TECHNICAL INFORMATION SHEET
Tiling No 12- Tiling in adverse weather conditions

GENERAL

Cement based materials harden and gain strength as a result of a chemical reaction and as such, the speed of this reaction is affected by ambient conditions. Similarly, dispersion adhesives will be affected as the ambient conditions will change the rate of drying of the adhesive.

In general terms colder and more humid conditions will tend to slow down the speed of set and prolong pot life and open time and warmer drier conditions will speed up set times and reduce the pot life and open time. While in the UK and Ireland extreme conditions are limited to no more than a few weeks in the summer and a few weeks in the winter, it is wise to be aware of the effects of ambient conditions and some of the measures which can be taken to reduce these effects.

WINTER & COLD WEATHER CONDITIONS

Effects:

1. Dispersion Adhesives

Cold and humid conditions greatly reduce the evaporation rate of moisture. This can affect both new substrates and the adhesive. The end result is that the adhesive dries much more slowly leading to a reduction in the rate of strength gain and early age bond strength. Freezing temperatures can cause damage to the polymer latex within the product, both in storage and on site causing irreversible damage to the product.

2. Cement-based Adhesives

Cold conditions greatly reduce the speed of reaction of cement and water. This will prolong setting times and reduce the speed of initial hardening of cement based tile adhesives. Cement based materials should not be used below 5°C as the reaction all but stops below this temperature and in freezing conditions the water contained in the mix can freeze causing irreversible damage. It is also worth noting that in winter ground floor slabs and even tap water can be much colder than the ambient room temperature and this will cause similar effects.

3. Cement-based Grouts

Likewise with cement based grouts, cold conditions greatly reduce the speed of initial hardening and again should not be used below 5°C. Further, in cold and damp conditions the grout takes much longer to dry out. This can lead to a greater incidence of efflorescence as the water soluble salts have more opportunity to migrate through the joint to be deposited on the surface.

4. Substrates

New plaster, screed and concrete will take much longer to dry during winter months. Sufficient time should be allowed to ensure new substrates are ready to receive tiling.
Timber substrates will absorb moisture during humid conditions leading to expansion and subsequent shrinkage during drier, in-service conditions. This can result in deformation of the substrate (warping, curling or cupping of boards) and will induce stresses which may, over time, be sufficient to lead to debonding of the tiles.

Prevention:

1. Do not store materials in cold or freezing conditions.
2. Ensure ambient and substrate temperatures are maintained above 10°C.
3. Take care to ensure materials are sufficiently hardened to cope with overnight low temperatures.
4. Where possible use as little mixing water as permitted for the product.

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5. Consider using cement based adhesives instead of dispersion adhesives and rapid setting adhesives in favour of standard setting adhesives.
6. Factor in sufficient time to allow adhesives to harden before trafficking or grouting.
7. Consider localised heating and dehumidification to reduce drying and curing times.
8. Consider mixing adhesives with luke-warm (not hot) water.
9. Ensure all substrates are dried to the expected, in-service, equilibrium moisture content. (The equilibrium moisture content of, for example, plywood will be much higher on a cold site than in a lived in, centrally heated house.)

SUMMER & HOT WEATHER CONDITIONS

Effects:

1. Dispersion Adhesives

In general, the warm and dry conditions during summer ensure good strength development of dispersion based adhesives. Care should be taken, particularly on very dry substrates, that there is good contact and transfer between the adhesive and the tiles, i.e. ensure the adhesive has not skinned over.

2. Cement-based Adhesives

Hot and dry conditions greatly increase the speed of reaction of cement and water. This will reduce setting times and increase the speed of initial hardening of cement based tile adhesives. This leads to shorter pot life and open times of spread adhesive. Cement based materials should not be used above 30°C as the setting times can be so quick to make the adhesive unworkable and the rate of drying out leads to a greater risk of skinning.
Particular care should be given to sunrooms, dark substrates or dark tiles and south facing external surfaces where the effects of direct sunlight can be much more pronounced.

3. Cement-based Grouts

Likewise with cement based grouts, hot conditions greatly increase the speed of initial hardening and again should not be used above 30°C. The main issues are the reduction in working times and a greater risk of premature drying out.

Prevention:

1. Do not store materials in very hot conditions or direct sunlight.
2. Do not try to work where ambient and substrate temperatures are above 30°C.
3. Consider working earlier in the day or later in the afternoon to avoid high midday temperatures.
4. Do not work in direct sunlight and keep freshly laid areas in the shade, this is particularly important when working with dark tiles or external works.
5. Consider using standard setting adhesives in favour of rapid setting adhesives.
6. Consider priming particularly dry substrates to reduce suction.
7. Where possible use as much mixing water as permitted for the product. Do not be tempted to add more than the recommended amount of water or try to 'wet-up' material which has started to set. Do not attempt to remix material which has begun to set.
8. Allow tap water to run cold before using and do not use water stored on site which may have heated.
9. Consider adding ice to cool mixing water (to around 10°C).
10. Mix smaller amounts of material and work in smaller areas. Always use mechanical mixing e.g. slow speed drill and paddle.
11. Prevent early drying out by keeping freshly laid grout damp by applying a light mist of water.

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