

**TABLE 3.5** Half- and tenth-value layer thicknesses for concrete, steel, and lead (ASTM E 94) [2-4].

Energy <sup>A</sup>	Half-Value Layer, mm			Tenth-Value Layer, mm		
	Concrete	Steel	Lead	Concrete	Steel	Lead
50 kV	4.32		0.05	15.1		0.16
70 kV	8.38		0.15	27.95		0.5
100 kV	15.1	1.5	0.24	50.8	5.0	0.8
125 kV	20.3	2.5	0.27	66.0	8.3	0.9
150 kV	22.35	3.6	0.29	73.6	12.	0.95
200 kV	25.4	5.1	0.48	83.8	17.	1.6
250 kV	27.95	6.4	0.9	94.0	21.	3.0
300 kV	31.2	6.9	1.4	104.0	23.	4.6
400 kV	33.0	8.9	2.2	109.1	30.	7.3
500 kV	35.55		3.6	116.8		11.9
Ir 192	41.	13.	6.1	140.	43.	20.
Cs 137	48.		6.35	160.		21.
1 MV	44.45	14.5	7.9	147.1	48.	26.0
2 MV	63.5	20.3	12.7	210.4	67.	42.0
Co 60	66.	22.	12.4	220.	73.	41.
3 MV	73.6		14.7	241.2		48.5
4 MV	91.4	25.4	16.5	304.5	84.	54.8
6 MV	104.0	29.2	17.0	348.0	97.	56.6
10 MV	116.8	31.8	16.5	388.5	106.	55.0
16 MV		33.0			110.	
20 MV		38.			130.	

<sup>A</sup>Approximate values determined at high filtration.

### C. Geometric Unsharpness

$$U_g = F(t/d_0) \quad (3.10)$$

where  $U_g$  = geometric unsharpness, mm (in.),

$F$  = focal spot size, mm (in.),

$t$  = specimen-to-film distance, measured from the source side of the specimen, mm (in.), and

$d_0$  = source-to-specimen distance, mm (in.)

Values of geometric unsharpness  $U_g$  may be determined from the nomograms in Figs. 3.1a and 3.1b.