

**Thickness and Cover Requirements for Fire Protection**  
**Simplified Design, PCA 1993**

Table 10-1 Minimum Thickness for Floor and Roof Slabs and Cast-In-Place Walls, in.  
 (Load Bearing and Nonload-Bearing)

Concrete type	Fire resistance rating				
	1 hr.	1½ hr.	2 hr.	3 hr.	4 hr.
Siliceous aggregate	3.5	4.3	5.0	6.2	7.0
Carbonate aggregate	3.2	4.0	4.6	5.7	6.6
Sand-lightweight	2.7	3.3	3.8	4.6	5.4
Lightweight	2.5	3.1	3.6	4.4	5.1

Table 10-2 Minimum Concrete Column Dimensions, in.

Concrete type	Fire resistance rating				
	1 hr.	1½ hr.	2 hr.	3 hr.	4 hr.
Siliceous aggregate	8	8	10	12	14
Carbonate aggregate	8	8	10	12	12
Sand-lightweight	8	8	9	10.5	12

Table 10-3 Minimum Cover for Reinforced Concrete Floor or Roof Slabs, in.

Concrete type	Restrained Slabs*				Unrestrained Slabs*			
	Fire resistance rating				Fire resistance rating			
	1 hr.	1½ hr.	2 hr.	3 hr.	1 hr.	1½ hr.	2 hr.	3 hr.
Siliceous aggregate	¾	¾	¾	¾	¾	¾	1	1¼
Carbonate aggregate	¾	¾	¾	¾	¾	¾	¾	1¼
Sand-lightweight or lightweight	¾	¾	¾	¾	¾	¾	¾	1¼

\*See Table 10-5

Table 10-4 Minimum Cover to Main Reinforcing Bars in Reinforced Concrete Beams, in.  
 (Applicable to All Types of Structural Concrete)

Restrained or unrestrained*	Beam width, in.**	Fire resistance rating				
		1 hr.	1½ hr.	2 hr.	3 hr.	4 hr.
Restrained	5	¾	¾	¾	1	1¼
Restrained	7	¾	¾	¾	¾	¾
Restrained	≥ 10	¾	¾	¾	¾	¾
Unrestrained	5	¾	1	1¼	—	—
Unrestrained	7	¾	¾	¾	¾	¾
Unrestrained	≥ 10	¾	¾	¾	1	¾

\*See Table 10-5

\*\*For beam widths between the tabulated values, the minimum cover can be determined by interpolation.

Table 10-6 Minimum Cover for Reinforced Concrete Columns, in.

Concrete type	Fire resistance rating				
	1 hr.	1½ hr.	2 hr.	3 hr.	4 hr.
Siliceous aggregate	1½	1½	1½	1½	2
Carbonate aggregate	1½	1½	1½	1½	1½
Sand-lightweight	1½	1½	1½	1½	1½