

## Muons in 1,2-dichloroethane $C_2H_4C_{12}$

|          | $\langle Z/A \rangle$ | $\rho$ [g/cm <sup>3</sup> ] | $I$ [eV] | $a$                      | $k = m_s$ | $x_0$   | $x_1$                              | $\bar{C}$              | $\delta_0$                  |
|----------|-----------------------|-----------------------------|----------|--------------------------|-----------|---------|------------------------------------|------------------------|-----------------------------|
|          | 0.50526               | 1.235                       | 111.9    | 0.13383                  | 3.1675    | 0.1375  | 2.9529                             | 4.1849                 | 0.00                        |
| $T$      | $p$<br>[MeV/c]        | Ionization                  | Brems    | Pair prod                | Photonucl | Total   | CSDA range<br>[g/cm <sup>2</sup> ] |                        |                             |
|          |                       |                             |          | [MeV cm <sup>2</sup> /g] |           |         |                                    |                        |                             |
| 10.0 MeV | $4.704 \times 10^1$   | 6.875                       |          |                          |           | 6.875   |                                    | $8.071 \times 10^{-1}$ |                             |
| 14.0 MeV | $5.616 \times 10^1$   | 5.373                       |          |                          |           | 5.373   |                                    | $1.472 \times 10^0$    |                             |
| 20.0 MeV | $6.802 \times 10^1$   | 4.205                       |          |                          |           | 4.205   |                                    | $2.749 \times 10^0$    |                             |
| 30.0 MeV | $8.509 \times 10^1$   | 3.268                       |          |                          |           | 3.269   |                                    | $5.484 \times 10^0$    |                             |
| 40.0 MeV | $1.003 \times 10^2$   | 2.795                       |          |                          |           | 2.795   |                                    | $8.814 \times 10^0$    |                             |
| 80.0 MeV | $1.527 \times 10^2$   | 2.103                       |          |                          |           | 2.103   |                                    | $2.583 \times 10^1$    |                             |
| 100. MeV | $1.764 \times 10^2$   | 1.975                       |          |                          |           | 1.975   |                                    | $3.567 \times 10^1$    |                             |
| 140. MeV | $2.218 \times 10^2$   | 1.846                       |          |                          |           | 1.846   |                                    | $5.671 \times 10^1$    |                             |
| 200. MeV | $2.868 \times 10^2$   | 1.775                       |          |                          |           | 1.775   |                                    | $8.999 \times 10^1$    |                             |
| 293. MeV | $3.844 \times 10^2$   | 1.753                       |          |                          | 0.000     | 1.753   |                                    |                        | <i>Minimum ionization</i>   |
| 300. MeV | $3.917 \times 10^2$   | 1.753                       |          |                          | 0.000     | 1.753   |                                    | $1.468 \times 10^2$    |                             |
| 400. MeV | $4.945 \times 10^2$   | 1.764                       |          |                          | 0.000     | 1.764   |                                    | $2.038 \times 10^2$    |                             |
| 800. MeV | $8.995 \times 10^2$   | 1.844                       | 0.000    |                          | 0.000     | 1.845   |                                    | $4.255 \times 10^2$    |                             |
| 1.00 GeV | $1.101 \times 10^3$   | 1.879                       | 0.000    |                          | 0.000     | 1.879   |                                    | $5.329 \times 10^2$    |                             |
| 1.40 GeV | $1.502 \times 10^3$   | 1.934                       | 0.001    | 0.000                    | 0.001     | 1.936   |                                    | $7.424 \times 10^2$    |                             |
| 2.00 GeV | $2.103 \times 10^3$   | 1.996                       | 0.001    | 0.000                    | 0.001     | 1.998   |                                    | $1.047 \times 10^3$    |                             |
| 3.00 GeV | $3.104 \times 10^3$   | 2.065                       | 0.002    | 0.001                    | 0.001     | 2.069   |                                    | $1.538 \times 10^3$    |                             |
| 4.00 GeV | $4.104 \times 10^3$   | 2.113                       | 0.002    | 0.002                    | 0.002     | 2.119   |                                    | $2.016 \times 10^3$    |                             |
| 8.00 GeV | $8.105 \times 10^3$   | 2.221                       | 0.006    | 0.006                    | 0.004     | 2.237   |                                    | $3.847 \times 10^3$    |                             |
| 10.0 GeV | $1.011 \times 10^4$   | 2.254                       | 0.008    | 0.008                    | 0.005     | 2.275   |                                    | $4.733 \times 10^3$    |                             |
| 14.0 GeV | $1.411 \times 10^4$   | 2.301                       | 0.012    | 0.013                    | 0.006     | 2.333   |                                    | $6.468 \times 10^3$    |                             |
| 20.0 GeV | $2.011 \times 10^4$   | 2.348                       | 0.019    | 0.022                    | 0.009     | 2.398   |                                    | $9.004 \times 10^3$    |                             |
| 30.0 GeV | $3.011 \times 10^4$   | 2.398                       | 0.031    | 0.038                    | 0.013     | 2.480   |                                    | $1.310 \times 10^4$    |                             |
| 40.0 GeV | $4.011 \times 10^4$   | 2.432                       | 0.044    | 0.056                    | 0.017     | 2.549   |                                    | $1.708 \times 10^4$    |                             |
| 80.0 GeV | $8.011 \times 10^4$   | 2.508                       | 0.099    | 0.135                    | 0.033     | 2.776   |                                    | $3.209 \times 10^4$    |                             |
| 100. GeV | $1.001 \times 10^5$   | 2.532                       | 0.129    | 0.177                    | 0.041     | 2.879   |                                    | $3.916 \times 10^4$    |                             |
| 140. GeV | $1.401 \times 10^5$   | 2.567                       | 0.189    | 0.266                    | 0.057     | 3.080   |                                    | $5.259 \times 10^4$    |                             |
| 200. GeV | $2.001 \times 10^5$   | 2.604                       | 0.284    | 0.406                    | 0.080     | 3.376   |                                    | $7.119 \times 10^4$    |                             |
| 300. GeV | $3.001 \times 10^5$   | 2.646                       | 0.447    | 0.642                    | 0.120     | 3.857   |                                    | $9.889 \times 10^4$    |                             |
| 400. GeV | $4.001 \times 10^5$   | 2.676                       | 0.616    | 0.888                    | 0.160     | 4.341   |                                    | $1.233 \times 10^5$    |                             |
| 627. GeV | $6.275 \times 10^5$   | 2.723                       | 1.011    | 1.459                    | 0.253     | 5.447   |                                    |                        | <i>Muon critical energy</i> |
| 800. GeV | $8.001 \times 10^5$   | 2.748                       | 1.317    | 1.900                    | 0.324     | 6.290   |                                    | $1.994 \times 10^5$    |                             |
| 1.00 TeV | $1.000 \times 10^6$   | 2.772                       | 1.678    | 2.420                    | 0.407     | 7.277   |                                    | $2.290 \times 10^5$    |                             |
| 1.40 TeV | $1.400 \times 10^6$   | 2.808                       | 2.403    | 3.457                    | 0.578     | 9.247   |                                    | $2.776 \times 10^5$    |                             |
| 2.00 TeV | $2.000 \times 10^6$   | 2.846                       | 3.516    | 5.045                    | 0.836     | 12.244  |                                    | $3.339 \times 10^5$    |                             |
| 3.00 TeV | $3.000 \times 10^6$   | 2.890                       | 5.378    | 7.685                    | 1.280     | 17.234  |                                    | $4.024 \times 10^5$    |                             |
| 4.00 TeV | $4.000 \times 10^6$   | 2.922                       | 7.268    | 10.358                   | 1.732     | 22.281  |                                    | $4.533 \times 10^5$    |                             |
| 8.00 TeV | $8.000 \times 10^6$   | 3.001                       | 14.909   | 21.113                   | 3.611     | 42.634  |                                    | $5.809 \times 10^5$    |                             |
| 10.0 TeV | $1.000 \times 10^7$   | 3.027                       | 18.767   | 26.525                   | 4.578     | 52.897  |                                    | $6.229 \times 10^5$    |                             |
| 14.0 TeV | $1.400 \times 10^7$   | 3.066                       | 26.470   | 37.314                   | 6.567     | 73.417  |                                    | $6.868 \times 10^5$    |                             |
| 20.0 TeV | $2.000 \times 10^7$   | 3.108                       | 38.110   | 53.576                   | 9.622     | 104.416 |                                    | $7.550 \times 10^5$    |                             |
| 30.0 TeV | $3.000 \times 10^7$   | 3.157                       | 57.470   | 80.645                   | 14.916    | 156.189 |                                    | $8.328 \times 10^5$    |                             |
| 40.0 TeV | $4.000 \times 10^7$   | 3.193                       | 76.914   | 107.793                  | 20.346    | 208.246 |                                    | $8.881 \times 10^5$    |                             |
| 80.0 TeV | $8.000 \times 10^7$   | 3.280                       | 154.871  | 216.464                  | 43.095    | 417.710 |                                    | $1.021 \times 10^6$    |                             |
| 100. TeV | $1.000 \times 10^8$   | 3.308                       | 193.942  | 270.857                  | 54.873    | 522.981 |                                    | $1.064 \times 10^6$    |                             |