## Muons in bromine gas ($Br_2$)

| Z | $A$ [g/mol] | $\rho$ [g/cm$^3$] | $I$ [eV] | $a$ | $k = m_s$ | $x_0$ | $x_1$ | $\overline{C}$ | $\delta_0$ |
|---|---|---|---|---|---|---|---|---|---|
| 35 (Br) | 79.904(1) | $7.072 \times 10^{-3}$ | 343.0 | 0.06335 | 3.4670 | 1.5262 | 4.9899 | 11.7307 | 0.00 |

| $T$ | $p$ [MeV/$c$] | Ionization | Brems | Pair prod | Photonucl | Total | CSDA range [g/cm$^2$] |
|---|---|---|---|---|---|---|---|
| | | [MeV cm$^2$/g] | | | | | |
| 10.0 MeV | $4.704 \times 10^1$ | 5.027 | | | | 5.027 | $1.125 \times 10^0$ |
| 14.0 MeV | $5.616 \times 10^1$ | 3.963 | | | | 3.963 | $2.030 \times 10^0$ |
| 20.0 MeV | $6.802 \times 10^1$ | 3.125 | | | | 3.125 | $3.753 \times 10^0$ |
| 30.0 MeV | $8.509 \times 10^1$ | 2.448 | | | | 2.448 | $7.418 \times 10^0$ |
| 40.0 MeV | $1.003 \times 10^2$ | 2.103 | | | | 2.103 | $1.185 \times 10^1$ |
| 80.0 MeV | $1.527 \times 10^2$ | 1.601 | | | | 1.601 | $3.432 \times 10^1$ |
| 100. MeV | $1.764 \times 10^2$ | 1.513 | | | | 1.513 | $4.720 \times 10^1$ |
| 140. MeV | $2.218 \times 10^2$ | 1.429 | | | | 1.429 | $7.453 \times 10^1$ |
| 200. MeV | $2.868 \times 10^2$ | 1.391 | | | | 1.391 | $1.172 \times 10^2$ |
| 232. MeV | $3.210 \times 10^2$ | 1.388 | | | | 1.388 | *Minimum ionization* |
| 300. MeV | $3.917 \times 10^2$ | 1.396 | 0.000 | | 0.000 | 1.396 | $1.892 \times 10^2$ |
| 400. MeV | $4.945 \times 10^2$ | 1.423 | 0.000 | | 0.000 | 1.423 | $2.601 \times 10^2$ |
| 800. MeV | $8.995 \times 10^2$ | 1.537 | 0.001 | | 0.000 | 1.538 | $5.300 \times 10^2$ |
| 1.00 GeV | $1.101 \times 10^3$ | 1.584 | 0.001 | | 0.000 | 1.585 | $6.580 \times 10^2$ |
| 1.40 GeV | $1.502 \times 10^3$ | 1.660 | 0.001 | 0.000 | 0.001 | 1.662 | $9.042 \times 10^2$ |
| 2.00 GeV | $2.103 \times 10^3$ | 1.745 | 0.002 | 0.001 | 0.001 | 1.749 | $1.256 \times 10^3$ |
| 3.00 GeV | $3.104 \times 10^3$ | 1.844 | 0.004 | 0.002 | 0.001 | 1.852 | $1.810 \times 10^3$ |
| 4.00 GeV | $4.104 \times 10^3$ | 1.916 | 0.005 | 0.004 | 0.002 | 1.927 | $2.339 \times 10^3$ |
| 8.00 GeV | $8.105 \times 10^3$ | 2.077 | 0.013 | 0.013 | 0.003 | 2.106 | $4.314 \times 10^3$ |
| 10.0 GeV | $1.011 \times 10^4$ | 2.125 | 0.017 | 0.018 | 0.004 | 2.164 | $5.250 \times 10^3$ |
| 14.0 GeV | $1.411 \times 10^4$ | 2.193 | 0.026 | 0.029 | 0.006 | 2.254 | $7.059 \times 10^3$ |
| 20.0 GeV | $2.011 \times 10^4$ | 2.260 | 0.040 | 0.047 | 0.008 | 2.356 | $9.661 \times 10^3$ |
| 30.0 GeV | $3.011 \times 10^4$ | 2.329 | 0.066 | 0.082 | 0.012 | 2.490 | $1.379 \times 10^4$ |
| 40.0 GeV | $4.011 \times 10^4$ | 2.375 | 0.093 | 0.120 | 0.015 | 2.604 | $1.771 \times 10^4$ |
| 80.0 GeV | $8.011 \times 10^4$ | 2.475 | 0.211 | 0.287 | 0.030 | 3.003 | $3.198 \times 10^4$ |
| 100. GeV | $1.001 \times 10^5$ | 2.504 | 0.273 | 0.377 | 0.037 | 3.192 | $3.844 \times 10^4$ |
| 140. GeV | $1.401 \times 10^5$ | 2.545 | 0.401 | 0.563 | 0.052 | 3.562 | $5.029 \times 10^4$ |
| 200. GeV | $2.001 \times 10^5$ | 2.587 | 0.601 | 0.858 | 0.074 | 4.120 | $6.594 \times 10^4$ |
| 300. GeV | $3.001 \times 10^5$ | 2.632 | 0.943 | 1.351 | 0.111 | 5.037 | $8.786 \times 10^4$ |
| 327. GeV | $3.267 \times 10^5$ | 2.641 | 1.036 | 1.485 | 0.121 | 5.284 | *Muon critical energy* |
| 400. GeV | $4.001 \times 10^5$ | 2.663 | 1.296 | 1.862 | 0.148 | 5.969 | $1.061 \times 10^5$ |
| 800. GeV | $8.001 \times 10^5$ | 2.733 | 2.758 | 3.959 | 0.299 | 9.751 | $1.580 \times 10^5$ |
| 1.00 TeV | $1.000 \times 10^6$ | 2.756 | 3.510 | 5.033 | 0.376 | 11.675 | $1.767 \times 10^5$ |
| 1.40 TeV | $1.400 \times 10^6$ | 2.788 | 5.018 | 7.176 | 0.532 | 15.516 | $2.064 \times 10^5$ |
| 2.00 TeV | $2.000 \times 10^6$ | 2.823 | 7.325 | 10.448 | 0.770 | 21.368 | $2.392 \times 10^5$ |
| 3.00 TeV | $3.000 \times 10^6$ | 2.862 | 11.181 | 15.886 | 1.178 | 31.108 | $2.778 \times 10^5$ |
| 4.00 TeV | $4.000 \times 10^6$ | 2.890 | 15.090 | 21.384 | 1.592 | 40.957 | $3.057 \times 10^5$ |
| 8.00 TeV | $8.000 \times 10^6$ | 2.958 | 30.860 | 43.490 | 3.310 | 80.619 | $3.740 \times 10^5$ |
| 10.0 TeV | $1.000 \times 10^7$ | 2.981 | 38.811 | 54.604 | 4.193 | 100.590 | $3.962 \times 10^5$ |
| 14.0 TeV | $1.400 \times 10^7$ | 3.015 | 54.670 | 76.779 | 6.006 | 140.471 | $4.297 \times 10^5$ |
| 20.0 TeV | $2.000 \times 10^7$ | 3.051 | 78.608 | 110.188 | 8.786 | 200.634 | $4.652 \times 10^5$ |
| 30.0 TeV | $3.000 \times 10^7$ | 3.094 | 118.459 | 165.776 | 13.592 | 300.922 | $5.057 \times 10^5$ |
| 40.0 TeV | $4.000 \times 10^7$ | 3.125 | 158.463 | 221.502 | 18.513 | 401.603 | $5.343 \times 10^5$ |
| 80.0 TeV | $8.000 \times 10^7$ | 3.200 | 318.748 | 444.574 | 39.070 | 805.593 | $6.033 \times 10^5$ |
| 100. TeV | $1.000 \times 10^8$ | 3.225 | 399.040 | 556.220 | 49.690 | 1008.176 | $6.254 \times 10^5$ |