ASTM C936 Requirements for Solid Concrete Interlocking Paving Units								
Compressive Strength (psi)		Absorption (%)		Freeze-Thaw Resistance, Loss in Dry Mass (%)	Abrasion Resistance		Dimensional Tolerance (± in.)	
Average	Individual Unit	Average	Individual		Volume Loss (in^3/7.75 in^2)	Thickness Loss (in.)	Length or Width	Height
8000	7200	5	7	1.0	0.915	0.118	1/16	1/8

ASTM C1319 Requirements for Concrete Grid Paving Units					
Net Area Compressive Strength (psi)		Maximum Water Absorption (lb/cu.ft)		Web Width (in.)	
Average of 3 Units	Individual Unit	Average of 3 Units	Minimum Net Area (%)	Minimum	Average
5000	4500	10	50	1.00	1.25

Figure 4-19 Minimum requirements for concrete masonry pavers. (*Copyright ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Reprinted with permission.*)

water, can be fractured by the expanding ice crystals. A drier unit can accommodate some expansion into empty pore areas without damage. Minimum ASTM requirements differentiate between unit weights because of the effect of aggregate characteristics on this property. Absorption values are measured in pounds of water per cubic foot of concrete. They may range from as little as 4 or 5 lb/cu ft for heavy sand and gravel materials to 20 lb/cu ft for the most porous, lightweight aggregates.

Porosity influences other properties, such as thermal insulation and sound absorption. Increases in these characteristics are often accompanied by an undesirable increase in moisture absorption as well. Pore structure varies for different aggregates and material types and has varying influence on these values and their relationships to one another. Relatively large interconnected pores readily absorb air and sound as well as water, and offer less resistance to damage from freezing. Unconnected or closed pores such as those in structural grade expanded aggregate offer good insulating qualities, and reduced absorption of water and sound. A high initial rate of water absorption, or suction, adversely affects the bond between mortar and unit just as it does in clay masonry. Unlike brick, however, concrete products may not be prewetted at the job site to control suction because of the moisture shrinkage inherent to concrete. Prewetting concrete masonry units could cause excessive shrinkage cracking in the wall. Suction can be controlled only through proper product specification by ASTM standards, and through the use of highly water retentive mortars (i.e., maximum proportion of lime) to ensure the integrity of the bond.

Architectural block is sometimes treated with an integral water repellent to resist soil accumulations and to decrease surface water absorption. Whenever an integral water repellent is used in a concrete masonry product, compatibility and bond with mortar must be considered because the bonding characteristics of the unit are affected. In general, a CMU product that has

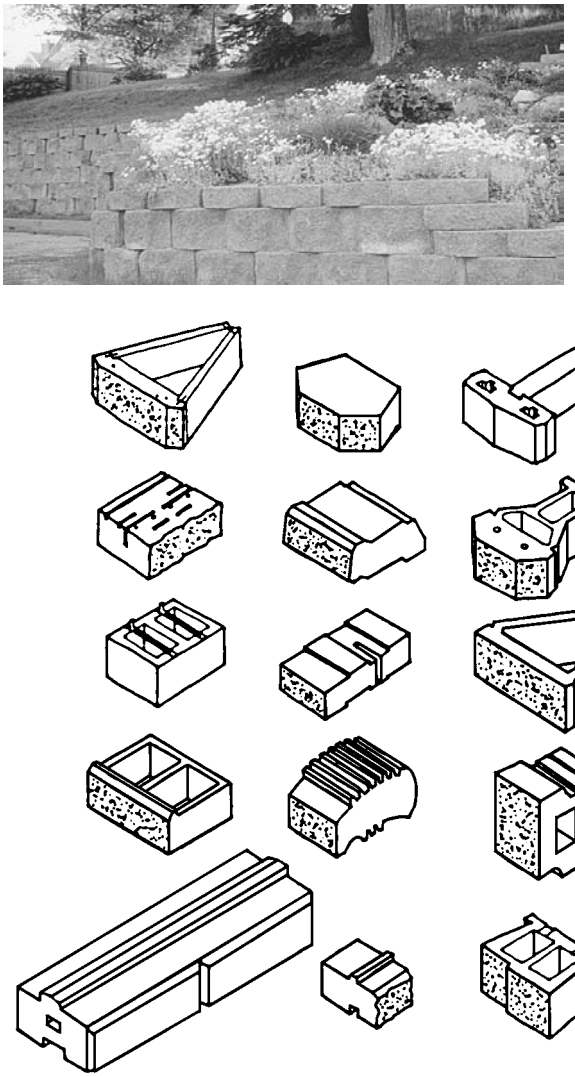

Figure 4-20 A number of proprietary segmental retaining wall (SRW) units are available. (*From National Concrete Masonry Association,* Design Manual for Segmental Retaining Walls, *NCMA, Herndon, VA.*)

been treated with an integral water repellent requires use of mortar that has compatible chemical admixtures to promote better bond.

4.7.3 Volume Changes

Volume changes in concrete masonry are caused by several things. Moisture shrinkage can be the most damaging because evaporation of residual mixing water from the forming and curing process causes permanent shrinkage. Aged units expand and contract reversibly with changes in moisture content. The different manufacturing techniques described in Chapter 2 bear significantly on this characteristic because of the variations in curing and drying methods. For a given aggregate, shrinkage tendencies due to moisture