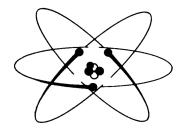
## RADIOLOGICAL HEALTH HANDBOOK

Compiled and edited
by the
Bureau of Radiological Health
and the
Training Institute
Environmental Control Administration



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## U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE Public Health Service Consumer Protection and Environmental Health Service Rockville, Maryland 20852

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MASS ATTENUATION COEFFICIENTS--Continued

| Photon Con Con Pale Poly- |                |                |       |               |  |       |        |                  |        |               |               |                |
|---------------------------|----------------|----------------|-------|---------------|--|-------|--------|------------------|--------|---------------|---------------|----------------|
| Photon<br>Energy          | SiOs           | NaI            | Air   | Con-<br>crete | 0.8N<br>H <sub>2</sub> SO <sub>4</sub> | Bone  | Muscle | Poly-<br>styrene | Lucite | ethyl-<br>ene | Bake-<br>lite | Pyrex<br>Glass |
| keV                       |                |                |       |               |  |       |        |                  |        |               |               |                |
| 10                        | 19.0           | 139.           | 4.99  | 26.9          | 5.76                                   | 20.3  | 5.27   | 2.13             | 3.25   | 2.01          | 2.76          | 17.1           |
| 15                        | 5.73           | 47.4           | 1.55  | 8.24          | 1.76                                   | 6.32  | 1.63   | 0.755            | 1.06   | 0.728         | 0.923         | 5.14           |
| 20                        | 2.49           | 22.3           | 0.752 | 3.59          | 0.849                                  | 2.79  | 0.793  | .424             | 0.551  | .420          | .492          | 2.25           |
| 30                        | 0.859          | 7.45*          | .349  | 1.19          | .391                                   | 0.962 | .373   | .259             | . 298  | .266          | .277          | 0.786          |
| 40                        | .463           | 19.3           | .248  | 0.605         | .276                                   | .512  | .268   | .217             | .234   | .226          | .223          | .431           |
| 50                        | .318           | 10.7           | .208  | .392          | .231                                   | .349  | .227   | .199             | .208   | .209          | .200          | .302           |
| 60                        | .252           | 6.62           | .188  | .295          | .208                                   | .274  | .205   | .188             | .193   | .198          | .187          | .242           |
| 80                        | .194           | 3.12           | .167  | .213          | .185                                   | .209  | .183   | .173             | .176   | .183          | .171          | .190           |
| 100                       | .169           | 1.72           | 154   | 170           | 171                                    | 100   | 170    | 162              | 16%    | 172           | 141           | 166            |
| 150                       |                |                | .154  | .179          | .171                                   | .180  | .170   | .163             | .164   | .172          | .161          | .166           |
| 200                       | .140<br>.126   | 0.625          | .136  | .144          | .150                                   | .149  | .149   | .145             | .146   | .154          | .143          | .139           |
| 300                       |                | .334           | .123  | .127          | .137                                   | .133  | .136   | .132             | .133   | .140          | .130          | .125           |
| 300                       | .108           | .167           | .107  | .108          | .118                                   | .114  | .118   | .115             | .115   | .122          | .113          | .107           |
| 400                       | .0959          | .117           | .0954 | .0963         | .106                                   | .102  | .105   | .103             | .103   | .109          | .101          | .0954          |
| 500                       | .0874          | .0955          | .0870 | .0877         | .0965                                  | .0927 | .0960  | .0938            | .0941  | .0995         | .0921         | .0870          |
| 600                       | .0808          | .0826          | .0805 | .0810         | .0893                                  | .0857 | .0888  | .0868            | .0871  | .0921         | .0852         | .0804          |
| 800<br>MeV                | .0707          | .0676          | .0707 | .0709         | .0783                                  | .0752 | .0779  | .0763            | .0765  | .0809         | .0749         | .0704          |
| 1.0                       | .0636          | .0586          | .0636 | .0637         | .0704                                  | .0676 | .0700  | .0685            | .0687  | .0727         | .0673         | .0633          |
| 1.5                       | .0518          | .0469          | .0518 | .0519         | .0573                                  | .0550 | .0570  | .0558            | .0559  | .0592         | .0548         | .0516          |
| 2.0                       | .0447          | .0413          | .0445 | .0448         | .0492                                  | .0473 | .0489  | .0478            | .0480  | .0507         | .0470         | .0444          |
| 3.0                       | .0363          | .0366          | .0358 | .0365         | .0396                                  | .0383 | .0393  | .0383            | .0385  | .0405         | .0377         | .0361          |
| 4                         | .0317          | .0351          | .0308 | .0319         | .0340                                  | .0331 | .0337  | .0327            | .0329  | .0345         | .0322         | .0314          |
| 5                         | .0287          | .0346          | .0275 | .0290         | .0303                                  | .0297 | .0300  | .0290            | .0292  | .0305         | .0286         | .0282          |
| 6                         | .0266          | .0347          | .0252 | .0270         | .0277                                  | .0274 | .0274  | .0263            | .0266  | .0277         | .0260         | .0263          |
| 8                         | .0241          | .0355          | .0223 | .0245         | .0243                                  | .0244 | .0240  | .0228            | .0232  | .0239         | .0227         | .0237          |
| 10                        |                |                |       |               |  |       |        |                  |        |               |               |                |
| 10                        | .0226          | .0368          | .0204 | .0231         | .0222                                  | .0226 | .0219  | .0206            | .0211  | .0215         | .0206         | .0222          |
| 15                        | .0209          | .0402          | .0181 | .0215         | .0194                                  | .0204 | .0192  | .0176            | .0182  | .0182         | .0178         | .0204          |
| 20                        | .0203          | .0433          | .0170 | .0210         | .0182                                  | .0194 | .0179  | .0162            | .0168  | .0166         | .0164         | .0198          |
| 30                        | .0202          | .0484          | .0162 | .0210         | .0172                                  | .0189 | .0168  | .0149            | .0157  | .0151         | .0153         | .0195          |
| 40                        | .0204          | .0520          | .0161 | .0213         | .0169                                  | .0189 | .0165  | .0144            | .0153  | .0145         | .0148         | .0198          |
| 50                        | .0208          | .0548          | .0161 | .0218         | .0168                                  | .0190 | .0164  | .0142            | .0151  | .0142         | .0147         | .0201          |
| 60                        | .0212          | .0571          | .0162 | .0222         | .0169                                  | .0193 | .0165  | .0142            | .0151  | .0141         | .0147         | .0204          |
| 80                        | .0218          | .0605          | .0165 | .0229         | .0171                                  | .0197 | .0167  | .0142            | .0152  | .0141         | .0148         | .0210          |
| 100                       | .0224          | .0629          | .0168 | .0235         | .0174                                  | .0201 | .0170  | .0144            | .0154  | .0142         | .0150         | .0215          |
| 150                       | .0234          | .0670          | .0174 | .0247         | .0180                                  | .0210 | .0175  | .0147            | .0159  | .0145         | .0154         | .0225          |
| 200                       | .0241          | .0695          | .0179 | .0254         | .0184                                  | .0215 | .0179  | .0150            | .0162  | .0147         | .0157         | .0232          |
| 300                       | .0250          | .0724          | .0185 | .0264         | .0190                                  | .0223 | .0185  | .0155            | .0167  | .0152         | .0162         | .0240          |
| 400                       | .0256          | 07/1           | 0100  | 0260          | 0104                                   | 0220  | 0100   | 0150             | 0171   | 0155          | 0166          | 0245           |
| 500                       | .0256          | .0741<br>.0752 | .0189 | .0269         | .0194                                  | .0228 | .0189  | .0158            | .0171  | .0155         | .0166         | .0245<br>.0249 |
| 600                       | .0262          |                | .0192 | .0273         | .0197                                  | .0231 | .0192  | .0160            | .0173  | .0157         | .0168         |                |
| 800                       | .0266          | .0760          | .0194 | .0276         | .0199                                  | .0233 | .0194  | .0162            | .0175  | .0159         | .0170         | .0252          |
| GeV                       | .0200          | .0771          | .0197 | .0281         | .0202                                  | .0237 | .0197  | .0165            | .0178  | .0161         | .0173         | .0256          |
| 1                         | .0269          | .0778          | .0199 | .0283         | .0204                                  | .0239 | .0199  | .0166            | .0180  | .0163         | .0174         | .0258          |
| 1.5                       | .0273          | .0789          | .0202 | .0287         | .0207                                  | .0243 | .0202  | .0169            | .0182  | .0165         | .0177         | .0262          |
| 2                         | .0275          | .0794          | .0204 | .0290         | .0209                                  | .0245 | .0203  | .0171            | .0184  | .0167         | .0179         | .0264          |
| 3                         | .0278          | .0800          | .0206 | .0292         | .0211                                  | .0247 | .0205  | .0173            | .0186  | .0169         | .0181         | .0267          |
| 4                         | .0279          | .0803          | .0207 | .0294         | .0212                                  | .0249 | .0206  | .0174            | .0187  | .0170         | .0182         | .0268          |
| 5                         | .0280          | .0805          | .0208 | .0295         | .0212                                  | .0249 | .0207  | .0174            | .0188  | .0170         | .0183         | .0269          |
| 6                         | .0281          | .0807          | .0208 | .0295         | .0213                                  | .0250 | .0208  | .0174            | .0188  | .0170         | .0183         | .0269          |
| 8                         | .0281          | .0808          | .0208 | .0295         | .0213                                  | .0251 | .0208  | .0175            | .0189  | .0171         | .0183         | .0209          |
|                           |                |                |       |               |  |       |        |                  |        |               |               |                |
| 10                        | .0282          | .0809          | .0209 | .0297         | .0214                                  | .0251 | .0209  | .0176            | .0189  | .0172         | .0184         | .0271          |
| 15                        | .0283          | .0811          | .0210 | .0298         | .0215                                  | .0252 | .0209  | .0176            | .0190  | .0173         | .0185         | .0271          |
| 20<br>30                  | .0283<br>.0283 | .0812          | .0210 | .0298         | .0215                                  | .0252 | .0210  | .0177            | .0190  | .0173         | .0185         | .0272          |
| 30                        | .0203          | .0813          | .0211 | .0298         | .0216                                  | .0253 | .0210  | .0177            | .0191  | .0173         | .0185         | .0272          |
| 40                        | .0284          | .0813          | .0211 | .0299         | .0216                                  | .0253 | .0210  | .0177            | .0191  | <b>.0</b> 173 | .0186         | .0272          |
|                           | .0284          | .0814          | .0211 | .0299         | .0216                                  | .0253 | .0210  | .0177            | .0191  | .0173         | .0186         | .0272          |
| 50                        |                | .0814          | .0211 | .0299         | .0216                                  | .0253 | .0210  | .0177            | .0191  | .0174         | .0186         | .0273          |
| 60                        | .0284          |                |       |               |  |       |        |                  |        |               |               |                |
|                           | .0284          | .0815          | .0211 | .0299         | .0216                                  | .0253 | .0210  | .0178            | .0191  | .0174         | .0186         | .0273          |

<sup>\*</sup> K edge of Iodine--33.2keV 5.69, 30.9.