Calculated STC Ratings for Clay Masonry Walls[§]								
	Hollow Units		Grout Filled		Sand Filled		Solid Units	
Nominal Wall Thickness (inches)	Weight	STC	Weight	STC	Weight	STC	Weight	STC
3	—	—	—	—	—	—	30	45
4	20	44	38	47	32	46	35	46
6	32	46	63	51	50	49	55	50
8	42	48	86	55	68	52	75	53
10	53	50	109	60	86	55	95	57
12	62	51	132	64	104	59	115	61

§ Based on unit dimension at smaller of specified less manufacturing tolerance; clay density of 120 lb/ft³; grout density of 144 lb/ft³; and sand density of 100 lb/ft³. STC values for grout filled and sand filled units assume the materials completely fill all void areas in and around the units. STC values for solid units are based on bed and head joints solidly filled with mortar.

Figure 8-49 STC ratings for clay masonry walls. (*From The Masonry Society's* Standard Method for Determining the Sound Transmission Class Rating for Masonry Walls, *TMS 0302-00.*)

loss is less because of the coupling effect of the tightly enclosed air. For maximum benefit, the wythes should be further apart.

Some building codes incorporate standards for sound transmission characteristics in buildings of residential occupancy. The standards generally specify minimum STC ratings for party wall and floor–ceiling separations between dwelling units. Party walls generally require an STC of 45 to 50. STC ratings for brick and block masonry walls are determined based on the standard methodology described in TMS 0302-00, *Standard Method for Determining the Sound Transmission Class for Masonry Walls.* Tabulated values are shown in *Figs. 8-49 through 8-52.*

8.9 MOVEMENT CHARACTERISTICS

All building materials expand and contract to some degree with changes in temperature. Others also expand and contract with variations in moisture content. The thermal movement characteristics of most materials are known, and a standard coefficient can be used to calculate the expected expansion or contraction of a material for a given set of conditions. Masonry materials are relatively stable in thermal movement when compared to metals and plastics.

In addition to thermal movement, however, most masonry materials also experience moisture-related movement. Some shrinking and swelling occur alternately through normal wetting and drying cycles, but more important are the *permanent moisture expansion* of clay masonry and the *permanent moisture shrinkage* of concrete masonry. Clay masonry begins to reabsorb moisture from the atmosphere as soon as the drying and firing process is complete, and as the moisture content increases, the units expand permanently. Concrete masonry products are moist cured to hydrate the portland cement in the mix. Once the curing is complete, residual moisture evaporates, causing the units to shrink permanently.

Calculated STC Ratings for Lightweight Concrete Masonry Walls[§]

Nominal Wall Thickness (inches)	Density	Hollow Units	Grout Filled	Sand Filled	Solid Units
4	80	43	45	45	45
	85	43	46	45	45
	90	44	46	45	45
	95	44	46	45	45
	100	44	46	45	46
6	80	44	49	47	47
	85	44	49	47	47
	90	44	50	48	48
	95	44	50	48	48
	100	45	50	48	49
8	80	45	53	50	50
	85	45	53	50	50
	90	45	53	50	51
	95	46	53	51	51
	100	46	54	51	52
10	80	46	56	52	52
	85	46	56	53	53
	90	47	57	53	53
	95	47	57	53	54
	100	47	57	54	55
12	80	47	60	55	55
	85	47	60	55	55
	90	48	60	56	56
	95	48	61	56	57
	100	48	61	57	58

§ Based on grout density of 140 lb/ft³ and sand density of 90 lb/ft³. Percent solid thickness of units based on mold manufacturer's literature for typical units as follows: 4 in = 73.8% solid, 6 in = 55% solid, 8 in = 53% solid, 10 in = 51.7% solid, and 12 in = 48.7% solid. STC values for grout-filled and sand-filled units assume the materials completely fill all void areas in and around the units. STC values for solid units are based on bed and head joints solidly filled with mortar.

Figure 8-50 STC ratings for lightweight concrete masonry walls. (*Adapted from The Masonry Society's* Standard Method for Determining the Sound Transmission Class Rating for Masonry Walls, *TMS 0302-00.*)

The cumulative effect of reversible thermal movement and irreversible moisture movement must be accommodated in construction through the installation of expansion joints in clay masonry and control joints in concrete masonry. When clay and concrete masonry are combined, or when masonry is combined with or attached to other materials, allowance must also be made for the differential movement of the various components. Expansion, contraction, differential movement, and flexible anchorage are discussed in detail in Chapter 9.