

## Muons in hydrogen gas (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)	$8.376 \times 10^{-5}$	19.2	0.14092	5.7273	1.8639	3.2718	9.5834	0.00

  

T	p	Ionization	Brems	Pair prod	Photonucl	Total	CSDA range
	[MeV/c]			[MeV cm <sup>2</sup> /g]			[g/cm <sup>2</sup> ]
10.0 MeV	$4.704 \times 10^1$	16.742				16.743	$3.267 \times 10^{-1}$
14.0 MeV	$5.616 \times 10^1$	12.988				12.988	$6.009 \times 10^{-1}$
20.0 MeV	$6.802 \times 10^1$	10.089				10.089	$1.131 \times 10^0$
30.0 MeV	$8.509 \times 10^1$	7.783				7.783	$2.276 \times 10^0$
40.0 MeV	$1.003 \times 10^2$	6.621				6.621	$3.678 \times 10^0$
80.0 MeV	$1.527 \times 10^2$	4.927				4.927	$1.091 \times 10^1$
100. MeV	$1.764 \times 10^2$	4.621				4.621	$1.511 \times 10^1$
140. MeV	$2.218 \times 10^2$	4.314				4.314	$2.411 \times 10^1$
200. MeV	$2.868 \times 10^2$	4.148			0.000	4.148	$3.835 \times 10^1$
282. MeV	$3.733 \times 10^2$	4.103			0.000	4.103	<i>Minimum ionization</i>
300. MeV	$3.917 \times 10^2$	4.104			0.000	4.105	$6.266 \times 10^1$
400. MeV	$4.945 \times 10^2$	4.141			0.000	4.141	$8.693 \times 10^1$
800. MeV	$8.995 \times 10^2$	4.373			0.000	4.373	$1.809 \times 10^2$
1.00 GeV	$1.101 \times 10^3$	4.474			0.001	4.475	$2.261 \times 10^2$
1.40 GeV	$1.502 \times 10^3$	4.642	0.000		0.001	4.643	$3.138 \times 10^2$
2.00 GeV	$2.103 \times 10^3$	4.832	0.000		0.001	4.833	$4.403 \times 10^2$
3.00 GeV	$3.104 \times 10^3$	5.056	0.000	0.000	0.002	5.059	$6.422 \times 10^2$
4.00 GeV	$4.104 \times 10^3$	5.218	0.001	0.000	0.002	5.221	$8.367 \times 10^2$
8.00 GeV	$8.105 \times 10^3$	5.606	0.001	0.001	0.005	5.614	$1.572 \times 10^3$
10.0 GeV	$1.011 \times 10^4$	5.711	0.002	0.002	0.006	5.720	$1.925 \times 10^3$
14.0 GeV	$1.411 \times 10^4$	5.841	0.003	0.003	0.008	5.855	$2.615 \times 10^3$
20.0 GeV	$2.011 \times 10^4$	5.955	0.005	0.006	0.011	5.976	$3.629 \times 10^3$
30.0 GeV	$3.011 \times 10^4$	6.063	0.008	0.010	0.015	6.097	$5.284 \times 10^3$
40.0 GeV	$4.011 \times 10^4$	6.132	0.012	0.015	0.020	6.179	$6.913 \times 10^3$
80.0 GeV	$8.011 \times 10^4$	6.285	0.028	0.038	0.038	6.389	$1.327 \times 10^4$
100. GeV	$1.001 \times 10^5$	6.331	0.037	0.050	0.047	6.466	$1.638 \times 10^4$
140. GeV	$1.401 \times 10^5$	6.401	0.055	0.076	0.066	6.598	$2.250 \times 10^4$
200. GeV	$2.001 \times 10^5$	6.473	0.085	0.118	0.093	6.770	$3.148 \times 10^4$
300. GeV	$3.001 \times 10^5$	6.556	0.137	0.191	0.139	7.023	$4.597 \times 10^4$
400. GeV	$4.001 \times 10^5$	6.614	0.191	0.268	0.185	7.258	$5.998 \times 10^4$
800. GeV	$8.001 \times 10^5$	6.756	0.423	0.592	0.373	8.144	$1.119 \times 10^5$
1.00 TeV	$1.000 \times 10^6$	6.802	0.544	0.761	0.468	8.576	$1.359 \times 10^5$
1.40 TeV	$1.400 \times 10^6$	6.873	0.791	1.101	0.663	9.429	$1.803 \times 10^5$
2.00 TeV	$2.000 \times 10^6$	6.948	1.175	1.627	0.961	10.711	$2.400 \times 10^5$
3.00 TeV	$3.000 \times 10^6$	7.035	1.827	2.504	1.474	12.840	$3.252 \times 10^5$
3.61 TeV	$3.611 \times 10^6$	7.075	2.234	3.049	1.792	14.151	<i>Muon critical energy</i>
4.00 TeV	$4.000 \times 10^6$	7.098	2.496	3.399	1.996	14.989	$3.972 \times 10^5$
8.00 TeV	$8.000 \times 10^6$	7.252	5.240	7.012	4.180	23.684	$6.078 \times 10^5$
10.0 TeV	$1.000 \times 10^7$	7.302	6.642	8.837	5.308	28.089	$6.852 \times 10^5$
14.0 TeV	$1.400 \times 10^7$	7.379	9.452	12.466	7.642	36.939	$8.090 \times 10^5$
20.0 TeV	$2.000 \times 10^7$	7.463	13.734	17.952	11.236	50.385	$9.476 \times 10^5$
30.0 TeV	$3.000 \times 10^7$	7.559	20.884	27.062	17.498	73.003	$1.112 \times 10^6$
40.0 TeV	$4.000 \times 10^7$	7.628	28.113	36.210	23.940	95.890	$1.231 \times 10^6$
80.0 TeV	$8.000 \times 10^7$	7.799	57.248	72.833	51.135	189.015	$1.523 \times 10^6$
100. TeV	$1.000 \times 10^8$	7.855	71.920	91.170	65.290	236.236	$1.617 \times 10^6$