

## Muons in liquid oxygen (O<sub>2</sub>)

Z	A [g/mol]	$\rho$ [g/cm <sup>3</sup> ]	I [eV]	$a$	$k = m_s$	$x_0$	$x_1$	$\bar{C}$	$\delta_0$
8 (O)	15.9994 (3)	1.141	95.0	0.52231	3.0000	0.2868	2.0000	3.9471	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	$4.704 \times 10^1$	6.951				6.951	$7.977 \times 10^{-1}$		
14.0 MeV	$5.616 \times 10^1$	5.429				5.430	$1.456 \times 10^0$		
20.0 MeV	$6.802 \times 10^1$	4.246				4.246	$2.720 \times 10^0$		
30.0 MeV	$8.509 \times 10^1$	3.298				3.298	$5.429 \times 10^0$		
40.0 MeV	$1.003 \times 10^2$	2.818				2.819	$8.731 \times 10^0$		
80.0 MeV	$1.527 \times 10^2$	2.120				2.120	$2.561 \times 10^1$		
100. MeV	$1.764 \times 10^2$	1.995				1.995	$3.536 \times 10^1$		
140. MeV	$2.218 \times 10^2$	1.873				1.873	$5.615 \times 10^1$		
200. MeV	$2.868 \times 10^2$	1.807				1.807	$8.888 \times 10^1$		
287. MeV	$3.779 \times 10^2$	1.788			0.000	1.788	<i>Minimum ionization</i>		
300. MeV	$3.917 \times 10^2$	1.788			0.000	1.789	$1.447 \times 10^2$		
400. MeV	$4.945 \times 10^2$	1.801			0.000	1.801	$2.004 \times 10^2$		
800. MeV	$8.995 \times 10^2$	1.879	0.000		0.000	1.880	$4.177 \times 10^2$		
1.00 GeV	$1.101 \times 10^3$	1.912	0.000		0.000	1.912	$5.232 \times 10^2$		
1.40 GeV	$1.502 \times 10^3$	1.963	0.000	0.000	0.001	1.965	$7.294 \times 10^2$		
2.00 GeV	$2.103 \times 10^3$	2.019	0.001	0.000	0.001	2.021	$1.030 \times 10^3$		
3.00 GeV	$3.104 \times 10^3$	2.080	0.001	0.001	0.001	2.084	$1.517 \times 10^3$		
4.00 GeV	$4.104 \times 10^3$	2.122	0.002	0.001	0.002	2.127	$1.992 \times 10^3$		
8.00 GeV	$8.105 \times 10^3$	2.218	0.004	0.004	0.004	2.229	$3.824 \times 10^3$		
10.0 GeV	$1.011 \times 10^4$	2.247	0.005	0.005	0.005	2.262	$4.714 \times 10^3$		
14.0 GeV	$1.411 \times 10^4$	2.289	0.008	0.008	0.006	2.312	$6.462 \times 10^3$		
20.0 GeV	$2.011 \times 10^4$	2.333	0.012	0.014	0.009	2.369	$9.024 \times 10^3$		
30.0 GeV	$3.011 \times 10^4$	2.381	0.020	0.024	0.013	2.439	$1.318 \times 10^4$		
40.0 GeV	$4.011 \times 10^4$	2.414	0.028	0.036	0.017	2.495	$1.723 \times 10^4$		
80.0 GeV	$8.011 \times 10^4$	2.489	0.064	0.087	0.034	2.674	$3.269 \times 10^4$		
100. GeV	$1.001 \times 10^5$	2.513	0.084	0.114	0.042	2.753	$4.006 \times 10^4$		
140. GeV	$1.401 \times 10^5$	2.548	0.123	0.171	0.058	2.901	$5.421 \times 10^4$		
200. GeV	$2.001 \times 10^5$	2.584	0.185	0.262	0.082	3.115	$7.417 \times 10^4$		
300. GeV	$3.001 \times 10^5$	2.626	0.292	0.416	0.123	3.458	$1.046 \times 10^5$		
400. GeV	$4.001 \times 10^5$	2.655	0.403	0.577	0.165	3.800	$1.322 \times 10^5$		
800. GeV	$8.001 \times 10^5$	2.727	0.863	1.244	0.333	5.166	$2.221 \times 10^5$		
890. GeV	$8.900 \times 10^5$	2.738	0.969	1.398	0.371	5.476	<i>Muon critical energy</i>		
1.00 TeV	$1.000 \times 10^6$	2.750	1.101	1.588	0.418	5.857	$2.585 \times 10^5$		
1.40 TeV	$1.400 \times 10^6$	2.786	1.579	2.273	0.593	7.230	$3.198 \times 10^5$		
2.00 TeV	$2.000 \times 10^6$	2.824	2.313	3.322	0.858	9.317	$3.928 \times 10^5$		
3.00 TeV	$3.000 \times 10^6$	2.867	3.544	5.068	1.314	12.793	$4.840 \times 10^5$		
4.00 TeV	$4.000 \times 10^6$	2.899	4.794	6.837	1.779	16.309	$5.531 \times 10^5$		
8.00 TeV	$8.000 \times 10^6$	2.977	9.855	13.962	3.711	30.505	$7.296 \times 10^5$		
10.0 TeV	$1.000 \times 10^7$	3.002	12.412	17.550	4.706	37.670	$7.885 \times 10^5$		
14.0 TeV	$1.400 \times 10^7$	3.041	17.515	24.700	6.755	52.011	$8.785 \times 10^5$		
20.0 TeV	$2.000 \times 10^7$	3.083	25.230	35.482	9.902	73.697	$9.749 \times 10^5$		
30.0 TeV	$3.000 \times 10^7$	3.131	38.075	53.425	15.361	109.993	$1.085 \times 10^6$		
40.0 TeV	$4.000 \times 10^7$	3.166	50.983	71.424	20.963	146.537	$1.164 \times 10^6$		
80.0 TeV	$8.000 \times 10^7$	3.253	102.749	143.480	44.451	293.933	$1.353 \times 10^6$		
100. TeV	$1.000 \times 10^8$	3.281	128.700	179.550	56.620	368.151	$1.413 \times 10^6$		