

Spot Bonding

Introduction

The popularity of large size ceramic and stone products and the desire for smaller grout joints brings increasing challenges to the installation community. Achieving durable and aesthetically pleasing installations of large tile require a greater degree of adherence to standards by both the substrate and tile trades. This is often contrary to the perspective of the designer, specifier or end user who wrongly perceives fewer tile and smaller grout joints equal less work. When the faulty perception of less or easier work is combined with accelerated construction schedules and tight budgets unrealistic expectations often occur. The tile contractor often finds him or herself under pressure to find a means of accelerating the installation schedule while still achieving a profit. This often leads the installer to employ the questionable practice of spot bonding.

The Issue

Historically Floor and wall surface tolerance recommendations have been $\frac{1}{4}$ " in 10' with no more than a $\frac{1}{16}$ " variation in 12". This works well for smaller size tile such as that under 12" square with a $\frac{1}{4}$ " grout joint. However that particular substrate recommendation often proves inadequate when using a larger size tile such as 15". Industry trends continue to include tiles in larger formats, in multiple size patterns with minimal grout width requirements. Thus the ANSI substrate recommendations for tile with a leading edge of 15" or greater became $\frac{1}{8}$ " in 10' with no greater than $\frac{1}{16}$ " variation in 24" several years ago. **Thin grout joints on large tile compound the need for floor flatness.** The stringent tolerances under the ANSI revision are often beyond the technical capabilities of the typical concrete contractor. It then falls to the tile contractor to provide a suitable substrate for this product. Remediating the substrate to the tolerances of the ANSI A108 .01 2.6.22 *should* be addressed by providing an appropriate allowance in the specification process, however it is often ignored. This financial dilemma often leads to spot bonding where dollops of mortar are used in lieu of an appropriate floor filler material. This practice is done often in both wall and floor tile applications.

Industry Coverage Requirements

Standards are under constant review with changes made on a regular basis. The current coverage standards have a lengthy history of providing long lasting serviceable tile installations. Spot bonding has been dutifully reviewed and considered on a number of occasions in the past. The only approved method for spot bonding under the TCNA handbook methods is W260, which is recommended for walls in **dry areas only** using a suitable bonding **epoxy**. Spot bonding, whether used in conjunction with fully troweling the floor prior to applying the dollops or spots; or as is happening in increasing circumstances, when the spots are simply applied directly to the substrate without keying in the mortar or troweling it in; rarely provides the coverage required by manufactures recommendations and industry standards. It is also in conflict with the design of the products as defined under A118 thinset standards; which state "dryset mortars are



Death takes a holiday.

designed as direct bond adhesives and not intended for truing or leveling substrates or the work of others". Additionally, spot bonding does not provide coverage as required under A 108.5 which states

2.3.4 Average contact area shall be not less than 80% except on exterior or shower installation where contact area shall be 95% when not less than three tiles or tile assemblies are removed for inspection. The 80% or 95% coverage shall be sufficiently distributed to give full support of the tile.

2.3.5 If 95% coverage is specified in the project specifications, back butter each tile with bond coat; or select a notched trowel sized to facilitate the proper coverage, key the mortar into the substrate with the flat side of the trowel, and comb with the notched side of the trowel in one direction. Embed the tile in the mortar by beating-in, pushing in a direction perpendicular to the combed ridges, or other means to achieve specified coverage. The method used should produce maximum coverage with the corners and edges fully supported. Periodically remove and check a tile to assure that proper coverage is being attained.

The Problem

Ceramic tile is not considered a structural product until it reaches a thickness of 1 ¼". As a thin clay surfacing unit, tile must be fully supported. On a purely technical basis spot bonding affects the tile installation negatively in numerous other ways.

- Limited impact resistance- Other than those areas supported by mortar dollops, impact resistance is limited to that of the tile product. Such loads are typically several hundred pounds force rather than in excess of 2,000 pounds force when the tile is fully supported by thinset and the substrate
- Limited load resistance- Values are similarly reduced under wheel loads which are not uncommon in residential applications and typical in commercial installations.
- Product Design Limitations- Dollops thicker than ¼" for 118.4 and 5/8" for 118.xx are beyond the design limitations of the product and may result in excessive shrinkage causing bond loss.
- Shear Bond- Spot setting greatly reduces the shear bond value of the tile to thinset interface. Subjecting spot set tile to curvature related tensile stress, moisture expansion, and thermal expansion and contraction can cause bond loss.
- Grout- Side support for the tile, vital to longevity of the installation cannot be properly provided when a large part of the tile body is suspended from the substrate by mortar dollops.
- Moisture- when used in wet areas voids provide a reservoir for the accumulation of moisture. Wet walls will retain water and in horizontal on grade applications moisture will condensate on the underside of the tile and water will pool in voids causing degradation and/or maintenance issues.

Conclusion

Beyond the technical issues addressed here there are legal issues to consider as well. If there is a specification on the project you are legally obligated to follow the specification. Not following the contract you are signatory to may serve as a basis for rejection of your work. We are also seeing an increasing amount of exterior facades utilizing unapproved spot bonding methods and materials. Several injuries have been reported and death by falling tile is certainly not out of the realm of possibility.