

Time (min)	L	B/B ₀	>53MeV	>54MeV	>56MeV	>57MeV	>58MeV	>59MeV	>61MeV	>62MeV	>63MeV	>64MeV	>66MeV	>67MeV	>68MeV	>69MeV	>71MeV	>72MeV	>73MeV	TOTALS	
5	1.44168	2.14962	2.090E+02 (0.04726rad, 0.00284rad)	2.075E+02 (0.04781rad, 0.00287rad)	2.047E+02 (0.04891rad, 0.00293rad)	2.03E+02 (0.04942rad, 0.00296rad)	2.018E+02 (0.04994rad, 0.00300rad)	2.004E+02 (0.05045rad, 0.00303rad)	1.975E+02 (0.05140rad, 0.00308rad)	1.960E+02 (0.05185rad, 0.00311rad)	1.946E+02 (0.05231rad, 0.00314rad)	1.931E+02 (0.05273rad, 0.00316rad)	1.902E+02 (0.05356rad, 0.00321rad)	1.888E+02 (0.05397rad, 0.00324rad)	1.873E+02 (0.05434rad, 0.00326rad)	1.859E+02 (0.05473rad, 0.00328rad)	1.831E+02 (0.05547rad, 0.00333rad)	1.818E+02 (0.05585rad, 0.00335rad)	1.804E+02 (0.05619rad, 0.00337rad)	0.88619rad, 0.05316rad	
6	1.51254	2.50334	3.236E+02 (0.07318rad, 0.00439rad)	3.207E+02 (0.07389rad, 0.00443rad)	3.150E+02 (0.07526rad, 0.00452rad)	3.121E+02 (0.07590rad, 0.00455rad)	3.094E+02 (0.07657rad, 0.00459rad)	3.066E+02 (0.07718rad, 0.00463rad)	3.008E+02 (0.07829rad, 0.00470rad)	2.978E+02 (0.07878rad, 0.00473rad)	2.948E+02 (0.07924rad, 0.00475rad)	2.918E+02 (0.07968rad, 0.00478rad)	2.859E+02 (0.08051rad, 0.00483rad)	2.830E+02 (0.08090rad, 0.00485rad)	2.802E+02 (0.08130rad, 0.00488rad)	2.774E+02 (0.08167rad, 0.00490rad)	2.718E+02 (0.08234rad, 0.00494rad)	2.691E+02 (0.08267rad, 0.00496rad)	2.664E+02 (0.08297rad, 0.00498rad)	1.26443rad, 0.07566rad	
7	1.62236	2.90373	6.127E+02 (0.13855rad, 0.00831rad)	6.048E+02 (0.13935rad, 0.00836rad)	5.817E+02 (0.13899rad, 0.00834rad)	5.742E+02 (0.13965rad, 0.00838rad)	5.742E+02 (0.14210rad, 0.00853rad)	5.667E+02 (0.14266rad, 0.00856rad)	5.513E+02 (0.14349rad, 0.00861rad)	5.433E+02 (0.14372rad, 0.00862rad)	5.353E+02 (0.14389rad, 0.00863rad)	5.275E+02 (0.14404rad, 0.00864rad)	5.123E+02 (0.14426rad, 0.00866rad)	5.048E+02 (0.14431rad, 0.00866rad)	4.975E+02 (0.14434rad, 0.00866rad)	4.903E+02 (0.14434rad, 0.00866rad)	4.761E+02 (0.14423rad, 0.00865rad)	4.761E+02 (0.14626rad, 0.00878rad)	4.623E+02 (0.14399rad, 0.00864rad)	2.28902rad, 0.14559rad	
8	1.73976	3.34539	4.479E+02 (0.10129rad, 0.00608rad)	4.385E+02 (0.10103rad, 0.00606rad)	4.204E+02 (0.10045rad, 0.00603rad)	4.116E+02 (0.10010rad, 0.00601rad)	4.030E+02 (0.09973rad, 0.00598rad)	3.946E+02 (0.09933rad, 0.00596rad)	3.777E+02 (0.09830rad, 0.00590rad)	3.692E+02 (0.09767rad, 0.00586rad)	3.609E+02 (0.09701rad, 0.00582rad)	3.528E+02 (0.09634rad, 0.00578rad)	3.371E+02 (0.09493rad, 0.00570rad)	3.295E+02 (0.09419rad, 0.00565rad)	3.221E+02 (0.09345rad, 0.00561rad)	3.149E+02 (0.09271rad, 0.00557rad)	3.009E+02 (0.09115rad, 0.00547rad)	2.941E+02 (0.09035rad, 0.00542rad)	2.875E+02 (0.08955rad, 0.00537rad)	1.53629rad, 0.09826rad	
9	1.86325	3.82043	2.750E+02 (0.06219rad, 0.00373rad)	2.671E+02 (0.06154rad, 0.00369rad)	2.520E+02 (0.06021rad, 0.00361rad)	2.448E+02 (0.05954rad, 0.00357rad)	2.378E+02 (0.05885rad, 0.00353rad)	2.310E+02 (0.05815rad, 0.00349rad)	2.181E+02 (0.05676rad, 0.00341rad)	2.120E+02 (0.05608rad, 0.00336rad)	2.061E+02 (0.05540rad, 0.00332rad)	2.004E+02 (0.05472rad, 0.00328rad)	1.893E+02 (0.05331rad, 0.00320rad)	1.841E+02 (0.05263rad, 0.00316rad)	1.789E+02 (0.05190rad, 0.00311rad)	1.740E+02 (0.05123rad, 0.00307rad)	1.644E+02 (0.04980rad, 0.00295rad)	1.598E+02 (0.04909rad, 0.00295rad)	1.554E+02 (0.04840rad, 0.00290rad)	0.93980rad, 0.05637rad	
10	1.99131	4.31882	1.774E+02 (0.04012rad, 0.00241rad)	1.711E+02 (0.03942rad, 0.00237rad)	1.593E+02 (0.03806rad, 0.00228rad)	1.593E+02 (0.03874rad, 0.00232rad)	1.483E+02 (0.03670rad, 0.00220rad)	1.431E+02 (0.03602rad, 0.00216rad)	1.338E+02 (0.03482rad, 0.00209rad)	1.297E+02 (0.03431rad, 0.00206rad)	1.257E+02 (0.03379rad, 0.00203rad)	1.219E+02 (0.03329rad, 0.00200rad)	1.145E+02 (0.03224rad, 0.00193rad)	1.110E+02 (0.03173rad, 0.00190rad)	1.076E+02 (0.03122rad, 0.00187rad)	1.043E+02 (0.03071rad, 0.00184rad)	9.804E+01 (0.02970rad, 0.00178rad)	9.503E+01 (0.02919rad, 0.00175rad)	9.212E+01 (0.02869rad, 0.00172rad)	0.57875rad, 0.03471rad	
11	2.12248	4.82912	7.323E+01 (0.01656rad, 0.00099rad)	7.037E+01 (0.01621rad, 0.00097rad)	6.498E+01 (0.01553rad, 0.00093rad)	6.244E+01 (0.01519rad, 0.00091rad)	6.000E+01 (0.01485rad, 0.00089rad)	5.766E+01 (0.01451rad, 0.00087rad)	5.347E+01 (0.01392rad, 0.00083rad)	5.160E+01 (0.01365rad, 0.00082rad)	4.980E+01 (0.01339rad, 0.00080rad)	4.806E+01 (0.01312rad, 0.00079rad)	4.476E+01 (0.01260rad, 0.00076rad)	4.320E+01 (0.01235rad, 0.00074rad)	4.169E+01 (0.01210rad, 0.00073rad)	4.023E+01 (0.01184rad, 0.00071rad)	3.747E+01 (0.01135rad, 0.00068rad)	3.616E+01 (0.01111rad, 0.00067rad)	3.490E+01 (0.01087rad, 0.00065rad)	0.22915rad, 0.01374rad	
12	2.25532	5.33932	2.970E+01 (0.00673rad, 0.00040rad)	2.824E+01 (0.00651rad, 0.00039rad)	2.552E+01 (0.00610rad, 0.00037rad)	2.426E+01 (0.00590rad, 0.00035rad)	2.306E+01 (0.00571rad, 0.00034rad)	2.192E+01 (0.00552rad, 0.00033rad)	1.999E+01 (0.00520rad, 0.00031rad)	1.918E+02 (0.00507rad, 0.00030rad)	1.840E+01 (0.00495rad, 0.00030rad)	1.765E+01 (0.00482rad, 0.00029rad)	1.624E+01 (0.00457rad, 0.00027rad)	1.558E+01 (0.00445rad, 0.00027rad)	1.494E+01 (0.00433rad, 0.00026rad)	1.433E+01 (0.00422rad, 0.00025rad)	1.319E+01 (0.00400rad, 0.00024rad)	1.265E+01 (0.00389rad, 0.00023rad)	1.214E+01 (0.00378rad, 0.00023rad)	0.08575rad, 0.00481rad	
13	2.38857	5.83768	1.310E+01 (0.00296rad, 0.00018rad)	1.236E+01 (0.00285rad, 0.00017rad)	1.100E+01 (0.00263rad, 0.00016rad)	1.038E+01 (0.00252rad, 0.00015rad)	9.789E+00 (0.00242rad, 0.00014rad)	9.235E+00 (0.00232rad, 0.00014rad)	8.306E+00 (0.00216rad, 0.00013rad)	7.918E+00 (0.00209rad, 0.00013rad)	7.459E+00 (0.00200rad, 0.00012rad)	7.197E+00 (0.00197rad, 0.00012rad)	6.541E+00 (0.00184rad, 0.00011rad)	6.236E+00 (0.00178rad, 0.00011rad)	5.945E+00 (0.00172rad, 0.00010rad)	5.668E+00 (0.00167rad, 0.00010rad)	5.152E+00 (0.00156rad, 0.00009rad)	4.912E+00 (0.00151rad, 0.00009rad)	4.683E+00 (0.00146rad, 0.00009rad)	0.03546rad, 0.00204rad	
14	2.52112	6.31360	4.944E+00 (0.00112rad, 0.00007rad)	4.654E+00 (0.00107rad, 0.00006rad)	4.122E+00 (0.00098rad, 0.00006rad)	3.880E+00 (0.00094rad, 0.00006rad)	3.651E+00 (0.00090rad, 0.00005rad)	3.436E+00 (0.00086rad, 0.00005rad)	3.078E+00 (0.00080rad, 0.00005rad)	2.929E+00 (0.00077rad, 0.00005rad)	2.787E+00 (0.00075rad, 0.00004rad)	2.652E+00 (0.00072rad, 0.00004rad)	2.402E+00 (0.00068rad, 0.00004rad)	2.286E+00 (0.00065rad, 0.00004rad)	2.175E+00 (0.00063rad, 0.00004rad)	2.070E+00 (0.00061rad, 0.00004rad)	1.875E+00 (0.00057rad, 0.00003rad)	1.784E+00 (0.00055rad, 0.00003rad)	1.698E+00 (0.00053rad, 0.00003rad)	0.01313rad, 0.00081rad	
15	2.65202	6.75809	1.41E+00 (0.00024rad, 0.00002rad)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00024rad, 0.00002rad
TOTALS																					7.85821rad, 0.48517rad

Skin dose Calculations

$$\begin{aligned} &(\text{Protons/cm}^2/\text{s}) \cdot (100^2 \text{cm}^2) \cdot (3600 \text{s/hr}) = \text{Protons/m}^2/\text{hr} \\ &(\text{Protons/m}^2/\text{hr}) \cdot 2 \text{m}^2 = \text{Protons/hr} \\ &\text{Protons/hr} \cdot (E \text{ MeV/Proton}) = E \text{ MeV/hr} \\ &(E \text{ MeV/hr}) \cdot (1.6 \cdot 10^{-13} / \text{MeV}) = \text{Joules/hr} \\ &(\text{Joules/hr}) / 4.5 \text{kg} = \text{Gray/hr} \\ &(\text{Gray/hr}) \cdot 100 \text{rad/Gray} = \text{rad/hr} \\ &\text{Rad/hr} \cdot 1/60 = \text{rad/min} \end{aligned}$$

Depth dose Calculations

$$(\text{Protons/cm}^2/\text{s}) * (100^2 \text{cm}^2) * (3600 \text{s/hr}) = \text{Protons/m}^2/\text{hr}$$

$$(\text{Protons/m}^2/\text{hr}) * 2 \text{m}^2 = \text{Protons/hr}$$

$$\text{Protons/hr} * (E \text{ MeV/Proton}) = E \text{ MeV/hr}$$

$$(E \text{ MeV/hr}) * (1.6 * 10^{-13} / \text{MeV}) = \text{Joules/hr}$$

$$(\text{Joules/hr}) / 75 \text{kg} = \text{Gray/hr}$$

$$(\text{Gray/hr}) * 100 \text{rad/Gray} = \text{rad/hr}$$

$$\text{Rad/hr} * 1/60 = \text{rad/min}$$