CERAMIC TILE INSTITUTE OF AMERICA, INC.

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CTIOA Field Report 86-5-1

SUBJECT: INSTALLING CERAMIC TILE VENEERS WITH LATEX MODIFIED MORTAR AND GROUTS

I. INTRODUCTION

A. The use of various latex additives have over the last 20 years increased in usage. Latex additives are being widely used in mortar, Portland cement plaster, stucco, concrete, bonding mortars and Portland cement grouts.

B. Latex additives do add several positive characteristics to sand cement mortar mixtures. Increased tensile strength, bond strength, water resistance, impact resistance and density are the major benefits derived from latex additives. As with all products and techniques, they must be understood in order to be used properly and if they are not, negative effects may be the result.

C. This report will deal with installation techniques when using latex additives

D. Of major concern is the white efflorescence-like substance which has been labeled, either accurately or inaccurately, as "latex leaching". Potential causes for this occurrence will also be discussed.

E. For additional Information on latex additives see Field Report CTI 86-2-3, "Understanding Grout and Mortar Additives".

II. **SYSTEM EVALUATION**

A. Before selecting any bonding mortar or grout, an evaluation of substrate, tile type, performance requirements and environment must be made. The use of an admix may not be necessary in all cases.

B. Substrate Evaluation

1. Not all substrates provide the same bonding potential.

2. A sand cement mortar bed, broom finish concrete or concrete block would provide the best bonding surface. Smooth tilt up or cast concrete will be more difficult to bond to so an additive may be necessary. The critical factors are porosity and texture of the surface. Cement bonds by mechanical means, therefore, if the surface is very smooth or dense, latex additive will greatly enhance bond strength by adding the adhesive dimension to the bonding mortar.

3. Cementitious backer units always necessitate a latex modified bonding mortar for exterior use.

C. Tile Type

1. Today there are many tiles, which are suitable for exterior veneer. They do, however, have many different characteristics.

2. Water absorption is a key indicator of the bond potential of a tile. Porous brick veneer provides an excellent surface to bond. Standard dry-set mortar will bond this material very well. Semi-vitreous or vitreous tile, however, may be more difficult to bond. A latex additive will greatly enhance bond strength with dense tile and, in most cases, would be recommended for exterior

veneer application.

D. Performance Requirements

1. Depending on the building size, type of construction and environment, a latex additive may be necessary.

2. As the height of the building increases, so do the demands made on the bonding mortar and grout. Wind load and structural movement will exert increased tensile and flexural demands on the bond coat and grout. Although it is perhaps a poor word when used with a rigid material like cement, latex additives will increase the flexibility of the mortar by increasing tensile and flexural strength.

3. Environment also plays a significant role in determining the need for an additive. Freeze thaw areas do require, in most cases, the need for a latex additive. The latex will inhibit water penetration into the system and thereby reduce or eliminate damage caused by freeze thaw cycling. Many areas also experience wide variations in temperature. This condition also puts extra stress on a tile installation. By adding some degree of flexibility to the mortar, a latex additive will add resistance against degeneration through prolonged thermal movement.

III. **INSTALLATION REQUIREMENTS**

A. As with all the installations, proper procedures must be followed for exterior vertical applications of tile.

B. First on the list is complete coverage of bond coat on the tile. Failure to achieve 100% coverage will of course diminish bond strength, but it will also provide space where moisture can accumulate only to percolate through the tile or joint and produce efflorescence.

C. When using latex additives, it is critical that they be used per manufacturer's recommendations. Each manufacturer specifies that the

material be used as is in lieu of water or diluted with water at varying ratios. These requirements must be followed. Latices perform best at a certain solid content by weight of cement. If the mix has too high of concentration level of solids, the bond coat may be adversely affected. When the latex solids are highly diluted, the latex will not provide the necessary performance level.

D. Wet weather installations require special care. Installations where latex admixtures are used must be kept dry for a minimum of 72 hours. If temperatures are low and humidity high, the cure time will be extended. Under those conditions, most manufacturers would recommend 7 to 14 days cure time prior to prolonged water exposure.

E. It must be understood that if latex is exposed to prolonged water saturation, the cure of the latex is stopped. If the latex is not allowed to cure, the possibility for re-emulsification of the latex is high. Once the latex is cured, however, latex such as styrene-butadiene rubber (S.B.R.â€™s) and acrylics should not re-emulsify under water exposure.

F. If latex admixtures are used in wet and/or cold conditions, the installation must be protected. Polyethylene sheeting or tarps would be effective. If temperatures are very low, (50Â°F or less) warm air blowers are very helpful to assist curing.

G. If conditions are going to be wet and/or cold, it is best to use an acrylic latex rather than a S.B.R. (crete) latex. As the acrylic has a faster cure time and when dry is less sensitive to prolonged water exposure.

IV. **LATEX LEACHING**

A. If leaching occurs, it must first be identified. If the whitish film can be removed with sulfamic acid, it is not latex. The residue is probably common efflorescence, which may be generated by the mortar bed, concrete block, concrete, or simply deposited through evaporation of water containing salts.

B. If the residue cannot be removed with either neutral soap or mild acid, a

solvent-based stripper can be tried. A product such as Aqua Mix Product's seal stripper will dissolve the latex film.

C. The essence of this tough film is difficult to analyze. Tests have been performed on the film and the trace elements identified are not those of latex in some samples.

D. It is possible that if the installation is saturated, the soluble salts contained in the mortar become chemically modified by the latex which renders them very difficult to remove.

V. **CONCLUSION**

A. Latex admixtures are being used extensively throughout the United States. Of the virtually millions of square feet installed with latex, very few leaching problems occur.

B. As with all materials and procedures, instructions and recommendations must be followed.

C. Before using a latex modified mortar, evaluate the installation to determine if a latex additive is required or necessary. If used, take the necessary precautions to prevent a fresh installation from becoming water saturated.

D. It is always recommended to consult with the Ceramic Tile Institute (CTI) and/or the latex manufacturer prior to installation.