IVD-Instruction Sheet No. 7
Issue January 2011

Elastic Joint Seals in Facades of Ceramic Tiles fixed with mortar

Content

0 Policy Statements on Standardization and Quality

Legal Framework

The following statements refer to the standard EN 15651 anticipated to come into force in 2014.
The following requirements resulting from the standard (e.g. use of CE-marking) are also expected to come into force in 2014 together with the standard.

Sealants as a construction product succumb to the European Construction Products Directive CPD (in Germany transposed into national law by the Construction Products Act). Building products are by definition intended to remain permanently in the building. The Construction Products Directive forms the legal basis for defining the requirements for a general fitness of the products and the elimination of technical barriers to trade within the EU.
The directive itself only states targets, but not how to achieve them. These targets are summarized in the six essential requirements:

1. Mechanical resistance and stability
2. Fire Protection
3. Hygiene, health and environmental protection
4. Safety in use
5. Sound insulation
6. Energy saving and thermal protection

These essential requirements provide the basis for the creation of so-called "harmonized" standards. Such standards are prepared on the basis of a mandate from the European Commission by CEN. The necessary compliance of a construction product with the harmonized standard is documented by the CE-mark. Without CE-mark a product must not be placed onto the market!
In developing the harmonized standards, the different circumstances of member states have to be taken into account via the introduction of classes, so that local products can still be placed on the market, i.e. the CE-mark only indicates suitability for distribution in the EU, which does not necessarily imply a high quality standard.

The harmonized standards are created as EN standards and then adopted as DIN EN standards in Germany. Possibly conflicting national standards shall be withdrawn from that date. However, some further parts of the national standards continue to exist as a so-called "residual rules". Thus, if essential national building code regulations are affected, a

product not compliant with these rules may not be used in this country, despite the CE-mark.

Quality Requirements

The quality requirements for sprayable (gun grade) sealants are contrived in DIN EN 15 651 part 1-4
Part 1: Sealants for facade elements
Part 2: Sealants for glazing
Part 3: Sealants for sanitary joints
Part 4: Sealants for pedestrian walkways
It should be pointed out that the DIN EN 15 651 only defines minimum requirements for sealants as to provide a certain reliability of seals.
The long experience of the IVD in practice in relation to the existing building tolerances, joint structures, loads on the joint and the sealing as well as the variety of sealant qualities, however, show that the quality requirements of the IVD regarding individual properties and regarding certain applications are in some cases significantly higher than is required by each part of the DIN EN 15651.
The example of the volume shrinkage may serve to clarify this point:

- According to the requirements of the IVD a sealing material for the sanitary field may have a max. 10 % volume shrinkage.
- DIN EN 15651-3 allows quality-related volume shrinkage of up to 55%.

What does increased volume shrinkage mean?

1. Increased exposure to ponding water / dampness
2. Increased risk of mold growth
3. Increased deposition of dirt and more difficult cleaning
4. Inadequate joint dimensioning (width to depth ratio of the joint sealant)
5. Impairment of the permissible maximum movement allocation and the expansion tension value due to the inadequate dimensioning.

Complete comparison for each of the quality requirements of IVD vs. the relevant parts of DIN EN 15651 is set out in the respective IVD Sheets in the chapter “Classification and Quality Requirements of sealants according to DIN EN 15651”.

1 Preamble

The elastic sealing with gun grade sealants in facades from mortar bonded ceramic tiles is not subject to the scope of DIN 18540 and is detailed in this Instruction Sheet.

2 Scope

The instruction sheet serves as a complement to existing standards and regulations. It applies to elastic jointing on exterior cladding of ceramic tiles.

3 Classification and Quality Requirements of Sealants according to DIN EN 15651-1

According to the harmonized European standard DIN EN 15651-1 sealants for facade elements are referred to as type F.
So this part of DIN EN 15 651 is also valid for the external wall- and expansion joint of facades of ceramic tiles fixed with mortar according to IVD-Instruction Sheet No. 7.

3.1 Classification of Sealants according to DIN EN 15651-1

DIN EN 15651-1 classifies sealants by the following classes:

- 25LM (Low Modulus/low expansion tension value)
- 25HM (High Modulus/high expansion tension value)
- 20LM
- 20HM
- 12,5E (Elastic)
- 12,5P (Plastic)
- 7,5P (Plastic)

3.2 IVD–Quality Requirements in comparison to DIN EN 15651-1

DIN EN 15651-1 makes minimum demands for the quality of sealants to ensure the security of the joint sealing

Based on many years experience in practice with regard to the existing joint designs, construction tolerances, joint loads and sealant qualities, the quality requirements of the IVD in this Instruction Sheet are higher than the EN requires within DIN EN 15651-1 for certain however essential qualities.

Attribute	**IVD**	**DIN EN 15651-1**
Classification	25LM 25HM	Permitted are also classes 12,5P and 7,5P
Maximum movement accommodation	25 %	7,5 % to 25 %
Quality requirements	DIN 18540 – Test certificate Neutral monitoring contract	No corresponding requirement
Volume shrinkage	≤ 10 %	≤ 10 % 25LM/25HM 20LM/20HM

	bei Dispersionsdichtstoffen auf Wasserbasis ≤ 25 %	≤ 30 % 12,5E ≤ 25 % 12,5P ≤ 25 % 7,5P
Paint compatibility	Test after DIN 52452-4, A1 und A2	No requirement
Compatibility with other building materials	Test after DIN 52452-1	No requirement

The experiences in practice show that exterior wall joints are subject to intensive expansion and compression movements. This is due to the different sizes of facade elements, especially the often too narrow-sized joints or construction tolerances.

For this reason the quality requirements of the IVD, which specify the classes 25LM and 25HM, i.e. devise a maximum movement accommodation of 25%, are of great importance.

The approval of other classes and a lower maximum movement accommodation leads to high risks and uncertainties for the user.

Increased volume shrinkage in non-aqueous sealant systems will over time cause hardening, reduction of the maximum movement accommodation and the risk of edge damage or cohesion damage within the sealant.

The knowledge of the compatibility with other building materials and compatibility with existing and / or successive coating systems is essential in order to be able to use the correct sealant.

The comparison of the quality requirements thus shows the need for a higher quality level of the IVD compared to DIN EN 15651-1.

4 Joint Types, Functions and Allocation

4.1 Expansion Joints

The construction design and execution is carried out in accordance with DIN 18540. For the dimension of the joint Tab. 3 of DIN 18540, Section 4 is used. These joints go through all supporting or not supporting parts of the building and have to be taken over at the same place for the sheating in appropriate standard measures (see Fig. 1).

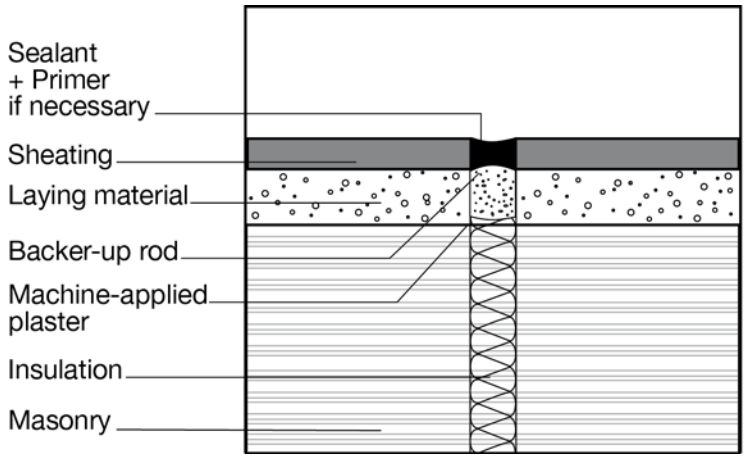


Fig. 1: Expansion joint in a facade sheating

4.2 Area Section Joints

Area section joints within the tile surface are to be carried out from the top edge of the sheating down to the structural base. Normally, these joints should be arranged horizontally and vertically in distances between 3 and 6 meters. Here, the size of the tiles as well as aesthetic aspects is taken into account (see Fig. 2).

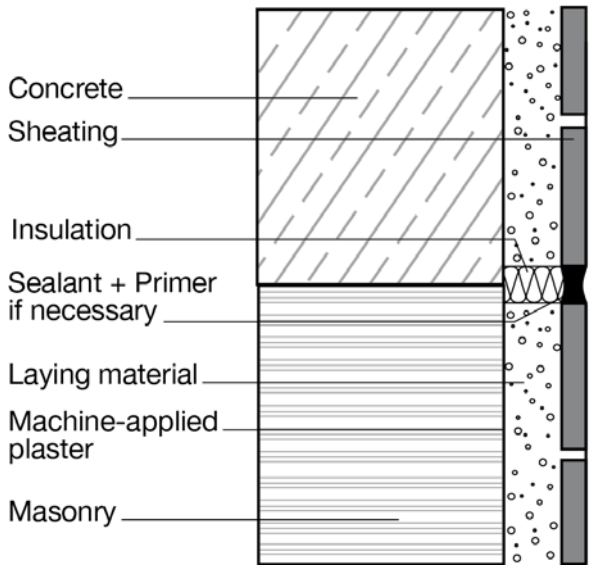


Fig. 2: Area section joints in a facade sheating

4.3 Perimetre Joints

Perimetre joints may be required between coverings and adjacent construction materials or fixtures.
For the dimensioning of the joints correspondingly Tab. 3 of DIN 18540 can be used (see Fig. 3).

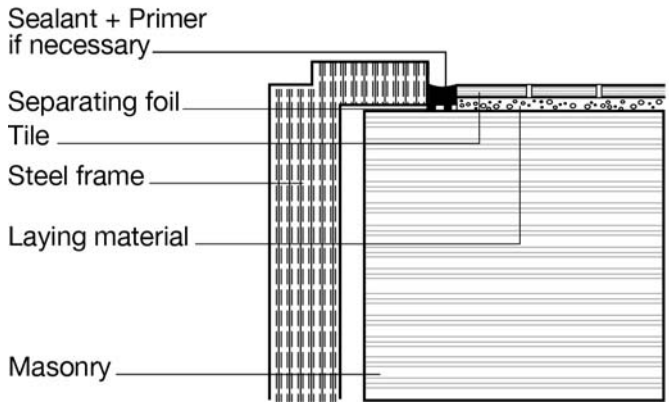


Figure 3: Perimetre joint to a steel frame

4.4 Building Partitions

These joints can be seen as a variant of the expansion joints mentioned in 4.1. Construction with gun grade sealant according to DIN 18540, Section 1 is not allowed. Here elastomeric joint tapes are to be used, therefore we advise the Instruction Sheet No. 4 of the IVD.

5 Material Selection

5.1 Sprayable Sealants (gun grade)

Gun grade sealants from the product groups listed below may be used: neutral and amine cross linker silicones, polysulphides, polyurethanes, and dispersion acrylate and hybrid sealants.

5.2 Prefabricated Joint Tapes

Using adhesives prefabricated joint tapes made from the following commodities may be used: silicone rubber, polysulfide rubber or polyurethane.

6 Material Requirements

6.1 Sprayable Sealants (gun grade)

For the types of joints described in paragraph 3.1 and 3.2 sealants having passed the test according to DIN 18540 should be used together with external monitoring.

The sealants used for sealing must be resistant to age and weather as well as compatible with the adjacent materials. To prevent the discoloration of adjacent components a certificate from the manufacturer of having passed the test according to DIN 52452-1 should be on hand.

6.2 Profiled Sealants

Because of the different requirement criteria we point to Instruction Sheet No. 4 of INDUSTRIEVERBAND DICHTSTOFFE E.V. - IVD.

6.3 Backing Materials

Backing materials have to exhibit the properties required by DIN 18540, Paragraph 5.1.2.

6.4 Tooling Agents

Tooling agents have to exhibit the properties required by DIN 18540, Paragraph 5.1.3. For compatibility between sealants and tooling agents and for creating a suitable dilution the manufacturer's instructions must be observed.

7 Construction Work

7.1 Surface of the Components in the Joint Area

The substrates for the sealant must be clean, dry and free of grease as well as solid and sustainable. In the area of the joints the surface of the components must be compact and sufficiently firm. Substrates must be free of impurities. They must also be free of such surface treatments - such as paints, sealings, impregnation - which affect the adhesion and hardening of the joint sealing system. Depending on the type of product a pretreatment of the bonding surfaces with a primer (adhesion promoter) may be required. The technical guidelines of the manufacturer are to be adhered to. Mortar for the repair of damaged areas must be sufficiently compact, hardened and free of cracks, must have a largely pore-free surface and adequate adhesion to the substrate. Such repairs shall not affect the adhesion of the sealant.

7.2 Preparation of the Joints

To ensure a clean boundary of the joint edges, these can be masked with tape. The adhesion of the sealant to the joint ground must be prevented by insertion of closed-cell backer rod or release films, so that three-point adhesion is avoided. To the joint edges, if required, the primer has to be applied evenly. The backing material should be installed evenly deep and sufficiently strong.

7.3 Application of the Sealant

The minimum and maximum flash-off times of the primer specified by the manufacturer should be adhered to. The processing instructions of the manufacturer are to be followed. Multi-component sealants are mixed in accordance with processing instructions in the prescribed mixing ratio completely and evenly and processed within the specified pot life. The joint sealant is inserted evenly and as far as possible free of bubbles. By pressing and smoothing a good contact with the joint edges is to be achieved, with as little tooling agent as possible. It is important to ensure that the adhesive surfaces of the sealant are not wetted by tooling agent.

7.4 Sealing with Elastomeric Joint-Tapes

Because of the special processing the Instruction Sheet mentioned in Chapter 2.1 is being referred to.

8 Documentation

In the interest of the processor, it is advisable to take the following records of the operation sequence:

- Date
- Air temperature and relative humidity
- Component temperature
- Description of work performed (joint dimensions, etc.)
- sealant and primers used (make, character)

Other auxiliary materials used (e.g., back-up, tooling agent).

9 Reference List

DIN EN ISO 11600
Building construction - Jointing products - Classification and requirements for sealants
Beuth-Verlag GmbH, 10787 Berlin

DIN EN 15651-1
Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1: Sealants for facade elements
Beuth-Verlag GmbH, 10787 Berlin

DIN 18540
Sealing of exterior wall joints in building using joint sealants
Beuth-Verlag GmbH, 10787 Berlin

DIN 18515-1
Cladding for external walls - Part 1: Tiles fixed with mortar; principles of design and application
Beuth-Verlag GmbH, 10787 Berlin

DIN 52452-1
Testing of building sealants for compatibility with construction materials
Beuth-Verlag GmbH, 10787 Berlin

DIN 52452-4
Testing of sealing compounds in building constructions - Compatibility of sealing products– Part 4: Compatibility with other protection coatings
Beuth-Verlag GmbH, 10787 Berlin

Instruction Sheet: „Bewegungsfugen in Bekleidungen und Belägen aus Fliesen und Platten“ (Expansion Joints in sheatings and coverings of tiles and slabs)
Zentralverband des Deutschen Baugewerbes.

IVD-Instruction Sheet No. 4
Sealing of outside wall joints in building construction with elastomeric joint tapes
IVD INDUSTRIEVERBAND DICHTSTOFFE E.V.

Contributors:

Wolfram Fuchs

cost of printed IVD-instruction sheet:
EUR 9.60 *

ordering online at instruction sheet:

*Ordering information: All cost are without the german VAT but only if you will send us your VAT ID number together with your order. Additional costs will be charged for a handling charge (EUR 2.50 - 4.50) as well as a shipping charge (approx. EUR 3.45 - 35.00 up to a weight of 10 kilograms). The delivery depends on prepayment invoice only: You order, we send you the bill, you pay and after the incoming payment you will receive the delivery.

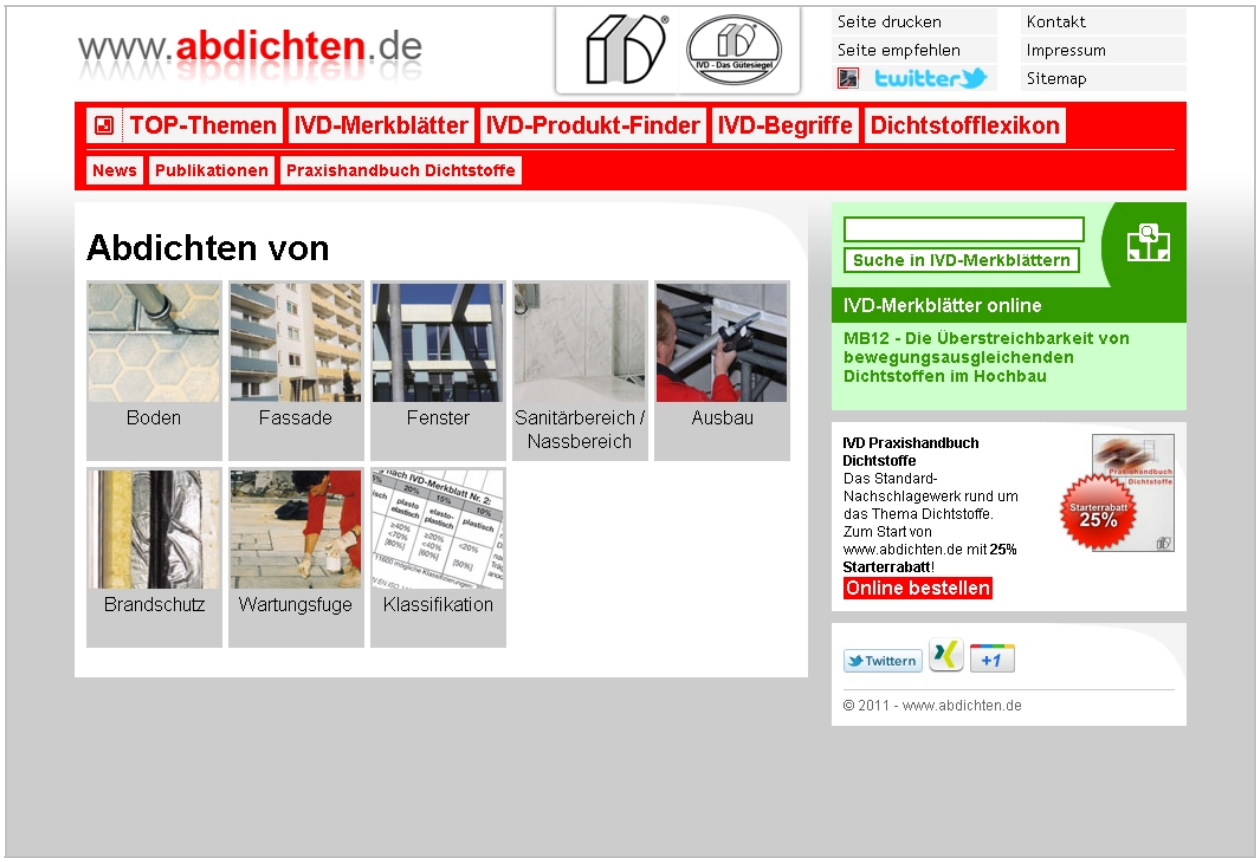
Free download of all current IVD instruction sheets at:

www.abdichten.de

The IVD-Product-Finder helps you find the advised quality products of the IVD corporate members according to the IVD instruction sheets.

In addition, all information about the joint-sealing in the areas of soil, facade, windows, sanitary and water construction.

As well as the IVD term search, the entire sealant online lexicon and continuously updated news about the topic.



www.abdichten.de – Your internet platform for joint sealing.

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