

## Muons in liquid hydrogen (H<sub>2</sub>)

Z	A [g/mol]	$\rho$ [g/cm <sup>3</sup> ]	I [eV]	$a$	$k = m_s$	$x_0$	$x_1$	$\bar{C}$	$\delta_0$
1 (H)	1.008(7)	$7.080 \times 10^{-2}$	21.8	0.13483	5.6249	0.4400	1.8856	3.0977	0.00
$T$	$p$ [MeV/c]	Ionization	Brems	Pair prod [MeV cm <sup>2</sup> /g]	Photonucl	Total	CSDA range [g/cm <sup>2</sup> ]		
10.0 MeV	$4.704 \times 10^1$	16.508				16.508	$3.316 \times 10^{-1}$		
14.0 MeV	$5.616 \times 10^1$	12.812				12.812	$6.097 \times 10^{-1}$		
20.0 MeV	$6.802 \times 10^1$	9.956				9.956	$1.147 \times 10^0$		
30.0 MeV	$8.509 \times 10^1$	7.684				7.684	$2.307 \times 10^0$		
40.0 MeV	$1.003 \times 10^2$	6.539				6.539	$3.727 \times 10^0$		
80.0 MeV	$1.527 \times 10^2$	4.870				4.870	$1.105 \times 10^1$		
100. MeV	$1.764 \times 10^2$	4.568				4.568	$1.530 \times 10^1$		
140. MeV	$2.218 \times 10^2$	4.267				4.267	$2.440 \times 10^1$		
200. MeV	$2.868 \times 10^2$	4.104			0.000	4.104	$3.879 \times 10^1$		
300. MeV	$3.917 \times 10^2$	4.037			0.000	4.038	$6.342 \times 10^1$		
344. MeV	$4.372 \times 10^2$	4.034			0.000	4.034	<i>Minimum ionization</i>		
400. MeV	$4.945 \times 10^2$	4.038			0.000	4.038	$8.820 \times 10^1$		
800. MeV	$8.995 \times 10^2$	4.134			0.000	4.135	$1.862 \times 10^2$		
1.00 GeV	$1.101 \times 10^3$	4.182			0.001	4.182	$2.342 \times 10^2$		
1.40 GeV	$1.502 \times 10^3$	4.261	0.000		0.001	4.262	$3.289 \times 10^2$		
2.00 GeV	$2.103 \times 10^3$	4.352	0.000		0.001	4.353	$4.682 \times 10^2$		
3.00 GeV	$3.104 \times 10^3$	4.459	0.000	0.000	0.002	4.461	$6.949 \times 10^2$		
4.00 GeV	$4.104 \times 10^3$	4.536	0.001	0.000	0.002	4.539	$9.170 \times 10^2$		
8.00 GeV	$8.105 \times 10^3$	4.719	0.001	0.001	0.005	4.726	$1.779 \times 10^3$		
10.0 GeV	$1.011 \times 10^4$	4.777	0.002	0.002	0.006	4.786	$2.199 \times 10^3$		
14.0 GeV	$1.411 \times 10^4$	4.861	0.003	0.003	0.008	4.876	$3.027 \times 10^3$		
20.0 GeV	$2.011 \times 10^4$	4.948	0.005	0.006	0.011	4.969	$4.245 \times 10^3$		
30.0 GeV	$3.011 \times 10^4$	5.043	0.008	0.010	0.015	5.077	$6.234 \times 10^3$		
40.0 GeV	$4.011 \times 10^4$	5.108	0.012	0.015	0.020	5.155	$8.188 \times 10^3$		
80.0 GeV	$8.011 \times 10^4$	5.258	0.028	0.038	0.038	5.362	$1.578 \times 10^4$		
100. GeV	$1.001 \times 10^5$	5.305	0.037	0.050	0.047	5.439	$1.949 \times 10^4$		
140. GeV	$1.401 \times 10^5$	5.374	0.055	0.076	0.066	5.572	$2.675 \times 10^4$		
200. GeV	$2.001 \times 10^5$	5.447	0.085	0.118	0.093	5.743	$3.735 \times 10^4$		
300. GeV	$3.001 \times 10^5$	5.529	0.137	0.191	0.139	5.996	$5.439 \times 10^4$		
400. GeV	$4.001 \times 10^5$	5.588	0.191	0.268	0.185	6.232	$7.074 \times 10^4$		
800. GeV	$8.001 \times 10^5$	5.730	0.423	0.592	0.373	7.117	$1.307 \times 10^5$		
1.00 TeV	$1.000 \times 10^6$	5.776	0.544	0.761	0.468	7.549	$1.580 \times 10^5$		
1.40 TeV	$1.400 \times 10^6$	5.846	0.791	1.101	0.663	8.402	$2.082 \times 10^5$		
2.00 TeV	$2.000 \times 10^6$	5.921	1.175	1.627	0.961	9.684	$2.747 \times 10^5$		
3.00 TeV	$3.000 \times 10^6$	6.008	1.827	2.504	1.474	11.813	$3.680 \times 10^5$		
3.10 TeV	$3.102 \times 10^6$	6.016	1.894	2.595	1.527	12.032	<i>Muon critical energy</i>		
4.00 TeV	$4.000 \times 10^6$	6.071	2.496	3.399	1.996	13.962	$4.458 \times 10^5$		
8.00 TeV	$8.000 \times 10^6$	6.225	5.240	7.012	4.180	22.658	$6.686 \times 10^5$		
10.0 TeV	$1.000 \times 10^7$	6.276	6.642	8.837	5.308	27.063	$7.493 \times 10^5$		
14.0 TeV	$1.400 \times 10^7$	6.353	9.452	12.466	7.642	35.913	$8.772 \times 10^5$		
20.0 TeV	$2.000 \times 10^7$	6.436	13.734	17.952	11.236	49.358	$1.019 \times 10^6$		
30.0 TeV	$3.000 \times 10^7$	6.532	20.884	27.062	17.498	71.976	$1.186 \times 10^6$		
40.0 TeV	$4.000 \times 10^7$	6.602	28.113	36.210	23.940	94.863	$1.307 \times 10^6$		
80.0 TeV	$8.000 \times 10^7$	6.773	57.248	72.833	51.135	187.988	$1.601 \times 10^6$		
100. TeV	$1.000 \times 10^8$	6.829	71.920	91.170	65.290	235.209	$1.696 \times 10^6$		