

CHAPTER 6—UNREINFORCED MASONRY

6.1—Scope

6.1.1 This chapter covers requirements for unreinforced masonry as defined in Section 2.2, except as otherwise indicated in Section 6.4.

6.1.2 The provisions of this chapter are to be applied in conjunction with the provisions of Chapter 5.

6.2—Stresses in reinforcement

6.2.1 The effect of stresses in reinforcement shall be neglected.

6.3—Axial compression and flexure

6.3.1 Members subjected to axial compression, flexure, or to combined axial compression and flexure shall be designed to satisfy Eq. (6-1) and Eq. (6-2).

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} \leq 1 \quad (6-1)$$

$$P \leq (1/4) P_e \quad (6-2)$$

where:

(a) For members having an h/r ratio not greater than 99:

$$F_a = (1/4)f'_m \left[1 - \left(\frac{h}{140r} \right)^2 \right] \quad (6-3)$$

(b) For members having an h/r ratio greater than 99:

$$F_a = (1/4)f'_m \left(\frac{70r}{h} \right)^2 \quad (6-4)$$

$$(c) \quad F_b = (1/3)f'_m \quad (6-5)$$

$$(d) \quad P_e = \frac{\pi^2 E_m I}{h^2} \left(1 - 0.577 \frac{e}{r} \right)^3 \quad (6-6)$$

6.3.1.1 Allowable tensile stresses due to flexure transverse to the plane of masonry member shall be in accordance with the values in Table 6.3.1.1.

Table 6.3.1.1—Allowable flexural tension for clay and concrete masonry, psi (MPa)

Masonry type	Mortar types			
	Portland cement/lime		Masonry cement and air entrained portland cement/lime	
	M or S	N	M or S	N
Normal to bed joints				
Solid units	40 (0.28)	30 (0.21)	24 (0.17)	15 (0.10)
Hollow units ¹				
UngROUTED	25 (0.17)	19 (0.13)	15 (0.10)	9 (0.06)
Fully grouted	68 (0.47)	58 (0.40)	41 (0.28)	26 (0.18)
Parallel to bed joints in running bond				
Solid units	80 (0.55)	60 (0.41)	48 (0.33)	30 (0.21)
Hollow units				
UngROUTED and partially grouted	50 (0.35)	38 (0.26)	30 (0.21)	19 (0.13)
Fully grouted	80 (0.55)	60 (0.41)	48 (0.33)	30 (0.21)

¹ For partially grouted masonry, allowable stresses shall be determined on the basis of linear interpolation between hollow units that are fully grouted or ungrouted and hollow units based on amount of grouting.

6.4—Axial tension

6.4.1 The tensile strength of masonry shall be neglected in design when the masonry is subjected to axial tension forces.

6.5—Shear

6.5.1 Shear stresses due to forces acting in the direction considered shall be computed in accordance with Section 5.13.1 and determined by Eq. (6-7).

$$f_v = \frac{VQ}{Ib} \quad (6-7)$$

6.5.2 In-plane shear stresses shall not exceed any of:

- (a) $1.5 \sqrt{f'_m}$
- (b) 120 psi (0.83 MPa)
- (c) $\nu + 0.45 N_v/A_n$

where ν :

- = 37 psi (0.26 MPa) for masonry in running bond that is not grouted solid, or
- = 37 psi (0.26 MPa) for masonry in other than running bond with open end units that are grouted solid, or
- = 60 psi (0.41 MPa) for masonry in running bond that is grouted solid.

(d) 15 psi (0.10 MPa) for masonry in other than running bond with other than open end units that are grouted solid.

6.5.3 Shear stresses shall not exceed the requirements of Section 5.8.2.2 at interfaces between wythes and filled collar joints or between wythes and headers.