 | $2.064 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.308 | 8.941 | 12.651 | 0.755 | 24.657 | $2.350 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.346 | 13.642 | 19.231 | 1.155 | 36.375 | $2.682 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.374 | 18.406 | 25.880 | 1.561 | 48.222 | $2.920 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.441 | 37.618 | 52.615 | 3.245 | 95.921 | $3.497 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.463 | 47.302 | 66.055 | 4.110 | 119.932 | $3.683 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 2.497 | 66.618 | 92.871 | 5.885 | 167.873 | $3.964 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 2.534 | 95.768 | 133.268 | 8.606 | 240.177 | $4.261 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 2.576 | 144.295 | 200.482 | 13.309 | 360.663 | $4.599 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 2.606 | 193.001 | 267.858 | 18.123 | 481.589 | $4.838 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 2.682 | 388.132 | 537.566 | 38.226 | 966.607 | $5.412 \times 10^5$ |
| 100. TeV | $1.000 \times 10^8$ | 2.706 | 485.870 | 672.550 | 48.610 | 1209.737 | $5.597 \times 10^5$ |