

Muons in copper (Cu)

| Z | A [g/mol] | ρ [g/cm ³] | I [eV] | a | k = m _s | x ₀ | x ₁ | \overline{C} | δ_0 |
|---------|-----------|-----------------------------|--------|---------|--------------------|----------------|----------------|----------------|------------|
| 29 (Cu) | 63.546(3) | 8.960 | 322.0 | 0.14339 | 2.9044 | -0.0254 | 3.2792 | 4.4190 | 0.08 |

| T | p [MeV/c] | Ionization | Brems | Pair prod [MeV cm ² /g] | Photonucl | Total | CSDA range [g/cm ²] |
|----------|---------------------|------------|---------|---------------------------------------|-----------|---------|------------------------------------|
| 10.0 MeV | 4.704×10^1 | 5.283 | | | | 5.283 | 1.069×10^0 |
| 14.0 MeV | 5.616×10^1 | 4.160 | | | | 4.160 | 1.930×10^0 |
| 20.0 MeV | 6.802×10^1 | 3.277 | | | | 3.277 | 3.573×10^0 |
| 30.0 MeV | 8.509×10^1 | 2.562 | | | | 2.562 | 7.071×10^0 |
| 40.0 MeV | 1.003×10^2 | 2.198 | | | | 2.198 | 1.131×10^1 |
| 80.0 MeV | 1.527×10^2 | 1.659 | | | | 1.659 | 3.291×10^1 |
| 100. MeV | 1.764×10^2 | 1.561 | | | | 1.561 | 4.537×10^1 |
| 140. MeV | 2.218×10^2 | 1.464 | | | | 1.465 | 7.195×10^1 |
| 200. MeV | 2.868×10^2 | 1.414 | | | | 1.414 | 1.138×10^2 |
| 267. MeV | 3.577×10^2 | 1.403 | | | 0.000 | 1.403 | <i>Minimum ionization</i> |
| 300. MeV | 3.917×10^2 | 1.404 | | | 0.000 | 1.404 | 1.849×10^2 |
| 400. MeV | 4.945×10^2 | 1.419 | 0.000 | | 0.000 | 1.419 | 2.558×10^2 |
| 800. MeV | 8.995×10^2 | 1.499 | 0.000 | | 0.000 | 1.500 | 5.298×10^2 |
| 1.00 GeV | 1.101×10^3 | 1.532 | 0.001 | | 0.000 | 1.533 | 6.617×10^2 |
| 1.40 GeV | 1.502×10^3 | 1.585 | 0.001 | 0.000 | 0.001 | 1.587 | 9.179×10^2 |
| 2.00 GeV | 2.103×10^3 | 1.643 | 0.002 | 0.001 | 0.001 | 1.647 | 1.289×10^3 |
| 3.00 GeV | 3.104×10^3 | 1.709 | 0.003 | 0.002 | 0.001 | 1.716 | 1.882×10^3 |
| 4.00 GeV | 4.104×10^3 | 1.755 | 0.005 | 0.004 | 0.002 | 1.765 | 2.457×10^3 |
| 8.00 GeV | 8.105×10^3 | 1.860 | 0.011 | 0.011 | 0.003 | 1.886 | 4.641×10^3 |
| 10.0 GeV | 1.011×10^4 | 1.891 | 0.015 | 0.016 | 0.004 | 1.926 | 5.690×10^3 |
| 14.0 GeV | 1.411×10^4 | 1.936 | 0.023 | 0.025 | 0.006 | 1.991 | 7.731×10^3 |
| 20.0 GeV | 2.011×10^4 | 1.981 | 0.035 | 0.041 | 0.008 | 2.067 | 1.069×10^4 |
| 30.0 GeV | 3.011×10^4 | 2.029 | 0.058 | 0.072 | 0.012 | 2.172 | 1.540×10^4 |
| 40.0 GeV | 4.011×10^4 | 2.061 | 0.082 | 0.105 | 0.016 | 2.265 | 1.991×10^4 |
| 80.0 GeV | 8.011×10^4 | 2.133 | 0.185 | 0.252 | 0.031 | 2.602 | 3.636×10^4 |
| 100. GeV | 1.001×10^5 | 2.155 | 0.240 | 0.332 | 0.038 | 2.765 | 4.381×10^4 |
| 140. GeV | 1.401×10^5 | 2.187 | 0.352 | 0.495 | 0.053 | 3.088 | 5.750×10^4 |
| 200. GeV | 2.001×10^5 | 2.221 | 0.527 | 0.755 | 0.075 | 3.579 | 7.553×10^4 |
| 300. GeV | 3.001×10^5 | 2.259 | 0.828 | 1.189 | 0.113 | 4.389 | 1.007×10^5 |
| 317. GeV | 3.170×10^5 | 2.264 | 0.880 | 1.264 | 0.119 | 4.528 | <i>Muon critical energy</i> |
| 400. GeV | 4.001×10^5 | 2.285 | 1.139 | 1.640 | 0.151 | 5.215 | 1.216×10^5 |
| 800. GeV | 8.001×10^5 | 2.351 | 2.425 | 3.491 | 0.304 | 8.571 | 1.809×10^5 |
| 1.00 TeV | 1.000×10^6 | 2.372 | 3.087 | 4.439 | 0.382 | 10.280 | 2.021×10^5 |
| 1.40 TeV | 1.400×10^6 | 2.404 | 4.414 | 6.331 | 0.542 | 13.691 | 2.357×10^5 |
| 2.00 TeV | 2.000×10^6 | 2.439 | 6.446 | 9.220 | 0.784 | 18.890 | 2.729×10^5 |
| 3.00 TeV | 3.000×10^6 | 2.479 | 9.842 | 14.023 | 1.199 | 27.544 | 3.165×10^5 |
| 4.00 TeV | 4.000×10^6 | 2.508 | 13.286 | 18.879 | 1.621 | 36.295 | 3.480×10^5 |
| 8.00 TeV | 8.000×10^6 | 2.579 | 27.184 | 38.410 | 3.372 | 71.545 | 4.251×10^5 |
| 10.0 TeV | 1.000×10^7 | 2.602 | 34.193 | 48.231 | 4.272 | 89.299 | 4.500×10^5 |
| 14.0 TeV | 1.400×10^7 | 2.637 | 48.174 | 67.823 | 6.121 | 124.756 | 4.878×10^5 |
| 20.0 TeV | 2.000×10^7 | 2.676 | 69.280 | 97.344 | 8.956 | 178.257 | 5.278×10^5 |
| 30.0 TeV | 3.000×10^7 | 2.720 | 104.417 | 146.463 | 13.860 | 267.461 | 5.733×10^5 |
| 40.0 TeV | 4.000×10^7 | 2.752 | 139.692 | 195.708 | 18.883 | 357.035 | 6.055×10^5 |
| 80.0 TeV | 8.000×10^7 | 2.831 | 281.045 | 392.831 | 39.878 | 716.586 | 6.831×10^5 |
| 100. TeV | 1.000×10^8 | 2.856 | 351.860 | 491.490 | 50.730 | 896.937 | 7.080×10^5 |