REINFORCING TAPE FOR GIB® PLASTERBOARD JOINTS – PREVENTING FAILURES

CASE STUDY 5

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The reinforcing tape in plasterboard joints form a critical component to achieve the performance stated in various GIB® systems.

A taped and stopped plasterboard joint provides the load transfer mechanism between plasterboard sheets in GIB EzyBrace® Systems. Stopped and taped joints are also important to achieve stated performance in GIB® Fire Rated Systems and GIB Noise Control® Systems.

Setting compounds (plaster-based) typically provide better tape adhesion and joint strength compared to using a multi-purpose air drying compound. Hence setting compounds are recommended for bedding in joint tapes.

Setting compounds need to be fully hydrated to set (by a chemical reaction) after the specific working time and cannot have dried out (ie, water needs to be present for the plaster to react and form the gypsum crystals). Also when bedding in the joint tape, appropriate contact is needed between the compound, the tape and the plasterboard surface to produce a strong bond.

— Chemical reaction. The bond strength of a setting compound is developed by a chemical reaction, which requires water to hydrate, crystals to form and set hard after a specific working time.
— Adequate contacts. Comprehensive mechanical entanglement of the setting compound with the surface of plasterboard and joint tape is also required to create a good joint and finish.

In New Zealand two types of jointing tape failure are more commonly observed.

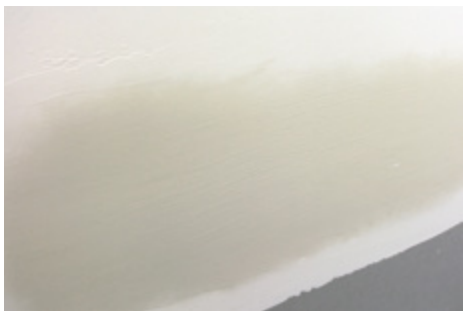

FIGURE 1: Basecoat compound has a darker colour and indicates it has set properly.

FIGURE 2: Basecoat compound is lighter in colour and shows it has not set properly.

Dried before setting.

One common failure is when the chemical bonding process is not fully accomplished due to water loss in the compound and insufficient water present when setting needs to occur. This phenomena is where the compound has dried out before it sets and there is no, or insufficient, water left in the compound after the working time has finished. The plaster then doesn't have water for the chemical reaction to occur and form gypsum crystals. The drying out before setting phenomena is more common during hot weather conditions and when using compounds with longer working time. Figures 1 and 2 show the colour differences between a standard hydrated setting compound. The dark basecoat plaster hydrated to form gypsum crystals. Compared with the much lighter in colour, dry basecoat compound that has not set and is still plaster that hasn't changed to gypsum.

When the plaster hasn't set it is still soft. Scraping the light coloured joint (with the plaster that hasn't set) a deep gouge is made. As opposed to scrapping the darker coloured joint (where the plaster has set and changed to gypsum) only a shallow scratch is made (see figures 3 and 4). Also when the plaster hasn't set the bonding strength isn't there to hold in the tape and causes the bedding coat to fail.

FIGURE 3: A scratch in a properly set basecoat is only super-visual and indicates it is hard.

FIGURE 4: A scratch in a basecoat not properly set goes deep/right through and indicates it is soft.

Inadequate compound/plaster under the tape.

The other common failure seen with paper joint tapes is where the joint has bubbled, cracked or is falling out. These symptoms are often due to the lack of mechanical entanglement with the surface of the plasterboard or paper joint tape and are referred to as tape adhesion failure. Good tape adhesion requires an adequate amount of compound placed behind/under the paper joint tape. At least 0.5mm thickness of compound is required under paper joint tape.

Figures 5 and 6 show the performance of a standard paper tape joint and compared to a failed embedded paper joint tape that had inadequate contact between the plaster, the surface of plasterboard or paper joint tape. The joint will not achieve adequate reinforcing if inadequate compound has been placed underneath the paper joint tape.

Figure 7 shows where the two plasterboards sheets that form a joint are not flat (ie, one is higher than the other). Half the paper joint tape has adhered well (ie, the lower half where the paper is delaminating when pulled out), and half the paper tape hasn't adhered well and comes out relatively cleanly. Under the top half of the paper tape there is little compound, it is so thinly applied that the plasterboard paper can been seen.

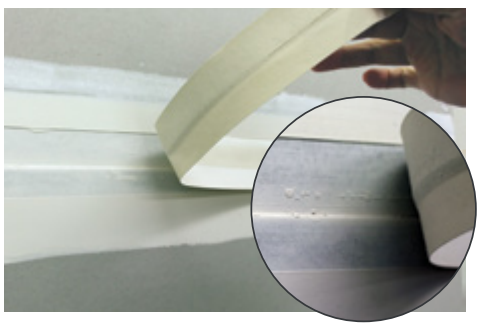

FIGURE 5: Inadequate compound under the tape and the tape can be removed relatively clean and easily.

FIGURE 6: Here the tape has adhered well. It is difficult to pull out and delaminates when pulled out.

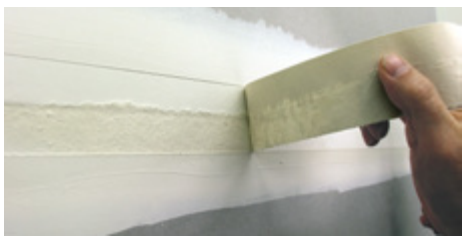

FIGURE 7: Shows lower half of the tape has adhered well to the basecoat and the top half has not, indication inadequate compound under the top half.

In summary, both well hydrated compound and adequate compound under the paper joint tape are essential to avoid two common joint tape failure modes in New Zealand conditions. A well hydrated compound is needed for the chemical reaction to occur and form a strong bond as the compound sets. Adequate compound under the paper joint tape is needed for good tape adhesion, created with proper mechanical entanglement between the tape, compound and plasterboard.

For further information go to gib.co.nz or call the GIB® Helpline 0800 100 442.