Test for Wetting Brick

The following test is useful for determining the necessity of wetting brick prior to use:

A circle approximately 1" (25mm) in diameter is drawn on the bed surface of the brick, using a wax pencil and a twenty-five cent coin as a guide. Twenty drops of water are placed into the circle using an eye dropper. If after 90 seconds all of the water has been absorbed, wetting the brick prior to placement is recommended.

The air temperature at time of installation also affects the mortar choice. For example, in hot weather a high lime content mortar will help to retain the moisture in the mortar for a longer time. In cold weather a lower lime content, a type S mortar with lower water retentivity, may improve bond strength. Also, a type III (type 30) Portland cement, a high early strength, will provide extra heat from hydration to enable the mortar to hydrate sufficiently to bond with the brick.

If there is any doubt about which mortar to use, independent testing should be conducted to verify bond strength and moisture resistance for the brickwork.

All these variables need to be considered in choosing a mortar. In addition, workmanship is a critical factor. Preconstruction meetings with the mason should be arranged to impress upon him the need for quality workmanship.

Masonry Cements

Masonry cement mortars are widely used because of their convenience and generally good workability. However, there has been considerable debate concerning whether or not masonry cement mortars are as effective as PCL mortars with respect to bond strength and moisture penetration resistance.

The following are some of the concerns:

- First, the manufacturers of masonry cements which are proprietary products do not disclose their product formulae. Different producers use different amounts and types of ingredients which leads to inconsistent properties. In a bag of masonry cement, only about half the bag is Portland cement while the other half is ground inert limestone (a fine non-cementitious aggregate) as a filler. Additives are added to provide workability, water retentivity and air entrainment.

- The second reason is that masonry cement mortars have air contents around 20% which makes the mortar very workable. However, the high air content means that there will be less cementitious material in contact with the brick causing less surface adhesion and reduced bond strength. Also, the voids created by the air will allow moisture to more easily penetrate through the mortar.

- A third reason is that masonry cements contain little or no hydrated lime although some may contain an inert limestone. Without hydrated lime, autogeneous healing can not occur to seal voids or cracks caused by poor workmanship or shrinkage cracks.

The lime also provides some additional strength. A frequent comment from masons is that they prefer masonry cement mortars over PCL mortars because PCL mortars are too hard to get off the brick - the PCL mortar bonds to the brick too well. Masonry cements have performed reasonably well for many years, however, they should be used with caution.

Mortar Cements

Mortar cement mortars are covered by ASTM C1329 "Standard Specification for Mortar Cements". Mortar Cements are similar to Masonry Cements, but have a limit on the maximum air content (14% for types M & S, 16% for types N & O) and a minimum bond wrench strength specified. Mortar Cements were developed to overcome some of the concerns of the Masonry Cement.

References

1. Technical Note 8, "Mortar for Brickwork", Brick Industry Association, January 2008.

2. Technical Note 8B, "Mortar for Brickwork - Selection and Quality Assurance", Brick Industry Association, October 2006.