

# Water Repellent Coatings

## Brick

These recommendations are applicable to all face brick and Atlas® brick manufactured by Interstate® Brick or H.C. Muddox, conforming to ASTM C-216 or ASTM C-652.

## Water Repellents

Water repellents react with the brick and the humidity to transform the surface into a highly water repellent membrane to provide protection against moisture intrusion, efflorescence, leaching, mildew, freeze/thaw spalling and atmospheric staining. The water repellents specified are clear, penetrating, VOC compliant (environmentally safe) and have high vapor transmission rates thus allowing moisture trapped within a wall to pass through the repellent surface.

1. **Sure Klean® Weather Seal Siloxane WB** is water based and **Weather Seal Siloxane** is a solvent-based water repellent. Both have a 10 – 12 year service life, are not affected by high alkaline substances, chemically bond to the masonry, and have a vapor transmission rate in excess of 95 percent.
2. **Hydrozo Enviroseal™ Double 7 For Brick** is water-based, silane with a vapor transmission rate in excess of 85 percent.
3. **Protectosil® CHEM-TRETE® BSM 350** and **Aqua-Trete® Concentrate** are, silane water repellents. **Chem-Trete® BSM 350** is solvent based and will not leave a residue on glass, metal, or other non-porous surfaces. **Aqua-Trete® Concentrate** is water based water repellent.

## Application

1. Mortars and grout shall have been allowed to cure a minimum of 28 days.
2. Remove and repoint any damaged mortar or cracks in the mortar joints exceeding .02" (approximate thickness of a business card).
3. Allow repointed mortar to cure 7 days prior to application.
4. All caulking and sealant work must be done and allowed to cure completely before application of water repellents. (Refer to manufacturer's recommendations.)
5. Assure that all surfaces are clean and dry.
6. All materials, along with the surrounding air, must be maintained above 45° F during application.
7. Test a small area of surface to insure compatibility with existing conditions, and to establish proper coverage rates.
8. Do not dilute or alter water repellents.
9. Apply water repellent from the bottom of the wall up.

10. Initially fog the wall down with a fine mist, followed by flooding the wall with a minimum 8" rundown using a manual-pump low-pressure sprayer. Roll or brush out excessive drip areas.

## Coverage

Normal coverage of both products is recommended between 100 to 200 square feet per gallon dependent on density and absorption of brick. The test panel will help to identify actual coverage rate required.

## Precautions

1. Brick surface shall be clean and surface dry prior to application.
2. Neutralize alkalis and remove efflorescence salts prior to application.
3. Protect surfaces to remain uncoated.
4. Provide adequate ventilation.
5. Avoid prolonged inhalation of vapors and contact with skin or eyes.
6. Weather shall be clear and no precipitation expected before or following application for at least 24 hours.
7. Keep materials away from fire or flames.
8. The suggested sealers perform very well in preventing moisture from entering a wall through the brick face provided that application procedures are followed. As there are other means for water to enter a wall, the designer must properly detail all potential avenues of water penetration. Proper flashing, expansion joint, window, parapet and other details must be considered.
9. Water repellents should not be applied to walls undergoing efflorescence. Efflorescence is a sign of moisture trapped within a wall. Application of water repellents to efflorescing walls may trap these salts behind the coating resulting in salt concentrations which may cause spalling.

## Specifications

1. The above products comply with the following:
2. ASTM C-67 for Water Repellent.
3. ASTM D-1653 and E-96 Moisture Vapor Transmission Rate.
4. Accelerated Weathering (Q.U.V.) Test — 2500 hours.
5. Efflorescence NBS-883 Highly Resistant.
6. Dry time 24 Hours.
7. Surface appearance after application unchanged to slightly darken.

# Specification for Face Brick

## Part 1 Quality Assurance

### Brick Tests

1. All tests shall be performed by an independent certified testing laboratory.
2. All tests shall be in accordance with ASTM C-67.

### Submittals

1. Submit test report and certificate of conformance document for each type and color of brick specified on contract documents for architect's approval.
2. Test reports shall include:
  - a. Compressive strength
  - b. 24 hour cold water absorption
  - c. 5 hour boil absorption (if required)
  - d. Saturation Coefficient (if required)
  - e. Initial Rate of Absorption (I.R.A.)
  - f. Efflorescence
  - g. Weather classification
3. Certificate of conformance shall state that brick meets or exceeds applicable ASTM specifications.

### Sample Panels

1. Sample panel size shall be 4'x4' showing the proposed color range, texture, bond, mortar, workmanship, cleaning, and water repellents where applicable.
2. Final brick selection shall be made only following architect's review of sample panel.
3. Brick from manufactured material for project shall be shipped to site and sample panel erected.
4. No brick shall be shipped from manufacturer to site until architect's acceptance of job panel constructed from actual material for project. This panel shall replace all other sample panels and shall remain on site throughout construction, and become the project standard for bond, mortar, workmanship, and appearance.

## Part II Products

### Face Brick

1. Manufacturer: **Interstate Brick Company**, 9780 S 5200 W, West Jordan UT 84081-5625 or **H.C. Muddox**, 4875 Bradshaw Road, Sacramento CA 95827-9793
2. ASTM C-216, Grade SW, Type FBX or better.
3. Color and texture
4. Dimensions (*width*) x (*height*) x (*length*).
5. Minimum compressive strength 9,000 psi.
6. Maximum Saturation Coefficient 0.78 (if required).
7. Minimum IRA 6 g/ min/30 in<sup>2</sup>.
8. Maximum IRA 30 g/min/30 in<sup>2</sup>. Where IRA exceeds 30 g/min/30 in<sup>2</sup>, pre-wetting brick is recommended.

9. Shapes; where special shapes are shown on architectural drawings, manufacturer shall provide shop drawings for architect's approval prior to manufacturing shapes.

### Mortar

Mortar shall conform to ASTM C 270 Type N

#### Proportion Specification:

1 part Portland cement (ASTM C 150 Types I, IA, II, IIA, III, IIIA or V) less than 6 months old

1 part hydrated lime (ASTM C-207)

6 parts sand (ASTM C-144)

OR

#### Property Specification:

Portland cement - lime mortar

Compressive strength 750 psi

Water retention 75% minimum

Air content 14% maximum

Sand: 2 ¼ -3 ½ the sum of the separate volumes of cementitious materials sand (ASTM C-144)

## Part III Execution

### Bond

Bond shall be running bond unless otherwise shown on contract documents.

### Jointing

Mortar joints shall be concave unless otherwise shown on contract documents.

### Construction

All construction strictly adheres to International Building Code (IBC) or TMS 402/ACI530/ASCE5.

### Cleaning

Cleaning shall conform to Interstate Brick Technical Bulletin 4 Brick Cleaning Recommendations, Section 040120 and BIA Technical Note #20 Cleaning Brickwork. Do not use muriatic acid or sand blasting.

Contact manufacturer for recommendations.

### Water Repellent & Coatings

Where water repellents are required, consult Interstate Brick Technical Bulletin 1 Water Repellent Coatings and Section 071900.

# Specification for Atlas™ Hollow Brick

## Part 1 Quality Assurance

### Brick Tests

1. All tests shall be performed by an independent certified testing laboratory.
2. All tests shall be in accordance with ASTM C-67.

### Submittals

1. Submit test report and certificate of conformance document for each type and color of brick specified on contract documents for architect's approval.
2. Test reports shall include:
  - a. Compressive strength
  - b. 24 hour cold water absorption
  - c. 5 hour boil absorption (if required)
  - d. Saturation Coefficient (if required)
  - e. Initial Rate of Absorption (I.R.A.)
  - f. Efflorescence
  - g. Weather classification
3. Certificate of conformance shall state that brick meets or exceeds applicable ASTM specifications.

### Sample Panels

1. Sample panel size shall be 4'x4' showing the proposed color range, texture, bond, mortar, workmanship, cleaning, and water repellents where applicable.
2. Final brick selection shall be made only following architect's review of sample panel.
3. Brick from manufactured material for project shall be shipped to site and sample panel erected.
4. No brick shall be shipped from manufacturer to site until architect's acceptance of job panel constructed from actual material for project. This panel shall replace all other sample panels and shall remain on site throughout construction, and become the project standard for bond, mortar, workmanship, and appearance.

## Part II Products

### Hollow Brick

1. Manufacturer: **Interstate Brick Company** or **H.C. Muddox**
2. ASTM C-652, Grade SW, Type HBX or better.
3. Color and texture
4. Dimensions (*width*) x (*height*) x (*length*).
5. Minimum compressive strength 9,000 psi.
6. Maximum Saturation Coefficient 0.78 (if required).
7. Minimum IRA 6 g/ min/30 in<sup>2</sup>.
8. Maximum IRA 30 g/min/30 in<sup>2</sup>. Where IRA exceeds 30 g/min/30 in<sup>2</sup>, pre-wetting brick is recommended.
9. Shapes; where special shapes are shown on architectural drawings, manufacturer shall provide shop drawings for

architect's approval prior to manufacturing shapes.

### Mortar

Mortar shall conform to ASTM C 270 Type S

#### Proportion Specification:

1 part Portland cement (ASTM C 150 Types I, IA, II, IIA, III, IIIA or V) less than 6 months old  
 ½ part hydrated lime (ASTM C-207)  
 3-½ to 4-½ parts sand (ASTM C-144)  
 OR

#### Property Specification:

Portland cement - lime mortar  
 Compressive strength 1800 psi  
 Water retention 75% minimum  
 Air content 12% maximum  
 Sand: 2 ¼ -3 ½ the sum of the separate volumes of cementitious materials sand (ASTM C-144)

### Grout

Grout shall conform to ASTM C 476  
 Grout strength shall be greater than or equal to  $f'_m$

## Part III Execution

### Bond

Bond shall be running bond unless otherwise shown on contract documents.

### Jointing

Mortar joints shall be concave unless otherwise shown on contract documents.

### Construction

All construction strictly adheres to International Building Code (IBC) or TMS 402/ACI530/ASCE5.

### Cleaning

Cleaning shall conform to Interstate Brick Technical Bulletin 4 Brick Cleaning Recommendations, Section 040120 and BIA Technical Note #20 Cleaning Brickwork. Do not use muriatic acid or sand blasting.  
 Contact manufacturer for recommendations.

### Water Repellent & Coatings

Where water repellents are required, consult Interstate Brick Technical Bulletin 1 Water Repellent Coatings and Section 071900.

# Brick Cleaning Recommendations

## General

An important phase of constructing a masonry wall is cleaning. Sometimes walls are determined unacceptable because of poor cleaning. Failure to properly clean the brick after construction or use of aggressive cleaning products and/or methods can cause many problems. Mortar smear, white scum, efflorescence, green stain, etched bricks and mortar joints, removal of brick coatings, discolored masonry, acid burn, corrosion of reinforcing, pitting of window frames, and metal staining of the masonry are a few of the common problems associated with poor and/or improper cleaning.

The intent of this bulletin is to provide general brick cleaning guidelines that, when followed, will reduce or eliminate the problems mentioned above. Although **EaCo Chem** and **Prosoco Prosoco Sure Klean®** products are identified in this bulletin; it does not preclude the use of other acceptable brick cleaning products. For additional information refer to BIA Technical Note # 20. ([www.gobrick.com](http://www.gobrick.com))

*All information presented in this document is for general information only, representing what is deemed 'best practice'. This information should not under any circumstances be relied upon for any specific project cleaning applications of brick installations without independent evaluation by an experienced brick cleaning professional familiar with the products, means, and methods noted. Anyone making use of this information does so at their own risk and assumes any and all liability resulting from such use.*

## Methods

There are three acceptable methods for cleaning brick recommended by the Brick Industries Association (BIA). These are: (1) 'Bucket and Brush' hand cleaning, and/or Low-Pressure water/detergent spray; (2) High- Pressure water spray; and, (3) Abrasive Blasting. **Interstate Brick®** and **H.C. Muddox** strongly recommend that options (2) and (3) be reserved for only those projects in which the other methods have failed to properly clean the masonry, and the owner accept the condition of the brick after such cleaning.

## Products

Pre-mixed commercial cleaners are recommended over job blended mixtures of acids and detergents. Pre-blended cleaners reduce the risk of acid burn, metal staining, scum, corrosion, and etching.

Not all cleaning agents react the same on all brick and mortar. Some products are formulated to control manganese, iron, vanadium, and other metals found in brick. Use caution when specifying commercial cleaners to insure compatibility with the brick, mortar, and surrounding materials.

**EaCo Chem NMD 80** is a buffered detergent-based solution designed for the cleaning of new masonry structures. **EaCo Chem SOS 50** is a buffered detergent-based solution in which hydrochloric acid has been substituted with an organic salt and can be used for cleaning new masonry structures where uses of acidic solutions are precluded.

**NMD 80 and SOS 50** can be used on any type of brick, block, stone, cast stone, and pre-cast. No scrubbing is necessary. Both products help prevent efflorescence, manganese and vanadium stains and are safe for glass and anodized aluminum when used as directed.

**Prosoco Sure Klean® 600** is a safe, effective general-purpose cleaner formulated of surface acting acids, chelating and wetting agents to clean excess mortar grout and job dirt. When properly applied, this product will not discolor or damage the surface. **Prosoco Sure Klean® Vana Trol®** is a blend of organic and inorganic acids with special inhibitors which control oxidation of vanadium, manganese, molybdenum and other metallic salts common in most light colored brick. **Vana Trol®** removes mortar and grout stains, and other new construction stains and controls efflorescence. **Vana Trol®** is also recommended for colored mortars as it will not bleach the mortar.

Use **EaCo Chem** or **Prosoco Sure Klean®** products as defined in the following table titled "Recommended Cleaners" or an approved equivalent.

## Limitations

1. High-pressure spray application of the cleaning solution is not recommended.
2. High-pressure spray is not recommended for all brick surfaces and may cause damage.
3. Brick cleaning should not be performed on wall surfaces in which the ambient air temperature falls below 40°F (Fahrenheit degrees).
4. Where a pressure sprayer is used, the masonry wall shall be allowed to cure for 7 days for **EaCo Chem** products and 14 days for **Prosoco Sure Klean®** before cleaning.
5. Surface coated brick:  
**EaCo Chem:** Use EC Jet or low pressure (50 psi or lower) application and low-pressure rinsing.  
**Prosoco Sure Klean®:** Use low-pressure (50 psi or lower) or the bucket and brush method application and low-pressure rinsing. Post-fired coatings on brick may wash off with aggressive cleaning means and methods, and over time.
6. Do not use unbuffered or non-buffered acidic solutions to clean brick.

## During Construction

1. Proper care should be taken during construction to keep the wall free of mortar and grout smears. Grout left on



the wall for even short periods of time become difficult to remove. Use a soft bristle brush immediately after tooling to remove excessive mortar. Avoid cleaning motions that press the mortar and grout into the face.

2. Cover the wall at the end of each working day. Failure to prevent moisture from entering the wall may result in efflorescence and other leaching problems.

3. Protect the wall from dirt and mortar splatter.

4. Store brick above the ground to protect from soil contamination.

## Application

Follow the manufacturers' instruction for application and cleaning ([www.eacoChem.com](http://www.eacoChem.com), [www.prosoco.com](http://www.prosoco.com)) . The following steps are only guidelines.

1. The cleaning operation should be undertaken within 7 to 28 days when using **EaCo Chem** products; and 14 to 28 days when using **Prosoco Sure Klean®** Products, after the masonry construction. Cleaning before the wall has properly cured may weaken the masonry. Prolonged curing prior to cleaning may create more permanent stains which may become difficult to remove.

2. Test panel: Test proposed cleaning means and methods to ensure acceptable results. Test a small area of wall in an inconspicuous location using the cleaning mixture specified. A 16 sq. foot area may be sufficient. Where field panels are required, they should be cleaned using the product and procedures specified for the project. This can alert the owner's representative and contractor of any adverse reactions prior to cleaning the wall. Allow the test area to dry for one week prior to evaluating the effectiveness of the solution. The architect or owners' representative shall evaluate and approve the test area prior to cleaning the remainder of the wall. If the cleaning procedure is not effective, contact the manufacturer of the cleaner for further recommendations.

3. Mask or protect metal, glass, wood and other materials that may be adversely affected by the cleaning solution.

4. Pre-wet the area of wall to be cleaned and the area directly below. This will prevent absorption of the dissolved particles into the brick.

5. Use EC Jet or low pressure (50 psi or lower) spray to apply **EaCo Chem** products. Use a soft-fibered brush or a low-pressure spray to apply **Prosoco Sure Klean®** products. **DO NOT USE HIGH-PRESSURE SPRAY.**

6. **EaCo Chem:** Allow the solution to remain on the wall for 5 minutes and reapply. Allow solution to remain on the wall for additional 5 minutes after reapplication. **DO NOT ALLOW THE CLEANING SOLUTION TO DRY ON THE BRICK.**

**Note:** Depending on the mortar type or age a third application of **NMD 80** and **SOS 50** may be required.

**Prosoco Sure Klean®:** Allow the solution to remain on the wall for 1 to 3 minutes. Immediately reapply cleaning solution and remove heavy buildups of mortar and grout. **DO NOT ALLOW THE CLEANING SOLUTION TO DRY ON THE BRICK.**

7. Rinse thoroughly with clean water. Remove all cleaning solution from the area cleaned and any rundown. Failure to remove all cleaning solution may result in streaking, staining, and scumming.

## Coverage

**NMD 80:** Dilute 1 part concentrate to 4 parts water

**SOS 50:** Dilute 1 part concentrate to 4 parts water

**600:** Dilute 1 part concentrate to 4 to 12 parts water

**Vana Trol®:** Dilute 1 part concentrate to 4 to 8 parts water

The test panel will help to identify the actual coverage rate required.

## Precautions

Masonry cleaners are acidic and should be handled with caution. Applicators should wear goggles, rubber gloves, suits, etc. to avoid contact with the skin. To remove special stains refer to the BIA Technical Note # 20 for additional brick cleaning recommendations.

## Recommended Cleaners

### INTERSTATE® BRICK

#### H.C. MUDDOX PLANT

All brick colors can be cleaned using EaCo Chem NMD80 or PROSOCO Sure Klean® Vana Trol.

### INTERSTATE® BRICK

#### WEST JORDAN, UT PLANT

All brick colors can be cleaned using EaCoChem NMD80 or PROSOCO Sure Klean® Vana Trol. In addition, the following brick colors may also be cleaned with PROSOCO Sure Klean® 600:

Brick Color	EaCo Chem	Prosoco Sure Klean®
Copperstone	NMD 80	600
Ironstone	NMD 80	600
Mojave Brown	NMD 80	600
Monterey	NMD 80	600
Mountain Red	NMD 80	600
Ochre Buff	NMD 80	600
Terra Cotta	NMD 80	600
Walnut	NMD 80	600



INTERSTATE® BRICK 9780 South 5200 West, West Jordan, UT 84081-5625  
Phone: (801) 280-5200 Toll Free (800) 233-8654 [www.interstatebrick.com](http://www.interstatebrick.com)

H.C. MUDDOX 4875 Bradshaw Road Sacramento, CA 95827-9727  
Phone: (916) 859-6320 Toll Free (800) 776-1244 [www.hcmuddox.com](http://www.hcmuddox.com)

# 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

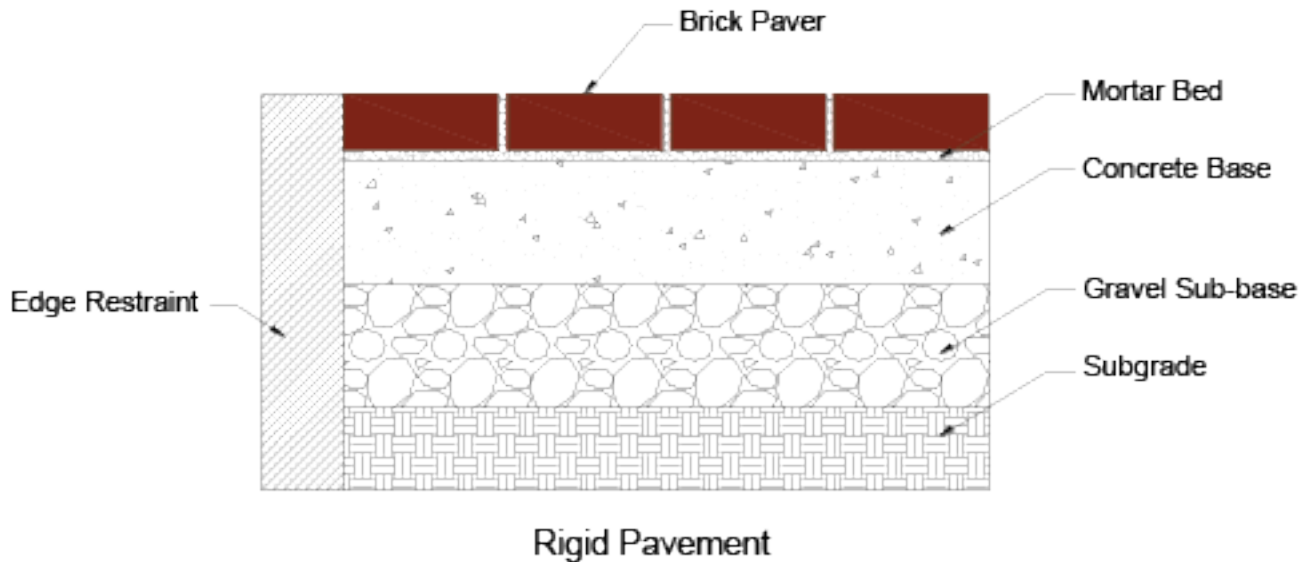
Unlike flexible pavements, rigid pavements require expansion and control joints. The design of rigid pavements must consider the movement of both the base and surface and detail expansion and control joints for the controlling case.

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.



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

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.

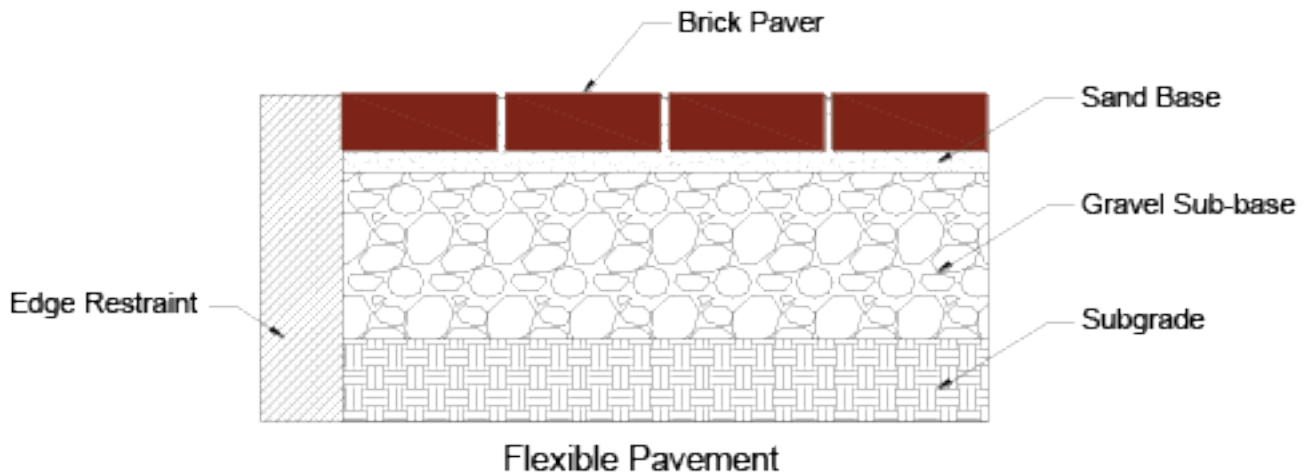
### Flexible Pavements

#### 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

- 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.
- 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.
- 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.
- Install edge restraints. The base of the edge restraints should be placed at least as deep as the bedding course.
- 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.
- 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.
- 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.
- 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

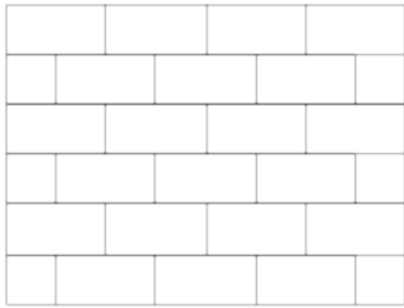
De-icing salts are not recommended for ice removal and may cause spalling and efflorescence.

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

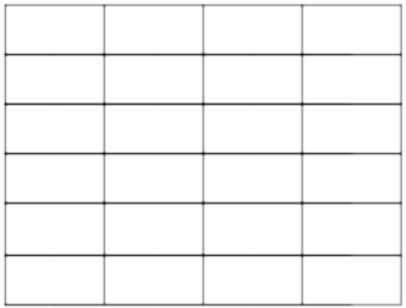
For more information contact your local H.C. Muddox or Interstate Brick representative.



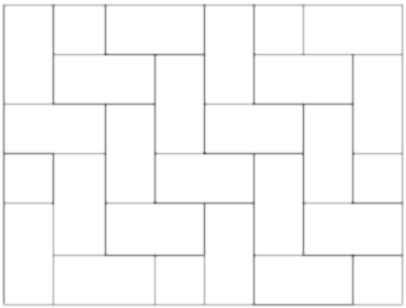
# Bond Pattern



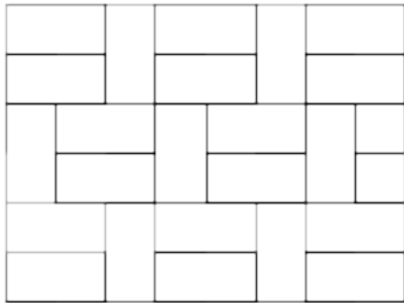
Running Bond



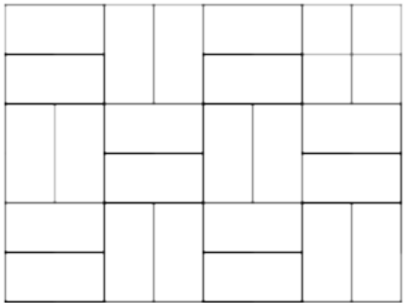
Stack Bond



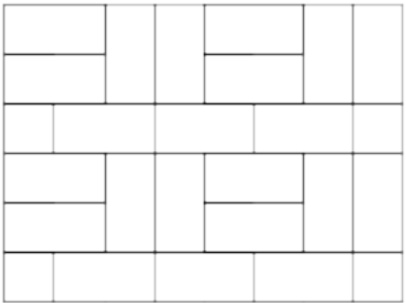
Herringbone



Single Basket Weave



Double Basket Weave



Running Weave

# Specification for Residential Brick

## Part 1 Quality Assurance

### Sample Panels

1. Sample panel size shall be 4'x4' showing the proposed color range texture, bond, mortar, workmanship, cleaning, and water repellents where applicable.
2. Final brick selection shall be made only following architect's or owner's review of sample panel.
3. Brick from manufactured material for project shall be shipped to site and sample panel erected.
4. No brick shall be shipped from manufacturer to site until architect's or owner's acceptance of job panel constructed from actual material for project. This panel shall replace all other sample panels and shall remain on site throughout construction, and become the project standard for bond, mortar, workmanship, and appearance.

## Part II Products

### Face Brick

1. Manufacturer: **Interstate Brick Company**, 9780 S 5200 W, West Jordan UT 84081-5625 or **H.C. Muddox**, 4875 Bradshaw Road, Sacramento CA 95827-9793
2. ASTM C-216, Grade SW, Type FBA (Type FBA brick include sand or slurry coated, tumbled, and heavily textured brick that is selected for characteristic architectural effects due to non-uniform size and texture. These units and may have a wider permitted variation in dimensional tolerances than Type FBS, and have no specified criteria for chippage, out-of-square, or warpage. The acceptance or rejection should be based on an approved sample panel) or better.
3. Color and texture
4. Dimensions (*width*) x (*height*) x (*length*).
5. Minimum compressive strength 9,000 psi.
6. Maximum Saturation Coefficient 0.78 (if required).
7. Minimum IRA 6 g/ min/30 in<sup>2</sup>.
8. Maximum IRA 30 g/min/30 in<sup>2</sup>. Where IRA exceeds 30 g/min/30 in<sup>2</sup>, pre-wetting brick is recommended.
9. Shapes; where special shapes are shown on architectural drawings, manufacturer shall provide shop drawings for architect's approval prior to manufacturing shapes.

## Mortar

Mortar shall conform to ASTM C 270 Type N

### Proportion Specification:

1 part Portland cement (ASTM C 150 Types I, IA, II, IIA, III, IIIA or V) less than 6 months old  
 1 part hydrated lime (ASTM C-207)  
 6 parts sand (ASTM C-144)  
 OR

### Property Specification:

Portland cement - lime mortar  
 Compressive strength 750 psi  
 Water retention 75% minimum  
 Air content 14% maximum  
 Sand: 2 ¼ -3 ½ the sum of the separate volumes of cementitious materials sand (ASTM C-144)

## Part III Execution

### Bond

Bond shall be running bond unless otherwise shown on contract documents.

### Jointing

Mortar joints shall be concave unless otherwise shown on contract documents.

### Construction

All construction strictly adheres to International Building Code (IBC) or TMS 402/ACI530/ASCE5.

### Cleaning

Cleaning shall conform to Interstate Brick Technical Bulletin 4 Brick Cleaning Recommendations, Section 040120 and BIA Technical Note #20 Cleaning Brickwork. Do not use muriatic acid or sand blasting. Contact manufacturer for recommendations.

### Water Repellent & Coatings

Where water repellents are required, consult Interstate Brick Technical Bulletin 1 Water Repellent Coatings and Section 071900.

# Structural Brick Compressive Strength Data Table

Selected Brick Colors	Average Net Area Unit Compressive Strength		Assumed Wall Assembly Design Strength ( $f'_m$ )	
	psi	(MPa)	psi	(MPa)
Arctic White	11,000	(75.84)	3,844	(26.50)
Autumn Red	12,000	(82.74)	4,000	(27.58)
Bronzestone	11,900	(82.05)	4,000	(27.58)
Canyon Rose	13,600	(93.77)	4,000	(27.58)
Cedar	13,200	(91.01)	4,000	(27.58)
Copperstone	14,000	(96.53)	4,000	(27.58)
Desert Sand	14,000	(96.53)	4,000	(27.58)
Golden Buff	15,400	(106.18)	4,000	(27.58)
Ironstone	14,600	(100.66)	4,000	(27.58)
Midnight Black	15,000	(103.42)	4,000	(27.58)
Monterey	14,400	(99.28)	4,000	(27.58)
Mountain Red	15,600	(107.56)	4,000	(27.58)
Ochre Buff	14,700	(101.35)	4,000	(27.58)
Park Rose	13,600	(93.77)	4,000	(27.58)
Platinum	11,000	(75.84)	3,844	(26.50)
Smokey Mountain	15,500	(106.87)	4,000	(27.58)
Tumbleweed	15,400	(106.18)	4,000	(27.58)
Walnut	12,800	(88.25)	4,000	(27.58)

1. Clay and shales are naturally occurring materials that vary, to some degree, throughout the deposits and strata layers. Consequently, various physical properties of the brick units, including the unit compressive strength values noted above are variable. The data above is based on historic data, not future projections. The data for the noted colors, and other colors, is kept on file, available upon request.
2. Assumed Wall Assembly Design Strengths  $f'_m$ , are based on TMS 602-22, Section 1.4-B-2(a), Table 1, and represent the design strength of wall assemblies comprised of masonry units, mortar, and grout. Mortar is assumed to be ASTM C270 compliant Type M, or Type S mortar. Grout is assumed to be ASTM C476 compliant grout with 28-day minimum compressive strength ( $f'_c$ ) equal to or greater than  $f'_m$ .
3. Wall Assembly Design Strengths ( $f'_m$ ) in excess of 4,000 psi can be achieved based on job specific prism testing.