

Clay brick masonry is one of the most beautiful and durable building products. As with all building products, clay brick should be inspected annually, ideally in the spring, and if necessary, remedial work should be carried out to ensure the durability and aesthetics of the brickwork is not compromised.

Inspection of brickwork. Periodic (annual) inspection of the masonry should identify:

- damaged brick
- cracks in the masonry
- spalling
- efflorescence
- staining, moss or other signs of excess moisture
- possible sources of excess moisture – external detailing
- the condition of roof overhang, and drainage details
- copings to parapet and freestanding walls
- mortar joints – cracks or deterioration
- brick above grade
- landscaping draining away from the building
- condition of sealants (caulking).

Brick quality: Forterra Brick clay brick are manufactured to meet or exceed the requirements of the American standards ASTM C216 “Facing Brick” and ASTM 652 “Hollow Brick”, grade SW (severe weathering). Contact your sales representative or dealer for a copy of a test report for your brick.

Maintenance: Brickwork requires little maintenance. However, it is important to carry out regular inspections of masonry, ideally in the spring, to identify any issues that need attention. Addressing these issues in a timely manner will help prolong the life of the building. Maintenance of brickwork includes the following:

- remedial cleaning
- addressing efflorescence if it occurs
- monitoring and replacing sealants when required
- tuck-pointing mortar joints if required
- replacing brick if required
- attending to ancillary details when excess moisture enters the masonry

Cleaning brickwork: The best method of cleaning mortar smears on new brickwork is to use clean water and a bristle brush within 24 hours of installation. Chemical or powerwashing methods should be used between 7 and 30 days after installation. Refer to Forterra Brick’s technical note “Cleaning Procedures New Brickwork” for more details. Refer to BIA’s technical note 20 “Cleaning Brick Masonry” for cleaning older brickwork. With all cleaning methods, it is important to do a trial section in an inconspicuous area to ensure that the desired result is achieved before cleaning the entire building.

Efflorescence: Refer to Forterra Brick’s Technical Note “Efflorescence”. If efflorescence occurs in a new building (new building bloom), the best advice is to allow the efflorescence to weather away of its own accord, normally with the first spring showers. If efflorescence occurs in an older building, it is a sign of a moisture problem, either from external detailing or from

air exfiltration from the interior. It is important to identify the source of the moisture and modify the offending detail before cleaning the efflorescence. Note that efflorescence is normally associated with cold wet conditions, i.e. winter and early spring construction. Cleaning of brickwork using wet cleaning methods is not recommended in winter months in the northern climates.

Spalling: Clay brick is a very durable cladding, and provided that it is correctly designed, detailed and installed, the brickwork will perform well beyond the life of the building. However, in the northern climates when subjected to excess moisture during the freeze-thaw cycles, masonry may be susceptible to spalling. Spalling can take up to twenty or more years to manifest itself, and will only occur where there is the concentration of excess moisture during the freeze-thaw cycles. The source of moisture is generally due to external detailing, which allows moisture to enter into certain areas of the masonry.

In some cases the source of moisture can be a result of exfiltration of moisture laden air from the interior of the building. Forterra Brick Technical Note “Weatherproofing for Northern Climates” describes recommended detailing to prevent excess moisture in the masonry. Attention to and maintenance of these details will ensure durable masonry. Excess moisture in masonry can be recognized by darkened masonry or mortar joints, moss growth, staining of brickwork and/or recurring efflorescence. Where excess moisture in the brickwork is identified, the offending detailing should be modified to eliminate the source of moisture. This will prevent possible future deterioration of brickwork at a later stage. Once the offending detail has been modified, the damaged brickwork, and mortar joints should be replaced. It may be advisable to replace some of the adjacent brickwork at the same time. One of the details covered in the technical note Weatherproofing for Northern Climates, is brick above grade. Forterra Brick recommends that brickwork be kept at least 6 inches above grade. This is to ensure that the durability of the brick is not compromised by snow melting into the brickwork resulting in excess moisture, and that the drainage cavity behind the veneer functions properly. This detail is usually correct at time of construction, but landscaping, paving and steps installed after construction is often taken to the level of the brickwork, compromising both the brick durability and the cavity drainage function. Annual inspections should monitor this to ensure that brick remains above grade and the landscaping drains away from the building.

Cracks: Most cracks in brickwork can be divided into three categories, hairline cracks, stepped cracks, or vertical cracks near corners.

- Hairline cracks appear on the face of the brick (normally vertical) and are generally not noticeable when viewed from 20 ft. Hairline cracks occur from time to time during the clay brick manufacturing process. During the firing process, the brick are heated to temperatures in excess of 1 800°F. During the heating and cooling, hairline cracks can sometimes develop. This type of

crack does not affect the structural integrity of the product. These hairline cracks will not widen with time and do not increase the likelihood of spalling.

- Stepped cracks which pass through both the brick and the mortar, or along the mortar joints, occur after installation and are normally associated with movement of the brickwork support or foundation. Since brick veneer is non-loadbearing, these cracks are not normally a structural concern. It is important to establish if the crack is still active (movement still taking place) or is passive (no more movement expected). If the crack is active, an engineer should investigate and determine what remedial work needs to be done to stabilize the brick veneer. If the crack is passive, and the veneer is secure, then the brickwork can be repaired by replacing damaged brick and tuck-pointing the cracked mortar joints.
- Vertical cracks close to corners are generally the result of expansion of brick and insufficient vertical movement joints to accommodate the expansion of brick or vertical movement joints filled with mortar negating the purpose of the joint. Refer to Forterra Brick's Technical Note "Control Joint Placement". If there are vertical movement joints, check that the joints are clear of mortar and debris. This can be checked by pushing a thin sharp object (nail) through the sealant. If the movement joint is filled, it must be cleared. If there are no vertical movement joints in close proximity to the corner, consider cutting movement joints into the brick veneer. Positioning the movement joint in line of the crack could be a good solution.

Tuck-pointing mortar joints: Where mortar joints have deteriorated or are cracked, the mortar should be removed to a depth of one inch, the joint cleaned of dust and the mortar replaced and tooled. The replacement mortar should be the same as the original mortar.

Sealant replacement: Sealants are used to seal the opening between masonry and windows/doors and to seal movement joints. The purpose of sealants is to prevent water entry into the wall system while accommodating movement. Sealants have a limited life and with movement, time and weathering will deteriorate. Sealants should be monitored regularly and if there are cracks or debonding, the sealant should be removed and replaced.

Water penetration into the building: A well constructed brick veneer with tooled mortar joints, clear cavity, flashing with end dams and weepholes provides the best protection against water penetration into the building. Water penetration into a building does not mean that the brick, mortar or workmanship is defective. It is expected that some water will penetrate the brick veneer, but will drain down the cavity and out the weepholes. If water is penetrating into the building, it is important to identify and correct the offending deficiency. Normally, water penetration is the result of incorrectly installed

flashing, the absence of flashing or landscaping built up above the weepholes. If the root cause is the absence or incorrectly installed flashing, flashing can be installed by removing a section of brickwork at the base, about 3 ft long, installing the flashing and replacing the brickwork. The mortar should cure for about a week before the adjacent sections are done. The use of waterproofing sealers should be the last resort in solving this problem.

Waterproofing sealers: Forterra Brick does not recommend the use of waterproofing sealers on brickwork. Although waterproofing sealers do reduce the wetting potential of the masonry, it can also inhibit the drying potential of the brickwork.

Weepholes: Weepholes are found at the base of the wall, and above windows and doors. Weepholes are normally open head joints, but may have a plastic insert. Weepholes provide an important function in the draining of moisture from the cavity behind the brick veneer. Weepholes should not be closed with mortar or caulking. Vents are open header joints (like weepholes) sometimes found at the top of the walls. Together with the weepholes, vents allow for air circulation and drying of the cavity. Vents should also not be filled or closed.

Warranty: Should a failure in a wall be proven to be the result of a brick manufacturing defect, the brick will be replaced at no charge. See Forterra Brick website for details regarding the warranty.

The above guidelines should help you get the best performance out of your brick masonry. Contact your Forterra Brick representative for further information.

References:

The following is a list of relevant technical notes:

1. Brick Industry Association (BIA) Tech note 46 "Maintenance of Brick Masonry"
2. Brick Industry Association (BIA) Tech note 20 "Cleaning Brick Masonry"
3. Forterra Brick's Technical Note "Cleaning Procedures for New Brickwork"
4. Forterra Brick's Technical Note "Weatherproofing for Northern Climates"
5. Forterra Brick's Technical Note "Efflorescence"
6. Forterra Brick's "Lifetime Limited Warranty"
7. ASTM C216 Face Brick
8. ASTM C652 Hollow Brick

The first two technical notes can be found at the BIA website gobrick.com

References 3 to 6 can be found on the Forterra brick website Forterrabrick.com

Reference 7 & 8 can be obtained at ASTM.org