



CERAMIC TILE MOVEMENT JOINTS: WHY, WHERE, HOW?



Schlüter-Systems

Who is Schlüter?

1966 : Founding of tile contracting business
1975 : Development of Schlüter®-SCHIENE as the beginning of Schlüter-Systems
Today : 4000+ products
550 employees.

Introduction

To identify Why movement joints are required?
To identify Where movement joints are required?
To identify How movement joints are achieved?

Why?

Overview

- A ceramic floor or wall can be compared to a large sheet of glass in that each is rigid by nature
- Movement joints must be installed to prevent tiles or grout from cracking.

Movement Joints: A Definition

- The intentional interruption in the ceramic tile or stone surface to allow for movement
- Common Terms:
Movement Joint
Expansion Joint.

Tile and Natural Stone:

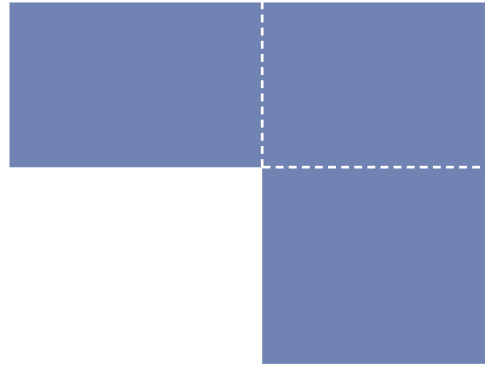
- All tiles expand and contract with changes in temperature
- The larger the tile field, the higher the coefficient of expansion and contraction
- Substrate and tile move differently



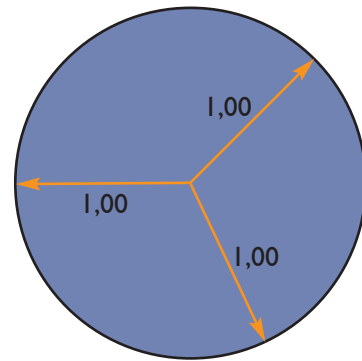
...because the substrate moves differently than the covering
...because cracks in the substrate become cracks in the covering.

Where?

Movement Joints BS 5385 Part 3 : 1989-Section Three 19.01.01

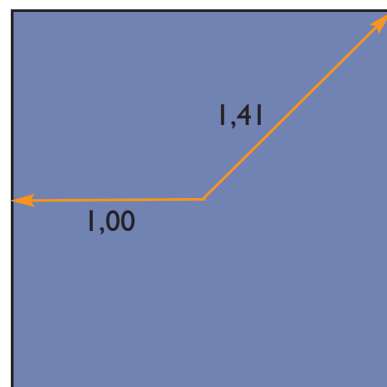


The building designer should assess the magnitude of any stresses and decide where movement joints, flexible joints and contraction joints should be located, having regard to all relevant factors including the type of flooring, bed and substrate.



The ideal covering

The distance from the centre of the force is the same in all directions

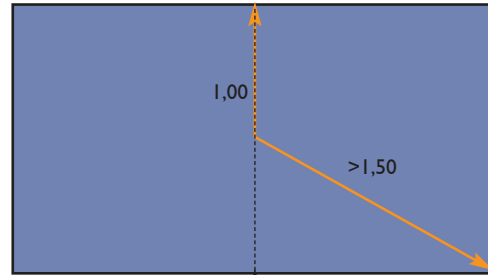


The ideal field size

Ratio of the shortest to the longest distance from the centre of the force should be approx. 1:1.5

The not ideal field size

Cracks are probable if the ratio of the shortest to the longest distance from the centre of the force exceeds 1:1.5



Risk area for cracks

Summary of Wall Expansion Joints BS 5385

- At storey heights horizontally & 3-4.5 metres apart vertically
- External angles, vertically between 0.25-1 metre from the angle
- Where tile works meet restraining surfaces (walls, pillars or columns) and where changes occur in finishing material
- Structural joints continue through the tile work and not be narrower.

Summary of Floor Movement Joints BS 5385

- Interior & external floor tiling; divided into maximum fields 10 metres in each direction
- On suspended floors tiling fields should be reduced and additional joints included over supporting walls or beams
- Movement joints should be incorporated over existing structural movement joints
- Perimeters, door openings, columns, kerbs, steps, where tiling is continuous across junctions of different base materials.

How?

Installation Methods:

Field Applied (Silicone type sealant)
Pre-Fabricated Profile

Comparative Analysis:

Silicone expansion joint:

- No edge protection
- Retains memory
- Maintenance
- Two step installation.

Pre-fabricated expansion joint profiles:

- Edge protection
- High elasticity
- Maintenance-free
- Straight uniform joint
- Prevents transmission of sound
- One step installation
- Long lasting professional installation.

Installed with silicone sealant:

- Torn joints
- Warranty problems
- Does not conform to technical standards
- High maintenance costs (replacement costs).



Installed with expansion joint profiles:

- Faster tile installation
- No torn joints
- No maintenance of the joint
- Joint can be warranted.



Internal Wall Corners

Without expansion joints

- Damage to the joints.

Installed with expansion joint profiles:

- No torn joints at the skirting or internal corner
- No maintenance of the joint
- Joint can be warranted.



Intermediate Movement Joints

Without expansion joints

- Damage to the covering.

Installed with expansion joint profiles:

- Edge protection for high mechanical stresses (Brass, aluminium, stainless steel)
- Replaceable movement zone
- No torn joints
- No maintenance of the joint
- Joint can be warranted.

Connection Joints

Installed with silicone sealant:

- Fungus infestation
- Soiling.

Installed with expansion joint profiles:

- Flexible connection to fixed building elements
- Eliminates sound bridges.



The Maintenance-Free Technically Engineered Expansion Joint

- Suitable for the absorption of:

- Compressive stress
- Tensile stress
- Vertical movement
- Shear stress
- Misalignment of fields
- Horizontal movement

- Joint is completed immediately after the installation of the covering
- No sound bridges.

Fire Performance

- As the profiles are a very small part of the tiled assembly they are deemed not to pose a significant problem within the overall construction scheme
- Individual product fire classification can be provided in accordance with DIN 4102.

Warranty

- Our worldwide product warranty covers installations against product failure
- A standard warranty period is given on the movement joint materials and function provided they have been installed in line with our recommendations.

Advantages of Engineered Movement Joints

- Saves time
- Faster grouting of the covering since consideration for sound bridging is not required
- No waiting time to seal the covering
- No useless travel or idle time due to other trades
- No co-ordination with other trades required.

Simpler installation

- Just cut and place
- Skirting tile is easier to install as the profile serves as support.

Better quality

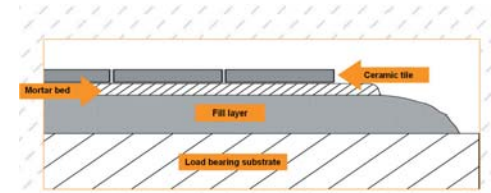
- No cracks or tears in the movement joint
- No maintenance of the joint means no unnecessary repairs
- Easy maintenance, because less sensitive than elastomeric sealant
- Jobs which may have had to be refused due to warranty concerns are now possible
- The only possibility to produce a movement joint that meets technical and warranty concerns.

More economical

- Saving time saves money
- Substantially more economical due to long life.

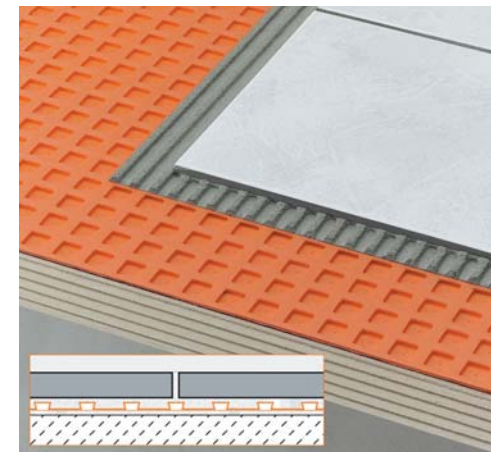
In Addition to Movement Joints

British Standards Institution states: BS 5385: Part 3: 1989 Isolation of tile bed from the base. Failure arising from variable stresses can be avoided by isolating the tile bed from the base by a separating layer that prevents the two elements from adhering to each other and thus allows each to move independently.



Uncoupling system

Function principle: Uncoupling (separation) of the covering.



Questions and Answers will appear in the May 2007 issue

SCHLÜTER-SYSTEMS MOVEMENT JOINT RIBA CPD

- FREQUENTLY ASKED QUESTIONS

Last month Specification Magazine featured a taster of world market-leader Schlüter-Systems Ltd's CPD presentation for architects on the use of movement joints, looking at why they should be used, where they should be fitted, and how they are installed.

Today we look at a selection of questions about movement joints frequently asked by architects.

Q: *I understand that a movement joint within the tiled surface can be misaligned by 500mm from a joint in the substrate, to keep in line with grout joints?*

A: No. Due to the possible horizontal and vertical movement, BS5385 states that all movement joints should be continuous through the tile, adhesive and screed. We're often asked if surface joints can be offset by putting them just a small distance away, but this is rarely possible.

On many occasions we've seen designs where contractors have offset the movement joint in the surface only by millimetres from the one in the screed, and the ceramic tile or stone covering has cracked.



If it's not absolutely over the top, problems do occur. There are some ways around it occasionally, depending on the type of joint in the screed, but you would need to take expert advice from movement joint specialists as to whether it's possible in the specific individual application. As a rule of thumb, though, they must be directly over the top.

Q: *I am working on an application whereby there is an existing joint within the substrate which is 15mm wide. Accepting what you say about a movement joint having to be directly on top of this, can the joint in the tiled surface be 6mm wide?*

A: No. The movement joint within the tiled surface must be at least the same width as the joint in the substrate. This will ensure that the surface joint is capable of doing what is being asked of it...namely absorbing the amount of surface movement in that particular tile field.

Q: *How often should movement joints be placed within tiles which are fixed to a heated floor?*

A: BS 5385 states that movement joints should be placed at no greater than 10 metres. However we recommend that they are placed more frequently to neutralise the higher degree of movement created by the heating system in the screed. Maximum centres of 5 metres are preferred.

Q: *How often should movement joints be placed within floor tiling which is not above a heated screed?*

A: All tiles expand and contract with temperature and moisture changes. In almost every case the substrate will move differently to the covering material. The larger the tile field the more it will expand and contract, and be vulnerable to failure. The amount of movement that can be absorbed, and therefore the degree of protection given by the joint, depends on the size of the profile. BS 5385 states that movement joints should be placed at 10 metre intervals. However, consideration must also be given to influences which may contribute to thermal expansion and contraction within the floor assembly, such as large areas of glazing. Movement joints should be placed more frequently to counteract this movement.



Q: *Can a PVC movement joint be used in a car showroom?*

A: A different type of joint will be required for different types of application – depending on whether it is heavy duty, light commercial, or domestic. In areas exposed to high traffic, such as shopping centres and airports, it is important to use a movement joint with metal edges to protect the edges of the joint itself while also preventing damage to the edge of the tiles. For residential or light commercial applications such as offices and car showrooms, PVC profiles will be suitable. However, if mechanical cleaners are used, then a movement joint with metal anchoring legs is preferred.

Q: *How much movement can a movement joint generally absorb?*

A: Pre-formed surface joints will usually accommodate movement of up to 20 per cent of the movement zone width. For example, Schlüter's largest movement joints, at 15mm wide, has a movement zone of 11mm, which will accommodate up to 2.5mm of tile movement.

Q: *Do movement joints need to be placed within wall tiling?*

A: Yes. Again quoting BS 5385, movement joints should be placed at three to four-point-five metres apart vertically in internal and external wall tiling. In external wall tiling they should be placed at storey heights, and for external walls at 250 mm to one metre away from the vertical angle of an outside wall corner.