

## Muons in methane (CH<sub>4</sub>)

$\langle Z/A \rangle$	$\rho$ [g/cm <sup>3</sup> ]	$I$ [eV]	$a$	$k = m_s$	$x_0$	$x_1$	$\bar{C}$	$\delta_0$
0.62334	$6.672 \times 10^{-4}$	41.7	0.09253	3.6257	1.6263	3.9716	9.5243	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	$4.704 \times 10^1$	9.623				9.623	$5.714 \times 10^{-1}$	
14.0 MeV	$5.616 \times 10^1$	7.487				7.487	$1.048 \times 10^0$	
20.0 MeV	$6.802 \times 10^1$	5.832				5.832	$1.966 \times 10^0$	
30.0 MeV	$8.509 \times 10^1$	4.513				4.513	$3.943 \times 10^0$	
40.0 MeV	$1.003 \times 10^2$	3.847				3.847	$6.359 \times 10^0$	
80.0 MeV	$1.527 \times 10^2$	2.876				2.876	$1.877 \times 10^1$	
100. MeV	$1.764 \times 10^2$	2.702				2.702	$2.597 \times 10^1$	
140. MeV	$2.218 \times 10^2$	2.528				2.529	$4.134 \times 10^1$	
200. MeV	$2.868 \times 10^2$	2.438				2.438	$6.560 \times 10^1$	
270. MeV	$3.608 \times 10^2$	2.417			0.000	2.417	<i>Minimum ionization</i>	
300. MeV	$3.917 \times 10^2$	2.420			0.000	2.420	$1.069 \times 10^2$	
400. MeV	$4.945 \times 10^2$	2.446			0.000	2.447	$1.480 \times 10^2$	
800. MeV	$8.995 \times 10^2$	2.597	0.000		0.000	2.597	$3.066 \times 10^2$	
1.00 GeV	$1.101 \times 10^3$	2.661	0.000		0.000	2.662	$3.826 \times 10^2$	
1.40 GeV	$1.502 \times 10^3$	2.767	0.000		0.001	2.768	$5.299 \times 10^2$	
2.00 GeV	$2.103 \times 10^3$	2.887	0.000	0.000	0.001	2.889	$7.418 \times 10^2$	
3.00 GeV	$3.104 \times 10^3$	3.028	0.001	0.000	0.002	3.031	$1.079 \times 10^3$	
4.00 GeV	$4.104 \times 10^3$	3.130	0.001	0.001	0.002	3.134	$1.403 \times 10^3$	
8.00 GeV	$8.105 \times 10^3$	3.328	0.003	0.002	0.004	3.338	$2.634 \times 10^3$	
10.0 GeV	$1.011 \times 10^4$	3.385	0.003	0.003	0.005	3.397	$3.228 \times 10^3$	
14.0 GeV	$1.411 \times 10^4$	3.464	0.005	0.006	0.007	3.482	$4.390 \times 10^3$	
20.0 GeV	$2.011 \times 10^4$	3.540	0.008	0.010	0.010	3.568	$6.091 \times 10^3$	
30.0 GeV	$3.011 \times 10^4$	3.619	0.014	0.017	0.014	3.664	$8.854 \times 10^3$	
40.0 GeV	$4.011 \times 10^4$	3.671	0.020	0.025	0.018	3.734	$1.156 \times 10^4$	
80.0 GeV	$8.011 \times 10^4$	3.782	0.045	0.060	0.035	3.923	$2.199 \times 10^4$	
100. GeV	$1.001 \times 10^5$	3.815	0.058	0.079	0.044	3.997	$2.704 \times 10^4$	
140. GeV	$1.401 \times 10^5$	3.862	0.086	0.120	0.061	4.129	$3.688 \times 10^4$	
200. GeV	$2.001 \times 10^5$	3.911	0.130	0.184	0.086	4.311	$5.110 \times 10^4$	
300. GeV	$3.001 \times 10^5$	3.964	0.206	0.293	0.129	4.592	$7.357 \times 10^4$	
400. GeV	$4.001 \times 10^5$	4.001	0.285	0.407	0.172	4.865	$9.472 \times 10^4$	
800. GeV	$8.001 \times 10^5$	4.091	0.616	0.883	0.346	5.936	$1.690 \times 10^5$	
1.00 TeV	$1.000 \times 10^6$	4.120	0.787	1.130	0.435	6.473	$2.013 \times 10^5$	
1.40 TeV	$1.400 \times 10^6$	4.164	1.133	1.622	0.617	7.537	$2.585 \times 10^5$	
1.72 TeV	$1.716 \times 10^6$	4.191	1.411	2.017	0.762	8.382	<i>Muon critical energy</i>	
2.00 TeV	$2.000 \times 10^6$	4.211	1.665	2.378	0.894	9.148	$3.306 \times 10^5$	
3.00 TeV	$3.000 \times 10^6$	4.266	2.560	3.636	1.370	11.832	$4.265 \times 10^5$	
4.00 TeV	$4.000 \times 10^6$	4.305	3.472	4.914	1.855	14.546	$5.026 \times 10^5$	
8.00 TeV	$8.000 \times 10^6$	4.402	7.172	10.064	3.875	25.513	$7.076 \times 10^5$	
10.0 TeV	$1.000 \times 10^7$	4.434	9.048	12.659	4.916	31.057	$7.786 \times 10^5$	
14.0 TeV	$1.400 \times 10^7$	4.482	12.792	17.828	7.065	42.168	$8.887 \times 10^5$	
20.0 TeV	$2.000 \times 10^7$	4.535	18.464	25.629	10.368	58.996	$1.008 \times 10^6$	
30.0 TeV	$3.000 \times 10^7$	4.595	27.914	38.604	16.107	87.219	$1.147 \times 10^6$	
40.0 TeV	$4.000 \times 10^7$	4.639	37.423	51.623	22.001	115.686	$1.246 \times 10^6$	
80.0 TeV	$8.000 \times 10^7$	4.746	75.570	103.746	46.779	230.841	$1.486 \times 10^6$	
100. TeV	$1.000 \times 10^8$	4.781	94.703	129.840	59.637	288.962	$1.564 \times 10^6$	