

## Muons in palladium (Pd)

| Z        | A [g/mol]           | $\rho$ [g/cm <sup>3</sup> ] | I [eV]  | $a$                                   | $k = m_s$ | $x_0$    | $x_1$                              | $\bar{C}$ | $\delta_0$ |
|----------|---------------------|-----------------------------|---------|---------------------------------------|-----------|----------|------------------------------------|-----------|------------|
| 46 (Pd)  | 106.42(1)           | 12.020                      | 470.0   | 0.24178                               | 2.7239    | 0.0563   | 3.0555                             | 4.9358    | 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 | $4.704 \times 10^1$ | 4.682                       |         |                                       |           | 4.682    | $1.216 \times 10^0$                |           |            |
| 14.0 MeV | $5.616 \times 10^1$ | 3.702                       |         |                                       |           | 3.702    | $2.186 \times 10^0$                |           |            |
| 20.0 MeV | $6.802 \times 10^1$ | 2.926                       |         |                                       |           | 2.926    | $4.029 \times 10^0$                |           |            |
| 30.0 MeV | $8.509 \times 10^1$ | 2.295                       |         |                                       |           | 2.295    | $7.940 \times 10^0$                |           |            |
| 40.0 MeV | $1.003 \times 10^2$ | 1.972                       |         |                                       |           | 1.972    | $1.267 \times 10^1$                |           |            |
| 80.0 MeV | $1.527 \times 10^2$ | 1.500                       |         |                                       |           | 1.501    | $3.664 \times 10^1$                |           |            |
| 100. MeV | $1.764 \times 10^2$ | 1.417                       |         |                                       |           | 1.417    | $5.039 \times 10^1$                |           |            |
| 140. MeV | $2.218 \times 10^2$ | 1.335                       |         |                                       |           | 1.335    | $7.961 \times 10^1$                |           |            |
| 200. MeV | $2.868 \times 10^2$ | 1.295                       |         |                                       |           | 1.295    | $1.254 \times 10^2$                |           |            |
| 253. MeV | $3.431 \times 10^2$ | 1.289                       |         |                                       |           | 1.289    | <i>Minimum ionization</i>          |           |            |
| 300. MeV | $3.917 \times 10^2$ | 1.292                       | 0.000   |                                       | 0.000     | 1.292    | $2.029 \times 10^2$                |           |            |
| 400. MeV | $4.945 \times 10^2$ | 1.309                       | 0.000   |                                       | 0.000     | 1.310    | $2.798 \times 10^2$                |           |            |
| 800. MeV | $8.995 \times 10^2$ | 1.392                       | 0.001   |                                       | 0.000     | 1.393    | $5.756 \times 10^2$                |           |            |
| 1.00 GeV | $1.101 \times 10^3$ | 1.425                       | 0.001   |                                       | 0.000     | 1.427    | $7.174 \times 10^2$                |           |            |
| 1.40 GeV | $1.502 \times 10^3$ | 1.478                       | 0.002   | 0.000                                 | 0.001     | 1.481    | $9.924 \times 10^2$                |           |            |
| 2.00 GeV | $2.103 \times 10^3$ | 1.535                       | 0.003   | 0.001                                 | 0.001     | 1.540    | $1.389 \times 10^3$                |           |            |
| 3.00 GeV | $3.104 \times 10^3$ | 1.600                       | 0.005   | 0.003                                 | 0.001     | 1.609    | $2.023 \times 10^3$                |           |            |
| 4.00 GeV | $4.104 \times 10^3$ | 1.645                       | 0.007   | 0.005                                 | 0.002     | 1.658    | $2.635 \times 10^3$                |           |            |
| 8.00 GeV | $8.105 \times 10^3$ | 1.746                       | 0.016   | 0.016                                 | 0.003     | 1.782    | $4.953 \times 10^3$                |           |            |
| 10.0 GeV | $1.011 \times 10^4$ | 1.776                       | 0.022   | 0.022                                 | 0.004     | 1.824    | $6.062 \times 10^3$                |           |            |
| 14.0 GeV | $1.411 \times 10^4$ | 1.819                       | 0.033   | 0.036                                 | 0.005     | 1.894    | $8.212 \times 10^3$                |           |            |
| 20.0 GeV | $2.011 \times 10^4$ | 1.862                       | 0.051   | 0.059                                 | 0.008     | 1.981    | $1.131 \times 10^4$                |           |            |
| 30.0 GeV | $3.011 \times 10^4$ | 1.908                       | 0.084   | 0.103                                 | 0.011     | 2.106    | $1.620 \times 10^4$                |           |            |
| 40.0 GeV | $4.011 \times 10^4$ | 1.938                       | 0.118   | 0.150                                 | 0.015     | 2.222    | $2.082 \times 10^4$                |           |            |
| 80.0 GeV | $8.011 \times 10^4$ | 2.005                       | 0.267   | 0.360                                 | 0.029     | 2.662    | $3.724 \times 10^4$                |           |            |
| 100. GeV | $1.001 \times 10^5$ | 2.026                       | 0.345   | 0.473                                 | 0.037     | 2.881    | $4.446 \times 10^4$                |           |            |
| 140. GeV | $1.401 \times 10^5$ | 2.056                       | 0.507   | 0.706                                 | 0.051     | 3.321    | $5.738 \times 10^4$                |           |            |
| 200. GeV | $2.001 \times 10^5$ | 2.087                       | 0.760   | 1.075                                 | 0.072     | 3.995    | $7.384 \times 10^4$                |           |            |
| 218. GeV | $2.178 \times 10^5$ | 2.095                       | 0.835   | 1.182                                 | 0.079     | 4.191    | <i>Muon critical energy</i>        |           |            |
| 300. GeV | $3.001 \times 10^5$ | 2.123                       | 1.192   | 1.692                                 | 0.108     | 5.116    | $9.591 \times 10^4$                |           |            |
| 400. GeV | $4.001 \times 10^5$ | 2.149                       | 1.639   | 2.331                                 | 0.145     | 6.264    | $1.136 \times 10^5$                |           |            |
| 800. GeV | $8.001 \times 10^5$ | 2.211                       | 3.484   | 4.952                                 | 0.292     | 10.940   | $1.613 \times 10^5$                |           |            |
| 1.00 TeV | $1.000 \times 10^6$ | 2.231                       | 4.432   | 6.293                                 | 0.367     | 13.324   | $1.778 \times 10^5$                |           |            |
| 1.40 TeV | $1.400 \times 10^6$ | 2.261                       | 6.333   | 8.969                                 | 0.520     | 18.085   | $2.035 \times 10^5$                |           |            |
| 2.00 TeV | $2.000 \times 10^6$ | 2.294                       | 9.242   | 13.053                                | 0.752     | 25.343   | $2.314 \times 10^5$                |           |            |
| 3.00 TeV | $3.000 \times 10^6$ | 2.332                       | 14.099  | 19.840                                | 1.150     | 37.423   | $2.637 \times 10^5$                |           |            |
| 4.00 TeV | $4.000 \times 10^6$ | 2.359                       | 19.022  | 26.700                                | 1.554     | 49.637   | $2.868 \times 10^5$                |           |            |
| 8.00 TeV | $8.000 \times 10^6$ | 2.427                       | 38.875  | 54.277                                | 3.230     | 98.811   | $3.428 \times 10^5$                |           |            |
| 10.0 TeV | $1.000 \times 10^7$ | 2.449                       | 48.881  | 68.141                                | 4.091     | 123.563  | $3.609 \times 10^5$                |           |            |
| 14.0 TeV | $1.400 \times 10^7$ | 2.482                       | 68.839  | 95.802                                | 5.858     | 172.982  | $3.881 \times 10^5$                |           |            |
| 20.0 TeV | $2.000 \times 10^7$ | 2.518                       | 98.956  | 137.472                               | 8.566     | 247.514  | $4.170 \times 10^5$                |           |            |
| 30.0 TeV | $3.000 \times 10^7$ | 2.560                       | 149.094 | 206.805                               | 13.246    | 371.707  | $4.497 \times 10^5$                |           |            |
| 40.0 TeV | $4.000 \times 10^7$ | 2.591                       | 199.416 | 276.306                               | 18.037    | 496.350  | $4.729 \times 10^5$                |           |            |
| 80.0 TeV | $8.000 \times 10^7$ | 2.665                       | 401.021 | 554.502                               | 38.045    | 996.234  | $5.287 \times 10^5$                |           |            |
| 100. TeV | $1.000 \times 10^8$ | 2.690                       | 502.000 | 693.730                               | 48.380    | 1246.801 | $5.466 \times 10^5$                |           |            |