

## Muons in strontium (Sr)

| Z        | A [g/mol]           | $\rho$ [g/cm <sup>3</sup> ] | I [eV]  | $a$                                   | $k = m_s$ | $x_0$    | $x_1$                              | $\bar{C}$ | $\delta_0$ |
|----------|---------------------|-----------------------------|---------|---------------------------------------|-----------|----------|------------------------------------|-----------|------------|
| 38 (Sr)  | 87.62(1)            | 2.540                       | 366.0   | 0.07165                               | 3.4435    | 0.4585   | 3.6778                             | 5.9867    | 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 | $4.704 \times 10^1$ | 4.921                       |         |                                       |           | 4.921    | $1.150 \times 10^0$                |           |            |
| 14.0 MeV | $5.616 \times 10^1$ | 3.881                       |         |                                       |           | 3.882    | $2.074 \times 10^0$                |           |            |
| 20.0 MeV | $6.802 \times 10^1$ | 3.062                       |         |                                       |           | 3.062    | $3.834 \times 10^0$                |           |            |
| 30.0 MeV | $8.509 \times 10^1$ | 2.399                       |         |                                       |           | 2.399    | $7.572 \times 10^0$                |           |            |
| 40.0 MeV | $1.003 \times 10^2$ | 2.062                       |         |                                       |           | 2.062    | $1.210 \times 10^1$                |           |            |
| 80.0 MeV | $1.527 \times 10^2$ | 1.569                       |         |                                       |           | 1.569    | $3.502 \times 10^1$                |           |            |
| 100. MeV | $1.764 \times 10^2$ | 1.482                       |         |                                       |           | 1.482    | $4.816 \times 10^1$                |           |            |
| 140. MeV | $2.218 \times 10^2$ | 1.398                       |         |                                       |           | 1.398    | $7.608 \times 10^1$                |           |            |
| 200. MeV | $2.868 \times 10^2$ | 1.358                       |         |                                       |           | 1.358    | $1.198 \times 10^2$                |           |            |
| 237. MeV | $3.260 \times 10^2$ | 1.353                       |         |                                       |           | 1.354    | <i>Minimum ionization</i>          |           |            |
| 300. MeV | $3.917 \times 10^2$ | 1.359                       | 0.000   |                                       | 0.000     | 1.359    | $1.936 \times 10^2$                |           |            |
| 400. MeV | $4.945 \times 10^2$ | 1.380                       | 0.000   |                                       | 0.000     | 1.381    | $2.666 \times 10^2$                |           |            |
| 800. MeV | $8.995 \times 10^2$ | 1.471                       | 0.001   |                                       | 0.000     | 1.472    | $5.467 \times 10^2$                |           |            |
| 1.00 GeV | $1.101 \times 10^3$ | 1.507                       | 0.001   |                                       | 0.000     | 1.509    | $6.808 \times 10^2$                |           |            |
| 1.40 GeV | $1.502 \times 10^3$ | 1.564                       | 0.001   | 0.000                                 | 0.001     | 1.566    | $9.408 \times 10^2$                |           |            |
| 2.00 GeV | $2.103 \times 10^3$ | 1.624                       | 0.002   | 0.001                                 | 0.001     | 1.629    | $1.316 \times 10^3$                |           |            |
| 3.00 GeV | $3.104 \times 10^3$ | 1.692                       | 0.004   | 0.003                                 | 0.001     | 1.700    | $1.916 \times 10^3$                |           |            |
| 4.00 GeV | $4.104 \times 10^3$ | 1.739                       | 0.006   | 0.004                                 | 0.002     | 1.751    | $2.495 \times 10^3$                |           |            |
| 8.00 GeV | $8.105 \times 10^3$ | 1.844                       | 0.014   | 0.014                                 | 0.003     | 1.875    | $4.694 \times 10^3$                |           |            |
| 10.0 GeV | $1.011 \times 10^4$ | 1.875                       | 0.018   | 0.019                                 | 0.004     | 1.917    | $5.749 \times 10^3$                |           |            |
| 14.0 GeV | $1.411 \times 10^4$ | 1.920                       | 0.028   | 0.031                                 | 0.006     | 1.985    | $7.798 \times 10^3$                |           |            |
| 20.0 GeV | $2.011 \times 10^4$ | 1.965                       | 0.043   | 0.050                                 | 0.008     | 2.066    | $1.076 \times 10^4$                |           |            |
| 30.0 GeV | $3.011 \times 10^4$ | 2.012                       | 0.070   | 0.087                                 | 0.012     | 2.181    | $1.547 \times 10^4$                |           |            |
| 40.0 GeV | $4.011 \times 10^4$ | 2.043                       | 0.099   | 0.128                                 | 0.015     | 2.286    | $1.994 \times 10^4$                |           |            |
| 80.0 GeV | $8.011 \times 10^4$ | 2.113                       | 0.224   | 0.305                                 | 0.030     | 2.673    | $3.609 \times 10^4$                |           |            |
| 100. GeV | $1.001 \times 10^5$ | 2.134                       | 0.291   | 0.401                                 | 0.037     | 2.864    | $4.332 \times 10^4$                |           |            |
| 140. GeV | $1.401 \times 10^5$ | 2.165                       | 0.427   | 0.599                                 | 0.052     | 3.244    | $5.644 \times 10^4$                |           |            |
| 200. GeV | $2.001 \times 10^5$ | 2.198                       | 0.640   | 0.912                                 | 0.073     | 3.824    | $7.346 \times 10^4$                |           |            |
| 265. GeV | $2.651 \times 10^5$ | 2.223                       | 0.875   | 1.250                                 | 0.097     | 4.446    | <i>Muon critical energy</i>        |           |            |
| 300. GeV | $3.001 \times 10^5$ | 2.234                       | 1.004   | 1.436                                 | 0.110     | 4.785    | $9.680 \times 10^4$                |           |            |
| 400. GeV | $4.001 \times 10^5$ | 2.259                       | 1.381   | 1.979                                 | 0.147     | 5.767    | $1.158 \times 10^5$                |           |            |
| 800. GeV | $8.001 \times 10^5$ | 2.321                       | 2.938   | 4.208                                 | 0.297     | 9.765    | $1.685 \times 10^5$                |           |            |
| 1.00 TeV | $1.000 \times 10^6$ | 2.342                       | 3.738   | 5.349                                 | 0.373     | 11.802   | $1.871 \times 10^5$                |           |            |
| 1.40 TeV | $1.400 \times 10^6$ | 2.372                       | 5.343   | 7.626                                 | 0.528     | 15.870   | $2.163 \times 10^5$                |           |            |
| 2.00 TeV | $2.000 \times 10^6$ | 2.405                       | 7.799   | 11.101                                | 0.764     | 22.071   | $2.482 \times 10^5$                |           |            |
| 3.00 TeV | $3.000 \times 10^6$ | 2.443                       | 11.902  | 16.877                                | 1.169     | 32.392   | $2.854 \times 10^5$                |           |            |
| 4.00 TeV | $4.000 \times 10^6$ | 2.471                       | 16.062  | 22.716                                | 1.580     | 42.829   | $3.122 \times 10^5$                |           |            |
| 8.00 TeV | $8.000 \times 10^6$ | 2.538                       | 32.842  | 46.191                                | 3.284     | 84.857   | $3.772 \times 10^5$                |           |            |
| 10.0 TeV | $1.000 \times 10^7$ | 2.560                       | 41.301  | 57.994                                | 4.160     | 106.016  | $3.983 \times 10^5$                |           |            |
| 14.0 TeV | $1.400 \times 10^7$ | 2.594                       | 58.173  | 81.542                                | 5.958     | 148.268  | $4.300 \times 10^5$                |           |            |
| 20.0 TeV | $2.000 \times 10^7$ | 2.630                       | 83.638  | 117.018                               | 8.714     | 212.001  | $4.637 \times 10^5$                |           |            |
| 30.0 TeV | $3.000 \times 10^7$ | 2.672                       | 126.032 | 176.047                               | 13.479    | 318.231  | $5.020 \times 10^5$                |           |            |
| 40.0 TeV | $4.000 \times 10^7$ | 2.702                       | 168.586 | 235.222                               | 18.357    | 424.869  | $5.291 \times 10^5$                |           |            |
| 80.0 TeV | $8.000 \times 10^7$ | 2.777                       | 339.085 | 472.087                               | 38.739    | 852.688  | $5.942 \times 10^5$                |           |            |
| 100. TeV | $1.000 \times 10^8$ | 2.802                       | 424.490 | 590.630                               | 49.270    | 1067.193 | $6.151 \times 10^5$                |           |            |