

SUBJECT: Summary of Clay Pavers Standards

ASTM Standards for clay pavers contain the requirements for the physical properties, dimension tolerances, and allowable defects, such as chips and cracks. These requirements cover a broad range of requirements that regulate the durability and appearance of clay pavers in each of these categories. This summary lists some of those properties for interested parties that do not need the complete standard. For those who need them, the standards can be purchased from ASTM International at www.ASTM.org. The standards covered in this digest are:

- ASTM C902 Standard Specification for Pedestrian and Light Traffic Paving Brick
- ASTM C1272 Standard Specification for Heavy Vehicular Paving Brick

We have grouped these two together, because their properties and tolerances are very similar.

Classifications:

There are two main classifications with each having several sub-classifications:

Light Traffic: Meant for pedestrian and light vehicular traffic.

Classes include: Weather and Traffic

Weather: SX- Brick that maybe frozen while saturated with water.

MX-Brick intended for exterior with no freezing conditions.

NX- Brick intended for interior use with no freezing conditions.

Type: Type I- Pavers subjected to extensive abrasion, such as public sidewalks and driveways.

Type II- Pavers subjected to intermediate abrasion, such as residential walkways and residential driveways.

Type III- Pavers subjected to low abrasion, such as floors or patios in single family Homes.

Heavy Traffic: Meant for high volume of heavy vehicular traffic.

Classes include: Intended installation

Intended installation:

Type R- Brick intended to be set in mortar and supported by a concrete base or properly supported asphalt base.

Type F- Brick intended to be set in sand, with sand joints supported by a proper base.

Both Light Traffic and Heavy Traffic Pavers will also be specified by their application:

PS- these are general use pavers.

PX- intended for use where a lower tolerance for dimensional variation is required than PS.

PA- used to produce characteristic architectural effects resulting from non-uniformity in color, size, and texture.

Physical requirements:

Each classification has physical requirements for compressive strength, cold water absorption, saturation coefficients and other properties that affect the durability and freeze-thaw resistance of the brick. Those properties are as follows:

Physical requirements for Pedestrian and Light Traffic Paving Brick

Designation	Compressive Strength Minimum psi		Max Cold Water Absorption, max, %		Saturation Coefficient, max	
	Avg. of 5	Individual	Avg. of 5	Individual	Avg. of 5	Individual
SX	8000	7000	8	11	0.78	0.80
MX	3000	2500	14	17	No limit	No limit
NX	3000	2500	No limit	No limit	No limit	No limit

Physical requirements for Heavy Vehicular Paving Brick

Type	Compressive Strength Minimum psi		Max Cold Water Absorption, %		Min Breaking Load, lb/in	
	Avg. of 5	Individual	Avg. of 5	Individual	Avg. of 5	Individual
R	8000	7000	6.0	7.0
F	10,000	8000	6.0	7.0	475	333

Manufacturers are responsible for testing and certifying their product to meet these requirements. Purchasers can request copies of the test results for products from the manufacturer.

Abrasion Resistance Property Requirements:

Each brick shall meet either the Abrasion Resistance index or the Volume Abrasion Loss column. The Abrasion Resistance index is calculated by using the cold water absorption and the compressive from the previous tables.

$$\text{Abrasion index} = \frac{100 * \text{Cold Water Absorption}}{\text{Compressive strength}}$$

Type	Abrasion Index, Max	Volume Abrasion Loss, Max, cm ³ /cm ²
Type I (Light Pavers)	0.11	1.7
Type II (Light Pavers)	0.25	2.7
Type III (Light Pavers)	0.50	4.0
R and F (Heavy Pavers)	0.11	1.7

Tolerances on Dimensions:

Each standard has two or three types. Both types have allowable tolerances for variation from their specified dimensions as follows:

This table applies to both Light and Heavy use pavers.

Dimension, in	Application		
	PS	PX	PA
3 and under	1/8	1/16	No limit
3 to 5	3/16	3/32	No limit
5 to 8	1/4	1/8	No limit
Over 8	5/16	7/32	No limit

Tolerances on Warpage:

All of these standards have tolerances for permissible variation from plane or warpage:

Specified Dimension max in	Permissible Warpage, max in		
	PX	PS	PA
C902			
8 and under	1/16	3/32	No Limit
8 – 12	3/32	1/8	No Limit
12 – 16	1/8	5/32	No Limit

Tolerances on Chippage:

The total length on chips on the face side should not be greater than 10% of the total length of the brick face.

Maximum Permissible Extent of Chippage from Edges and Corners

Application	Chippage in Inches in from	
	Edge	Corner
PS (Light Use Pavers)	5/16	1/2
PX (Light Use Pavers)	1/4	3/8
PS (Heavy Use Pavers)	5/16	1/2
PX (Heavy Use Pavers)	5/16	1/2
PA (Heavy Use Pavers)	No Limit	No Limit

The number of brick in a delivery that are broken or otherwise fail to meet the requirements for chippage and tolerances shall not exceed 5%.

Note: Most pavers that meet C1272 Type R requirements will also meet all ASTM C902 requirements.