

Specification for Paving Brick

Part 1 General

Description

Recommendations found herein are for brick used in flexible and rigid pavements for light and heavy traffic conditions.

Flexible pavements bear on sand and a crushed stone base, are mortarless and do not rely on a rigid layer to distribute superimposed traffic loads to the subgrade.

Rigid pavements contain a rigid support base of either asphalt or concrete, a mortar bed and mortared joints between each unit.

Quality Assurance

1. Use a qualified paving contractor experienced in the installation of similar products.
2. All Brick tests shall be performed by an independent certified testing laboratory.
3. All brick tests shall be in accordance with ASTM C67 latest edition.

Submittals

1. Submit for architect's approval a test report and certificate of conformance for each type and color of brick specified on contract documents.
2. Test reports shall include:
 - a. Compressive strength
 - b. Modulus of Rupture
 - c. 24 hour cold water absorption
 - d. 5 hour boil
 - e. Saturation coefficient
 - f. Initial rate of absorption
 - g. Efflorescence
 - h. Weather classification
 - i. Paver type
3. Certificate of conformance shall state that brick meet or exceed applicable ASTM specifications indicated herein.

Sample Panel

1. A 4' x 4' sample panel shall be set up at the job site showing the proposed color range, texture, bond, workmanship and where applicable, mortar.
2. Upon acceptance of the sample panel, a field panel shall be laid up out of the actual material to be used on the job.
3. No brick shall be shipped from the manufacturer to the site until architect's acceptance of the field panel. Once the first 100 square feet of the job has been installed and approved, this becomes the accepted standard for workmanship, color and texture. Upon approval, the field panel may be removed.

Part II Products

Paving Brick

1. All brick shown on contract documents shall be color and texture as manufactured by **H.C. Muddox**, 4875 Bradshaw Rd., Sacramento, CA 95827-9727, or **Interstate Brick**, 9780 S 5200 W, West Jordan, Utah 84081-5625.
2. Dimensions (*width*) x (*height*) x (*length*)
3. Maximum permissible variation on length is 1/8 in.
4. Maximum permissible variation on width and height is 1/16 inch.

5. Optional: Brick Pavers shall contain 1/4 in. lugs

Pedestrian and Light Traffic Brick

1. Light Traffic brick shall conform to ASTM C902 Class SX, Type 1.
2. Minimum compressive strength 8000 psi.
3. Maximum cold water absorption 8%
4. Maximum saturation coefficient 0.78 (if applicable).
5. Maximum Abrasion Index 0.11

Heavy Traffic Brick

Heavy Traffic brick shall conform to ASTM C 1272 Application PX, Type R or F:

1. Minimum compressive strength, Type F: 8000 psi Type R: 10,000 psi.
2. Minimum breaking load 475 lb/in.
3. Maximum cold water absorption 6%
4. Minimum thickness 2 5/8 in.
5. Maximum Abrasion Index 0.11

Bedding and Jointing Sand

Bedding sand should be washed free from deleterious or foreign materials, well graded, angular, concrete sand conforming to ASTM C33 with a 3/16 in. maximum aggregate size

Joint Sand Stabilizer (If specified)

Use SUREBOND Joint Stabilizer or equivalent. Joint sand stabilizers prevent sand erosion and help to maintain interlocking pavement stability.

Gravel

Gravel base materials for pedestrian and light vehicular traffic should be well graded conforming to ASTM D2940.

Geotextile Filter

Use Mirafi 700X geotextile fabric below sand bed to control fine sands from migrating into subgrade.

Edge Restraint

Use preformed steel, plastic, wood, precast or cast in place concrete edge restraint

Mortar

Mortar shall conform to ASTM C270. Type M mortar is recommended for severe weather conditions. Type M mortars are difficult to clean and should be used carefully. Type S mortars are recommended for moderate weather regions.

Base Material

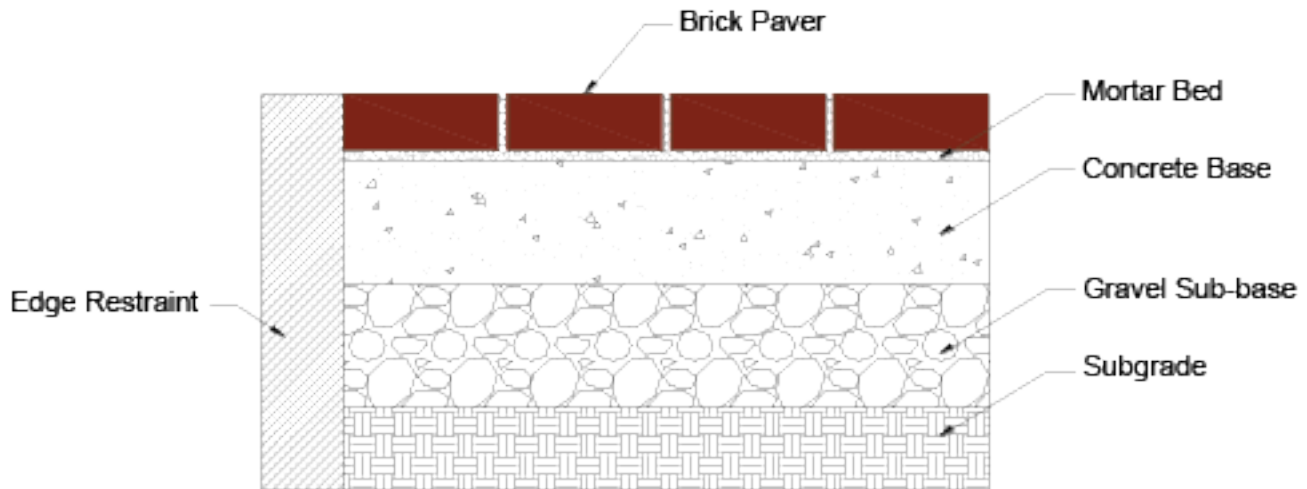
Gravel base materials for pedestrian and light vehicular traffic should be well graded conforming to ASTM D2940. Federal, state or local guidelines should be followed when used for heavy vehicular traffic or for state or local roads. Base material supporting flexible brick pavements should maintain 3 to 8 percent fines passing the No. 200 sieve.

Part III Execution

Rigid Pavements

1. Control and expansion joints

Unlike flexible pavements, rigid pavements require expansion and control joints. The design of rigid pavements must consider the movement of both the base and surface and detail expansion and control joints for the controlling case.



Rigid Pavement

A common mistake is made when expansion or contraction joints are placed in the base and omitted in the brick. When movement occurs in the base, it will be reflected at the surface generally in the form of a crack.

A standard expansion joint can be installed using a compressible joint filler and joint breaker placed in the movement joint and a durable tack free sealant placed over the joint flush with the surface of the pavement.

2. Mortar

Brick that are mortared to a rigid base should be placed in a single operation bedding and joint filling method. For weathering regions, a mortar consisting of 1 part cement to 3 parts sand is recommended. In regions where the brick are not subject to severe weathering conditions, a mortar consisting of 1 part cement, 1/2 part lime and 4-1/2 parts sand is acceptable. The mortar bed thickness should range between 5/8 inch and 3/4 inch.

3. Brick

Brick that are specified for rigid pavements should be sized to allow for a standard mortar joint of 3/8 inch. A common modular sized brick that allows the most flexibility in pattern layout is the 3-5/8 x 7-5/8 paving brick.

4. Construction

a. Install all utilities, pipes, and proper subgrade as required to support rigid base.

b. Rigid brick paving is permeable and will not prohibit water from reaching the subsurface. Install subsurface drainage as required. Slope the surface of the rigid base to

the sub-surface drains.

c. Place expansion and control joints in the rigid base as required and continue joints to the surface of the brick pavement.

d. Spread the mortar bed to the proper thickness and install the brick pavers.

e. Using a trowel or grout bag, fill all voids between brick pavers.

f. Compress and tool joints using a concave tooled joint. Allow the mortar to become thumbprint hard before tooling.

g. Scrape and remove excess mortar from brick. Brush clean.

h. Clean brick within 2 to 4 weeks. Follow recommendations as outlined in Technical Bulletin 4: Brick Cleaning Recommendations.

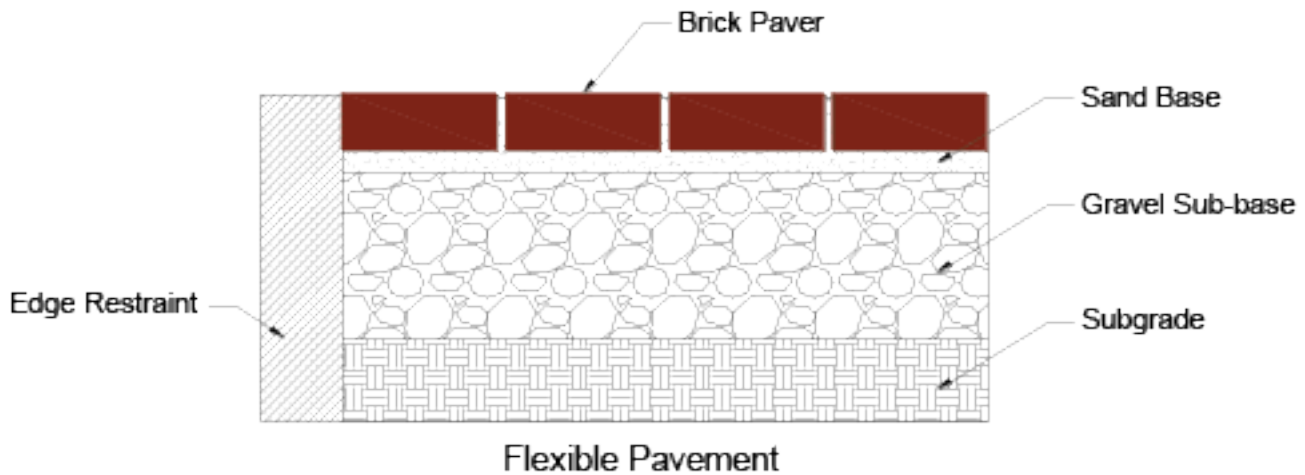
Flexible Pavements

1. Edge Restraint

Edge restraints are essential to the proper performance of flexible pavements. They are placed around the perimeter of the paved section and provide lateral restraint to the paving brick. This restraint supplies the force necessary to develop interlocking. Interlocking helps to resist vertical, rotational and horizontal displacements of the brick. Concrete, steel, wood and plastic are a few of the materials that can be used for edge restraint. The size and strength of the edge restraint must be increased as the traffic loads increase.

2. Bond Pattern

Brick can be placed in a variety of patterns. Basket weave, running bond, stack bond, and herringbone are just a few of the many patterns available. Herringbone is the only pattern that develops interlocking sufficiently to resist movement from the braking and accelerating of vehicles.



3. Construction

- a. Install all utilities, pipes and subsurface drainage prior to installing the base or subbase. Unsuitable, unstable materials should be removed and replaced with suitable materials when supporting heavy traffic.
- b. Spread and compact base materials in uniform layers not exceeding 4 inches. Compact to 95 percent maximum density. The surface of the base materials should be close-knit to prevent bedding sand from filtering and eroding the base.
- c. Geotextile fabrics can also be used to prevent filtering of one material layer into another and also to help reinforce and stabilize the soil. The finish surface and slope of the base should reflect that of the final paving surface. A minimum 2 percent slope is required for adequate drainage. Flexible pavements are not recommended for slopes greater than 10 percent.
- d. Install edge restraints. The base of the edge restraints should be placed at least as deep as the bedding course.
- e. Place and screed the bedding sand to the desired contours. The bedding sand should not be used to fill large voids in the base course.
- f. Install brick pavers in the desired pattern. For best results, "true pavers" should be used for flexible pavements. These brick are designed to be installed without mortar joints. The 4 x 8 true paver is the most versatile and allows for the largest variety of patterns.
- g. Compact the surface of the brick using a mechanical plate vibrator. After the initial compaction, sweep fine jointing sand over the surface of the brick and recompact.
- h. Remove surplus jointing sand.

Cleaning

Clean brick pavement using mild detergents and the "bucket and brush" method recommended by BIA Technical Note #20R.

Efflorescence

Efflorescence is the formation of soluble salts on the surface of the pavement. As moisture enters the pavement, free salts are wicked through the brick to the surface of the pavement and appear as a white milky powder.

Efflorescence is commonly removed using a brush and water.

Hard water salts that are insoluble must be removed using an industrial detergent.

Sand is a common carrier of these free salts, therefore it is important to use clean washed sands for jointing and bedding materials. Improper drainage of the base may create a condition in which the brick become saturated. Free salts in the bed layer are carried into the brick and wick to the surface as the water evaporates. Proper drainage will help to eliminate efflorescence and problems associated with freezing and thawing.

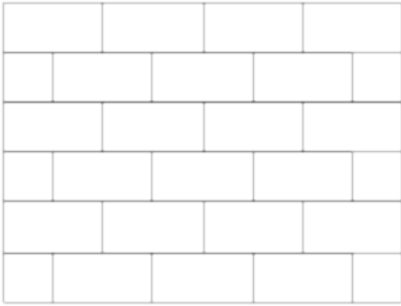
Precautions

De-icing salts are not recommended for ice removal and may cause spalling and efflorescence.

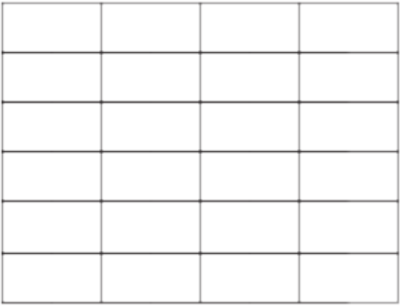
Sealers are not recommended for brick pavements in regions where the brick will be saturated when subject to freezing and thawing.

For more information contact your local H.C. Muddox or Interstate Brick representative.

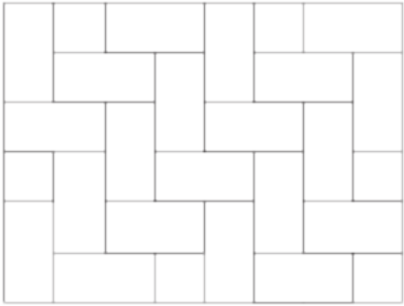
Bond Pattern



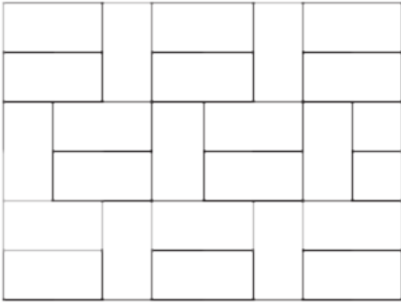
Running Bond



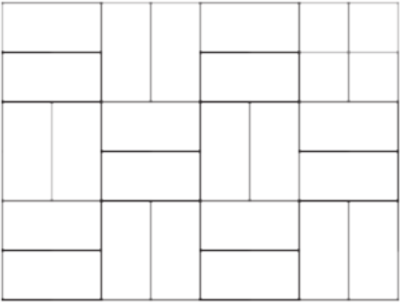
Stack Bond



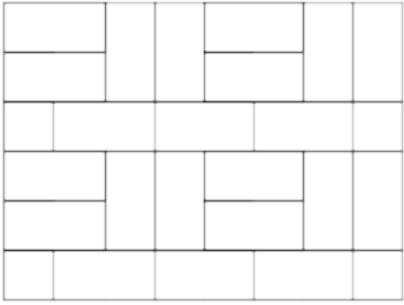
Herringbone



Single Basket Weave



Double Basket Weave



Running Weave