

## Muons in water (vapor) (H<sub>2</sub>O)

$\langle Z/A \rangle$	$\rho$ [g/cm <sup>3</sup> ]	$I$ [eV]	$a$	$k = m_s$	$x_0$	$x_1$	$\bar{C}$	$\delta_0$
0.55509	$7.562 \times 10^{-4}$	71.6	0.08101	3.5901	1.7952	4.3437	10.5962	0.00
$T$	$p$ [MeV/c]	Ionization	Brems	Pair prod	Photonucl	Total	CSDA range [g/cm <sup>2</sup> ]	
10.0 MeV	$4.704 \times 10^1$	8.013				8.013	$6.895 \times 10^{-1}$	
14.0 MeV	$5.616 \times 10^1$	6.249				6.249	$1.261 \times 10^0$	
20.0 MeV	$6.802 \times 10^1$	4.879				4.879	$2.360 \times 10^0$	
30.0 MeV	$8.509 \times 10^1$	3.784				3.784	$4.720 \times 10^0$	
40.0 MeV	$1.003 \times 10^2$	3.231				3.231	$7.598 \times 10^0$	
80.0 MeV	$1.527 \times 10^2$	2.425				2.425	$2.234 \times 10^1$	
100. MeV	$1.764 \times 10^2$	2.281				2.281	$3.087 \times 10^1$	
140. MeV	$2.218 \times 10^2$	2.139				2.139	$4.907 \times 10^1$	
200. MeV	$2.868 \times 10^2$	2.066				2.066	$7.772 \times 10^1$	
260. MeV	$3.496 \times 10^2$	2.052			0.000	2.052	<i>Minimum ionization</i>	
300. MeV	$3.917 \times 10^2$	2.056			0.000	2.056	$1.264 \times 10^2$	
400. MeV	$4.945 \times 10^2$	2.082			0.000	2.083	$1.747 \times 10^2$	
800. MeV	$8.995 \times 10^2$	2.219	0.000		0.000	2.220	$3.606 \times 10^2$	
1.00 GeV	$1.101 \times 10^3$	2.277	0.000		0.000	2.278	$4.496 \times 10^2$	
1.40 GeV	$1.502 \times 10^3$	2.372	0.000		0.001	2.373	$6.214 \times 10^2$	
2.00 GeV	$2.103 \times 10^3$	2.479	0.001	0.000	0.001	2.480	$8.684 \times 10^2$	
3.00 GeV	$3.104 \times 10^3$	2.604	0.001	0.001	0.001	2.608	$1.261 \times 10^3$	
4.00 GeV	$4.104 \times 10^3$	2.695	0.001	0.001	0.002	2.700	$1.638 \times 10^3$	
8.00 GeV	$8.105 \times 10^3$	2.902	0.004	0.003	0.004	2.913	$3.055 \times 10^3$	
10.0 GeV	$1.011 \times 10^4$	2.958	0.005	0.005	0.005	2.972	$3.735 \times 10^3$	
14.0 GeV	$1.411 \times 10^4$	3.036	0.007	0.008	0.007	3.058	$5.060 \times 10^3$	
20.0 GeV	$2.011 \times 10^4$	3.112	0.011	0.013	0.009	3.146	$6.993 \times 10^3$	
30.0 GeV	$3.011 \times 10^4$	3.190	0.019	0.023	0.013	3.246	$1.012 \times 10^4$	
40.0 GeV	$4.011 \times 10^4$	3.241	0.027	0.034	0.018	3.319	$1.316 \times 10^4$	
80.0 GeV	$8.011 \times 10^4$	3.351	0.060	0.081	0.034	3.527	$2.483 \times 10^4$	
100. GeV	$1.001 \times 10^5$	3.383	0.078	0.107	0.042	3.611	$3.043 \times 10^4$	
140. GeV	$1.401 \times 10^5$	3.429	0.116	0.161	0.059	3.765	$4.128 \times 10^4$	
200. GeV	$2.001 \times 10^5$	3.475	0.174	0.246	0.084	3.979	$5.677 \times 10^4$	
300. GeV	$3.001 \times 10^5$	3.525	0.275	0.391	0.125	4.317	$8.089 \times 10^4$	
400. GeV	$4.001 \times 10^5$	3.560	0.379	0.542	0.167	4.648	$1.032 \times 10^5$	
800. GeV	$8.001 \times 10^5$	3.642	0.814	1.171	0.337	5.963	$1.790 \times 10^5$	
1.00 TeV	$1.000 \times 10^6$	3.668	1.038	1.496	0.423	6.626	$2.108 \times 10^5$	
1.23 TeV	$1.231 \times 10^6$	3.692	1.299	1.868	0.526	7.385	<i>Muon critical energy</i>	
1.40 TeV	$1.400 \times 10^6$	3.707	1.491	2.142	0.601	7.941	$2.659 \times 10^5$	
2.00 TeV	$2.000 \times 10^6$	3.749	2.186	3.132	0.870	9.937	$3.333 \times 10^5$	
3.00 TeV	$3.000 \times 10^6$	3.798	3.352	4.781	1.332	13.263	$4.201 \times 10^5$	
4.00 TeV	$4.000 \times 10^6$	3.833	4.537	6.452	1.803	16.626	$4.873 \times 10^5$	
8.00 TeV	$8.000 \times 10^6$	3.919	9.338	13.185	3.763	30.206	$6.633 \times 10^5$	
10.0 TeV	$1.000 \times 10^7$	3.948	11.766	16.575	4.773	37.063	$7.229 \times 10^5$	
14.0 TeV	$1.400 \times 10^7$	3.991	16.613	23.331	6.854	50.789	$8.148 \times 10^5$	
20.0 TeV	$2.000 \times 10^7$	4.037	23.944	33.521	10.051	71.553	$9.138 \times 10^5$	
30.0 TeV	$3.000 \times 10^7$	4.091	36.151	50.475	15.600	106.318	$1.028 \times 10^6$	
40.0 TeV	$4.000 \times 10^7$	4.130	48.424	67.484	21.296	141.334	$1.109 \times 10^6$	
80.0 TeV	$8.000 \times 10^7$	4.226	97.657	135.575	45.199	282.658	$1.305 \times 10^6$	
100. TeV	$1.000 \times 10^8$	4.257	122.347	169.661	57.590	353.855	$1.369 \times 10^6$	