Table 106: Muons in Aluminum oxide (Sapphire, Al_2O_3)

$\langle Z/A\rangle$	ρ [g/cm^3]	I [eV]	a	$k = m_s$	x_0	x_1	$\overline{C}$	δ_0
0.49038	3.970	145.2	0.08500	3.5458	0.0402	2.8665	3.5682	0.00

T	p [MeV/c]	Ionization	Brems	Pair prod [MeV cm^2/g]	Photonucl	Total	CSDA range [g/cm^2]
10.0 MeV	4.704×10^1	6.435				6.435	8.647×10^{-1}
14.0 MeV	5.616×10^1	5.037				5.037	1.575×10^0
20.0 MeV	6.802×10^1	3.947				3.947	2.935×10^0
30.0 MeV	8.509×10^1	3.073				3.073	5.847×10^0
40.0 MeV	1.003×10^2	2.630				2.630	9.387×10^0
80.0 MeV	1.527×10^2	1.977				1.977	2.747×10^1
100. MeV	1.764×10^2	1.857				1.857	3.794×10^1
140. MeV	2.218×10^2	1.736				1.736	6.032×10^1
200. MeV	2.868×10^2	1.669				1.669	9.570×10^1
297. MeV	3.884×10^2	1.647			0.000	1.648	*Minimum ionization*
300. MeV	3.917×10^2	1.647			0.000	1.648	1.562×10^2
400. MeV	4.945×10^2	1.657			0.000	1.658	2.167×10^2
800. MeV	8.995×10^2	1.730	0.000		0.000	1.731	4.529×10^2
1.00 GeV	1.101×10^3	1.762	0.000		0.000	1.763	5.673×10^2
1.40 GeV	1.502×10^3	1.813	0.000	0.000	0.001	1.815	7.908×10^2
2.00 GeV	2.103×10^3	1.869	0.001	0.000	0.001	1.871	1.116×10^3
3.00 GeV	3.104×10^3	1.932	0.001	0.001	0.001	1.936	1.641×10^3
4.00 GeV	4.104×10^3	1.976	0.002	0.002	0.002	1.982	2.151×10^3
8.00 GeV	8.105×10^3	2.076	0.005	0.005	0.004	2.090	4.110×10^3
10.0 GeV	1.011×10^4	2.107	0.006	0.007	0.005	2.125	5.059×10^3
14.0 GeV	1.411×10^4	2.151	0.010	0.011	0.006	2.178	6.917×10^3
20.0 GeV	2.011×10^4	2.195	0.015	0.018	0.009	2.237	9.634×10^3
30.0 GeV	3.011×10^4	2.242	0.025	0.031	0.013	2.312	1.403×10^4
40.0 GeV	4.011×10^4	2.275	0.036	0.045	0.017	2.373	1.830×10^4
80.0 GeV	8.011×10^4	2.349	0.080	0.109	0.033	2.572	3.446×10^4
100. GeV	1.001×10^5	2.372	0.104	0.143	0.041	2.661	4.211×10^4
140. GeV	1.401×10^5	2.406	0.154	0.214	0.057	2.832	5.667×10^4
200. GeV	2.001×10^5	2.442	0.231	0.327	0.081	3.082	7.698×10^4
300. GeV	3.001×10^5	2.483	0.364	0.519	0.121	3.487	1.075×10^5
400. GeV	4.001×10^5	2.512	0.501	0.718	0.162	3.893	1.346×10^5
705. GeV	7.056×10^5	2.569	0.935	1.347	0.288	5.139	*Muon critical energy*
800. GeV	8.001×10^5	2.582	1.072	1.545	0.327	5.526	2.204×10^5
1.00 TeV	1.000×10^6	2.605	1.366	1.971	0.411	6.354	2.541×10^5
1.40 TeV	1.400×10^6	2.639	1.958	2.819	0.583	8.000	3.101×10^5
2.00 TeV	2.000×10^6	2.677	2.866	4.116	0.844	10.503	3.754×10^5
3.00 TeV	3.000×10^6	2.720	4.386	6.274	1.293	14.673	4.556×10^5
4.00 TeV	4.000×10^6	2.751	5.931	8.459	1.749	18.890	5.155×10^5
8.00 TeV	8.000×10^6	2.827	12.175	17.256	3.647	35.906	6.666×10^5
10.0 TeV	1.000×10^7	2.852	15.329	21.685	4.624	44.489	7.165×10^5
14.0 TeV	1.400×10^7	2.890	21.624	30.510	6.635	61.660	7.926×10^5
20.0 TeV	2.000×10^7	2.931	31.141	43.817	9.722	87.611	8.738×10^5
30.0 TeV	3.000×10^7	2.979	46.972	65.963	15.075	130.989	9.665×10^5
40.0 TeV	4.000×10^7	3.013	62.875	88.176	20.566	174.631	1.032×10^6
80.0 TeV	8.000×10^7	3.097	126.647	177.102	43.574	350.421	1.191×10^6
100. TeV	1.000×10^8	3.125	158.613	221.615	55.487	438.841	1.242×10^6