## Muons in barium sulfate $BaSO_4$

| $\langle Z/A \rangle$ | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|
| 0.44561 | 4.500 | 285.7 | 0.11747 | 3.0427 | −0.0128 | 3.4069 | 4.8923 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 5.288 | | | | 5.288 | $1.061 \times 10^0$ |
| 14.0 MeV | $5.616 \times 10^1$ | 4.157 | | | | 4.157 | $1.923 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.270 | | | | 3.271 | $3.569 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.557 | | | | 2.557 | $7.074 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.194 | | | | 2.194 | $1.132 \times 10^1$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.659 | | | | 1.659 | $3.293 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.563 | | | | 1.563 | $4.538 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.467 | | | | 1.467 | $7.193 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.417 | | | | 1.417 | $1.137 \times 10^2$ |
| 267. MeV | $3.577 \times 10^2$ | 1.406 | | | 0.000 | 1.407 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.408 | 0.000 | | 0.000 | 1.408 | $1.847 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.423 | 0.000 | | 0.000 | 1.423 | $2.553 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.503 | 0.001 | | 0.000 | 1.504 | $5.285 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.536 | 0.001 | | 0.000 | 1.537 | $6.600 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.589 | 0.001 | 0.000 | 0.001 | 1.591 | $9.155 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.647 | 0.002 | 0.001 | 0.001 | 1.651 | $1.285 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.713 | 0.004 | 0.002 | 0.001 | 1.720 | $1.878 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.758 | 0.005 | 0.004 | 0.002 | 1.769 | $2.451 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 1.861 | 0.013 | 0.012 | 0.003 | 1.890 | $4.630 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 1.892 | 0.017 | 0.017 | 0.004 | 1.931 | $5.676 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 1.937 | 0.026 | 0.028 | 0.006 | 1.997 | $7.711 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 1.982 | 0.040 | 0.046 | 0.008 | 2.076 | $1.066 \times 10^4$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.029 | 0.066 | 0.080 | 0.012 | 2.187 | $1.534 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.061 | 0.093 | 0.117 | 0.016 | 2.287 | $1.981 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.131 | 0.211 | 0.282 | 0.031 | 2.655 | $3.601 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.153 | 0.273 | 0.371 | 0.038 | 2.835 | $4.330 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.184 | 0.401 | 0.554 | 0.053 | 3.192 | $5.659 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.217 | 0.601 | 0.843 | 0.075 | 3.737 | $7.395 \times 10^4$ |
| 285. GeV | $2.847 \times 10^5$ | 2.249 | 0.890 | 1.253 | 0.107 | 4.500 | *Muon critical energy* |
| 300. GeV | $3.001 \times 10^5$ | 2.254 | 0.943 | 1.329 | 0.113 | 4.640 | $9.793 \times 10^4$ |
| 400. GeV | $4.001 \times 10^5$ | 2.280 | 1.297 | 1.832 | 0.150 | 5.561 | $1.176 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.344 | 2.760 | 3.899 | 0.303 | 9.307 | $1.726 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.365 | 3.511 | 4.957 | 0.381 | 11.216 | $1.922 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.396 | 5.019 | 7.068 | 0.540 | 15.024 | $2.229 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.430 | 7.326 | 10.291 | 0.781 | 20.829 | $2.567 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.469 | 11.179 | 15.646 | 1.196 | 30.491 | $2.961 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.497 | 15.085 | 21.061 | 1.616 | 40.261 | $3.246 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.567 | 30.840 | 42.832 | 3.363 | 79.603 | $3.939 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.589 | 38.782 | 53.777 | 4.261 | 99.411 | $4.163 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 2.624 | 54.625 | 75.614 | 6.107 | 138.970 | $4.502 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 2.661 | 78.535 | 108.513 | 8.938 | 198.648 | $4.861 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 2.705 | 118.337 | 163.251 | 13.836 | 298.129 | $5.270 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 2.736 | 158.287 | 218.124 | 18.854 | 398.002 | $5.559 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 2.813 | 318.350 | 437.779 | 39.839 | 798.781 | $6.254 \times 10^5$ |
| 100. TeV | $1.000 \times 10^8$ | 2.838 | 398.526 | 547.713 | 50.689 | 999.767 | $6.478 \times 10^5$ |