

# THRA1 Instruction Manual

 **KYOTO KAGAKU co.,LTD**

## **Therapy Body Phantom THRA 1 Instruction manual**

THRA1 is a phantom designed to measure percent depth dose or dose distribution in tissue at each part of the body, so as to help radiotherapy treatment plannings.

The original phantom materials were developed through collaboration between National Institute of Radiological Sciences (NIRS), Japan and KYOTOKAGAKU CO., LTD.

The phantom in life-size human torso figure is cross sectioned into 30 mm thick slices.

As for the physical property of the phantom materials, refer to the data at the end of this manual.

### **<Cautions>**

The phantom weighs approximate to human body; quite heavy.

Therefore, do not drop the phantom parts or make them fall so as not to harm you or give damages to objects hit by them.

The phantom material is breakable.

Therefore, ensure not to give shocks to the phantom parts, or drop them or make them fall.

Before carrying the assembled phantom, make absolutely sure that the supporting frame is properly assembled and the all phantom parts set in the frame are firmly locked.

When you clean the phantom, wipe the surface with a neutral detergent or an antistatic cleaner.

### **<Materials>**

Human soft tissue substitute WE-211

Lung substitute LP-430

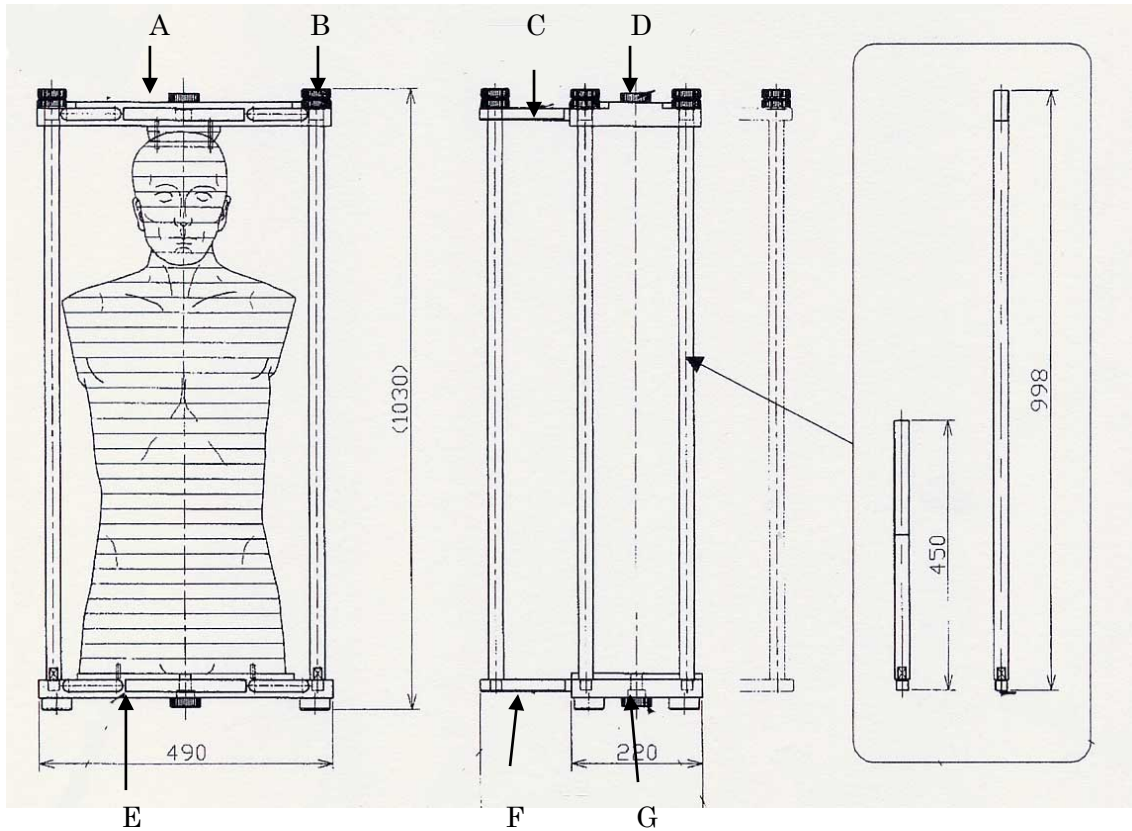
Bone substitute BE-303

### **<Accessories>**

Carrying case

Supporting frame

## Supporting Frame



A: Top plate

B: Nut

C and F: Center pole base

D and G: Fixing screw for the center pole base

E: Base plate

**The frame is designed to be supported four or five poles.**

Three position of the poles can be arranged by using 6 possible site, four corners and front or back center, to fit your purpose.

Attach one pole at the front center, when you use the phantom at spine position, taking off one of the poles at the front corners.

Attach one pole at the back center, when you use the phantom at spine position, taking off one of the poles at the back corners.

Never take off 2 or more poles out of the five at one time while the phantom is lying.

A set of shorter poles allows you to assembly the phantom partially, for example chest part only, or lumbar part only.

### **How to assemble the supporting frame**

1. Loose the screws (D and G) at the center of the base and top plates (A and E).  
Draw out the center pole bases (C & F) toward the direction you intended to use.  
Then fix them firmly by tightening the screws (A& E).  
Ensure that the center poles are completely locked.
2. Assemble the phantom on the base plate (E).  
Attach the four corner poles by screwing them into the holes.
3. Place the top plate (A) onto the assembled phantom, passing the corner poles through the holes at the corners of the plate.  
Fix the top plate with the nuts (B).  
Fasten the four corners evenly so that the top plate is kept on the level.
4. Fasten the corners firmly with double nuts. Ensure that the phantom and the frame components are completely locked before moving on to next step.

### **How to take out one of the corner poles safely**

1. Put the assembled phantom upright. Ensure that the phantom is completely locked with the frame.
2. Insert a pole through the hole on the center pole base of the top plate (C), then screw in the tip of the pole into the hole on the center pole base of the top plate (F).
3. Fix the pole by fastening double nuts from above the top plate.
4. Take out one of the corner poles at the same side of the attached center pole; if the fifth pole is at the front-center, and then take out one of the front corners.
5. Ensure that the phantom is completely locked before moving onto the next step.

### **When you disassemble the frame**

1. Put the phantom locked with the frame upright.
2. Disassemble the frame following the reverse procedures of its assembly.

**Handle the components with utmost care at all time.**

**The parts are heavy and breakable.**

## Appendix

### 1. Basic data on phantom materials for radiotherapy

Table 1, Human Organs

Tissue	Elemental Composition (percentage by mass)					Mass Density	Electron Density
	H	C	N	O	Others		
Adipose tissue	11.4	59.8	0.7	27.8	0.1Na, 0.1S 0.1Cl	0.95	3.347
Breast (mammary gland)	10.6	33.2	3.0	52.7	0.1Na, 0.1P 0.2S, 0.1Cl	1.02	3.324
Lung	10.3	10.5	3.1	74.9	0.2Na, 0.2P 0.3S, 0.3Cl, 0.2K	0.26	3.315
Muscle	10.2	14.3	3.4	71.0	0.1Na, 0.2P 0.3S, 0.1Cl, 0.4K	1.05	3.312
Skeleton (cortical bone)	3.4	15.5	4.2	43.5	0.1Na, 0.2Mg 10.3P, 0.3S, 22.5Ca	1.92	3.100
Skeleton (compact bone)	6.4	27.8	2.7	41.0	0.2Mg, 7.0P 0.2S, 14.7Ca		3.192
Skin	10.0	20.4	4.2	64.5	0.2Na, 0.1P 0.2S, 0.3Cl, 0.1K	1.09	3.303
Water	11.2			88.8		1.00	3.343

Table 2, Major Phantoms

Substitute	Mass Density g cm <sup>-3</sup>	Electron Density g <sup>-1</sup> x 10 <sup>23</sup>	Manufacturer	Reference
(Water or Muscle)				
Tough Water (WE-211)	1.018	3.252	Kyoto Science	(5)
Solid Water (457)	1.035	3.249	RMI (a)	(6)
White Water (RW 3)	1.045	3.231	PTW (b)	(7)
Plastic Water	1.013	3.281	CIRS (c)	(8)
Mix-DP	1.000	3.382	Sanwa	(9)
Mix-R	1.000	3.298		(10)
Muscle (452)	1.060	3.258	RMI	(11)
(Bone )				
Tough Bone (BE-103)	1.730	3.108	Kyoto Science	(12)
Tough Bone (BE-204)	1.500	3.154	Kyoto Science	(12)
Tough Bone (BE-303)	1.240	3.213	Kyoto Science	(12)
Hard Bone (450)	1.826	3.100	RMI	(11)
Inner Bone (456)	1.179	3.226	RMI	(11)
(Lung)				
Tough Lung (LP-430)	0.320	3.264	Kyoto Science	(5)
Lung (455)		3.265	RMI	(11)
(Other Soft Tissue)				
Fat (453)	0.935	3.252	RMI	(11)
Breast (454)	0.979	3.266	RMI	(11)
(Plastic)				
Polystyrene	1.045	3.238		
PMMA (Lucite)	1.019	3.248		
Polyethylene	(0.954)	3.435		
Polyamide (6-Nylon)	(1.143)	3.300		

(a) Radiation Measurements Inc., Middleton, Wisconsin, U.S.A.

(b) Physikalisch-Technische Werkstaetten, Freiburg, Germany

(c) Computerized Imaging Reference Systems, Inc., Norfolk, Virginia, U.S.A.

Table 3, Elemental Composition of the Major Phantoms

Substitute	Elemental composition (percent by mass)				
	H	C	N	O	Others
<b>(Water or Muscle)</b>					
Tough Water (WE-211)	8.20	66.26	2.20	20.71	0.37Cl, 2.27Ca
Solid Water (457)	8.09	67.22	2.40	19.84	0.13Cl, 2.32Ca
White Water (RW 3)	7.59	90.41		0.80	1.20Ti
Plastic Water	9.26	62.82	1.00	17.94	0.96Cl, 7.95Ca, 0.03Br
Mix-DP	12.77	76.82		5.11	3.86Mg, 1.44Ti
Mix-R	9.83	86.74	0.13	0.34	2.31S, 0.65Zn
Muscle (452)	8.41	67.97	2.27	18.87	0.13Cl, 2.35Ca
<b>(Bone)</b>					
Tough Bone (BE-103)	3.69	29.22	1.19	32.66	10.24P, 0.06Cl, 22.92Ca
Tough Bone (BE-204)	5.11	42.45	1.73	28.13	7.00P, 0.09Cl, 15.49Ca
Tough Bone (BE-303)	6.97	60.03	2.45	21.79	2.30P, 0.13Cl, 6.33Ca
Hard Bone (450)	3.10	31.26	0.99	37.57	0.05Cl, 27.03Ca
Inner Bone (456)	7.90	63.79	4.23	9.88	14.20Cl
<b>(Lung)</b>					
Tough Lung (LP-430)	7.0	52.0	35.1		1.5Al, 5.0Si, 0.1P, 1.0Cl
Lung (455)	8.62	68.87	2.26	17.62	0.11Cl, 2.52Ca
<b>(Other Soft Tissue)</b>					
Fat (453)	8.36	69.14	2.36	16.93	3.07F, 0.14Cl
Breast (454)	8.68	69.95	2.37	17.91	0.14Cl, 0.95Ca
<b>(Plastic)</b>					
Polystyrene	7.74	92.26			
PMMA (Lucite)	8.05	59.99		31.96	
Polyethylene	14.37	85.63			
Polyamide (6-Nylon)	9.80	63.68	12.38	14.14	

## 2. Mass Attenuation Coefficients

Table 4, Standard Tissues and Tissue Substitute Materials

Standard tissue	Tissue substitute
Adipose tissue Breast (mammary gland) Lung Muscle Skeleton (cortical bone) Skeleton (compact bone) Skin Water	(Water or Muscle)
	Tough Water (WE-211)
	Solid Water (457)
	White Water (RW 3)
	Plastic Water
	Mix-DP
	Mix-R
	Muscle (452)
	(Bone )
	Tough Bone (BE-103)
	Tough Bone (BE-204)
	Tough Bone (BE-303)
	Hard Bone (450)
	Inner Bone (456)
	(Lung)
	Tough Lung (LP-430)
	Lung (455)
	(Other Soft Tissue)
	Fat (453)
Breast (454)	
(Plastic)	
Polystyrene	
PMMA (Lucite)	
Polyethylene	
Polyamide (6-Nylon)	



Table 5-1, Mass attenuation Coefficient

Values of the mass attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Adipose	Brastr	Lung	Muscle	Cortical b
1.000E-03	2.628E+03	3.263E+03	3.802E+03	3.719E+03	3.781E+03
1.500E-03	8.622E+02	1.088E+03	1.283E+03	1.251E+03	1.295E+03
2.000E-03	3.800E+02	4.841E+02	5.746E+02	5.593E+02	5.869E+02
3.000E-03	1.188E+02	1.546E+02	1.888E+02	1.812E+02	2.958E+02
4.000E-03	5.054E+01	6.625E+01	8.306E+01	8.126E+01	1.331E+02
5.000E-03	2.588E+01	3.407E+01	4.297E+01	4.206E+01	1.917E+02
6.000E-03	1.494E+01	1.972E+01	2.498E+01	2.446E+01	1.171E+02
8.000E-03	6.299E+00	8.320E+00	1.058E+01	1.037E+01	5.322E+01
1.000E-02	3.268E+00	4.295E+00	5.459E+00	5.357E+00	2.851E+01
1.500E-02	1.083E+00	1.378E+00	1.721E+00	1.693E+00	9.031E+00
2.000E-02	5.678E-01	6.889E-01	8.316E-01	8.205E-01	4.001E+00
3.000E-02	3.064E-01	3.403E-01	3.815E-01	3.783E-01	1.331E+00
4.000E-02	2.395E-01	2.530E-01	2.699E-01	2.685E-01	6.655E-01
5.000E-02	2.123E-01	2.186E-01	2.270E-01	2.262E-01	4.241E-01
6.000E-02	1.974E-01	2.005E-01	2.053E-01	2.047E-01	3.148E-01
8.000E-02	1.800E-01	1.808E-01	1.826E-01	1.823E-01	2.229E-01
1.000E-01	1.689E-01	1.687E-01	1.695E-01	1.693E-01	1.855E-01
1.500E-01	1.500E-01	1.493E-01	1.493E-01	1.492E-01	1.481E-01
2.000E-01	1.368E-01	1.361E-01	1.359E-01	1.358E-01	1.309E-01
3.000E-01	1.186E-01	1.179E-01	1.177E-01	1.176E-01	1.114E-01
4.000E-01	1.062E-01	1.055E-01	1.053E-01	1.052E-01	9.908E-02
5.000E-01	9.696E-02	9.631E-02	9.607E-02	9.598E-02	9.022E-02
6.000E-01	8.965E-02	8.905E-02	8.882E-02	8.874E-02	8.332E-02
8.000E-01	7.874E-02	7.821E-02	7.801E-02	7.794E-02	7.308E-02
1.000E+00	7.078E-02	7.031E-02	7.013E-02	7.007E-02	6.566E-02
1.250E+00	6.330E-02	6.287E-02	6.270E-02	6.265E-02	5.871E-02
1.500E+00	5.761E-02	5.721E-02	5.706E-02	5.701E-02	5.346E-02
2.000E+00	4.940E-02	4.910E-02	4.900E-02	4.895E-02	4.607E-02
3.000E+00	3.955E-02	3.937E-02	3.935E-02	3.931E-02	3.745E-02
4.000E+00	3.377E-02	3.369E-02	3.374E-02	3.369E-02	3.257E-02
5.000E+00	2.995E-02	2.995E-02	3.005E-02	3.000E-02	2.946E-02
6.000E+00	2.724E-02	2.731E-02	2.745E-02	2.740E-02	2.734E-02
8.000E+00	2.367E-02	2.384E-02	2.407E-02	2.401E-02	2.467E-02
1.000E+01	2.145E-02	2.169E-02	2.198E-02	2.192E-02	2.314E-02
1.500E+01	1.843E-02	1.882E-02	1.922E-02	1.915E-02	2.132E-02
2.000E+01	1.698E-02	1.746E-02	1.794E-02	1.786E-02	2.068E-02

Table5-2

Values of the mass attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Compact b	Skin	Water	Tough water	Solid water
1.000E-03	3.442E+03	3.572E+03	4.077E+03	2.610E+03	2.594E+03
1.500E-03	1.167E+03	1.201E+03	1.376E+03	8.513E+02	8.452E+02
2.000E-03	5.253E+02	5.362E+02	6.172E+02	3.748E+02	3.720E+02
3.000E-03	2.397E+02	1.741E+02	1.928E+02	1.196E+02	1.155E+02
4.000E-03	1.068E+02	7.570E+01	8.277E+01	5.109E+01	4.913E+01
5.000E-03	1.354E+02	3.907E+01	4.258E+01	3.844E+01	3.763E+01
6.000E-03	8.245E+01	2.267E+01	2.464E+01	2.277E+01	2.229E+01
8.000E-03	3.727E+01	9.587E+00	1.037E+01	9.955E+00	9.741E+00
1.000E-02	1.993E+01	4.947E+00	5.329E+00	5.254E+00	5.142E+00
1.500E-02	6.325E+00	1.570E+00	1.673E+00	1.715E+00	1.681E+00
2.000E-02	2.831E+00	7.681E-01	8.096E-01	8.410E-01	8.265E-01
3.000E-02	9.821E-01	3.626E-01	3.756E-01	3.856E-01	3.812E-01
4.000E-02	5.206E-01	2.617E-01	2.683E-01	2.702E-01	2.682E-01
5.000E-02	3.523E-01	2.226E-01	2.269E-01	2.255E-01	2.244E-01
6.000E-02	2.752E-01	2.025E-01	2.059E-01	2.029E-01	2.022E-01
8.000E-02	2.087E-01	1.811E-01	1.836E-01	1.797E-01	1.793E-01
1.000E-01	1.802E-01	1.685E-01	1.707E-01	1.665E-01	1.663E-01
1.500E-01	1.491E-01	1.488E-01	1.505E-01	1.465E-01	1.463E-01
2.000E-01	1.332E-01	1.355E-01	1.371E-01	1.333E-01	1.331E-01
3.000E-01	1.141E-01	1.173E-01	1.187E-01	1.154E-01	1.153E-01
4.000E-01	1.018E-01	1.050E-01	1.061E-01	1.033E-01	1.031E-01
5.000E-01	9.275E-02	9.580E-02	9.688E-02	9.424E-02	9.414E-02
6.000E-01	8.570E-02	8.857E-02	8.957E-02	8.713E-02	8.704E-02
8.000E-01	7.520E-02	7.779E-02	7.867E-02	7.651E-02	7.643E-02
1.000E+00	6.758E-02	6.994E-02	7.073E-02	6.878E-02	6.871E-02
1.250E+00	6.043E-02	6.253E-02	6.323E-02	6.151E-02	6.145E-02
1.500E+00	5.502E-02	5.691E-02	5.755E-02	5.598E-02	5.592E-02
2.000E+00	4.732E-02	4.885E-02	4.942E-02	4.802E-02	4.797E-02
3.000E+00	3.826E-02	3.922E-02	3.969E-02	3.850E-02	3.846E-02
4.000E+00	3.307E-02	3.359E-02	3.403E-02	3.294E-02	3.290E-02
5.000E+00	2.970E-02	2.990E-02	3.031E-02	2.927E-02	2.923E-02
6.000E+00	2.738E-02	2.730E-02	2.770E-02	2.668E-02	2.664E-02
8.000E+00	2.440E-02	2.390E-02	2.429E-02	2.327E-02	2.323E-02
1.000E+01	2.263E-02	2.180E-02	2.219E-02	2.116E-02	2.112E-02
1.500E+01	2.040E-02	1.900E-02	1.941E-02	1.833E-02	1.829E-02
2.000E+01	1.948E-02	1.770E-02	1.813E-02	1.699E-02	1.695E-02

Table5-3

Values of the mass attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	White water	Plastic wat	Mix-DP	Mix-R	Muscle(452)
1.000E-03	2.107E+03	2.661E+03	2.054E+03	2.005E+03	2.563E+03
1.500E-03	6.708E+02	8.747E+02	8.021E+02	6.649E+02	8.345E+02
2.000E-03	2.911E+02	3.886E+02	3.569E+02	2.899E+02	3.671E+02
3.000E-03	8.743E+01	1.330E+02	1.108E+02	1.157E+02	1.139E+02
4.000E-03	3.676E+01	5.772E+01	4.750E+01	5.036E+01	4.847E+01
5.000E-03	2.591E+01	7.271E+01	3.315E+01	2.626E+01	3.745E+01
6.000E-03	1.534E+01	4.408E+01	1.973E+01	1.538E+01	2.219E+01
8.000E-03	6.688E+00	1.985E+01	8.640E+00	6.625E+00	9.705E+00
1.000E-02	3.551E+00	1.062E+01	4.583E+00	4.794E+00	5.126E+00
1.500E-02	1.203E+00	3.457E+00	1.524E+00	1.631E+00	1.678E+00
2.000E-02	6.248E-01	1.602E+00	7.658E-01	8.201E-01	8.257E-01
3.000E-02	3.214E-01	6.178E-01	3.692E-01	3.863E-01	3.815E-01
4.000E-02	2.426E-01	3.697E-01	2.676E-01	2.730E-01	2.686E-01
5.000E-02	2.109E-01	2.773E-01	2.276E-01	2.286E-01	2.249E-01
6.000E-02	1.940E-01	2.336E-01	2.070E-01	2.058E-01	2.027E-01
8.000E-02	1.752E-01	1.935E-01	1.851E-01	1.822E-01	1.798E-01
1.000E-01	1.637E-01	1.743E-01	1.723E-01	1.689E-01	1.667E-01
1.500E-01	1.450E-01	1.498E-01	1.520E-01	1.485E-01	1.467E-01
2.000E-01	1.321E-01	1.353E-01	1.384E-01	1.351E-01	1.335E-01
3.000E-01	1.145E-01	1.167E-01	1.199E-01	1.170E-01	1.156E-01
4.000E-01	1.025E-01	1.043E-01	1.074E-01	1.047E-01	1.034E-01
5.000E-01	9.360E-02	9.516E-02	9.801E-02	9.558E-02	9.442E-02
6.000E-01	8.654E-02	8.796E-02	9.061E-02	8.836E-02	8.729E-02
8.000E-01	7.599E-02	7.722E-02	7.957E-02	7.759E-02	7.665E-02
1.000E+00	6.831E-02	6.941E-02	7.153E-02	6.975E-02	6.891E-02
1.250E+00	6.110E-02	6.207E-02	6.397E-02	6.238E-02	6.163E-02
1.500E+00	5.561E-02	5.650E-02	5.822E-02	5.678E-02	5.609E-02
2.000E+00	4.767E-02	4.849E-02	4.991E-02	4.867E-02	4.811E-02
3.000E+00	3.817E-02	3.896E-02	3.994E-02	3.896E-02	3.857E-02
4.000E+00	3.258E-02	3.340E-02	3.408E-02	3.326E-02	3.298E-02
5.000E+00	2.890E-02	2.976E-02	3.021E-02	2.949E-02	2.930E-02
6.000E+00	2.628E-02	2.720E-02	2.746E-02	2.683E-02	2.670E-02
8.000E+00	2.283E-02	2.384E-02	2.383E-02	2.330E-02	2.328E-02
1.000E+01	2.068E-02	2.178E-02	2.156E-02	2.109E-02	2.115E-02
1.500E+01	1.776E-02	1.905E-02	1.847E-02	1.811E-02	1.830E-02
2.000E+01	1.636E-02	1.779E-02	1.698E-02	1.667E-02	1.695E-02

Table5-4

Varues of the mess attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeU	Tough b(103)	Tough b(204)	Tough b(303)	Hard bone	Inner bone
1.000E-03	3.498E+03	3.178E+03	2.765E+03	3.766E+03	2.407E+03
1.500E-03	1.184E+03	1.064E+03	9.094E+02	1.275E+03	7.844E+02
2.000E-03	5.356E+02	4.777E+02	4.030E+02	5.769E+02	3.461E+02
3.000E-03	2.758E+02	2.230E+02	1.497E+02	1.843E+02	2.944E+02
4.000E-03	1.242E+02	9.952E+01	6.520E+01	8.071E+01	1.359E+02
5.000E-03	1.893E+02	1.359E+02	6.794E+01	1.874E+02	7.369E+01
6.000E-03	1.158E+02	8.286E+01	4.098E+01	1.150E+02	4.437E+01
8.000E-03	5.271E+01	3.756E+01	1.832E+01	5.259E+01	1.968E+01
1.000E-02	2.827E+01	2.011E+01	9.759E+00	2.831E+01	1.043E+01
1.500E-02	8.971E+00	6.398E+00	3.135E+00	9.027E+00	3.312E+00
2.000E-02	3.979E+00	2.865E+00	1.455E+00	4.015E+00	1.522E+00
3.000E-02	1.326E+00	9.918E-01	5.691E-01	1.340E+00	5.863E-01
4.000E-02	6.636E-01	5.236E-01	3.466E-01	6.702E-01	3.536E-01
5.000E-02	4.233E-01	3.528E-01	2.637E-01	4.267E-01	2.674E-01
6.000E-02	3.145E-01	2.746E-01	2.242E-01	3.164E-01	2.265E-01
8.000E-02	2.230E-01	2.073E-01	1.876E-01	2.235E-01	1.889E-01
1.000E-01	1.857E-01	1.787E-01	1.698E-01	1.858E-01	1.707E-01
1.500E-01	1.483E-01	1.474E-01	1.464E-01	1.481E-01	1.471E-01
2.000E-01	1.312E-01	1.317E-01	1.324E-01	1.309E-01	1.330E-01
3.000E-01	1.116E-01	1.128E-01	1.143E-01	1.113E-01	1.147E-01
4.000E-01	9.932E-02	1.005E-01	1.022E-01	9.908E-02	1.026E-01
5.000E-01	9.044E-02	9.164E-02	9.319E-02	9.023E-02	9.357E-02
6.000E-01	8.353E-02	8.466E-02	8.614E-02	8.333E-02	8.649E-02
8.000E-01	7.326E-02	7.429E-02	7.563E-02	7.309E-02	7.593E-02
1.000E+00	6.582E-02	6.676E-02	6.798E-02	6.567E-02	6.824E-02
1.250E+00	5.885E-02	5.969E-02	6.079E-02	5.871E-02	6.103E-02
1.500E+00	5.360E-02	5.435E-02	5.533E-02	5.347E-02	5.556E-02
2.000E+00	4.617E-02	4.675E-02	4.751E-02	4.605E-02	4.770E-02
3.000E+00	3.750E-02	3.780E-02	3.819E-02	3.738E-02	3.835E-02
4.000E+00	3.258E-02	3.266E-02	3.277E-02	3.247E-02	3.291E-02
5.000E+00	2.944E-02	2.934E-02	2.921E-02	2.932E-02	2.936E-02
6.000E+00	2.729E-02	2.704E-02	2.672E-02	2.717E-02	2.686E-02
8.000E+00	2.459E-02	2.410E-02	2.347E-02	2.445E-02	2.360E-02
1.000E+01	2.302E-02	2.234E-02	2.147E-02	2.287E-02	2.161E-02
1.500E+01	2.115E-02	2.014E-02	1.884E-02	2.097E-02	1.898E-02
2.000E+01	2.047E-02	1.923E-02	1.764E-02	2.027E-02	1.778E-02

Table5-5

Varues of the mess attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Tough lung	Lung(455)	Fat(453)	Breast(454)	Polystyrene
1.000E-03	2.439E+03	2.533E+03	2.562E+03	2.498E+03	2.040E+03
1.500E-03	7.876E+02	8.241E+02	8.342E+02	8.107E+02	6.462E+02
2.000E-03	5.024E+02	3.624E+02	3.666E+02	3.558E+02	2.793E+02
3.000E-03	1.747E+02	1.122E+02	1.136E+02	1.102E+02	8.338E+01
4.000E-03	7.693E+01	4.771E+01	4.823E+01	4.675E+01	3.489E+01
5.000E-03	4.035E+01	3.797E+01	2.465E+01	2.901E+01	1.767E+01
6.000E-03	2.371E+01	2.253E+01	1.422E+01	1.696E+01	1.013E+01
8.000E-03	1.020E+01	9.873E+00	5.986E+00	7.287E+00	4.252E+00
1.000E-02	5.323E+00	5.221E+00	3.104E+00	3.819E+00	2.219E+00
1.500E-02	1.707E+00	1.710E+00	1.031E+00	1.263E+00	7.738E-01
2.000E-02	8.301E-01	8.403E-01	5.431E-01	6.457E-01	4.364E-01
3.000E-02	3.805E-01	3.862E-01	2.954E-01	3.273E-01	2.640E-01
4.000E-02	2.680E-01	2.708E-01	2.319E-01	2.459E-01	2.183E-01
5.000E-02	2.247E-01	2.262E-01	2.059E-01	2.135E-01	1.986E-01
6.000E-02	2.027E-01	2.036E-01	1.915E-01	1.962E-01	1.870E-01
8.000E-02	1.800E-01	1.803E-01	1.748E-01	1.772E-01	1.725E-01
1.000E-01	1.670E-01	1.671E-01	1.640E-01	1.656E-01	1.625E-01
1.500E-01	1.470E-01	1.470E-01	1.457E-01	1.466E-01	1.448E-01
2.000E-01	1.338E-01	1.338E-01	1.329E-01	1.336E-01	1.322E-01
3.000E-01	1.158E-01	1.158E-01	1.153E-01	1.158E-01	1.147E-01
4.000E-01	1.037E-01	1.036E-01	1.032E-01	1.037E-01	1.027E-01
5.000E-01	9.460E-02	9.460E-02	9.420E-02	9.463E-02	9.379E-02
6.000E-01	8.746E-02	8.746E-02	8.710E-02	8.749E-02	8.672E-02
8.000E-01	7.680E-02	7.680E-02	7.650E-02	7.684E-02	7.616E-02
1.000E+00	6.903E-02	6.904E-02	6.877E-02	6.907E-02	6.846E-02
1.250E+00	6.174E-02	6.174E-02	6.150E-02	6.177E-02	6.123E-02
1.500E+00	5.619E-02	5.619E-02	5.597E-02	5.622E-02	5.573E-02
2.000E+00	4.822E-02	4.820E-02	4.800E-02	4.821E-02	4.777E-02
3.000E+00	3.869E-02	3.864E-02	3.845E-02	3.862E-02	3.822E-02
4.000E+00	3.313E-02	3.304E-02	3.285E-02	3.300E-02	3.261E-02
5.000E+00	2.947E-02	2.935E-02	2.915E-02	2.929E-02	2.889E-02
6.000E+00	2.690E-02	2.674E-02	2.654E-02	2.667E-02	2.626E-02
8.000E+00	2.352E-02	2.331E-02	2.309E-02	2.321E-02	2.277E-02
1.000E+01	2.143E-02	2.118E-02	2.094E-02	2.105E-02	2.059E-02
1.500E+01	1.864E-02	1.832E-02	1.804E-02	1.815E-02	1.763E-02
2.000E+01	1.734E-02	1.696E-02	1.666E-02	1.676E-02	1.620E-02

Table5-6

Varues of the mess attenuation coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	PMMA	Polyethylene	Polyamide(6)		
1.000E-03	2.794E+03	1.894E+03	2.468E+03	0.000E+00	0.000E+00
1.500E-03	9.153E+02	5.999E+02	7.992E+02	0.000E+00	0.000E+00
2.000E-03	4.037E+02	2.593E+02	3.501E+02	0.000E+00	0.000E+00
3.000E-03	1.236E+02	7.743E+01	1.063E+02	0.000E+00	0.000E+00
4.000E-03	5.247E+01	3.242E+01	4.491E+01	0.000E+00	0.000E+00
5.000E-03	2.681E+01	1.643E+01	2.288E+01	0.000E+00	0.000E+00
6.000E-03	1.545E+01	9.435E+00	1.317E+01	0.000E+00	0.000E+00
8.000E-03	6.494E+00	3.975E+00	5.533E+00	0.000E+00	0.000E+00
1.000E-02	3.357E+00	2.087E+00	2.871E+00	0.000E+00	0.000E+00
1.500E-02	1.101E+00	7.452E-01	9.635E-01	0.000E+00	0.000E+00
2.000E-02	5.714E-01	4.316E-01	5.165E-01	0.000E+00	0.000E+00
3.000E-02	3.032E-01	2.707E-01	2.895E-01	0.000E+00	0.000E+00
4.000E-02	2.350E-01	2.275E-01	2.310E-01	0.000E+00	0.000E+00
5.000E-02	2.074E-01	2.084E-01	2.067E-01	0.000E+00	0.000E+00
6.000E-02	1.924E-01	1.970E-01	1.930E-01	0.000E+00	0.000E+00
8.000E-02	1.751E-01	1.823E-01	1.768E-01	0.000E+00	0.000E+00
1.000E-01	1.641E-01	1.719E-01	1.661E-01	0.000E+00	0.000E+00
1.500E-01	1.456E-01	1.534E-01	1.478E-01	0.000E+00	0.000E+00
2.000E-01	1.328E-01	1.401E-01	1.348E-01	0.000E+00	0.000E+00
3.000E-01	1.151E-01	1.216E-01	1.169E-01	0.000E+00	0.000E+00
4.000E-01	1.031E-01	1.089E-01	1.047E-01	0.000E+00	0.000E+00
5.000E-01	9.410E-02	9.947E-02	9.558E-02	0.000E+00	0.000E+00
6.000E-01	8.700E-02	9.198E-02	8.838E-02	0.000E+00	0.000E+00
8.000E-01	7.641E-02	8.078E-02	7.762E-02	0.000E+00	0.000E+00
1.000E+00	6.869E-02	7.262E-02	6.977E-02	0.000E+00	0.000E+00
1.250E+00	6.143E-02	6.495E-02	6.240E-02	0.000E+00	0.000E+00
1.500E+00	5.591E-02	5.911E-02	5.679E-02	0.000E+00	0.000E+00
2.000E+00	4.796E-02	5.064E-02	4.869E-02	0.000E+00	0.000E+00
3.000E+00	3.844E-02	4.045E-02	3.898E-02	0.000E+00	0.000E+00
4.000E+00	3.286E-02	3.443E-02	3.328E-02	0.000E+00	0.000E+00
5.000E+00	2.919E-02	3.044E-02	2.951E-02	0.000E+00	0.000E+00
6.000E+00	2.659E-02	2.761E-02	2.685E-02	0.000E+00	0.000E+00
8.000E+00	2.317E-02	2.383E-02	2.332E-02	0.000E+00	0.000E+00
1.000E+01	2.105E-02	2.145E-02	2.112E-02	0.000E+00	0.000E+00
1.500E+01	1.819E-02	1.819E-02	1.815E-02	0.000E+00	0.000E+00
2.000E+01	1.684E-02	1.658E-02	1.671E-02	0.000E+00	0.000E+00

### 3. Mass energy Absorption Coefficient

Table6-1

Values of the mass energy absorption coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Adipose	Brast	Lung	Muscle	Cortical b
1.000E-03	2.623E+03	3.255E+03	3.792E+03	3.709E+03	3.772E+03
1.500E-03	8.602E+02	1.085E+03	1.280E+03	1.247E+03	1.291E+03
2.000E-03	3.786E+02	4.825E+02	5.727E+02	5.574E+02	5.846E+02
3.000E-03	1.178E+02	1.533E+02	1.870E+02	1.796E+02	2.897E+02
4.000E-03	4.982E+01	6.540E+01	8.180E+01	7.992E+01	1.303E+02
5.000E-03	2.531E+01	3.341E+01	4.210E+01	4.115E+01	1.757E+02
6.000E-03	1.446E+01	1.918E+01	2.430E+01	2.377E+01	1.086E+02
8.000E-03	5.915E+00	7.897E+00	1.010E+01	9.885E+00	4.988E+01
1.000E-02	2.934E+00	3.936E+00	5.066E+00	4.963E+00	2.680E+01
1.500E-02	8.101E-01	1.094E+00	1.422E+00	1.396E+00	8.384E+00
2.000E-02	3.251E-01	4.394E-01	5.739E-01	5.637E-01	3.599E+00
3.000E-02	9.493E-02	1.260E-01	1.635E-01	1.609E-01	1.069E+00
4.000E-02	4.574E-02	5.791E-02	7.285E-02	7.190E-02	4.502E-01
5.000E-02	3.085E-02	3.666E-02	4.393E-02	4.348E-02	2.333E-01
6.000E-02	2.566E-02	2.880E-02	3.281E-02	3.257E-02	1.398E-01
8.000E-02	2.358E-02	2.470E-02	2.625E-02	2.615E-02	6.886E-02
1.000E-01	2.433E-02	2.478E-02	2.549E-02	2.543E-02	4.580E-02
1.500E-01	2.737E-02	2.735E-02	2.748E-02	2.745E-02	3.181E-02
2.000E-01	2.959E-02	2.945E-02	2.945E-02	2.943E-02	3.002E-02
3.000E-01	3.194E-02	3.173E-02	3.167E-02	3.164E-02	3.032E-02
4.000E-01	3.282E-02	3.260E-02	3.252E-02	3.249E-02	3.069E-02
5.000E-01	3.303E-02	3.280E-02	3.272E-02	3.269E-02	3.073E-02
6.000E-01	3.289E-02	3.266E-02	3.257E-02	3.254E-02	3.052E-02
8.000E-01	3.211E-02	3.188E-02	3.180E-02	3.177E-02	2.973E-02
1.000E+00	3.107E-02	3.086E-02	3.077E-02	3.075E-02	2.874E-02
1.250E+00	2.970E-02	2.949E-02	2.940E-02	2.938E-02	2.745E-02
1.500E+00	2.838E-02	2.818E-02	2.810E-02	2.808E-02	2.623E-02
2.000E+00	2.609E-02	2.592E-02	2.586E-02	2.583E-02	2.420E-02
3.000E+00	2.275E-02	2.264E-02	2.262E-02	2.260E-02	2.145E-02
4.000E+00	2.049E-02	2.045E-02	2.048E-02	2.045E-02	1.975E-02
5.000E+00	1.891E-02	1.891E-02	1.899E-02	1.896E-02	1.863E-02
6.000E+00	1.773E-02	1.779E-02	1.790E-02	1.787E-02	1.787E-02
8.000E+00	1.612E-02	1.627E-02	1.645E-02	1.641E-02	1.693E-02
1.000E+01	1.509E-02	1.530E-02	1.553E-02	1.548E-02	1.641E-02
1.500E+01	1.364E-02	1.397E-02	1.430E-02	1.424E-02	1.581E-02
2.000E+01	1.292E-02	1.332E-02	1.372E-02	1.365E-02	1.560E-02

Table6-2

Varues of the mess energy absoption coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Compact b	Skin	Water	Tough water	Solid water
1.000E-03	3.435E+03	3.562E+03	4.064E+03	2.605E+03	2.589E+03
1.500E-03	1.164E+03	1.198E+03	1.372E+03	8.495E+02	8.434E+02
2.000E-03	5.233E+02	5.344E+02	6.151E+02	3.735E+02	3.707E+02
3.000E-03	2.353E+02	1.725E+02	1.916E+02	1.183E+02	1.145E+02
4.000E-03	1.048E+02	7.462E+01	8.189E+01	5.028E+01	4.843E+01
5.000E-03	1.248E+02	3.829E+01	4.187E+01	3.638E+01	3.559E+01
6.000E-03	7.667E+01	2.206E+01	2.405E+01	2.151E+01	2.104E+01
8.000E-03	3.495E+01	9.131E+00	9.911E+00	9.295E+00	9.085E+00
1.000E-02	1.869E+01	4.569E+00	4.943E+00	4.797E+00	4.687E+00
1.500E-02	5.805E+00	1.278E+00	1.373E+00	1.414E+00	1.382E+00
2.000E-02	2.483E+00	5.146E-01	5.502E-01	5.896E-01	5.758E-01
3.000E-02	7.367E-01	1.469E-01	1.556E-01	1.746E-01	1.707E-01
4.000E-02	3.121E-01	6.621E-02	6.946E-02	7.891E-02	7.732E-02
5.000E-02	1.641E-01	4.066E-02	4.223E-02	4.735E-02	4.656E-02
6.000E-02	1.008E-01	3.098E-02	3.190E-02	3.482E-02	3.437E-02
8.000E-02	5.343E-02	2.549E-02	2.597E-02	2.693E-02	2.674E-02
1.000E-01	3.851E-02	2.508E-02	2.546E-02	2.564E-02	2.553E-02
1.500E-01	3.036E-02	2.732E-02	2.764E-02	2.715E-02	2.710E-02
2.000E-01	2.994E-02	2.934E-02	2.967E-02	2.897E-02	2.894E-02
3.000E-01	3.095E-02	3.157E-02	3.193E-02	3.110E-02	3.106E-02
4.000E-01	3.150E-02	3.243E-02	3.279E-02	3.192E-02	3.189E-02
5.000E-01	3.159E-02	3.263E-02	3.299E-02	3.211E-02	3.208E-02
6.000E-01	3.140E-02	3.248E-02	3.284E-02	3.196E-02	3.193E-02
8.000E-01	3.062E-02	3.171E-02	3.206E-02	3.119E-02	3.116E-02
1.000E+00	2.961E-02	3.069E-02	3.103E-02	3.019E-02	3.016E-02
1.250E+00	2.829E-02	2.932E-02	2.965E-02	2.885E-02	2.882E-02
1.500E+00	2.703E-02	2.803E-02	2.834E-02	2.757E-02	2.755E-02
2.000E+00	2.491E-02	2.578E-02	2.608E-02	2.535E-02	2.533E-02
3.000E+00	2.195E-02	2.254E-02	2.282E-02	2.214E-02	2.211E-02
4.000E+00	2.005E-02	2.039E-02	2.066E-02	1.999E-02	1.996E-02
5.000E+00	1.877E-02	1.889E-02	1.916E-02	1.848E-02	1.845E-02
6.000E+00	1.787E-02	1.779E-02	1.807E-02	1.737E-02	1.734E-02
8.000E+00	1.670E-02	1.632E-02	1.661E-02	1.586E-02	1.583E-02
1.000E+01	1.601E-02	1.539E-02	1.569E-02	1.490E-02	1.487E-02
1.500E+01	1.512E-02	1.413E-02	1.445E-02	1.357E-02	1.354E-02
2.000E+01	1.474E-02	1.352E-02	1.388E-02	1.291E-02	1.288E-02



Table6-3

Values of the mass energy absorption coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	White water	Plastic wat	Mix-DP	Mix-R	Muscle(452)
1.000E-03	2.105E+03	2.657E+03	2.052E+03	2.003E+03	2.558E+03
1.500E-03	6.696E+02	8.728E+02	7.975E+02	6.635E+02	8.328E+02
2.000E-03	2.901E+02	3.872E+02	3.546E+02	2.888E+02	3.658E+02
3.000E-03	8.673E+01	1.310E+02	1.097E+02	1.133E+02	1.129E+02
4.000E-03	3.620E+01	5.660E+01	4.681E+01	4.919E+01	4.777E+01
5.000E-03	2.404E+01	6.687E+01	3.092E+01	2.550E+01	3.539E+01
6.000E-03	1.418E+01	4.083E+01	1.836E+01	1.481E+01	2.093E+01
8.000E-03	6.077E+00	1.848E+01	7.943E+00	6.214E+00	9.047E+00
1.000E-02	3.125E+00	9.835E+00	4.109E+00	3.920E+00	4.670E+00
1.500E-02	9.193E-01	3.053E+00	1.218E+00	1.233E+00	1.378E+00
2.000E-02	3.841E-01	1.306E+00	5.101E-01	5.362E-01	5.747E-01
3.000E-02	1.165E-01	3.910E-01	1.531E-01	1.679E-01	1.705E-01
4.000E-02	5.543E-02	1.697E-01	7.077E-02	7.855E-02	7.731E-02
5.000E-02	3.576E-02	9.328E-02	4.375E-02	4.810E-02	4.659E-02
6.000E-02	2.830E-02	6.104E-02	3.317E-02	3.571E-02	3.441E-02
8.000E-02	2.427E-02	3.774E-02	2.682E-02	2.768E-02	2.680E-02
1.000E-01	2.426E-02	3.112E-02	2.609E-02	2.625E-02	2.560E-02
1.500E-01	2.664E-02	2.886E-02	2.808E-02	2.764E-02	2.718E-02
2.000E-01	2.865E-02	2.983E-02	3.008E-02	2.944E-02	2.902E-02
3.000E-01	3.086E-02	3.154E-02	3.233E-02	3.156E-02	3.115E-02
4.000E-01	3.170E-02	3.227E-02	3.320E-02	3.239E-02	3.198E-02
5.000E-01	3.189E-02	3.243E-02	3.340E-02	3.258E-02	3.217E-02
6.000E-01	3.175E-02	3.226E-02	3.325E-02	3.242E-02	3.202E-02
8.000E-01	3.099E-02	3.147E-02	3.245E-02	3.164E-02	3.125E-02
1.000E+00	2.999E-02	3.045E-02	3.140E-02	3.062E-02	3.024E-02
1.250E+00	2.867E-02	2.910E-02	3.002E-02	2.927E-02	2.891E-02
1.500E+00	2.740E-02	2.781E-02	2.869E-02	2.797E-02	2.763E-02
2.000E+00	2.518E-02	2.558E-02	2.636E-02	2.571E-02	2.540E-02
3.000E+00	2.195E-02	2.238E-02	2.297E-02	2.241E-02	2.217E-02
4.000E+00	1.977E-02	2.026E-02	2.068E-02	2.018E-02	2.001E-02
5.000E+00	1.824E-02	1.879E-02	1.906E-02	1.861E-02	1.850E-02
6.000E+00	1.709E-02	1.771E-02	1.786E-02	1.744E-02	1.738E-02
8.000E+00	1.553E-02	1.626E-02	1.621E-02	1.584E-02	1.586E-02
1.000E+01	1.453E-02	1.534E-02	1.514E-02	1.482E-02	1.489E-02
1.500E+01	1.312E-02	1.409E-02	1.364E-02	1.337E-02	1.355E-02
2.000E+01	1.241E-02	1.347E-02	1.287E-02	1.263E-02	1.288E-02

Table6-4

Values of the mass energy absorption coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Tough b(103)	Tough b(204)	Tough b(303)	Hard bone	Inner bone
1.000E-03	3.491E+03	3.172E+03	2.760E+03	3.758E+03	2.403E+03
1.500E-03	1.181E+03	1.062E+03	9.074E+02	1.272E+03	7.827E+02
2.000E-03	5.335E+02	4.759E+02	4.016E+02	5.748E+02	3.448E+02
3.000E-03	2.699E+02	2.187E+02	1.476E+02	1.828E+02	2.779E+02
4.000E-03	1.216E+02	9.749E+01	6.406E+01	7.957E+01	1.295E+02
5.000E-03	1.731E+02	1.248E+02	6.313E+01	1.693E+02	7.057E+01
6.000E-03	1.071E+02	7.684E+01	3.827E+01	1.053E+02	4.255E+01
8.000E-03	4.934E+01	3.516E+01	1.713E+01	4.889E+01	1.880E+01
1.000E-02	2.655E+01	1.884E+01	9.054E+00	2.644E+01	9.850E+00
1.500E-02	8.325E+00	5.875E+00	2.767E+00	8.354E+00	2.968E+00
2.000E-02	3.579E+00	2.518E+00	1.175E+00	3.608E+00	1.247E+00
3.000E-02	1.065E+00	7.487E-01	3.488E-01	1.079E+00	3.656E-01
4.000E-02	4.488E-01	3.174E-01	1.513E-01	4.561E-01	1.571E-01
5.000E-02	2.327E-01	1.668E-01	8.359E-02	2.369E-01	8.610E-02
6.000E-02	1.396E-01	1.023E-01	5.527E-02	1.421E-01	5.654E-02
8.000E-02	6.883E-02	5.391E-02	3.507E-02	6.996E-02	3.553E-02
1.000E-01	4.583E-02	3.862E-02	2.952E-02	4.640E-02	2.975E-02
1.500E-01	3.187E-02	3.015E-02	2.799E-02	3.201E-02	2.811E-02
2.000E-01	3.009E-02	2.965E-02	2.910E-02	3.011E-02	2.922E-02
3.000E-01	3.039E-02	3.059E-02	3.086E-02	3.035E-02	3.098E-02
4.000E-01	3.077E-02	3.113E-02	3.159E-02	3.071E-02	3.171E-02
5.000E-01	3.081E-02	3.122E-02	3.175E-02	3.074E-02	3.187E-02
6.000E-01	3.060E-02	3.103E-02	3.159E-02	3.053E-02	3.171E-02
8.000E-01	2.981E-02	3.025E-02	3.082E-02	2.974E-02	3.094E-02
1.000E+00	2.882E-02	2.925E-02	2.982E-02	2.875E-02	2.993E-02
1.250E+00	2.752E-02	2.794E-02	2.850E-02	2.746E-02	2.861E-02
1.500E+00	2.630E-02	2.671E-02	2.723E-02	2.624E-02	2.734E-02
2.000E+00	2.426E-02	2.461E-02	2.506E-02	2.420E-02	2.515E-02
3.000E+00	2.148E-02	2.168E-02	2.194E-02	2.142E-02	2.203E-02
4.000E+00	1.975E-02	1.981E-02	1.988E-02	1.968E-02	1.997E-02
5.000E+00	1.861E-02	1.854E-02	1.845E-02	1.854E-02	1.854E-02
6.000E+00	1.783E-02	1.764E-02	1.741E-02	1.775E-02	1.750E-02
8.000E+00	1.686E-02	1.649E-02	1.601E-02	1.676E-02	1.611E-02
1.000E+01	1.631E-02	1.580E-02	1.514E-02	1.620E-02	1.524E-02
1.500E+01	1.566E-02	1.492E-02	1.395E-02	1.553E-02	1.406E-02
2.000E+01	1.542E-02	1.453E-02	1.338E-02	1.527E-02	1.349E-02

Table6-5

Values of the mass energy absorption coefficient as a function of photon energy for standard tissue and tissue substitute material

MeV	Tough lung	Lung(455)	Fat(453)	Breast(454)	Polystyrene
1.000E-03	2.436E+03	2.529E+03	2.557E+03	2.494E+03	2.039E+03
1.500E-03	7.857E+02	8.224E+02	8.323E+02	8.090E+02	6.450E+02
2.000E-03	4.951E+02	3.611E+02	3.653E+02	3.545E+02	2.783E+02
3.000E-03	1.713E+02	1.112E+02	1.127E+02	1.092E+02	8.271E+01
4.000E-03	7.534E+01	4.702E+01	4.754E+01	4.607E+01	3.435E+01
5.000E-03	3.938E+01	3.581E+01	2.411E+01	2.786E+01	1.722E+01
6.000E-03	2.300E+01	2.122E+01	1.375E+01	1.618E+01	9.726E+00
8.000E-03	9.726E+00	9.197E+00	5.612E+00	6.802E+00	3.915E+00
1.000E-02	4.942E+00	4.757E+00	2.779E+00	3.443E+00	1.918E+00
1.500E-02	1.418E+00	1.408E+00	7.654E-01	9.845E-01	5.200E-01
2.000E-02	5.805E-01	5.883E-01	3.067E-01	4.036E-01	2.075E-01
3.000E-02	1.682E-01	1.748E-01	8.964E-02	1.192E-01	6.246E-02
4.000E-02	7.539E-02	7.915E-02	4.340E-02	5.591E-02	3.263E-02
5.000E-02	4.529E-02	4.755E-02	2.945E-02	3.584E-02	2.421E-02
6.000E-02	3.355E-02	3.498E-02	2.465E-02	2.833E-02	2.172E-02
8.000E-02	2.639E-02	2.706E-02	2.279E-02	2.436E-02	2.160E-02
1.000E-01	2.539E-02	2.575E-02	2.358E-02	2.442E-02	2.295E-02
1.500E-01	2.714E-02	2.726E-02	2.658E-02	2.690E-02	2.632E-02
2.000E-01	2.904E-02	2.909E-02	2.874E-02	2.895E-02	2.856E-02
3.000E-01	3.120E-02	3.122E-02	3.103E-02	3.119E-02	3.089E-02
4.000E-01	3.203E-02	3.204E-02	3.189E-02	3.204E-02	3.175E-02
5.000E-01	3.222E-02	3.223E-02	3.210E-02	3.224E-02	3.196E-02
6.000E-01	3.208E-02	3.208E-02	3.195E-02	3.210E-02	3.182E-02
8.000E-01	3.131E-02	3.131E-02	3.119E-02	3.133E-02	3.106E-02
1.000E+00	3.029E-02	3.030E-02	3.019E-02	3.032E-02	3.006E-02
1.250E+00	2.896E-02	2.896E-02	2.885E-02	2.898E-02	2.873E-02
1.500E+00	2.767E-02	2.768E-02	2.758E-02	2.770E-02	2.746E-02
2.000E+00	2.545E-02	2.545E-02	2.535E-02	2.546E-02	2.523E-02
3.000E+00	2.224E-02	2.221E-02	2.211E-02	2.221E-02	2.198E-02
4.000E+00	2.011E-02	2.005E-02	1.993E-02	2.003E-02	1.979E-02
5.000E+00	1.861E-02	1.853E-02	1.840E-02	1.849E-02	1.823E-02
6.000E+00	1.752E-02	1.740E-02	1.727E-02	1.735E-02	1.707E-02
8.000E+00	1.604E-02	1.588E-02	1.573E-02	1.581E-02	1.549E-02
1.000E+01	1.511E-02	1.491E-02	1.474E-02	1.482E-02	1.447E-02
1.500E+01	1.382E-02	1.355E-02	1.336E-02	1.343E-02	1.303E-02
2.000E+01	1.320E-02	1.288E-02	1.267E-02	1.274E-02	1.230E-02

Table6-6

MeV	PMMA	Polyethylene	Polyamide(6)		
1.000E-03	2.788E+03	1.893E+03	2.464E+03	0.000E+00	0.000E+00
1.500E-03	9.133E+02	5.988E+02	7.975E+02	0.000E+00	0.000E+00
2.000E-03	4.023E+02	2.584E+02	3.489E+02	0.000E+00	0.000E+00
3.000E-03	1.228E+02	7.677E+01	1.055E+02	0.000E+00	0.000E+00
4.000E-03	5.181E+01	3.189E+01	4.430E+01	0.000E+00	0.000E+00
5.000E-03	2.627E+01	1.598E+01	2.237E+01	0.000E+00	0.000E+00
6.000E-03	1.498E+01	9.028E+00	1.272E+01	0.000E+00	0.000E+00
8.000E-03	6.112E+00	3.634E+00	5.168E+00	0.000E+00	0.000E+00
1.000E-02	3.026E+00	1.781E+00	2.550E+00	0.000E+00	0.000E+00
1.500E-02	8.322E-01	4.834E-01	6.981E-01	0.000E+00	0.000E+00
2.000E-02	3.328E-01	1.936E-01	2.791E-01	0.000E+00	0.000E+00
3.000E-02	9.644E-02	5.931E-02	8.200E-02	0.000E+00	0.000E+00
4.000E-02	4.598E-02	3.195E-02	4.046E-02	0.000E+00	0.000E+00
5.000E-02	3.067E-02	2.442E-02	2.814E-02	0.000E+00	0.000E+00
6.000E-02	2.529E-02	2.235E-02	2.404E-02	0.000E+00	0.000E+00
8.000E-02	2.302E-02	2.264E-02	2.275E-02	0.000E+00	0.000E+00
1.000E-01	2.368E-02	2.422E-02	2.375E-02	0.000E+00	0.000E+00
1.500E-01	2.658E-02	2.789E-02	2.692E-02	0.000E+00	0.000E+00
2.000E-01	2.872E-02	3.028E-02	2.914E-02	0.000E+00	0.000E+00
3.000E-01	3.100E-02	3.276E-02	3.148E-02	0.000E+00	0.000E+00
4.000E-01	3.185E-02	3.368E-02	3.236E-02	0.000E+00	0.000E+00
5.000E-01	3.206E-02	3.390E-02	3.257E-02	0.000E+00	0.000E+00
6.000E-01	3.191E-02	3.375E-02	3.242E-02	0.000E+00	0.000E+00
8.000E-01	3.115E-02	3.295E-02	3.165E-02	0.000E+00	0.000E+00
1.000E+00	3.015E-02	3.189E-02	3.063E-02	0.000E+00	0.000E+00
1.250E+00	2.882E-02	3.049E-02	2.928E-02	0.000E+00	0.000E+00
1.500E+00	2.754E-02	2.914E-02	2.798E-02	0.000E+00	0.000E+00
2.000E+00	2.532E-02	2.676E-02	2.572E-02	0.000E+00	0.000E+00
3.000E+00	2.210E-02	2.327E-02	2.242E-02	0.000E+00	0.000E+00
4.000E+00	1.994E-02	2.090E-02	2.020E-02	0.000E+00	0.000E+00
5.000E+00	1.843E-02	1.920E-02	1.863E-02	0.000E+00	0.000E+00
6.000E+00	1.731E-02	1.794E-02	1.747E-02	0.000E+00	0.000E+00
8.000E+00	1.579E-02	1.618E-02	1.588E-02	0.000E+00	0.000E+00
1.000E+01	1.483E-02	1.505E-02	1.486E-02	0.000E+00	0.000E+00
1.500E+01	1.349E-02	1.341E-02	1.343E-02	0.000E+00	0.000E+00
2.000E+01	1.283E-02	1.257E-02	1.272E-02	0.000E+00	0.000E+00

#### 4. Restricted and Unrestricted Stopping Power

1) Restricted stopping power

$$\frac{1}{\rho}L(T,\Delta) = \frac{0.153536}{\beta^2} \frac{Z}{A} \left[ \ln \frac{2(T+2\mu)(T-\Delta)\Delta}{I^2\mu} - 1 - \beta^2 \right. \\ \left. + \frac{T}{T-\Delta} + \left\{ \frac{\Delta^2}{2\mu^2} + \left( \frac{2T}{\mu} + 1 \right) \ln \left( 1 - \frac{\Delta}{T} \right) / \left( \frac{T}{\mu} + 1 \right)^2 - \delta \right\} \right]$$

2) Density effect correction

$$\delta = 0 \quad X < X_0$$

$$\delta = 4.6052X + C + a( X_1 - X )^m \quad X_0 < X < X_1$$

$$\delta = 4.6052X + C \quad X > X_1$$

when

$$X = \left( \frac{1}{4.6052} \right) \ln \left[ \frac{\beta^2}{1 - \beta^2} \right], C = -2 \ln \left[ \left( \frac{I}{28.816} \left( \frac{\rho Z}{A} \right)^{1/2} \right) \right] - 1$$

8MeV or lower

$$\delta_{ad} = -0.10791 + 0.20355E - 3.1469 \times 10^{-2}E^2 + 1.5835 \times 10^{-3}E^3,$$

8MeV or higher

$$\delta_{ad} = 0.41374 - 1.4867 \times 10^{-2}E + 2.0993 \times 10^{-4}E^2 - 1.3877 \times 10^{-6}E^3 \\ + 4.2730 \times 10^{-9}E^4 - 4.9342 \times 10^{-12}E^5$$

Table7-1

ADIPOSE TISSUE					
ENERGY	RESTRICTED	AND UNRESTRICTED	STOPPING	POWER (MeV*cm**2/g)	
MeV	1 keV	5 keV	10 keV	100 keV	Infini.
.010	2.028E+01	2.325E+01	2.325E+01	2.325E+01	2.325E+01
.015	1.436E+01	1.643E+01	1.693E+01	1.693E+01	1.693E+01
.020	1.126E+01	1.289E+01	1.353E+01	1.353E+01	1.353E+01
.030	8.031E+00	9.201E+00	9.635E+00	9.897E+00	9.897E+00
.040	6.356E+00	7.277E+00	7.629E+00	7.965E+00	7.965E+00
.050	5.326E+00	6.092E+00	6.392E+00	6.758E+00	6.758E+00
.060	4.626E+00	5.288E+00	5.551E+00	5.929E+00	5.929E+00
.070	4.120E+00	4.705E+00	4.941E+00	5.324E+00	5.324E+00
.080	3.736E+00	4.264E+00	4.478E+00	4.862E+00	4.862E+00
.090	3.436E+00	3.918E+00	4.115E+00	4.498E+00	4.498E+00
.100	3.193E+00	3.639E+00	3.823E+00	4.204E+00	4.204E+00
.150	2.460E+00	2.796E+00	2.936E+00	3.304E+00	3.304E+00
.200	2.091E+00	2.372E+00	2.490E+00	2.848E+00	2.848E+00
.300	1.729E+00	1.955E+00	2.051E+00	2.346E+00	2.399E+00
.400	1.556E+00	1.755E+00	1.840E+00	2.107E+00	2.187E+00
.500	1.459E+00	1.642E+00	1.721E+00	1.971E+00	2.070E+00
.600	1.392E+00	1.565E+00	1.640E+00	1.879E+00	1.993E+00
.700	1.346E+00	1.513E+00	1.585E+00	1.816E+00	1.943E+00
.800	1.314E+00	1.476E+00	1.545E+00	1.770E+00	1.909E+00
.900	1.290E+00	1.448E+00	1.516E+00	1.737E+00	1.885E+00
1.000	1.273E+00	1.427E+00	1.494E+00	1.711E+00	1.869E+00
1.500	1.227E+00	1.374E+00	1.437E+00	1.645E+00	1.837E+00
2.000	1.211E+00	1.354E+00	1.416E+00	1.620E+00	1.838E+00
3.000	1.202E+00	1.342E+00	1.403E+00	1.603E+00	1.858E+00
4.000	1.202E+00	1.341E+00	1.401E+00	1.599E+00	1.881E+00
5.000	1.204E+00	1.342E+00	1.402E+00	1.600E+00	1.902E+00
6.000	1.207E+00	1.345E+00	1.405E+00	1.602E+00	1.921E+00
7.000	1.210E+00	1.348E+00	1.408E+00	1.605E+00	1.938E+00
8.000	1.214E+00	1.352E+00	1.411E+00	1.608E+00	1.953E+00
9.000	1.217E+00	1.355E+00	1.414E+00	1.611E+00	1.966E+00
10.000	1.219E+00	1.357E+00	1.416E+00	1.613E+00	1.978E+00
15.000	1.228E+00	1.366E+00	1.425E+00	1.622E+00	2.023E+00
20.000	1.234E+00	1.371E+00	1.431E+00	1.627E+00	2.054E+00
30.000	1.241E+00	1.378E+00	1.437E+00	1.634E+00	2.096E+00
40.000	1.245E+00	1.382E+00	1.441E+00	1.638E+00	2.125E+00
50.000	1.247E+00	1.384E+00	1.444E+00	1.640E+00	2.147E+00
60.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.167E+00
70.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.180E+00
80.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.191E+00
90.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.202E+00
100.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.211E+00
150.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.245E+00
200.000	1.251E+00	1.389E+00	1.448E+00	1.644E+00	2.270E+00
300.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.305E+00
400.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.329E+00
500.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.349E+00
600.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.364E+00
700.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.377E+00
800.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.389E+00
900.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.399E+00
1000.000	1.251E+00	1.388E+00	1.448E+00	1.644E+00	2.408E+00

Table7-2

BREAST					
ENERGY	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
MeV	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.979E+01	2.274E+01	2.274E+01	2.274E+01	2.274E+01
.015	1.402E+01	1.608E+01	1.658E+01	1.658E+01	1.658E+01
.020	1.100E+01	1.263E+01	1.326E+01	1.326E+01	1.326E+01
.030	7.854E+00	9.018E+00	9.448E+00	9.709E+00	9.709E+00
.040	6.219E+00	7.135E+00	7.484E+00	7.818E+00	7.818E+00
.050	5.212E+00	5.975E+00	6.272E+00	6.636E+00	6.636E+00
.060	4.529E+00	5.187E+00	5.448E+00	5.824E+00	5.824E+00
.070	4.034E+00	4.616E+00	4.850E+00	5.231E+00	5.231E+00
.080	3.659E+00	4.184E+00	4.396E+00	4.778E+00	4.778E+00
.090	3.365E+00	3.845E+00	4.040E+00	4.421E+00	4.421E+00
.100	3.128E+00	3.572E+00	3.754E+00	4.132E+00	4.132E+00
.150	2.411E+00	2.745E+00	2.884E+00	3.250E+00	3.250E+00
.200	2.050E+00	2.329E+00	2.447E+00	2.802E+00	2.802E+00
.300	1.695E+00	1.920E+00	2.016E+00	2.309E+00	2.362E+00
.400	1.526E+00	1.724E+00	1.809E+00	2.074E+00	2.154E+00
.500	1.431E+00	1.614E+00	1.692E+00	1.941E+00	2.039E+00
.600	1.367E+00	1.540E+00	1.614E+00	1.851E+00	1.965E+00
.700	1.323E+00	1.489E+00	1.560E+00	1.790E+00	1.916E+00
.800	1.292E+00	1.453E+00	1.522E+00	1.746E+00	1.883E+00
.900	1.270E+00	1.426E+00	1.494E+00	1.713E+00	1.861E+00
1.000	1.252E+00	1.406E+00	1.473E+00	1.689E+00	1.845E+00
1.500	1.209E+00	1.355E+00	1.418E+00	1.625E+00	1.816E+00
2.000	1.194E+00	1.337E+00	1.398E+00	1.600E+00	1.817E+00
3.000	1.187E+00	1.326E+00	1.386E+00	1.585E+00	1.839E+00
4.000	1.187E+00	1.325E+00	1.385E+00	1.582E+00	1.862E+00
5.000	1.190E+00	1.327E+00	1.387E+00	1.583E+00	1.884E+00
6.000	1.193E+00	1.331E+00	1.390E+00	1.586E+00	1.903E+00
7.000	1.197E+00	1.334E+00	1.393E+00	1.589E+00	1.920E+00
8.000	1.200E+00	1.337E+00	1.396E+00	1.592E+00	1.935E+00
9.000	1.203E+00	1.340E+00	1.399E+00	1.595E+00	1.948E+00
10.000	1.206E+00	1.343E+00	1.402E+00	1.597E+00	1.960E+00
15.000	1.215E+00	1.352E+00	1.411E+00	1.606E+00	2.005E+00
20.000	1.221E+00	1.358E+00	1.416E+00	1.612E+00	2.036E+00
30.000	1.228E+00	1.364E+00	1.423E+00	1.619E+00	2.078E+00
40.000	1.232E+00	1.368E+00	1.427E+00	1.622E+00	2.107E+00
50.000	1.234E+00	1.371E+00	1.429E+00	1.625E+00	2.128E+00
60.000	1.238E+00	1.375E+00	1.434E+00	1.629E+00	2.148E+00
70.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.161E+00
80.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.173E+00
90.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.183E+00
100.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.192E+00
150.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.226E+00
200.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.251E+00
300.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.285E+00
400.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.310E+00
500.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.329E+00
600.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.344E+00
700.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.357E+00
800.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.369E+00
900.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.379E+00
1000.000	1.238E+00	1.375E+00	1.433E+00	1.629E+00	2.388E+00

Table7-3

LUNG					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.943E+01	2.237E+01	2.237E+01	2.237E+01	2.237E+01
.015	1.378E+01	1.583E+01	1.633E+01	1.633E+01	1.633E+01
.020	1.081E+01	1.243E+01	1.306E+01	1.306E+01	1.306E+01
.030	7.723E+00	8.882E+00	9.311E+00	9.571E+00	9.571E+00
.040	6.117E+00	7.030E+00	7.378E+00	7.711E+00	7.711E+00
.050	5.128E+00	5.888E+00	6.184E+00	6.547E+00	6.547E+00
.060	4.457E+00	5.112E+00	5.372E+00	5.748E+00	5.748E+00
.070	3.971E+00	4.550E+00	4.783E+00	5.163E+00	5.163E+00
.080	3.602E+00	4.125E+00	4.336E+00	4.717E+00	4.717E+00
.090	3.313E+00	3.791E+00	3.986E+00	4.365E+00	4.365E+00
.100	3.080E+00	3.522E+00	3.703E+00	4.080E+00	4.080E+00
.150	2.374E+00	2.707E+00	2.846E+00	3.210E+00	3.210E+00
.200	2.020E+00	2.298E+00	2.415E+00	2.769E+00	2.769E+00
.300	1.671E+00	1.895E+00	1.990E+00	2.282E+00	2.335E+00
.400	1.504E+00	1.702E+00	1.786E+00	2.050E+00	2.130E+00
.500	1.415E+00	1.597E+00	1.675E+00	1.922E+00	2.021E+00
.600	1.365E+00	1.537E+00	1.611E+00	1.847E+00	1.961E+00
.700	1.332E+00	1.497E+00	1.568E+00	1.797E+00	1.923E+00
.800	1.310E+00	1.470E+00	1.539E+00	1.762E+00	1.899E+00
.900	1.294E+00	1.451E+00	1.518E+00	1.736E+00	1.883E+00
1.000	1.283E+00	1.437E+00	1.502E+00	1.718E+00	1.874E+00
1.500	1.260E+00	1.405E+00	1.468E+00	1.674E+00	1.864E+00
2.000	1.257E+00	1.399E+00	1.460E+00	1.662E+00	1.878E+00
3.000	1.264E+00	1.403E+00	1.463E+00	1.661E+00	1.914E+00
4.000	1.273E+00	1.411E+00	1.470E+00	1.667E+00	1.946E+00
5.000	1.282E+00	1.419E+00	1.478E+00	1.674E+00	1.973E+00
6.000	1.289E+00	1.426E+00	1.485E+00	1.681E+00	1.996E+00
7.000	1.296E+00	1.432E+00	1.491E+00	1.687E+00	2.016E+00
8.000	1.302E+00	1.438E+00	1.497E+00	1.692E+00	2.034E+00
9.000	1.307E+00	1.443E+00	1.502E+00	1.697E+00	2.049E+00
10.000	1.311E+00	1.447E+00	1.506E+00	1.701E+00	2.062E+00
15.000	1.324E+00	1.460E+00	1.519E+00	1.713E+00	2.111E+00
20.000	1.331E+00	1.467E+00	1.526E+00	1.721E+00	2.143E+00
30.000	1.339E+00	1.475E+00	1.534E+00	1.728E+00	2.186E+00
40.000	1.343E+00	1.479E+00	1.538E+00	1.733E+00	2.215E+00
50.000	1.346E+00	1.482E+00	1.540E+00	1.735E+00	2.237E+00
60.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.256E+00
70.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.269E+00
80.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.281E+00
90.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.291E+00
100.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.300E+00
150.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.334E+00
200.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.359E+00
300.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.393E+00
400.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.418E+00
500.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.436E+00
600.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.452E+00
700.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.465E+00
800.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.476E+00
900.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.486E+00
1000.000	1.350E+00	1.486E+00	1.544E+00	1.739E+00	2.495E+00



Table7-4

MUSCLE					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini.
.010	1.945E+01	2.238E+01	2.238E+01	2.238E+01	2.238E+01
.015	1.379E+01	1.584E+01	1.634E+01	1.634E+01	1.634E+01
.020	1.082E+01	1.244E+01	1.307E+01	1.307E+01	1.307E+01
.030	7.729E+00	8.887E+00	9.316E+00	9.575E+00	9.575E+00
.040	6.121E+00	7.033E+00	7.381E+00	7.714E+00	7.714E+00
.050	5.132E+00	5.891E+00	6.187E+00	6.549E+00	6.549E+00
.060	4.460E+00	5.115E+00	5.375E+00	5.749E+00	5.749E+00
.070	3.973E+00	4.552E+00	4.785E+00	5.165E+00	5.165E+00
.080	3.604E+00	4.126E+00	4.338E+00	4.718E+00	4.718E+00
.090	3.315E+00	3.792E+00	3.987E+00	4.366E+00	4.366E+00
.100	3.082E+00	3.523E+00	3.704E+00	4.081E+00	4.081E+00
.150	2.376E+00	2.708E+00	2.847E+00	3.211E+00	3.211E+00
.200	2.021E+00	2.299E+00	2.416E+00	2.770E+00	2.770E+00
.300	1.672E+00	1.895E+00	1.990E+00	2.282E+00	2.335E+00
.400	1.505E+00	1.702E+00	1.786E+00	2.050E+00	2.130E+00
.500	1.412E+00	1.594E+00	1.672E+00	1.919E+00	2.018E+00
.600	1.350E+00	1.521E+00	1.595E+00	1.831E+00	1.945E+00
.700	1.307E+00	1.472E+00	1.543E+00	1.771E+00	1.897E+00
.800	1.277E+00	1.437E+00	1.506E+00	1.729E+00	1.866E+00
.900	1.255E+00	1.411E+00	1.478E+00	1.697E+00	1.844E+00
1.000	1.239E+00	1.392E+00	1.458E+00	1.673E+00	1.829E+00
1.500	1.198E+00	1.343E+00	1.405E+00	1.611E+00	1.802E+00
2.000	1.184E+00	1.325E+00	1.386E+00	1.588E+00	1.804E+00
3.000	1.177E+00	1.316E+00	1.376E+00	1.574E+00	1.826E+00
4.000	1.178E+00	1.316E+00	1.375E+00	1.572E+00	1.850E+00
5.000	1.181E+00	1.318E+00	1.377E+00	1.573E+00	1.872E+00
6.000	1.185E+00	1.322E+00	1.381E+00	1.576E+00	1.891E+00
7.000	1.188E+00	1.325E+00	1.384E+00	1.579E+00	1.908E+00
8.000	1.192E+00	1.329E+00	1.388E+00	1.583E+00	1.924E+00
9.000	1.195E+00	1.332E+00	1.390E+00	1.585E+00	1.937E+00
10.000	1.198E+00	1.334E+00	1.393E+00	1.588E+00	1.949E+00
15.000	1.208E+00	1.344E+00	1.402E+00	1.597E+00	1.994E+00
20.000	1.213E+00	1.349E+00	1.408E+00	1.603E+00	2.025E+00
30.000	1.220E+00	1.356E+00	1.415E+00	1.609E+00	2.067E+00
40.000	1.224E+00	1.360E+00	1.419E+00	1.613E+00	2.095E+00
50.000	1.227E+00	1.362E+00	1.421E+00	1.615E+00	2.117E+00
60.000	1.231E+00	1.367E+00	1.425E+00	1.620E+00	2.137E+00
70.000	1.231E+00	1.367E+00	1.425E+00	1.620E+00	2.150E+00
80.000	1.231E+00	1.367E+00	1.425E+00	1.620E+00	2.161E+00
90.000	1.231E+00	1.367E+00	1.425E+00	1.620E+00	2.171E+00
100.000	1.231E+00	1.367E+00	1.425E+00	1.619E+00	2.180E+00
150.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.215E+00
200.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.239E+00
300.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.273E+00
400.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.298E+00
500.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.316E+00
600.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.332E+00
700.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.345E+00
800.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.356E+00
900.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.366E+00
1000.000	1.231E+00	1.366E+00	1.425E+00	1.619E+00	2.375E+00

Table7-5

SKELETON(CORTICAL)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.667E+01	1.942E+01	1.942E+01	1.942E+01	1.942E+01
.015	1.187E+01	1.379E+01	1.425E+01	1.425E+01	1.425E+01
.020	9.340E+00	1.086E+01	1.144E+01	1.144E+01	1.144E+01
.030	6.694E+00	7.777E+00	8.179E+00	8.422E+00	8.422E+00
.040	5.313E+00	6.166E+00	6.492E+00	6.803E+00	6.803E+00
.050	4.461E+00	5.171E+00	5.449E+00	5.788E+00	5.788E+00
.060	3.882E+00	4.494E+00	4.738E+00	5.089E+00	5.089E+00
.070	3.461E+00	4.004E+00	4.221E+00	4.577E+00	4.577E+00
.080	3.143E+00	3.631E+00	3.829E+00	4.185E+00	4.185E+00
.090	2.892E+00	3.339E+00	3.521E+00	3.876E+00	3.876E+00
.100	2.691E+00	3.104E+00	3.273E+00	3.626E+00	3.626E+00
.150	2.079E+00	2.390E+00	2.520E+00	2.860E+00	2.860E+00
.200	1.771E+00	2.031E+00	2.141E+00	2.472E+00	2.472E+00
.300	1.468E+00	1.677E+00	1.766E+00	2.039E+00	2.039E+00
.400	1.324E+00	1.508E+00	1.587E+00	1.834E+00	1.908E+00
.500	1.243E+00	1.413E+00	1.486E+00	1.717E+00	1.809E+00
.600	1.186E+00	1.347E+00	1.416E+00	1.637E+00	1.743E+00
.700	1.148E+00	1.303E+00	1.369E+00	1.583E+00	1.701E+00
.800	1.121E+00	1.271E+00	1.335E+00	1.544E+00	1.672E+00
.900	1.101E+00	1.248E+00	1.310E+00	1.515E+00	1.652E+00
1.000	1.087E+00	1.230E+00	1.292E+00	1.493E+00	1.639E+00
1.500	1.050E+00	1.186E+00	1.245E+00	1.437E+00	1.616E+00
2.000	1.039E+00	1.171E+00	1.229E+00	1.417E+00	1.619E+00
3.000	1.035E+00	1.165E+00	1.220E+00	1.406E+00	1.642E+00
4.000	1.037E+00	1.166E+00	1.222E+00	1.406E+00	1.666E+00
5.000	1.042E+00	1.170E+00	1.225E+00	1.409E+00	1.689E+00
6.000	1.047E+00	1.175E+00	1.230E+00	1.413E+00	1.708E+00
7.000	1.052E+00	1.179E+00	1.234E+00	1.417E+00	1.725E+00
8.000	1.057E+00	1.184E+00	1.239E+00	1.422E+00	1.741E+00
9.000	1.061E+00	1.188E+00	1.243E+00	1.425E+00	1.755E+00
10.000	1.064E+00	1.192E+00	1.246E+00	1.429E+00	1.767E+00
15.000	1.077E+00	1.204E+00	1.259E+00	1.441E+00	1.813E+00
20.000	1.085E+00	1.212E+00	1.267E+00	1.449E+00	1.845E+00
30.000	1.095E+00	1.222E+00	1.277E+00	1.459E+00	1.887E+00
40.000	1.101E+00	1.228E+00	1.283E+00	1.465E+00	1.916E+00
50.000	1.104E+00	1.231E+00	1.286E+00	1.468E+00	1.937E+00
60.000	1.106E+00	1.233E+00	1.288E+00	1.470E+00	1.954E+00
70.000	1.107E+00	1.234E+00	1.289E+00	1.471E+00	1.967E+00
80.000	1.108E+00	1.235E+00	1.290E+00	1.472E+00	1.978E+00
90.000	1.108E+00	1.235E+00	1.290E+00	1.472E+00	1.988E+00
100.000	1.108E+00	1.235E+00	1.290E+00	1.472E+00	1.997E+00
150.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.030E+00
200.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.053E+00
300.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.085E+00
400.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.108E+00
500.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.126E+00
600.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.140E+00
700.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.152E+00
800.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.163E+00
900.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.172E+00
1000.000	1.109E+00	1.236E+00	1.291E+00	1.473E+00	2.180E+00

Table7-6

SKELETON(COMPACT)					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini. Infini.
.010	1.795E+01	2.078E+01	2.078E+01	2.078E+01	2.078E+01
.015	1.275E+01	1.473E+01	1.521E+01	1.521E+01	1.521E+01
.020	1.002E+01	1.158E+01	1.219E+01	1.219E+01	1.219E+01
.030	7.169E+00	8.285E+00	8.699E+00	8.949E+00	8.949E+00
.040	5.684E+00	6.563E+00	6.898E+00	7.219E+00	7.219E+00
.050	4.769E+00	5.500E+00	5.786E+00	6.135E+00	6.135E+00
.060	4.147E+00	4.778E+00	5.028E+00	5.390E+00	5.390E+00
.070	3.696E+00	4.254E+00	4.479E+00	4.844E+00	4.844E+00
.080	3.354E+00	3.857E+00	4.061E+00	4.428E+00	4.428E+00
.090	3.086E+00	3.546E+00	3.734E+00	4.099E+00	4.099E+00
.100	2.870E+00	3.295E+00	3.470E+00	3.833E+00	3.833E+00
.150	2.215E+00	2.535E+00	2.669E+00	3.020E+00	3.020E+00
.200	1.885E+00	2.153E+00	2.266E+00	2.607E+00	2.607E+00
.300	1.561E+00	1.777E+00	1.868E+00	2.149E+00	2.201E+00
.400	1.406E+00	1.597E+00	1.678E+00	1.932E+00	2.009E+00
.500	1.320E+00	1.495E+00	1.570E+00	1.809E+00	1.903E+00
.600	1.260E+00	1.426E+00	1.497E+00	1.725E+00	1.834E+00
.700	1.220E+00	1.379E+00	1.447E+00	1.667E+00	1.789E+00
.800	1.191E+00	1.345E+00	1.412E+00	1.626E+00	1.758E+00
.900	1.170E+00	1.321E+00	1.385E+00	1.596E+00	1.738E+00
1.000	1.155E+00	1.302E+00	1.366E+00	1.573E+00	1.723E+00
1.500	1.116E+00	1.256E+00	1.316E+00	1.514E+00	1.698E+00
2.000	1.103E+00	1.239E+00	1.298E+00	1.492E+00	1.700E+00
3.000	1.097E+00	1.231E+00	1.288E+00	1.479E+00	1.722E+00
4.000	1.099E+00	1.231E+00	1.288E+00	1.478E+00	1.746E+00
5.000	1.102E+00	1.235E+00	1.291E+00	1.480E+00	1.768E+00
6.000	1.107E+00	1.239E+00	1.295E+00	1.484E+00	1.788E+00
7.000	1.111E+00	1.242E+00	1.299E+00	1.487E+00	1.805E+00
8.000	1.115E+00	1.247E+00	1.303E+00	1.491E+00	1.820E+00
9.000	1.119E+00	1.250E+00	1.307E+00	1.495E+00	1.834E+00
10.000	1.122E+00	1.253E+00	1.310E+00	1.498E+00	1.846E+00
15.000	1.133E+00	1.264E+00	1.321E+00	1.508E+00	1.891E+00
20.000	1.140E+00	1.271E+00	1.328E+00	1.515E+00	1.922E+00
30.000	1.149E+00	1.280E+00	1.336E+00	1.523E+00	1.964E+00
40.000	1.153E+00	1.284E+00	1.341E+00	1.528E+00	1.993E+00
50.000	1.156E+00	1.287E+00	1.343E+00	1.531E+00	2.014E+00
60.000	1.157E+00	1.288E+00	1.345E+00	1.532E+00	2.031E+00
70.000	1.158E+00	1.289E+00	1.346E+00	1.533E+00	2.044E+00
80.000	1.158E+00	1.289E+00	1.346E+00	1.533E+00	2.055E+00
90.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.067E+00
100.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.075E+00
150.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.108E+00
200.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.132E+00
300.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.165E+00
400.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.188E+00
500.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.207E+00
600.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.222E+00
700.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.234E+00
800.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.245E+00
900.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.255E+00
1000.000	1.160E+00	1.291E+00	1.347E+00	1.535E+00	2.263E+00

Table7-7

SKIN					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.946E+01	2.240E+01	2.240E+01	2.240E+01	2.240E+01
.015	1.380E+01	1.585E+01	1.634E+01	1.634E+01	1.634E+01
.020	1.083E+01	1.245E+01	1.307E+01	1.307E+01	1.307E+01
.030	7.734E+00	8.889E+00	9.318E+00	9.576E+00	9.576E+00
.040	6.125E+00	7.035E+00	7.382E+00	7.714E+00	7.714E+00
.050	5.134E+00	5.892E+00	6.188E+00	6.549E+00	6.549E+00
.060	4.462E+00	5.115E+00	5.375E+00	5.749E+00	5.749E+00
.070	3.975E+00	4.553E+00	4.785E+00	5.164E+00	5.164E+00
.080	3.606E+00	4.127E+00	4.338E+00	4.718E+00	4.718E+00
.090	3.316E+00	3.793E+00	3.987E+00	4.366E+00	4.366E+00
.100	3.083E+00	3.523E+00	3.704E+00	4.081E+00	4.081E+00
.150	2.376E+00	2.708E+00	2.847E+00	3.210E+00	3.210E+00
.200	2.021E+00	2.299E+00	2.416E+00	2.769E+00	2.769E+00
.300	1.672E+00	1.895E+00	1.990E+00	2.281E+00	2.334E+00
.400	1.505E+00	1.702E+00	1.786E+00	2.050E+00	2.129E+00
.500	1.412E+00	1.594E+00	1.671E+00	1.918E+00	2.016E+00
.600	1.349E+00	1.520E+00	1.594E+00	1.830E+00	1.943E+00
.700	1.306E+00	1.471E+00	1.541E+00	1.770E+00	1.895E+00
.800	1.276E+00	1.435E+00	1.504E+00	1.726E+00	1.863E+00
.900	1.254E+00	1.409E+00	1.476E+00	1.695E+00	1.841E+00
1.000	1.237E+00	1.390E+00	1.456E+00	1.670E+00	1.826E+00
1.500	1.195E+00	1.340E+00	1.402E+00	1.608E+00	1.798E+00
2.000	1.181E+00	1.322E+00	1.383E+00	1.584E+00	1.800E+00
3.000	1.173E+00	1.312E+00	1.371E+00	1.569E+00	1.821E+00
4.000	1.174E+00	1.311E+00	1.370E+00	1.567E+00	1.845E+00
5.000	1.177E+00	1.314E+00	1.372E+00	1.568E+00	1.866E+00
6.000	1.180E+00	1.317E+00	1.376E+00	1.571E+00	1.886E+00
7.000	1.184E+00	1.320E+00	1.379E+00	1.574E+00	1.902E+00
8.000	1.188E+00	1.324E+00	1.382E+00	1.577E+00	1.918E+00
9.000	1.191E+00	1.327E+00	1.385E+00	1.580E+00	1.931E+00
10.000	1.193E+00	1.329E+00	1.388E+00	1.582E+00	1.943E+00
15.000	1.202E+00	1.338E+00	1.397E+00	1.591E+00	1.987E+00
20.000	1.208E+00	1.344E+00	1.402E+00	1.597E+00	2.018E+00
30.000	1.215E+00	1.351E+00	1.409E+00	1.603E+00	2.060E+00
40.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.089E+00
50.000	1.221E+00	1.357E+00	1.415E+00	1.610E+00	2.110E+00
60.000	1.225E+00	1.361E+00	1.419E+00	1.614E+00	2.130E+00
70.000	1.225E+00	1.361E+00	1.419E+00	1.614E+00	2.143E+00
80.000	1.225E+00	1.361E+00	1.419E+00	1.614E+00	2.154E+00
90.000	1.225E+00	1.361E+00	1.419E+00	1.614E+00	2.164E+00
100.000	1.225E+00	1.361E+00	1.419E+00	1.614E+00	2.173E+00
150.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.207E+00
200.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.232E+00
300.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.266E+00
400.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.290E+00
500.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.309E+00
600.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.325E+00
700.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.338E+00
800.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.349E+00
900.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.359E+00
1000.000	1.225E+00	1.361E+00	1.419E+00	1.613E+00	2.368E+00

Table7-8

WATER					
ENERGY	RESTRICTED	AND UNRESTRICTED	STOPPING	POWER (MeV*cm**2/g)	
MeV	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.960E+01	2.256E+01	2.256E+01	2.256E+01	2.256E+01
.015	1.390E+01	1.597E+01	1.647E+01	1.647E+01	1.647E+01
.020	1.091E+01	1.254E+01	1.317E+01	1.317E+01	1.317E+01
.030	7.790E+00	8.958E+00	9.391E+00	9.653E+00	9.653E+00
.040	6.170E+00	7.090E+00	7.441E+00	7.777E+00	7.777E+00
.050	5.173E+00	5.938E+00	6.237E+00	6.603E+00	6.603E+00
.060	4.495E+00	5.156E+00	5.418E+00	5.797E+00	5.797E+00
.070	4.005E+00	4.589E+00	4.824E+00	5.207E+00	5.207E+00
.080	3.633E+00	4.160E+00	4.374E+00	4.757E+00	4.757E+00
.090	3.341E+00	3.823E+00	4.020E+00	4.402E+00	4.402E+00
.100	3.107E+00	3.552E+00	3.735E+00	4.115E+00	4.115E+00
.150	2.395E+00	2.730E+00	2.870E+00	3.238E+00	3.238E+00
.200	2.037E+00	2.318E+00	2.436E+00	2.793E+00	2.793E+00
.300	1.685E+00	1.911E+00	2.007E+00	2.301E+00	2.355E+00
.400	1.517E+00	1.716E+00	1.801E+00	2.068E+00	2.148E+00
.500	1.424E+00	1.607E+00	1.686E+00	1.936E+00	2.035E+00
.600	1.361E+00	1.535E+00	1.609E+00	1.847E+00	1.962E+00
.700	1.319E+00	1.485E+00	1.557E+00	1.787E+00	1.915E+00
.800	1.289E+00	1.450E+00	1.520E+00	1.745E+00	1.883E+00
.900	1.267E+00	1.425E+00	1.492E+00	1.713E+00	1.861E+00
1.000	1.251E+00	1.405E+00	1.472E+00	1.689E+00	1.846E+00
1.500	1.210E+00	1.356E+00	1.419E+00	1.627E+00	1.819E+00
2.000	1.196E+00	1.339E+00	1.401E+00	1.604E+00	1.822E+00
3.000	1.190E+00	1.330E+00	1.390E+00	1.590E+00	1.845E+00
4.000	1.191E+00	1.330E+00	1.390E+00	1.588E+00	1.870E+00
5.000	1.195E+00	1.333E+00	1.393E+00	1.590E+00	1.892E+00
6.000	1.199E+00	1.337E+00	1.396E+00	1.593E+00	1.912E+00
7.000	1.202E+00	1.340E+00	1.400E+00	1.597E+00	1.929E+00
8.000	1.206E+00	1.344E+00	1.403E+00	1.600E+00	1.945E+00
9.000	1.210E+00	1.347E+00	1.406E+00	1.603E+00	1.958E+00
10.000	1.212E+00	1.350E+00	1.409E+00	1.606E+00	1.970E+00
15.000	1.222E+00	1.359E+00	1.418E+00	1.615E+00	2.016E+00
20.000	1.228E+00	1.365E+00	1.424E+00	1.621E+00	2.047E+00
30.000	1.235E+00	1.372E+00	1.431E+00	1.628E+00	2.089E+00
40.000	1.239E+00	1.376E+00	1.435E+00	1.631E+00	2.118E+00
50.000	1.241E+00	1.378E+00	1.438E+00	1.634E+00	2.140E+00
60.000	1.245E+00	1.383E+00	1.442E+00	1.638E+00	2.160E+00
70.000	1.245E+00	1.383E+00	1.442E+00	1.638E+00	2.173E+00
80.000	1.245E+00	1.383E+00	1.442E+00	1.638E+00	2.184E+00
90.000	1.245E+00	1.383E+00	1.442E+00	1.638E+00	2.195E+00
100.000	1.245E+00	1.383E+00	1.442E+00	1.638E+00	2.204E+00
150.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.238E+00
200.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.263E+00
300.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.298E+00
400.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.322E+00
500.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.341E+00
600.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.357E+00
700.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.370E+00
800.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.381E+00
900.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.391E+00
1000.000	1.245E+00	1.382E+00	1.442E+00	1.638E+00	2.400E+00

Table7-9

TOUGH WATER(WE-211)					
ENERGY MeV	RESTRICTED		AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)		
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.936E+01	2.224E+01	2.224E+01	2.224E+01	2.224E+01
.015	1.372E+01	1.573E+01	1.622E+01	1.622E+01	1.622E+01
.020	1.076E+01	1.235E+01	1.297E+01	1.297E+01	1.297E+01
.030	7.682E+00	8.819E+00	9.240E+00	9.495E+00	9.495E+00
.040	6.082E+00	6.977E+00	7.319E+00	7.646E+00	7.646E+00
.050	5.098E+00	5.843E+00	6.134E+00	6.489E+00	6.489E+00
.060	4.429E+00	5.072E+00	5.327E+00	5.695E+00	5.695E+00
.070	3.945E+00	4.514E+00	4.743E+00	5.115E+00	5.115E+00
.080	3.579E+00	4.091E+00	4.299E+00	4.672E+00	4.672E+00
.090	3.291E+00	3.760E+00	3.951E+00	4.323E+00	4.323E+00
.100	3.059E+00	3.493E+00	3.671E+00	4.041E+00	4.041E+00
.150	2.357E+00	2.684E+00	2.820E+00	3.177E+00	3.177E+00
.200	2.005E+00	2.278E+00	2.393E+00	2.740E+00	2.740E+00
.300	1.658E+00	1.878E+00	1.971E+00	2.257E+00	2.309E+00
.400	1.492E+00	1.686E+00	1.769E+00	2.028E+00	2.106E+00
.500	1.400E+00	1.578E+00	1.655E+00	1.898E+00	1.994E+00
.600	1.337E+00	1.506E+00	1.578E+00	1.810E+00	1.921E+00
.700	1.294E+00	1.456E+00	1.526E+00	1.750E+00	1.874E+00
.800	1.264E+00	1.421E+00	1.489E+00	1.707E+00	1.842E+00
.900	1.242E+00	1.395E+00	1.461E+00	1.676E+00	1.820E+00
1.000	1.225E+00	1.376E+00	1.440E+00	1.652E+00	1.805E+00
1.500	1.183E+00	1.326E+00	1.387E+00	1.589E+00	1.776E+00
2.000	1.169E+00	1.308E+00	1.368E+00	1.566E+00	1.778E+00
3.000	1.161E+00	1.298E+00	1.356E+00	1.551E+00	1.799E+00
4.000	1.162E+00	1.297E+00	1.355E+00	1.548E+00	1.822E+00
5.000	1.165E+00	1.299E+00	1.357E+00	1.550E+00	1.843E+00
6.000	1.168E+00	1.302E+00	1.360E+00	1.552E+00	1.862E+00
7.000	1.172E+00	1.306E+00	1.363E+00	1.555E+00	1.878E+00
8.000	1.175E+00	1.309E+00	1.367E+00	1.558E+00	1.893E+00
9.000	1.178E+00	1.312E+00	1.370E+00	1.561E+00	1.906E+00
10.000	1.181E+00	1.315E+00	1.372E+00	1.563E+00	1.918E+00
15.000	1.190E+00	1.323E+00	1.381E+00	1.572E+00	1.962E+00
20.000	1.195E+00	1.329E+00	1.386E+00	1.578E+00	1.992E+00
30.000	1.202E+00	1.336E+00	1.393E+00	1.584E+00	2.033E+00
40.000	1.206E+00	1.340E+00	1.397E+00	1.588E+00	2.061E+00
50.000	1.208E+00	1.342E+00	1.399E+00	1.590E+00	2.082E+00
60.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.102E+00
70.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.115E+00
80.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.126E+00
90.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.136E+00
100.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.144E+00
150.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.178E+00
200.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.202E+00
300.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.236E+00
400.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.260E+00
500.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.278E+00
600.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.294E+00
700.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.306E+00
800.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.317E+00
900.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.327E+00
1000.000	1.212E+00	1.346E+00	1.403E+00	1.594E+00	2.336E+00

Table7-10

SOLID WATER(457)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.934E+01	2.222E+01	2.222E+01	2.222E+01	2.222E+01
.015	1.370E+01	1.571E+01	1.620E+01	1.620E+01	1.620E+01
.020	1.075E+01	1.234E+01	1.295E+01	1.295E+01	1.295E+01
.030	7.674E+00	8.810E+00	9.231E+00	9.485E+00	9.485E+00
.040	6.076E+00	6.970E+00	7.311E+00	7.638E+00	7.638E+00
.050	5.093E+00	5.837E+00	6.127E+00	6.483E+00	6.483E+00
.060	4.425E+00	5.067E+00	5.322E+00	5.690E+00	5.690E+00
.070	3.941E+00	4.510E+00	4.738E+00	5.110E+00	5.110E+00
.080	3.575E+00	4.087E+00	4.295E+00	4.668E+00	4.668E+00
.090	3.288E+00	3.756E+00	3.947E+00	4.319E+00	4.319E+00
.100	3.056E+00	3.489E+00	3.667E+00	4.037E+00	4.037E+00
.150	2.355E+00	2.681E+00	2.817E+00	3.174E+00	3.174E+00
.200	2.003E+00	2.275E+00	2.390E+00	2.737E+00	2.737E+00
.300	1.656E+00	1.876E+00	1.969E+00	2.255E+00	2.307E+00
.400	1.491E+00	1.684E+00	1.767E+00	2.026E+00	2.104E+00
.500	1.398E+00	1.577E+00	1.653E+00	1.896E+00	1.992E+00
.600	1.336E+00	1.504E+00	1.576E+00	1.808E+00	1.919E+00
.700	1.293E+00	1.455E+00	1.524E+00	1.748E+00	1.872E+00
.800	1.263E+00	1.420E+00	1.487E+00	1.706E+00	1.840E+00
.900	1.241E+00	1.394E+00	1.460E+00	1.674E+00	1.818E+00
1.000	1.224E+00	1.375E+00	1.439E+00	1.650E+00	1.803E+00
1.500	1.182E+00	1.325E+00	1.386E+00	1.588E+00	1.775E+00
2.000	1.168E+00	1.307E+00	1.367E+00	1.565E+00	1.776E+00
3.000	1.161E+00	1.297E+00	1.355E+00	1.550E+00	1.797E+00
4.000	1.161E+00	1.296E+00	1.354E+00	1.547E+00	1.820E+00
5.000	1.164E+00	1.298E+00	1.356E+00	1.548E+00	1.841E+00
6.000	1.167E+00	1.301E+00	1.359E+00	1.551E+00	1.860E+00
7.000	1.171E+00	1.305E+00	1.362E+00	1.554E+00	1.877E+00
8.000	1.174E+00	1.308E+00	1.366E+00	1.557E+00	1.892E+00
9.000	1.177E+00	1.311E+00	1.369E+00	1.560E+00	1.905E+00
10.000	1.180E+00	1.314E+00	1.371E+00	1.562E+00	1.916E+00
15.000	1.189E+00	1.322E+00	1.380E+00	1.571E+00	1.960E+00
20.000	1.195E+00	1.328E+00	1.385E+00	1.576E+00	1.990E+00
30.000	1.201E+00	1.335E+00	1.392E+00	1.583E+00	2.032E+00
40.000	1.205E+00	1.338E+00	1.396E+00	1.587E+00	2.060E+00
50.000	1.207E+00	1.341E+00	1.398E+00	1.589E+00	2.081E+00
60.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.100E+00
70.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.113E+00
80.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.124E+00
90.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.134E+00
100.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.143E+00
150.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.176E+00
200.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.200E+00
300.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.234E+00
400.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.258E+00
500.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.276E+00
600.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.292E+00
700.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.304E+00
800.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.315E+00
900.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.325E+00
1000.000	1.211E+00	1.345E+00	1.402E+00	1.593E+00	2.334E+00

Table7-11

WHITE WATER (RW3)					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini.
.010	1.942E+01	2.229E+01	2.229E+01	2.229E+01	2.229E+01
.015	1.376E+01	1.576E+01	1.624E+01	1.624E+01	1.624E+01
.020	1.079E+01	1.237E+01	1.298E+01	1.298E+01	1.298E+01
.030	7.698E+00	8.828E+00	9.246E+00	9.499E+00	9.499E+00
.040	6.094E+00	6.983E+00	7.322E+00	7.647E+00	7.647E+00
.050	5.107E+00	5.847E+00	6.136E+00	6.489E+00	6.489E+00
.060	4.437E+00	5.075E+00	5.329E+00	5.694E+00	5.694E+00
.070	3.951E+00	4.516E+00	4.743E+00	5.113E+00	5.113E+00
.080	3.584E+00	4.093E+00	4.299E+00	4.670E+00	4.670E+00
.090	3.295E+00	3.761E+00	3.951E+00	4.321E+00	4.321E+00
.100	3.063E+00	3.494E+00	3.670E+00	4.038E+00	4.038E+00
.150	2.360E+00	2.684E+00	2.820E+00	3.175E+00	3.175E+00
.200	2.007E+00	2.278E+00	2.392E+00	2.737E+00	2.737E+00
.300	1.659E+00	1.877E+00	1.970E+00	2.254E+00	2.306E+00
.400	1.493E+00	1.685E+00	1.768E+00	2.025E+00	2.103E+00
.500	1.400E+00	1.578E+00	1.653E+00	1.895E+00	1.991E+00
.600	1.336E+00	1.504E+00	1.576E+00	1.806E+00	1.917E+00
.700	1.293E+00	1.454E+00	1.523E+00	1.746E+00	1.868E+00
.800	1.262E+00	1.418E+00	1.485E+00	1.702E+00	1.836E+00
.900	1.239E+00	1.392E+00	1.457E+00	1.670E+00	1.813E+00
1.000	1.222E+00	1.372E+00	1.436E+00	1.646E+00	1.798E+00
1.500	1.179E+00	1.320E+00	1.381E+00	1.582E+00	1.768E+00
2.000	1.163E+00	1.302E+00	1.361E+00	1.558E+00	1.768E+00
3.000	1.155E+00	1.290E+00	1.348E+00	1.542E+00	1.788E+00
4.000	1.155E+00	1.289E+00	1.347E+00	1.538E+00	1.810E+00
5.000	1.157E+00	1.291E+00	1.348E+00	1.539E+00	1.831E+00
6.000	1.160E+00	1.293E+00	1.351E+00	1.542E+00	1.849E+00
7.000	1.163E+00	1.296E+00	1.354E+00	1.544E+00	1.865E+00
8.000	1.167E+00	1.300E+00	1.357E+00	1.547E+00	1.880E+00
9.000	1.170E+00	1.302E+00	1.360E+00	1.550E+00	1.893E+00
10.000	1.172E+00	1.305E+00	1.362E+00	1.552E+00	1.904E+00
15.000	1.181E+00	1.313E+00	1.371E+00	1.560E+00	1.948E+00
20.000	1.186E+00	1.319E+00	1.376E+00	1.566E+00	1.977E+00
30.000	1.193E+00	1.325E+00	1.382E+00	1.572E+00	2.018E+00
40.000	1.197E+00	1.329E+00	1.386E+00	1.576E+00	2.046E+00
50.000	1.199E+00	1.331E+00	1.388E+00	1.578E+00	2.067E+00
60.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.086E+00
70.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.099E+00
80.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.110E+00
90.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.120E+00
100.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.129E+00
150.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.162E+00
200.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.186E+00
300.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.220E+00
400.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.243E+00
500.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.262E+00
600.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.277E+00
700.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.290E+00
800.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.301E+00
900.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.310E+00
1000.000	1.203E+00	1.335E+00	1.392E+00	1.582E+00	2.319E+00



Table7-12

PLASTIC WATER					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.946E+01	2.237E+01	2.237E+01	2.237E+01	2.237E+01
.015	1.379E+01	1.582E+01	1.632E+01	1.632E+01	1.632E+01
.020	1.082E+01	1.243E+01	1.305E+01	1.305E+01	1.305E+01
.030	7.726E+00	8.873E+00	9.298E+00	9.555E+00	9.555E+00
.040	6.118E+00	7.021E+00	7.365E+00	7.695E+00	7.695E+00
.050	5.128E+00	5.879E+00	6.173E+00	6.532E+00	6.532E+00
.060	4.456E+00	5.104E+00	5.362E+00	5.733E+00	5.733E+00
.070	3.969E+00	4.543E+00	4.773E+00	5.149E+00	5.149E+00
.080	3.600E+00	4.117E+00	4.327E+00	4.704E+00	4.704E+00
.090	3.311E+00	3.784E+00	3.977E+00	4.352E+00	4.352E+00
.100	3.078E+00	3.515E+00	3.695E+00	4.068E+00	4.068E+00
.150	2.372E+00	2.701E+00	2.839E+00	3.199E+00	3.199E+00
.200	2.017E+00	2.293E+00	2.409E+00	2.759E+00	2.759E+00
.300	1.668E+00	1.890E+00	1.984E+00	2.273E+00	2.326E+00
.400	1.502E+00	1.697E+00	1.781E+00	2.042E+00	2.121E+00
.500	1.409E+00	1.589E+00	1.666E+00	1.911E+00	2.008E+00
.600	1.346E+00	1.516E+00	1.589E+00	1.823E+00	1.935E+00
.700	1.303E+00	1.467E+00	1.537E+00	1.763E+00	1.888E+00
.800	1.273E+00	1.431E+00	1.499E+00	1.720E+00	1.856E+00
.900	1.251E+00	1.405E+00	1.472E+00	1.688E+00	1.834E+00
1.000	1.234E+00	1.386E+00	1.451E+00	1.664E+00	1.819E+00
1.500	1.192E+00	1.336E+00	1.398E+00	1.602E+00	1.791E+00
2.000	1.178E+00	1.318E+00	1.379E+00	1.579E+00	1.792E+00
3.000	1.171E+00	1.308E+00	1.367E+00	1.564E+00	1.814E+00
4.000	1.171E+00	1.308E+00	1.367E+00	1.561E+00	1.837E+00
5.000	1.174E+00	1.310E+00	1.369E+00	1.563E+00	1.859E+00
6.000	1.178E+00	1.313E+00	1.372E+00	1.565E+00	1.878E+00
7.000	1.181E+00	1.317E+00	1.375E+00	1.568E+00	1.894E+00
8.000	1.185E+00	1.320E+00	1.379E+00	1.572E+00	1.910E+00
9.000	1.188E+00	1.323E+00	1.381E+00	1.574E+00	1.923E+00
10.000	1.191E+00	1.326E+00	1.384E+00	1.577E+00	1.935E+00
15.000	1.200E+00	1.335E+00	1.393E+00	1.586E+00	1.979E+00
20.000	1.206E+00	1.340E+00	1.398E+00	1.591E+00	2.009E+00
30.000	1.213E+00	1.347E+00	1.405E+00	1.598E+00	2.051E+00
40.000	1.216E+00	1.351E+00	1.409E+00	1.602E+00	2.079E+00
50.000	1.219E+00	1.353E+00	1.411E+00	1.604E+00	2.101E+00
60.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.120E+00
70.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.133E+00
80.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.144E+00
90.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.154E+00
100.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.163E+00
150.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.197E+00
200.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.221E+00
300.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.256E+00
400.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.280E+00
500.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.298E+00
600.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.314E+00
700.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.327E+00
800.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.338E+00
900.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.348E+00
1000.000	1.223E+00	1.357E+00	1.415E+00	1.608E+00	2.356E+00

Table7-13

MIX-DP					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	2.076E+01	2.376E+01	2.376E+01	2.376E+01	2.376E+01
.015	1.469E+01	1.679E+01	1.729E+01	1.729E+01	1.729E+01
.020	1.151E+01	1.317E+01	1.381E+01	1.381E+01	1.381E+01
.030	8.210E+00	9.394E+00	9.832E+00	1.010E+01	1.010E+01
.040	6.496E+00	7.428E+00	7.784E+00	8.124E+00	8.124E+00
.050	5.442E+00	6.218E+00	6.521E+00	6.891E+00	6.891E+00
.060	4.727E+00	5.396E+00	5.662E+00	6.045E+00	6.045E+00
.070	4.209E+00	4.801E+00	5.039E+00	5.427E+00	5.427E+00
.080	3.817E+00	4.350E+00	4.567E+00	4.955E+00	4.955E+00
.090	3.509E+00	3.997E+00	4.196E+00	4.584E+00	4.584E+00
.100	3.261E+00	3.713E+00	3.898E+00	4.283E+00	4.283E+00
.150	2.511E+00	2.851E+00	2.993E+00	3.365E+00	3.365E+00
.200	2.135E+00	2.419E+00	2.539E+00	2.900E+00	2.900E+00
.300	1.764E+00	1.993E+00	2.090E+00	2.388E+00	2.442E+00
.400	1.587E+00	1.789E+00	1.875E+00	2.145E+00	2.226E+00
.500	1.488E+00	1.673E+00	1.753E+00	2.006E+00	2.106E+00
.600	1.418E+00	1.593E+00	1.669E+00	1.910E+00	2.026E+00
.700	1.370E+00	1.539E+00	1.611E+00	1.845E+00	1.974E+00
.800	1.336E+00	1.500E+00	1.570E+00	1.798E+00	1.938E+00
.900	1.311E+00	1.471E+00	1.539E+00	1.763E+00	1.913E+00
1.000	1.292E+00	1.449E+00	1.516E+00	1.736E+00	1.895E+00
1.500	1.244E+00	1.392E+00	1.456E+00	1.666E+00	1.861E+00
2.000	1.226E+00	1.370E+00	1.433E+00	1.639E+00	1.860E+00
3.000	1.214E+00	1.356E+00	1.417E+00	1.620E+00	1.878E+00
4.000	1.213E+00	1.354E+00	1.414E+00	1.615E+00	1.900E+00
5.000	1.215E+00	1.355E+00	1.415E+00	1.615E+00	1.921E+00
6.000	1.218E+00	1.357E+00	1.418E+00	1.617E+00	1.940E+00
7.000	1.220E+00	1.360E+00	1.420E+00	1.620E+00	1.956E+00
8.000	1.224E+00	1.363E+00	1.423E+00	1.623E+00	1.972E+00
9.000	1.227E+00	1.366E+00	1.426E+00	1.625E+00	1.985E+00
10.000	1.229E+00	1.368E+00	1.428E+00	1.627E+00	1.997E+00
15.000	1.238E+00	1.377E+00	1.436E+00	1.635E+00	2.041E+00
20.000	1.243E+00	1.382E+00	1.442E+00	1.641E+00	2.072E+00
30.000	1.250E+00	1.389E+00	1.449E+00	1.647E+00	2.115E+00
40.000	1.254E+00	1.393E+00	1.453E+00	1.651E+00	2.144E+00
50.000	1.256E+00	1.395E+00	1.455E+00	1.654E+00	2.166E+00
60.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.186E+00
70.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.200E+00
80.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.211E+00
90.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.222E+00
100.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.231E+00
150.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.266E+00
200.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.291E+00
300.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.326E+00
400.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.351E+00
500.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.370E+00
600.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.386E+00
700.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.399E+00
800.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.411E+00
900.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.421E+00
1000.000	1.260E+00	1.399E+00	1.459E+00	1.658E+00	2.430E+00

Table7-14

MIX-R					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini.
.010	2.002E+01	2.294E+01	2.294E+01	2.294E+01	2.294E+01
.015	1.417E+01	1.621E+01	1.671E+01	1.671E+01	1.671E+01
.020	1.111E+01	1.272E+01	1.335E+01	1.335E+01	1.335E+01
.030	7.926E+00	9.079E+00	9.506E+00	9.765E+00	9.765E+00
.040	6.273E+00	7.181E+00	7.527E+00	7.858E+00	7.858E+00
.050	5.256E+00	6.011E+00	6.306E+00	6.667E+00	6.667E+00
.060	4.566E+00	5.217E+00	5.476E+00	5.850E+00	5.850E+00
.070	4.066E+00	4.643E+00	4.874E+00	5.252E+00	5.252E+00
.080	3.687E+00	4.207E+00	4.418E+00	4.797E+00	4.797E+00
.090	3.390E+00	3.866E+00	4.060E+00	4.437E+00	4.437E+00
.100	3.151E+00	3.591E+00	3.771E+00	4.147E+00	4.147E+00
.150	2.427E+00	2.758E+00	2.897E+00	3.259E+00	3.259E+00
.200	2.064E+00	2.340E+00	2.457E+00	2.809E+00	2.809E+00
.300	1.706E+00	1.928E+00	2.023E+00	2.314E+00	2.366E+00
.400	1.535E+00	1.731E+00	1.815E+00	2.078E+00	2.157E+00
.500	1.439E+00	1.620E+00	1.698E+00	1.944E+00	2.042E+00
.600	1.373E+00	1.544E+00	1.617E+00	1.852E+00	1.965E+00
.700	1.327E+00	1.492E+00	1.562E+00	1.790E+00	1.915E+00
.800	1.295E+00	1.455E+00	1.523E+00	1.745E+00	1.881E+00
.900	1.272E+00	1.427E+00	1.494E+00	1.712E+00	1.858E+00
1.000	1.254E+00	1.407E+00	1.472E+00	1.686E+00	1.841E+00
1.500	1.208E+00	1.353E+00	1.415E+00	1.620E+00	1.810E+00
2.000	1.192E+00	1.333E+00	1.394E+00	1.595E+00	1.810E+00
3.000	1.182E+00	1.321E+00	1.380E+00	1.577E+00	1.829E+00
4.000	1.182E+00	1.319E+00	1.378E+00	1.574E+00	1.851E+00
5.000	1.184E+00	1.320E+00	1.379E+00	1.574E+00	1.872E+00
6.000	1.187E+00	1.323E+00	1.382E+00	1.576E+00	1.891E+00
7.000	1.190E+00	1.326E+00	1.385E+00	1.579E+00	1.907E+00
8.000	1.194E+00	1.329E+00	1.388E+00	1.582E+00	1.922E+00
9.000	1.196E+00	1.332E+00	1.391E+00	1.585E+00	1.935E+00
10.000	1.199E+00	1.334E+00	1.393E+00	1.587E+00	1.947E+00
15.000	1.207E+00	1.343E+00	1.401E+00	1.595E+00	1.991E+00
20.000	1.213E+00	1.348E+00	1.407E+00	1.600E+00	2.021E+00
30.000	1.220E+00	1.355E+00	1.413E+00	1.607E+00	2.063E+00
40.000	1.224E+00	1.359E+00	1.417E+00	1.611E+00	2.091E+00
50.000	1.226E+00	1.361E+00	1.420E+00	1.613E+00	2.112E+00
60.000	1.230E+00	1.365E+00	1.424E+00	1.617E+00	2.132E+00
70.000	1.230E+00	1.365E+00	1.424E+00	1.617E+00	2.145E+00
80.000	1.230E+00	1.365E+00	1.424E+00	1.617E+00	2.156E+00
90.000	1.230E+00	1.365E+00	1.424E+00	1.617E+00	2.166E+00
100.000	1.230E+00	1.365E+00	1.424E+00	1.617E+00	2.175E+00
150.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.210E+00
200.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.234E+00
300.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.268E+00
400.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.292E+00
500.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.311E+00
600.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.327E+00
700.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.340E+00
800.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.351E+00
900.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.361E+00
1000.000	1.230E+00	1.365E+00	1.423E+00	1.617E+00	2.370E+00

Table7-15

TOUGH BONE(BE-103)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.687E+01	1.963E+01	1.963E+01	1.963E+01	1.963E+01
.015	1.201E+01	1.393E+01	1.440E+01	1.440E+01	1.440E+01
.020	9.445E+00	1.096E+01	1.155E+01	1.155E+01	1.155E+01
.030	6.766E+00	7.853E+00	8.255E+00	8.499E+00	8.499E+00
.040	5.369E+00	6.225E+00	6.551E+00	6.863E+00	6.863E+00
.050	4.508E+00	5.220E+00	5.498E+00	5.838E+00	5.838E+00
.060	3.922E+00	4.536E+00	4.780E+00	5.131E+00	5.131E+00
.070	3.497E+00	4.040E+00	4.259E+00	4.615E+00	4.615E+00
.080	3.174E+00	3.664E+00	3.863E+00	4.220E+00	4.220E+00
.090	2.921E+00	3.369E+00	3.552E+00	3.908E+00	3.908E+00
.100	2.717E+00	3.131E+00	3.302E+00	3.655E+00	3.655E+00
.150	2.099E+00	2.411E+00	2.541E+00	2.883E+00	2.883E+00
.200	1.788E+00	2.048E+00	2.158E+00	2.491E+00	2.491E+00
.300	1.481E+00	1.691E+00	1.781E+00	2.054E+00	2.104E+00
.400	1.336E+00	1.521E+00	1.600E+00	1.847E+00	1.922E+00
.500	1.254E+00	1.425E+00	1.498E+00	1.730E+00	1.822E+00
.600	1.197E+00	1.358E+00	1.427E+00	1.649E+00	1.756E+00
.700	1.159E+00	1.313E+00	1.380E+00	1.594E+00	1.713E+00
.800	1.132E+00	1.282E+00	1.346E+00	1.555E+00	1.684E+00
.900	1.112E+00	1.258E+00	1.321E+00	1.526E+00	1.664E+00
1.000	1.097E+00	1.241E+00	1.303E+00	1.504E+00	1.651E+00
1.500	1.060E+00	1.197E+00	1.255E+00	1.448E+00	1.627E+00
2.000	1.049E+00	1.182E+00	1.239E+00	1.428E+00	1.631E+00
3.000	1.045E+00	1.175E+00	1.231E+00	1.417E+00	1.654E+00
4.000	1.047E+00	1.177E+00	1.232E+00	1.417E+00	1.678E+00
5.000	1.052E+00	1.181E+00	1.236E+00	1.420E+00	1.700E+00
6.000	1.057E+00	1.186E+00	1.241E+00	1.424E+00	1.720E+00
7.000	1.062E+00	1.190E+00	1.245E+00	1.428E+00	1.737E+00
8.000	1.067E+00	1.195E+00	1.250E+00	1.433E+00	1.753E+00
9.000	1.071E+00	1.199E+00	1.254E+00	1.437E+00	1.767E+00
10.000	1.075E+00	1.202E+00	1.257E+00	1.440E+00	1.779E+00
15.000	1.088E+00	1.215E+00	1.270E+00	1.453E+00	1.825E+00
20.000	1.096E+00	1.223E+00	1.278E+00	1.461E+00	1.857E+00
30.000	1.106E+00	1.234E+00	1.288E+00	1.471E+00	1.900E+00
40.000	1.112E+00	1.239E+00	1.294E+00	1.477E+00	1.929E+00
50.000	1.115E+00	1.243E+00	1.297E+00	1.480E+00	1.950E+00
60.000	1.117E+00	1.244E+00	1.299E+00	1.482E+00	1.967E+00
70.000	1.118E+00	1.245E+00	1.300E+00	1.483E+00	1.980E+00
80.000	1.118E+00	1.246E+00	1.301E+00	1.483E+00	1.992E+00
90.000	1.119E+00	1.246E+00	1.301E+00	1.484E+00	2.001E+00
100.000	1.119E+00	1.246E+00	1.301E+00	1.484E+00	2.010E+00
150.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.043E+00
200.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.066E+00
300.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.099E+00
400.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.121E+00
500.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.139E+00
600.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.154E+00
700.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.166E+00
800.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.176E+00
900.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.186E+00
1000.000	1.120E+00	1.248E+00	1.303E+00	1.485E+00	2.194E+00

Table7-16

TOUGH BONE(BE-204)					
ENERGY	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
MeV	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.770E+01	2.049E+01	2.049E+01	2.049E+01	2.049E+01
.015	1.258E+01	1.453E+01	1.500E+01	1.500E+01	1.500E+01
.020	9.883E+00	1.143E+01	1.202E+01	1.202E+01	1.202E+01
.030	7.071E+00	8.173E+00	8.581E+00	8.828E+00	8.828E+00
.040	5.606E+00	6.474E+00	6.805E+00	7.122E+00	7.122E+00
.050	4.704E+00	5.426E+00	5.708E+00	6.053E+00	6.053E+00
.060	4.090E+00	4.714E+00	4.961E+00	5.318E+00	5.318E+00
.070	3.646E+00	4.197E+00	4.419E+00	4.780E+00	4.780E+00
.080	3.309E+00	3.806E+00	4.007E+00	4.369E+00	4.369E+00
.090	3.044E+00	3.498E+00	3.684E+00	4.045E+00	4.045E+00
.100	2.831E+00	3.251E+00	3.424E+00	3.783E+00	3.783E+00
.150	2.185E+00	2.501E+00	2.633E+00	2.980E+00	2.980E+00
.200	1.860E+00	2.124E+00	2.236E+00	2.573E+00	2.573E+00
.300	1.540E+00	1.753E+00	1.844E+00	2.121E+00	2.172E+00
.400	1.388E+00	1.575E+00	1.656E+00	1.907E+00	1.983E+00
.500	1.302E+00	1.476E+00	1.550E+00	1.785E+00	1.879E+00
.600	1.244E+00	1.407E+00	1.477E+00	1.702E+00	1.810E+00
.700	1.204E+00	1.361E+00	1.428E+00	1.646E+00	1.766E+00
.800	1.176E+00	1.328E+00	1.394E+00	1.606E+00	1.736E+00
.900	1.155E+00	1.304E+00	1.368E+00	1.576E+00	1.716E+00
1.000	1.140E+00	1.286E+00	1.349E+00	1.553E+00	1.702E+00
1.500	1.102E+00	1.240E+00	1.299E+00	1.495E+00	1.677E+00
2.000	1.089E+00	1.224E+00	1.282E+00	1.474E+00	1.680E+00
3.000	1.084E+00	1.216E+00	1.273E+00	1.461E+00	1.702E+00
4.000	1.086E+00	1.217E+00	1.273E+00	1.460E+00	1.726E+00
5.000	1.090E+00	1.220E+00	1.276E+00	1.463E+00	1.747E+00
6.000	1.094E+00	1.224E+00	1.280E+00	1.466E+00	1.767E+00
7.000	1.098E+00	1.228E+00	1.284E+00	1.470E+00	1.783E+00
8.000	1.102E+00	1.232E+00	1.288E+00	1.474E+00	1.799E+00
9.000	1.106E+00	1.236E+00	1.292E+00	1.477E+00	1.812E+00
10.000	1.109E+00	1.239E+00	1.295E+00	1.480E+00	1.824E+00
15.000	1.120E+00	1.250E+00	1.306E+00	1.491E+00	1.869E+00
20.000	1.127E+00	1.257E+00	1.312E+00	1.498E+00	1.900E+00
30.000	1.136E+00	1.265E+00	1.321E+00	1.506E+00	1.942E+00
40.000	1.140E+00	1.270E+00	1.325E+00	1.511E+00	1.970E+00
50.000	1.143E+00	1.272E+00	1.328E+00	1.513E+00	1.991E+00
60.000	1.144E+00	1.274E+00	1.330E+00	1.515E+00	2.007E+00
70.000	1.145E+00	1.274E+00	1.330E+00	1.515E+00	2.020E+00
80.000	1.145E+00	1.275E+00	1.331E+00	1.516E+00	2.031E+00
90.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.042E+00
100.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.051E+00
150.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.084E+00
200.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.107E+00
300.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.140E+00
400.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.163E+00
500.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.181E+00
600.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.196E+00
700.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.208E+00
800.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.219E+00
900.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.228E+00
1000.000	1.147E+00	1.276E+00	1.332E+00	1.517E+00	2.237E+00

Table7-17

TOUGH BONE(BE-303)					
ENERGY	RESTRICTED	AND UNRESTRICTED	STOPPING	POWER (MeV*cm**2/g)	
MeV	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.878E+01	2.163E+01	2.163E+01	2.163E+01	2.163E+01
.015	1.332E+01	1.531E+01	1.579E+01	1.579E+01	1.579E+01
.020	1.045E+01	1.203E+01	1.263E+01	1.263E+01	1.263E+01
.030	7.468E+00	8.591E+00	9.007E+00	9.259E+00	9.259E+00
.040	5.915E+00	6.800E+00	7.137E+00	7.460E+00	7.460E+00
.050	4.959E+00	5.696E+00	5.983E+00	6.335E+00	6.335E+00
.060	4.310E+00	4.945E+00	5.198E+00	5.561E+00	5.561E+00
.070	3.840E+00	4.402E+00	4.628E+00	4.996E+00	4.996E+00
.080	3.484E+00	3.990E+00	4.196E+00	4.564E+00	4.564E+00
.090	3.204E+00	3.667E+00	3.856E+00	4.224E+00	4.224E+00
.100	2.979E+00	3.407E+00	3.583E+00	3.949E+00	3.949E+00
.150	2.297E+00	2.619E+00	2.754E+00	3.107E+00	3.107E+00
.200	1.954E+00	2.223E+00	2.337E+00	2.680E+00	2.680E+00
.300	1.616E+00	1.833E+00	1.925E+00	2.209E+00	2.260E+00
.400	1.455E+00	1.647E+00	1.728E+00	1.984E+00	2.062E+00
.500	1.365E+00	1.542E+00	1.617E+00	1.857E+00	1.953E+00
.600	1.304E+00	1.471E+00	1.542E+00	1.771E+00	1.881E+00
.700	1.262E+00	1.422E+00	1.491E+00	1.713E+00	1.835E+00
.800	1.233E+00	1.388E+00	1.455E+00	1.671E+00	1.804E+00
.900	1.211E+00	1.363E+00	1.428E+00	1.640E+00	1.782E+00
1.000	1.195E+00	1.344E+00	1.408E+00	1.616E+00	1.767E+00
1.500	1.154E+00	1.295E+00	1.356E+00	1.555E+00	1.740E+00
2.000	1.140E+00	1.278E+00	1.337E+00	1.532E+00	1.742E+00
3.000	1.133E+00	1.267E+00	1.325E+00	1.517E+00	1.762E+00
4.000	1.133E+00	1.267E+00	1.324E+00	1.515E+00	1.785E+00
5.000	1.136E+00	1.269E+00	1.326E+00	1.516E+00	1.806E+00
6.000	1.139E+00	1.272E+00	1.329E+00	1.519E+00	1.825E+00
7.000	1.143E+00	1.275E+00	1.332E+00	1.521E+00	1.841E+00
8.000	1.146E+00	1.279E+00	1.336E+00	1.525E+00	1.856E+00
9.000	1.149E+00	1.281E+00	1.338E+00	1.527E+00	1.869E+00
10.000	1.152E+00	1.284E+00	1.341E+00	1.530E+00	1.880E+00
15.000	1.161E+00	1.293E+00	1.349E+00	1.538E+00	1.923E+00
20.000	1.166E+00	1.298E+00	1.355E+00	1.544E+00	1.953E+00
30.000	1.173E+00	1.305E+00	1.361E+00	1.550E+00	1.994E+00
40.000	1.177E+00	1.308E+00	1.365E+00	1.554E+00	2.022E+00
50.000	1.179E+00	1.311E+00	1.367E+00	1.556E+00	2.043E+00
60.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.062E+00
70.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.074E+00
80.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.085E+00
90.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.095E+00
100.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.104E+00
150.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.137E+00
200.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.161E+00
300.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.194E+00
400.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.218E+00
500.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.236E+00
600.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.251E+00
700.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.264E+00
800.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.275E+00
900.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.284E+00
1000.000	1.183E+00	1.315E+00	1.371E+00	1.560E+00	2.293E+00

Table7-18

HARD BONE(450)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.687E+01	1.962E+01	1.962E+01	1.962E+01	1.962E+01
.015	1.200E+01	1.392E+01	1.439E+01	1.439E+01	1.439E+01
.020	9.443E+00	1.096E+01	1.155E+01	1.155E+01	1.155E+01
.030	6.764E+00	7.848E+00	8.249E+00	8.492E+00	8.492E+00
.040	5.367E+00	6.221E+00	6.546E+00	6.858E+00	6.858E+00
.050	4.506E+00	5.216E+00	5.493E+00	5.833E+00	5.833E+00
.060	3.920E+00	4.533E+00	4.776E+00	5.127E+00	5.127E+00
.070	3.495E+00	4.037E+00	4.255E+00	4.610E+00	4.610E+00
.080	3.173E+00	3.661E+00	3.860E+00	4.216E+00	4.216E+00
.090	2.920E+00	3.367E+00	3.549E+00	3.904E+00	3.904E+00
.100	2.716E+00	3.129E+00	3.299E+00	3.652E+00	3.652E+00
.150	2.098E+00	2.409E+00	2.539E+00	2.879E+00	2.879E+00
.200	1.787E+00	2.047E+00	2.156E+00	2.488E+00	2.488E+00
.300	1.480E+00	1.690E+00	1.779E+00	2.052E+00	2.102E+00
.400	1.335E+00	1.519E+00	1.598E+00	1.845E+00	1.920E+00
.500	1.253E+00	1.423E+00	1.496E+00	1.728E+00	1.820E+00
.600	1.196E+00	1.356E+00	1.425E+00	1.647E+00	1.753E+00
.700	1.157E+00	1.311E+00	1.377E+00	1.591E+00	1.709E+00
.800	1.129E+00	1.279E+00	1.343E+00	1.552E+00	1.680E+00
.900	1.109E+00	1.255E+00	1.318E+00	1.523E+00	1.660E+00
1.000	1.094E+00	1.238E+00	1.299E+00	1.501E+00	1.646E+00
1.500	1.057E+00	1.193E+00	1.251E+00	1.444E+00	1.622E+00
2.000	1.045E+00	1.177E+00	1.235E+00	1.423E+00	1.625E+00
3.000	1.040E+00	1.170E+00	1.226E+00	1.411E+00	1.648E+00
4.000	1.042E+00	1.171E+00	1.227E+00	1.411E+00	1.672E+00
5.000	1.047E+00	1.175E+00	1.230E+00	1.414E+00	1.694E+00
6.000	1.052E+00	1.180E+00	1.235E+00	1.418E+00	1.713E+00
7.000	1.056E+00	1.184E+00	1.239E+00	1.422E+00	1.730E+00
8.000	1.061E+00	1.189E+00	1.244E+00	1.426E+00	1.746E+00
9.000	1.065E+00	1.193E+00	1.247E+00	1.430E+00	1.759E+00
10.000	1.068E+00	1.196E+00	1.251E+00	1.433E+00	1.771E+00
15.000	1.081E+00	1.208E+00	1.263E+00	1.445E+00	1.817E+00
20.000	1.089E+00	1.217E+00	1.271E+00	1.453E+00	1.849E+00
30.000	1.099E+00	1.226E+00	1.281E+00	1.463E+00	1.891E+00
40.000	1.105E+00	1.232E+00	1.287E+00	1.469E+00	1.920E+00
50.000	1.108E+00	1.235E+00	1.290E+00	1.472E+00	1.942E+00
60.000	1.110E+00	1.237E+00	1.292E+00	1.474E+00	1.958E+00
70.000	1.111E+00	1.238E+00	1.293E+00	1.475E+00	1.971E+00
80.000	1.112E+00	1.239E+00	1.294E+00	1.476E+00	1.982E+00
90.000	1.112E+00	1.239E+00	1.294E+00	1.476E+00	1.992E+00
100.000	1.112E+00	1.239E+00	1.294E+00	1.476E+00	2.001E+00
150.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.034E+00
200.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.057E+00
300.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.089E+00
400.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.112E+00
500.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.130E+00
600.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.144E+00
700.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.156E+00
800.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.167E+00
900.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.176E+00
1000.000	1.113E+00	1.240E+00	1.295E+00	1.477E+00	2.185E+00

Table7-19

INNER BONE(456)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED		STOPPING POWER (MeV*cm**2/g)		
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.894E+01	2.180E+01	2.180E+01	2.180E+01	2.180E+01
.015	1.343E+01	1.543E+01	1.591E+01	1.591E+01	1.591E+01
.020	1.054E+01	1.212E+01	1.273E+01	1.273E+01	1.273E+01
.030	7.527E+00	8.655E+00	9.073E+00	9.325E+00	9.325E+00
.040	5.962E+00	6.850E+00	7.189E+00	7.513E+00	7.513E+00
.050	4.998E+00	5.737E+00	6.026E+00	6.379E+00	6.379E+00
.060	4.344E+00	4.981E+00	5.234E+00	5.599E+00	5.599E+00
.070	3.870E+00	4.434E+00	4.660E+00	5.030E+00	5.030E+00
.080	3.510E+00	4.019E+00	4.225E+00	4.595E+00	4.595E+00
.090	3.228E+00	3.693E+00	3.883E+00	4.252E+00	4.252E+00
.100	3.001E+00	3.431E+00	3.608E+00	3.975E+00	3.975E+00
.150	2.314E+00	2.637E+00	2.773E+00	3.127E+00	3.127E+00
.200	1.968E+00	2.239E+00	2.353E+00	2.698E+00	2.698E+00
.300	1.628E+00	1.846E+00	1.938E+00	2.223E+00	2.274E+00
.400	1.466E+00	1.658E+00	1.740E+00	1.997E+00	2.074E+00
.500	1.375E+00	1.552E+00	1.628E+00	1.869E+00	1.965E+00
.600	1.313E+00	1.481E+00	1.552E+00	1.783E+00	1.893E+00
.700	1.271E+00	1.432E+00	1.501E+00	1.724E+00	1.846E+00
.800	1.242E+00	1.398E+00	1.464E+00	1.681E+00	1.815E+00
.900	1.220E+00	1.372E+00	1.437E+00	1.650E+00	1.793E+00
1.000	1.204E+00	1.353E+00	1.417E+00	1.627E+00	1.778E+00
1.500	1.163E+00	1.304E+00	1.365E+00	1.565E+00	1.751E+00
2.000	1.148E+00	1.286E+00	1.346E+00	1.542E+00	1.752E+00
3.000	1.141E+00	1.276E+00	1.334E+00	1.527E+00	1.773E+00
4.000	1.141E+00	1.275E+00	1.333E+00	1.525E+00	1.796E+00
5.000	1.144E+00	1.278E+00	1.335E+00	1.526E+00	1.817E+00
6.000	1.147E+00	1.281E+00	1.338E+00	1.528E+00	1.836E+00
7.000	1.151E+00	1.284E+00	1.341E+00	1.531E+00	1.852E+00
8.000	1.154E+00	1.287E+00	1.345E+00	1.534E+00	1.867E+00
9.000	1.157E+00	1.290E+00	1.347E+00	1.537E+00	1.880E+00
10.000	1.160E+00	1.293E+00	1.350E+00	1.539E+00	1.891E+00
15.000	1.169E+00	1.301E+00	1.358E+00	1.548E+00	1.935E+00
20.000	1.174E+00	1.307E+00	1.364E+00	1.553E+00	1.965E+00
30.000	1.181E+00	1.314E+00	1.371E+00	1.560E+00	2.005E+00
40.000	1.185E+00	1.317E+00	1.374E+00	1.564E+00	2.033E+00
50.000	1.187E+00	1.320E+00	1.377E+00	1.566E+00	2.054E+00
60.000	1.191E+00	1.324E+00	1.381E+00	1.570E+00	2.073E+00
70.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.086E+00
80.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.097E+00
90.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.107E+00
100.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.116E+00
150.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.149E+00
200.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.173E+00
300.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.207E+00
400.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.230E+00
500.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.249E+00
600.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.264E+00
700.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.276E+00
800.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.287E+00
900.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.297E+00
1000.000	1.191E+00	1.323E+00	1.380E+00	1.570E+00	2.306E+00



Table7-20

LUNG(455)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.951E+01	2.240E+01	2.240E+01	2.240E+01	2.240E+01
.015	1.382E+01	1.584E+01	1.633E+01	1.633E+01	1.633E+01
.020	1.084E+01	1.244E+01	1.306E+01	1.306E+01	1.306E+01
.030	7.738E+00	8.879E+00	9.302E+00	9.557E+00	9.557E+00
.040	6.126E+00	7.025E+00	7.367E+00	7.695E+00	7.695E+00
.050	5.134E+00	5.882E+00	6.174E+00	6.531E+00	6.531E+00
.060	4.461E+00	5.106E+00	5.362E+00	5.732E+00	5.732E+00
.070	3.973E+00	4.544E+00	4.773E+00	5.147E+00	5.147E+00
.080	3.604E+00	4.118E+00	4.327E+00	4.702E+00	4.702E+00
.090	3.314E+00	3.784E+00	3.976E+00	4.350E+00	4.350E+00
.100	3.081E+00	3.516E+00	3.694E+00	4.066E+00	4.066E+00
.150	2.374E+00	2.701E+00	2.838E+00	3.197E+00	3.197E+00
.200	2.018E+00	2.292E+00	2.408E+00	2.757E+00	2.757E+00
.300	1.669E+00	1.889E+00	1.983E+00	2.271E+00	2.323E+00
.400	1.502E+00	1.697E+00	1.780E+00	2.040E+00	2.118E+00
.500	1.412E+00	1.591E+00	1.668E+00	1.911E+00	2.008E+00
.600	1.359E+00	1.528E+00	1.601E+00	1.834E+00	1.946E+00
.700	1.324E+00	1.487E+00	1.556E+00	1.782E+00	1.906E+00
.800	1.300E+00	1.457E+00	1.525E+00	1.745E+00	1.880E+00
.900	1.283E+00	1.437E+00	1.503E+00	1.718E+00	1.863E+00
1.000	1.270E+00	1.421E+00	1.486E+00	1.698E+00	1.852E+00
1.500	1.243E+00	1.386E+00	1.448E+00	1.650E+00	1.838E+00
2.000	1.238E+00	1.377E+00	1.437E+00	1.636E+00	1.849E+00
3.000	1.241E+00	1.378E+00	1.437E+00	1.632E+00	1.881E+00
4.000	1.248E+00	1.384E+00	1.442E+00	1.636E+00	1.911E+00
5.000	1.255E+00	1.390E+00	1.449E+00	1.642E+00	1.936E+00
6.000	1.262E+00	1.397E+00	1.455E+00	1.647E+00	1.958E+00
7.000	1.268E+00	1.402E+00	1.460E+00	1.653E+00	1.977E+00
8.000	1.273E+00	1.408E+00	1.466E+00	1.658E+00	1.994E+00
9.000	1.278E+00	1.412E+00	1.470E+00	1.662E+00	2.009E+00
10.000	1.281E+00	1.416E+00	1.473E+00	1.665E+00	2.021E+00
15.000	1.293E+00	1.428E+00	1.485E+00	1.677E+00	2.068E+00
20.000	1.300E+00	1.434E+00	1.492E+00	1.684E+00	2.100E+00
30.000	1.308E+00	1.442E+00	1.500E+00	1.691E+00	2.142E+00
40.000	1.312E+00	1.446E+00	1.504E+00	1.695E+00	2.171E+00
50.000	1.314E+00	1.448E+00	1.506E+00	1.698E+00	2.192E+00
60.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.211E+00
70.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.224E+00
80.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.235E+00
90.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.245E+00
100.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.254E+00
150.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.288E+00
200.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.312E+00
300.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.346E+00
400.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.370E+00
500.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.388E+00
600.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.404E+00
700.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.417E+00
800.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.428E+00
900.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.437E+00
1000.000	1.318E+00	1.452E+00	1.510E+00	1.702E+00	2.446E+00

Table7-21

FAT(453)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.970E+01	2.258E+01	2.258E+01	2.258E+01	2.258E+01
.015	1.395E+01	1.596E+01	1.645E+01	1.645E+01	1.645E+01
.020	1.094E+01	1.253E+01	1.314E+01	1.314E+01	1.314E+01
.030	7.803E+00	8.939E+00	9.361E+00	9.615E+00	9.615E+00
.040	6.175E+00	7.070E+00	7.412E+00	7.739E+00	7.739E+00
.050	5.174E+00	5.919E+00	6.210E+00	6.566E+00	6.566E+00
.060	4.495E+00	5.138E+00	5.393E+00	5.761E+00	5.761E+00
.070	4.003E+00	4.572E+00	4.800E+00	5.173E+00	5.173E+00
.080	3.630E+00	4.143E+00	4.351E+00	4.724E+00	4.724E+00
.090	3.338E+00	3.807E+00	3.998E+00	4.370E+00	4.370E+00
.100	3.103E+00	3.536E+00	3.714E+00	4.084E+00	4.084E+00
.150	2.390E+00	2.716E+00	2.853E+00	3.210E+00	3.210E+00
.200	2.032E+00	2.305E+00	2.420E+00	2.767E+00	2.767E+00
.300	1.679E+00	1.899E+00	1.992E+00	2.279E+00	2.331E+00
.400	1.511E+00	1.705E+00	1.788E+00	2.047E+00	2.125E+00
.500	1.417E+00	1.596E+00	1.672E+00	1.915E+00	2.011E+00
.600	1.353E+00	1.521E+00	1.594E+00	1.826E+00	1.937E+00
.700	1.309E+00	1.471E+00	1.540E+00	1.765E+00	1.888E+00
.800	1.278E+00	1.435E+00	1.502E+00	1.721E+00	1.855E+00
.900	1.255E+00	1.408E+00	1.474E+00	1.689E+00	1.833E+00
1.000	1.238E+00	1.388E+00	1.453E+00	1.664E+00	1.817E+00
1.500	1.194E+00	1.337E+00	1.398E+00	1.600E+00	1.787E+00
2.000	1.179E+00	1.318E+00	1.378E+00	1.575E+00	1.788E+00
3.000	1.170E+00	1.306E+00	1.365E+00	1.559E+00	1.807E+00
4.000	1.170E+00	1.305E+00	1.363E+00	1.556E+00	1.830E+00
5.000	1.172E+00	1.307E+00	1.365E+00	1.557E+00	1.851E+00
6.000	1.176E+00	1.310E+00	1.368E+00	1.560E+00	1.869E+00
7.000	1.179E+00	1.313E+00	1.371E+00	1.562E+00	1.886E+00
8.000	1.182E+00	1.316E+00	1.374E+00	1.566E+00	1.901E+00
9.000	1.185E+00	1.319E+00	1.377E+00	1.568E+00	1.914E+00
10.000	1.188E+00	1.322E+00	1.379E+00	1.570E+00	1.925E+00
15.000	1.197E+00	1.330E+00	1.388E+00	1.579E+00	1.969E+00
20.000	1.202E+00	1.336E+00	1.393E+00	1.584E+00	1.999E+00
30.000	1.209E+00	1.342E+00	1.400E+00	1.591E+00	2.040E+00
40.000	1.213E+00	1.346E+00	1.404E+00	1.595E+00	2.068E+00
50.000	1.215E+00	1.348E+00	1.406E+00	1.597E+00	2.089E+00
60.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.108E+00
70.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.121E+00
80.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.132E+00
90.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.142E+00
100.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.151E+00
150.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.185E+00
200.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.209E+00
300.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.243E+00
400.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.266E+00
500.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.285E+00
600.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.300E+00
700.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.313E+00
800.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.324E+00
900.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.334E+00
1000.000	1.219E+00	1.352E+00	1.410E+00	1.601E+00	2.342E+00

Table7-22

BREAST(454)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.958E+01	2.247E+01	2.247E+01	2.247E+01	2.247E+01
.015	1.387E+01	1.589E+01	1.638E+01	1.638E+01	1.638E+01
.020	1.088E+01	1.247E+01	1.309E+01	1.309E+01	1.309E+01
.030	7.762E+00	8.904E+00	9.327E+00	9.583E+00	9.583E+00
.040	6.145E+00	7.044E+00	7.387E+00	7.715E+00	7.715E+00
.050	5.150E+00	5.898E+00	6.190E+00	6.547E+00	6.547E+00
.060	4.474E+00	5.120E+00	5.376E+00	5.746E+00	5.746E+00
.070	3.985E+00	4.556E+00	4.786E+00	5.160E+00	5.160E+00
.080	3.614E+00	4.129E+00	4.338E+00	4.713E+00	4.713E+00
.090	3.324E+00	3.794E+00	3.986E+00	4.360E+00	4.360E+00
.100	3.090E+00	3.525E+00	3.703E+00	4.075E+00	4.075E+00
.150	2.380E+00	2.708E+00	2.845E+00	3.204E+00	3.204E+00
.200	2.024E+00	2.298E+00	2.414E+00	2.763E+00	2.763E+00
.300	1.673E+00	1.894E+00	1.988E+00	2.276E+00	2.328E+00
.400	1.506E+00	1.701E+00	1.784E+00	2.044E+00	2.122E+00
.500	1.413E+00	1.592E+00	1.669E+00	1.913E+00	2.010E+00
.600	1.349E+00	1.518E+00	1.591E+00	1.824E+00	1.936E+00
.700	1.306E+00	1.468E+00	1.538E+00	1.763E+00	1.888E+00
.800	1.275E+00	1.433E+00	1.500E+00	1.720E+00	1.855E+00
.900	1.252E+00	1.406E+00	1.473E+00	1.688E+00	1.833E+00
1.000	1.236E+00	1.387E+00	1.452E+00	1.664E+00	1.817E+00
1.500	1.193E+00	1.336E+00	1.398E+00	1.600E+00	1.788E+00
2.000	1.178E+00	1.318E+00	1.378E+00	1.577E+00	1.790E+00
3.000	1.170E+00	1.307E+00	1.366E+00	1.561E+00	1.810E+00
4.000	1.170E+00	1.306E+00	1.365E+00	1.558E+00	1.833E+00
5.000	1.173E+00	1.308E+00	1.366E+00	1.560E+00	1.854E+00
6.000	1.176E+00	1.311E+00	1.369E+00	1.562E+00	1.873E+00
7.000	1.180E+00	1.314E+00	1.372E+00	1.565E+00	1.890E+00
8.000	1.183E+00	1.318E+00	1.376E+00	1.568E+00	1.905E+00
9.000	1.186E+00	1.321E+00	1.379E+00	1.571E+00	1.918E+00
10.000	1.189E+00	1.323E+00	1.381E+00	1.573E+00	1.929E+00
15.000	1.198E+00	1.332E+00	1.390E+00	1.582E+00	1.973E+00
20.000	1.204E+00	1.338E+00	1.395E+00	1.587E+00	2.004E+00
30.000	1.210E+00	1.344E+00	1.402E+00	1.594E+00	2.045E+00
40.000	1.214E+00	1.348E+00	1.406E+00	1.598E+00	2.073E+00
50.000	1.216E+00	1.350E+00	1.408E+00	1.600E+00	2.094E+00
60.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.114E+00
70.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.127E+00
80.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.138E+00
90.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.148E+00
100.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.157E+00
150.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.191E+00
200.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.215E+00
300.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.249E+00
400.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.273E+00
500.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.291E+00
600.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.306E+00
700.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.319E+00
800.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.330E+00
900.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.340E+00
1000.000	1.220E+00	1.354E+00	1.412E+00	1.604E+00	2.349E+00

Table7-23

POLYSTYRENE					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.936E+01	2.223E+01	2.223E+01	2.223E+01	2.223E+01
.015	1.372E+01	1.572E+01	1.621E+01	1.621E+01	1.621E+01
.020	1.076E+01	1.234E+01	1.296E+01	1.296E+01	1.296E+01
.030	7.680E+00	8.812E+00	9.231E+00	9.485E+00	9.485E+00
.040	6.080E+00	6.971E+00	7.311E+00	7.637E+00	7.637E+00
.050	5.095E+00	5.837E+00	6.127E+00	6.481E+00	6.481E+00
.060	4.427E+00	5.067E+00	5.321E+00	5.688E+00	5.688E+00
.070	3.943E+00	4.510E+00	4.737E+00	5.108E+00	5.108E+00
.080	3.576E+00	4.087E+00	4.294E+00	4.666E+00	4.666E+00
.090	3.289E+00	3.756E+00	3.946E+00	4.317E+00	4.317E+00
.100	3.057E+00	3.489E+00	3.666E+00	4.034E+00	4.034E+00
.150	2.356E+00	2.681E+00	2.816E+00	3.172E+00	3.172E+00
.200	2.003E+00	2.275E+00	2.389E+00	2.735E+00	2.735E+00
.300	1.656E+00	1.875E+00	1.968E+00	2.253E+00	2.305E+00
.400	1.491E+00	1.684E+00	1.766E+00	2.024E+00	2.102E+00
.500	1.398E+00	1.576E+00	1.652E+00	1.894E+00	1.990E+00
.600	1.335E+00	1.503E+00	1.575E+00	1.806E+00	1.916E+00
.700	1.291E+00	1.453E+00	1.522E+00	1.745E+00	1.869E+00
.800	1.261E+00	1.417E+00	1.484E+00	1.702E+00	1.836E+00
.900	1.238E+00	1.391E+00	1.457E+00	1.670E+00	1.814E+00
1.000	1.222E+00	1.371E+00	1.436E+00	1.646E+00	1.798E+00
1.500	1.179E+00	1.321E+00	1.382E+00	1.583E+00	1.769E+00
2.000	1.164E+00	1.302E+00	1.362E+00	1.559E+00	1.770E+00
3.000	1.155E+00	1.291E+00	1.349E+00	1.543E+00	1.790E+00
4.000	1.155E+00	1.290E+00	1.348E+00	1.540E+00	1.812E+00
5.000	1.158E+00	1.292E+00	1.349E+00	1.541E+00	1.833E+00
6.000	1.161E+00	1.295E+00	1.352E+00	1.543E+00	1.852E+00
7.000	1.164E+00	1.298E+00	1.355E+00	1.546E+00	1.868E+00
8.000	1.168E+00	1.301E+00	1.359E+00	1.549E+00	1.883E+00
9.000	1.171E+00	1.304E+00	1.361E+00	1.552E+00	1.896E+00
10.000	1.173E+00	1.306E+00	1.364E+00	1.554E+00	1.907E+00
15.000	1.182E+00	1.315E+00	1.372E+00	1.562E+00	1.951E+00
20.000	1.187E+00	1.320E+00	1.378E+00	1.568E+00	1.981E+00
30.000	1.194E+00	1.327E+00	1.384E+00	1.574E+00	2.022E+00
40.000	1.198E+00	1.331E+00	1.388E+00	1.578E+00	2.050E+00
50.000	1.200E+00	1.333E+00	1.390E+00	1.580E+00	2.071E+00
60.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.090E+00
70.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.103E+00
80.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.114E+00
90.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.124E+00
100.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.132E+00
150.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.166E+00
200.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.190E+00
300.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.223E+00
400.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.247E+00
500.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.266E+00
600.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.281E+00
700.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.293E+00
800.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.305E+00
900.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.314E+00
1000.000	1.204E+00	1.337E+00	1.394E+00	1.584E+00	2.323E+00

Table7-24

PMMA(LUCITE)					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini.
.010	1.910E+01	2.198E+01	2.198E+01	2.198E+01	2.198E+01
.015	1.354E+01	1.555E+01	1.604E+01	1.604E+01	1.604E+01
.020	1.063E+01	1.222E+01	1.283E+01	1.283E+01	1.283E+01
.030	7.590E+00	8.725E+00	9.146E+00	9.400E+00	9.400E+00
.040	6.011E+00	6.905E+00	7.246E+00	7.573E+00	7.573E+00
.050	5.039E+00	5.783E+00	6.074E+00	6.429E+00	6.429E+00
.060	4.379E+00	5.021E+00	5.276E+00	5.644E+00	5.644E+00
.070	3.901E+00	4.469E+00	4.698E+00	5.070E+00	5.070E+00
.080	3.539E+00	4.051E+00	4.259E+00	4.631E+00	4.631E+00
.090	3.255E+00	3.723E+00	3.914E+00	4.286E+00	4.286E+00
.100	3.026E+00	3.459E+00	3.636E+00	4.006E+00	4.006E+00
.150	2.332E+00	2.658E+00	2.795E+00	3.152E+00	3.152E+00
.200	1.984E+00	2.257E+00	2.371E+00	2.719E+00	2.719E+00
.300	1.641E+00	1.860E+00	1.954E+00	2.240E+00	2.292E+00
.400	1.478E+00	1.671E+00	1.754E+00	2.012E+00	2.090E+00
.500	1.386E+00	1.564E+00	1.641E+00	1.883E+00	1.980E+00
.600	1.324E+00	1.492E+00	1.564E+00	1.796E+00	1.907E+00
.700	1.281E+00	1.443E+00	1.512E+00	1.736E+00	1.860E+00
.800	1.251E+00	1.408E+00	1.475E+00	1.694E+00	1.828E+00
.900	1.229E+00	1.382E+00	1.448E+00	1.662E+00	1.806E+00
1.000	1.212E+00	1.363E+00	1.427E+00	1.638E+00	1.791E+00
1.500	1.170E+00	1.313E+00	1.374E+00	1.576E+00	1.763E+00
2.000	1.156E+00	1.295E+00	1.355E+00	1.552E+00	1.764E+00
3.000	1.148E+00	1.284E+00	1.343E+00	1.537E+00	1.785E+00
4.000	1.148E+00	1.283E+00	1.342E+00	1.534E+00	1.808E+00
5.000	1.151E+00	1.285E+00	1.343E+00	1.535E+00	1.829E+00
6.000	1.154E+00	1.289E+00	1.346E+00	1.538E+00	1.847E+00
7.000	1.158E+00	1.292E+00	1.349E+00	1.541E+00	1.864E+00
8.000	1.161E+00	1.295E+00	1.353E+00	1.544E+00	1.879E+00
9.000	1.164E+00	1.298E+00	1.356E+00	1.547E+00	1.892E+00
10.000	1.167E+00	1.300E+00	1.358E+00	1.549E+00	1.903E+00
15.000	1.176E+00	1.309E+00	1.367E+00	1.557E+00	1.947E+00
20.000	1.181E+00	1.315E+00	1.372E+00	1.563E+00	1.977E+00
30.000	1.188E+00	1.321E+00	1.379E+00	1.569E+00	2.018E+00
40.000	1.192E+00	1.325E+00	1.383E+00	1.573E+00	2.046E+00
50.000	1.194E+00	1.327E+00	1.385E+00	1.575E+00	2.067E+00
60.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.087E+00
70.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.099E+00
80.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.111E+00
90.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.120E+00
100.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.129E+00
150.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.163E+00
200.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.187E+00
300.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.221E+00
400.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.244E+00
500.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.263E+00
600.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.278E+00
700.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.291E+00
800.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.302E+00
900.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.312E+00
1000.000	1.198E+00	1.331E+00	1.389E+00	1.579E+00	2.320E+00

Table7-25

POLYETHYLENE					
ENERGY MeV	RESTRICTED 1 keV	AND UNRESTRICTED 5 keV	STOPPING 10 keV	POWER (MeV*cm**2/g) 100 keV	Infini. Infini.
.010	2.137E+01	2.441E+01	2.441E+01	2.441E+01	2.441E+01
.015	1.511E+01	1.724E+01	1.775E+01	1.775E+01	1.775E+01
.020	1.184E+01	1.352E+01	1.417E+01	1.417E+01	1.417E+01
.030	8.438E+00	9.639E+00	1.008E+01	1.035E+01	1.035E+01
.040	6.674E+00	7.620E+00	7.980E+00	8.325E+00	8.325E+00
.050	5.590E+00	6.377E+00	6.684E+00	7.060E+00	7.060E+00
.060	4.854E+00	5.533E+00	5.803E+00	6.191E+00	6.191E+00
.070	4.322E+00	4.922E+00	5.164E+00	5.557E+00	5.557E+00
.080	3.918E+00	4.460E+00	4.679E+00	5.074E+00	5.074E+00
.090	3.602E+00	4.097E+00	4.299E+00	4.692E+00	4.692E+00
.100	3.348E+00	3.805E+00	3.993E+00	4.384E+00	4.384E+00
.150	2.577E+00	2.922E+00	3.066E+00	3.443E+00	3.443E+00
.200	2.190E+00	2.478E+00	2.600E+00	2.967E+00	2.967E+00
.300	1.809E+00	2.041E+00	2.140E+00	2.442E+00	2.497E+00
.400	1.627E+00	1.832E+00	1.919E+00	2.193E+00	2.275E+00
.500	1.525E+00	1.714E+00	1.794E+00	2.051E+00	2.153E+00
.600	1.455E+00	1.633E+00	1.709E+00	1.955E+00	2.072E+00
.700	1.407E+00	1.578E+00	1.651E+00	1.888E+00	2.019E+00
.800	1.373E+00	1.539E+00	1.610E+00	1.841E+00	1.983E+00
.900	1.348E+00	1.510E+00	1.579E+00	1.806E+00	1.958E+00
1.000	1.329E+00	1.487E+00	1.556E+00	1.779E+00	1.940E+00
1.500	1.279E+00	1.429E+00	1.494E+00	1.708E+00	1.905E+00
2.000	1.260E+00	1.407E+00	1.470E+00	1.679E+00	1.903E+00
3.000	1.248E+00	1.392E+00	1.454E+00	1.659E+00	1.921E+00
4.000	1.245E+00	1.388E+00	1.449E+00	1.653E+00	1.942E+00
5.000	1.246E+00	1.388E+00	1.449E+00	1.652E+00	1.962E+00
6.000	1.248E+00	1.389E+00	1.451E+00	1.653E+00	1.980E+00
7.000	1.250E+00	1.391E+00	1.452E+00	1.655E+00	1.996E+00
8.000	1.252E+00	1.394E+00	1.455E+00	1.657E+00	2.011E+00
9.000	1.254E+00	1.396E+00	1.457E+00	1.659E+00	2.024E+00
10.000	1.256E+00	1.397E+00	1.458E+00	1.660E+00	2.035E+00
15.000	1.263E+00	1.404E+00	1.464E+00	1.666E+00	2.078E+00
20.000	1.267E+00	1.408E+00	1.469E+00	1.670E+00	2.108E+00
30.000	1.272E+00	1.413E+00	1.474E+00	1.676E+00	2.150E+00
40.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.186E+00
50.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.206E+00
60.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.222E+00
70.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.236E+00
80.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.247E+00
90.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.258E+00
100.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.267E+00
150.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.303E+00
200.000	1.283E+00	1.424E+00	1.484E+00	1.686E+00	2.328E+00
300.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.364E+00
400.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.389E+00
500.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.409E+00
600.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.425E+00
700.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.438E+00
800.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.450E+00
900.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.460E+00
1000.000	1.283E+00	1.423E+00	1.484E+00	1.686E+00	2.469E+00

Table7-26

POLYAMIDE(6-NYLON)					
ENERGY MeV	RESTRICTED AND UNRESTRICTED STOPPING POWER (MeV*cm**2/g)				
	1 keV	5 keV	10 keV	100 keV	Infini.
.010	1.998E+01	2.290E+01	2.290E+01	2.290E+01	2.290E+01
.015	1.414E+01	1.619E+01	1.668E+01	1.668E+01	1.668E+01
.020	1.109E+01	1.270E+01	1.333E+01	1.333E+01	1.333E+01
.030	7.912E+00	9.066E+00	9.493E+00	9.752E+00	9.752E+00
.040	6.262E+00	7.170E+00	7.517E+00	7.849E+00	7.849E+00
.050	5.247E+00	6.003E+00	6.298E+00	6.659E+00	6.659E+00
.060	4.558E+00	5.210E+00	5.469E+00	5.843E+00	5.843E+00
.070	4.059E+00	4.636E+00	4.868E+00	5.246E+00	5.246E+00
.080	3.681E+00	4.202E+00	4.412E+00	4.791E+00	4.791E+00
.090	3.385E+00	3.861E+00	4.055E+00	4.432E+00	4.432E+00
.100	3.146E+00	3.586E+00	3.767E+00	4.142E+00	4.142E+00
.150	2.424E+00	2.755E+00	2.893E+00	3.256E+00	3.256E+00
.200	2.061E+00	2.337E+00	2.454E+00	2.807E+00	2.807E+00
.300	1.703E+00	1.926E+00	2.021E+00	2.312E+00	2.364E+00
.400	1.533E+00	1.729E+00	1.813E+00	2.076E+00	2.155E+00
.500	1.437E+00	1.618E+00	1.695E+00	1.942E+00	2.040E+00
.600	1.369E+00	1.541E+00	1.614E+00	1.850E+00	1.962E+00
.700	1.324E+00	1.488E+00	1.558E+00	1.786E+00	1.912E+00
.800	1.291E+00	1.450E+00	1.519E+00	1.741E+00	1.877E+00
.900	1.267E+00	1.423E+00	1.489E+00	1.707E+00	1.853E+00
1.000	1.249E+00	1.402E+00	1.467E+00	1.682E+00	1.837E+00
1.500	1.202E+00	1.347E+00	1.409E+00	1.614E+00	1.804E+00
2.000	1.185E+00	1.326E+00	1.387E+00	1.588E+00	1.803E+00
3.000	1.174E+00	1.313E+00	1.372E+00	1.569E+00	1.821E+00
4.000	1.173E+00	1.310E+00	1.369E+00	1.565E+00	1.843E+00
5.000	1.175E+00	1.311E+00	1.370E+00	1.565E+00	1.863E+00
6.000	1.178E+00	1.314E+00	1.372E+00	1.567E+00	1.881E+00
7.000	1.180E+00	1.316E+00	1.375E+00	1.569E+00	1.897E+00
8.000	1.184E+00	1.320E+00	1.378E+00	1.572E+00	1.912E+00
9.000	1.186E+00	1.322E+00	1.381E+00	1.575E+00	1.925E+00
10.000	1.189E+00	1.324E+00	1.383E+00	1.577E+00	1.937E+00
15.000	1.197E+00	1.333E+00	1.391E+00	1.585E+00	1.980E+00
20.000	1.203E+00	1.338E+00	1.396E+00	1.590E+00	2.011E+00
30.000	1.209E+00	1.345E+00	1.403E+00	1.597E+00	2.052E+00
40.000	1.213E+00	1.348E+00	1.407E+00	1.600E+00	2.081E+00
50.000	1.215E+00	1.351E+00	1.409E+00	1.603E+00	2.102E+00
60.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.122E+00
70.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.135E+00
80.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.146E+00
90.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.156E+00
100.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.165E+00
150.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.199E+00
200.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.224E+00
300.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.258E+00
400.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.282E+00
500.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.301E+00
600.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.316E+00
700.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.329E+00
800.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.341E+00
900.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.351E+00
1000.000	1.219E+00	1.355E+00	1.413E+00	1.607E+00	2.359E+00



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