

## Muons in berkelium (Bk)

| Z        | A [g/mol]           | $\rho$ [g/cm <sup>3</sup> ] | I [eV]  | a                                     | $k = m_s$ | $x_0$    | $x_1$                              | $\bar{C}$ | $\delta_0$ |
|----------|---------------------|-----------------------------|---------|---------------------------------------|-----------|----------|------------------------------------|-----------|------------|
| 97 (Bk)  | [247.07031(4)]      | 9.860                       | 952.0   | 0.25556                               | 3.0000    | 0.0509   | 2.5000                             | 3.9886    | 0.00       |
| T        | p<br>[MeV/c]        | Ionization                  | Brems   | Pair prod<br>[MeV cm <sup>2</sup> /g] | Photonucl | Total    | CSDA range<br>[g/cm <sup>2</sup> ] |           |            |
| 10.0 MeV | $4.704 \times 10^1$ | 3.662                       |         |                                       |           | 3.662    | $1.604 \times 10^0$                |           |            |
| 14.0 MeV | $5.616 \times 10^1$ | 2.938                       |         |                                       |           | 2.938    | $2.834 \times 10^0$                |           |            |
| 20.0 MeV | $6.802 \times 10^1$ | 2.351                       |         |                                       |           | 2.351    | $5.140 \times 10^0$                |           |            |
| 30.0 MeV | $8.509 \times 10^1$ | 1.866                       |         |                                       |           | 1.866    | $9.973 \times 10^0$                |           |            |
| 40.0 MeV | $1.003 \times 10^2$ | 1.616                       |         |                                       |           | 1.616    | $1.576 \times 10^1$                |           |            |
| 80.0 MeV | $1.527 \times 10^2$ | 1.248                       |         |                                       |           | 1.249    | $4.473 \times 10^1$                |           |            |
| 100. MeV | $1.764 \times 10^2$ | 1.182                       |         |                                       |           | 1.182    | $6.123 \times 10^1$                |           |            |
| 140. MeV | $2.218 \times 10^2$ | 1.119                       |         |                                       |           | 1.119    | $9.616 \times 10^1$                |           |            |
| 200. MeV | $2.868 \times 10^2$ | 1.088                       |         |                                       |           | 1.089    | $1.507 \times 10^2$                |           |            |
| 242. MeV | $3.316 \times 10^2$ | 1.085                       | 0.000   |                                       |           | 1.085    | <i>Minimum ionization</i>          |           |            |
| 300. MeV | $3.917 \times 10^2$ | 1.088                       | 0.000   |                                       | 0.000     | 1.089    | $2.428 \times 10^2$                |           |            |
| 400. MeV | $4.945 \times 10^2$ | 1.105                       | 0.000   |                                       | 0.000     | 1.105    | $3.340 \times 10^2$                |           |            |
| 800. MeV | $8.995 \times 10^2$ | 1.175                       | 0.001   |                                       | 0.000     | 1.176    | $6.843 \times 10^2$                |           |            |
| 1.00 GeV | $1.101 \times 10^3$ | 1.203                       | 0.002   |                                       | 0.000     | 1.205    | $8.522 \times 10^2$                |           |            |
| 1.40 GeV | $1.502 \times 10^3$ | 1.246                       | 0.003   |                                       | 0.000     | 1.250    | $1.178 \times 10^3$                |           |            |
| 2.00 GeV | $2.103 \times 10^3$ | 1.293                       | 0.005   | 0.001                                 | 0.001     | 1.299    | $1.648 \times 10^3$                |           |            |
| 3.00 GeV | $3.104 \times 10^3$ | 1.345                       | 0.008   | 0.003                                 | 0.001     | 1.358    | $2.400 \times 10^3$                |           |            |
| 4.00 GeV | $4.104 \times 10^3$ | 1.381                       | 0.012   | 0.006                                 | 0.002     | 1.401    | $3.124 \times 10^3$                |           |            |
| 8.00 GeV | $8.105 \times 10^3$ | 1.462                       | 0.029   | 0.024                                 | 0.003     | 1.518    | $5.857 \times 10^3$                |           |            |
| 10.0 GeV | $1.011 \times 10^4$ | 1.486                       | 0.038   | 0.034                                 | 0.004     | 1.563    | $7.155 \times 10^3$                |           |            |
| 14.0 GeV | $1.411 \times 10^4$ | 1.521                       | 0.059   | 0.056                                 | 0.005     | 1.642    | $9.650 \times 10^3$                |           |            |
| 20.0 GeV | $2.011 \times 10^4$ | 1.556                       | 0.091   | 0.092                                 | 0.007     | 1.748    | $1.319 \times 10^4$                |           |            |
| 30.0 GeV | $3.011 \times 10^4$ | 1.594                       | 0.150   | 0.164                                 | 0.011     | 1.919    | $1.865 \times 10^4$                |           |            |
| 40.0 GeV | $4.011 \times 10^4$ | 1.620                       | 0.212   | 0.242                                 | 0.014     | 2.089    | $2.364 \times 10^4$                |           |            |
| 80.0 GeV | $8.011 \times 10^4$ | 1.679                       | 0.479   | 0.591                                 | 0.027     | 2.777    | $4.020 \times 10^4$                |           |            |
| 100. GeV | $1.001 \times 10^5$ | 1.698                       | 0.620   | 0.779                                 | 0.034     | 3.132    | $4.698 \times 10^4$                |           |            |
| 116. GeV | $1.164 \times 10^5$ | 1.710                       | 0.737   | 0.934                                 | 0.039     | 3.422    | <i>Muon critical energy</i>        |           |            |
| 140. GeV | $1.401 \times 10^5$ | 1.725                       | 0.911   | 1.166                                 | 0.047     | 3.850    | $5.848 \times 10^4$                |           |            |
| 200. GeV | $2.001 \times 10^5$ | 1.754                       | 1.364   | 1.780                                 | 0.067     | 4.967    | $7.218 \times 10^4$                |           |            |
| 300. GeV | $3.001 \times 10^5$ | 1.786                       | 2.138   | 2.805                                 | 0.101     | 6.832    | $8.929 \times 10^4$                |           |            |
| 400. GeV | $4.001 \times 10^5$ | 1.810                       | 2.938   | 3.867                                 | 0.134     | 8.750    | $1.022 \times 10^5$                |           |            |
| 800. GeV | $8.001 \times 10^5$ | 1.866                       | 6.235   | 8.222                                 | 0.271     | 16.596   | $1.349 \times 10^5$                |           |            |
| 1.00 TeV | $1.000 \times 10^6$ | 1.884                       | 7.927   | 10.449                                | 0.341     | 20.603   | $1.457 \times 10^5$                |           |            |
| 1.40 TeV | $1.400 \times 10^6$ | 1.912                       | 11.316  | 14.891                                | 0.483     | 28.603   | $1.621 \times 10^5$                |           |            |
| 2.00 TeV | $2.000 \times 10^6$ | 1.942                       | 16.495  | 21.668                                | 0.698     | 40.805   | $1.795 \times 10^5$                |           |            |
| 3.00 TeV | $3.000 \times 10^6$ | 1.976                       | 25.134  | 32.928                                | 1.067     | 61.107   | $1.994 \times 10^5$                |           |            |
| 4.00 TeV | $4.000 \times 10^6$ | 2.001                       | 33.883  | 44.307                                | 1.441     | 81.633   | $2.136 \times 10^5$                |           |            |
| 8.00 TeV | $8.000 \times 10^6$ | 2.062                       | 69.129  | 90.039                                | 2.991     | 164.222  | $2.474 \times 10^5$                |           |            |
| 10.0 TeV | $1.000 \times 10^7$ | 2.082                       | 86.879  | 113.023                               | 3.786     | 205.772  | $2.583 \times 10^5$                |           |            |
| 14.0 TeV | $1.400 \times 10^7$ | 2.112                       | 122.282 | 158.887                               | 5.417     | 288.699  | $2.746 \times 10^5$                |           |            |
| 20.0 TeV | $2.000 \times 10^7$ | 2.145                       | 175.674 | 227.972                               | 7.914     | 413.707  | $2.919 \times 10^5$                |           |            |
| 30.0 TeV | $3.000 \times 10^7$ | 2.183                       | 264.646 | 342.902                               | 12.227    | 621.960  | $3.115 \times 10^5$                |           |            |
| 40.0 TeV | $4.000 \times 10^7$ | 2.211                       | 353.935 | 458.095                               | 16.639    | 830.882  | $3.253 \times 10^5$                |           |            |
| 80.0 TeV | $8.000 \times 10^7$ | 2.278                       | 711.071 | 919.187                               | 35.048    | 1667.586 | $3.586 \times 10^5$                |           |            |
| 100. TeV | $1.000 \times 10^8$ | 2.301                       | 889.750 | 1149.940                              | 44.550    | 2086.543 | $3.693 \times 10^5$                |           |            |