

**Table 050: Muons in Tin**

| Z        | A [g/mol]           | $\rho$ [g/cm <sup>3</sup> ] | I [eV]  | a                                     | $k = m_s$ | $x_0$    | $x_1$                              | $\bar{C}$ | $\delta_0$ |
|----------|---------------------|-----------------------------|---------|---------------------------------------|-----------|----------|------------------------------------|-----------|------------|
| 50 (Sn)  | 118.710 (7)         | 7.310                       | 488.0   | 0.18689                               | 2.8576    | 0.2879   | 3.2959                             | 5.5340    | 0.14       |
| 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 | $4.704 \times 10^1$ | 4.538                       |         |                                       |           | 4.538    | $1.256 \times 10^0$                |           |            |
| 14.0 MeV | $5.616 \times 10^1$ | 3.591                       |         |                                       |           | 3.591    | $2.257 \times 10^0$                |           |            |
| 20.0 MeV | $6.802 \times 10^1$ | 2.840                       |         |                                       |           | 2.840    | $4.156 \times 10^0$                |           |            |
| 30.0 MeV | $8.509 \times 10^1$ | 2.231                       |         |                                       |           | 2.231    | $8.181 \times 10^0$                |           |            |
| 40.0 MeV | $1.003 \times 10^2$ | 1.920                       |         |                                       |           | 1.920    | $1.304 \times 10^1$                |           |            |
| 80.0 MeV | $1.527 \times 10^2$ | 1.464                       |         |                                       |           | 1.464    | $3.762 \times 10^1$                |           |            |
| 100. MeV | $1.764 \times 10^2$ | 1.383                       |         |                                       |           | 1.383    | $5.171 \times 10^1$                |           |            |
| 140. MeV | $2.218 \times 10^2$ | 1.305                       |         |                                       |           | 1.305    | $8.161 \times 10^1$                |           |            |
| 200. MeV | $2.868 \times 10^2$ | 1.268                       |         |                                       |           | 1.268    | $1.284 \times 10^2$                |           |            |
| 246. MeV | $3.356 \times 10^2$ | 1.263                       |         |                                       |           | 1.264    | <i>Minimum ionization</i>          |           |            |
| 300. MeV | $3.917 \times 10^2$ | 1.268                       | 0.000   |                                       | 0.000     | 1.268    | $2.074 \times 10^2$                |           |            |
| 400. MeV | $4.945 \times 10^2$ | 1.286                       | 0.000   |                                       | 0.000     | 1.287    | $2.858 \times 10^2$                |           |            |
| 800. MeV | $8.995 \times 10^2$ | 1.371                       | 0.001   |                                       | 0.000     | 1.372    | $5.864 \times 10^2$                |           |            |
| 1.00 GeV | $1.101 \times 10^3$ | 1.404                       | 0.001   |                                       | 0.000     | 1.406    | $7.304 \times 10^2$                |           |            |
| 1.40 GeV | $1.502 \times 10^3$ | 1.458                       | 0.002   | 0.000                                 | 0.001     | 1.460    | $1.009 \times 10^3$                |           |            |
| 2.00 GeV | $2.103 \times 10^3$ | 1.515                       | 0.003   | 0.001                                 | 0.001     | 1.520    | $1.412 \times 10^3$                |           |            |
| 3.00 GeV | $3.104 \times 10^3$ | 1.580                       | 0.005   | 0.003                                 | 0.001     | 1.590    | $2.054 \times 10^3$                |           |            |
| 4.00 GeV | $4.104 \times 10^3$ | 1.625                       | 0.007   | 0.005                                 | 0.002     | 1.639    | $2.673 \times 10^3$                |           |            |
| 8.00 GeV | $8.105 \times 10^3$ | 1.727                       | 0.017   | 0.017                                 | 0.003     | 1.764    | $5.016 \times 10^3$                |           |            |
| 10.0 GeV | $1.011 \times 10^4$ | 1.757                       | 0.023   | 0.023                                 | 0.004     | 1.807    | $6.136 \times 10^3$                |           |            |
| 14.0 GeV | $1.411 \times 10^4$ | 1.800                       | 0.035   | 0.038                                 | 0.005     | 1.879    | $8.305 \times 10^3$                |           |            |
| 20.0 GeV | $2.011 \times 10^4$ | 1.844                       | 0.054   | 0.062                                 | 0.008     | 1.967    | $1.142 \times 10^4$                |           |            |
| 30.0 GeV | $3.011 \times 10^4$ | 1.889                       | 0.088   | 0.107                                 | 0.011     | 2.096    | $1.634 \times 10^4$                |           |            |
| 40.0 GeV | $4.011 \times 10^4$ | 1.919                       | 0.124   | 0.157                                 | 0.015     | 2.216    | $2.098 \times 10^4$                |           |            |
| 80.0 GeV | $8.011 \times 10^4$ | 1.987                       | 0.280   | 0.377                                 | 0.029     | 2.674    | $3.738 \times 10^4$                |           |            |
| 100. GeV | $1.001 \times 10^5$ | 2.007                       | 0.363   | 0.495                                 | 0.036     | 2.902    | $4.456 \times 10^4$                |           |            |
| 140. GeV | $1.401 \times 10^5$ | 2.037                       | 0.533   | 0.739                                 | 0.050     | 3.360    | $5.736 \times 10^4$                |           |            |
| 200. GeV | $2.001 \times 10^5$ | 2.068                       | 0.798   | 1.125                                 | 0.072     | 4.064    | $7.358 \times 10^4$                |           |            |
| 207. GeV | $2.069 \times 10^5$ | 2.071                       | 0.829   | 1.168                                 | 0.074     | 4.143    | <i>Muon critical energy</i>        |           |            |
| 300. GeV | $3.001 \times 10^5$ | 2.103                       | 1.252   | 1.771                                 | 0.107     | 5.234    | $9.522 \times 10^4$                |           |            |
| 400. GeV | $4.001 \times 10^5$ | 2.128                       | 1.721   | 2.440                                 | 0.143     | 6.433    | $1.124 \times 10^5$                |           |            |
| 800. GeV | $8.001 \times 10^5$ | 2.188                       | 3.659   | 5.182                                 | 0.290     | 11.320   | $1.587 \times 10^5$                |           |            |
| 1.00 TeV | $1.000 \times 10^6$ | 2.208                       | 4.655   | 6.585                                 | 0.364     | 13.813   | $1.747 \times 10^5$                |           |            |
| 1.40 TeV | $1.400 \times 10^6$ | 2.237                       | 6.651   | 9.385                                 | 0.515     | 18.789   | $1.994 \times 10^5$                |           |            |
| 2.00 TeV | $2.000 \times 10^6$ | 2.269                       | 9.704   | 13.657                                | 0.745     | 26.377   | $2.263 \times 10^5$                |           |            |
| 3.00 TeV | $3.000 \times 10^6$ | 2.306                       | 14.802  | 20.756                                | 1.139     | 39.005   | $2.573 \times 10^5$                |           |            |
| 4.00 TeV | $4.000 \times 10^6$ | 2.333                       | 19.969  | 27.932                                | 1.540     | 51.774   | $2.794 \times 10^5$                |           |            |
| 8.00 TeV | $8.000 \times 10^6$ | 2.398                       | 40.801  | 56.776                                | 3.200     | 103.176  | $3.331 \times 10^5$                |           |            |
| 10.0 TeV | $1.000 \times 10^7$ | 2.420                       | 51.300  | 71.275                                | 4.052     | 129.048  | $3.504 \times 10^5$                |           |            |
| 14.0 TeV | $1.400 \times 10^7$ | 2.452                       | 72.241  | 100.206                               | 5.801     | 180.702  | $3.765 \times 10^5$                |           |            |
| 20.0 TeV | $2.000 \times 10^7$ | 2.488                       | 103.840 | 143.788                               | 8.482     | 258.599  | $4.041 \times 10^5$                |           |            |
| 30.0 TeV | $3.000 \times 10^7$ | 2.529                       | 156.444 | 216.299                               | 13.115    | 388.388  | $4.354 \times 10^5$                |           |            |
| 40.0 TeV | $4.000 \times 10^7$ | 2.558                       | 209.238 | 288.983                               | 17.857    | 518.638  | $4.576 \times 10^5$                |           |            |
| 80.0 TeV | $8.000 \times 10^7$ | 2.631                       | 420.738 | 579.930                               | 37.655    | 1040.955 | $5.110 \times 10^5$                |           |            |
| 100. TeV | $1.000 \times 10^8$ | 2.655                       | 526.670 | 725.540                               | 47.880    | 1302.746 | $5.281 \times 10^5$                |           |            |