



Lippage and Warpage – What You Need to Know

After all that hard work you step back and the installation on the wall looks great! Then you turn on the wall-wash lighting and much to your chagrin there they are, shadows, everywhere. What happened? Was this a poor installation? A variety of conditions in an installation may cause the appearance of having unacceptable lippage when in fact it may be within the specified limits. In addition, there may be issues related to improper measurement of the actual lippage based on a misunderstanding of how to take the tile warpage into consideration.

What is Lippage?

According to ANSI A-3.3.7, lippage refers to differences in elevation between edges of adjacent tile modules. These differences or perception thereof are influenced by many factors such as:

- The allowable thickness variation of the tile modules when judged in accordance with manufacturing standards.
- The allowable warpage of the tile modules.
- The spacing or separation of each tile module which would influence a gradual or abrupt change in elevation.
- Angle of natural or manufactured light accentuating otherwise acceptable variance in modules.
- Highly reflective surfaces of tile modules accentuating otherwise acceptable variance in modules.

The table below is a guideline for identifying acceptable lippage – in addition to the inherent warpage of the tile

manufactured in accordance with ANSI A137.1 – for typical installations of tile:

How Do I Use the Below Information?

It may seem that the proper way to calculate lippage on a job is to look at the tile size, reference the allowable warpage in A137.1, and then add the allowable warpage to the allowable lippage from the table below. However, this is not the correct procedure. The key word in A-3.3.7 above is INHERENT. Chances are that the inherent warpage in the tile being installed is less than what the standard A137.1 allows. This is why the below instructions indicate adding the INHERENT warpage of the tile to the allowable lippage. The lippage allowance will be the

sum of the value in the lippage table and whatever warpage is present in the tile.

Don't Forget the Lights!

If wall wash lighting is specified or is already in place it should be about 12 inches out from the wall. If the lighting is already in place and less than 12 inches away from the wall this should be discussed with the customer prior to installing the tile. It needs to be made clear that the lighting may affect the final appearance giving the perception that the lippage is outside the specification when it may be fine. Natural lighting can have the same impact so locations of windows, etc. must also be taken into consideration.

Lumps and Bumps

Another factor to consider is the existing variation in the plane of the substrate prior to installation. When tile is installed by the thinset method over an uneven substrate, the installation may not meet lippage standards. Thinsets generally are not designed for leveling the sub-floor beyond a certain thickness so a substrate may need to be treated with some

American National Standards Specifications for the Installation of Ceramic Tile - ANSI A-3.3.7 - 1999

Tile Type	Tile Size	Joint Width	Allowable Lippage
Glazed Wall/ Mosaics	1"x1" to 6"x6"	1/8" or less	1/32"
Quarry	6"x6" to 8"x8"	1/4" or greater	1/16"
Paver	All	1/8" to 1/4"	1/32"
Paver	All	1/4" or greater	1/16"

other leveling material to ensure proper lippage in the final installation.

Installations of handmade or specialty tiles with texture or relief may be more likely to have higher lippage. Therefore,

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where handmade or rustic tiles with a cottage edge are used, the grout joints are specified to be wider. This allows for

a more gradual change from tile to tile reducing the perceived lippage.

Big and Shiny

An installation with large format and highly polished tiles may appear to have unacceptable lippage when their reflective surfaces make any unevenness clearly

visible. Unevenness in the substrate which may be compensated for by adjusting smaller tiles can become impossible to negotiate with large tiles. These factors should be taken into consideration during the installation also. As the standards are updated they will include values for larger format tiles. **TILE**

About the Author



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Sharon Jones, Director of Research and Installation Standards, is a ceramic engineer with the Tile Council of North America (TCNA). TCNA is a publisher of the American National Standards Institute's (ANSI) Specifications for the Installation of Ceramic Tile and the TCNA Handbook for Ceramic Tile Installation, the industry's guidelines for ceramic tile installation.

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► Your Problem:

Keeping other trades off the installed underlayment before you set tile.

► An Example:

You want to use a lightweight time saving underlayment on tile installations for a major homebuilder customer but the tight construction schedule makes it impossible to keep traffic from other trades off the installed underlayment. You are concerned that the flexible plastic matting you would like to use will delaminate before you can set the tile. And barb wire is hard to handle. What do you do?

► Blanke-Solution:

Blanke • PERMAT. With its more rigid design, greater compression tolerance and improved substrate bonding, **Blanke • PERMAT** provides a more stable and movement resistant underlayment than the standard plastic roll matting. While it is always recommended to keep traffic off the underlayment before the tile is installed, the real world is that you often can't and the **Blanke • PERMAT** offers additional protection against underlayment delamination.

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