

# SILKA CALCIUM SILICATE ELEMENTS



**silka**

# TOGETHER, WE CAN FACE ANY CONSTRUCTION CHALLENGE

Calcium silicate products are the building material of the future. Certainly if they bear the signature of Xella, a firm with more than half a century of experience behind it. Xella has a clear mission: to build reliably by using innovative products and services. Craftsmen who give of their best to achieve guaranteed quality and provide outstanding service. Xella possesses a large number of production locations

and its own facilities for market research and product development. The synergy within the concern enables Xella to convert the requirements in the building world rapidly and flexibly to specific, efficient and cost-saving building solutions. Better construction with fewer costs? Xella is ready for that! Many in the building world know the slogan: "Building? With Silka naturally!" A slogan

with a clear message: Silka calcium silicate elements are an excellent building material with a particularly low environmental load. But exactly how "natural" are Silka elements? And how do they relate to sustainable building? These are the important questions that will be addressed extensively in this brochure.



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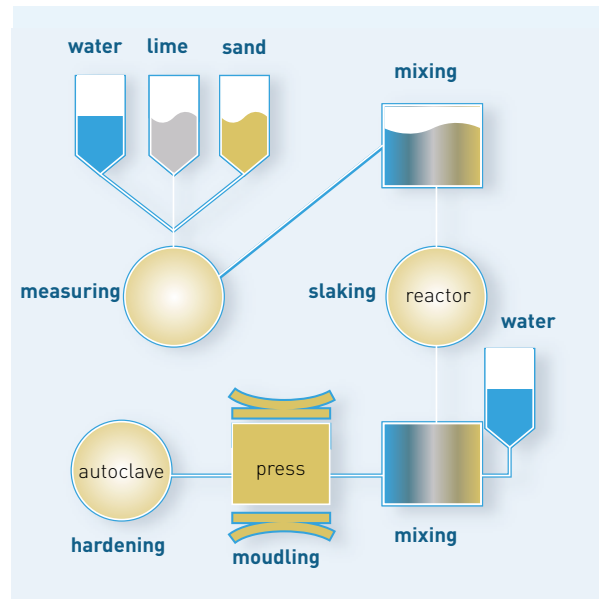
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## Chapter 1

# INTRODUCTION

The natural components of Silka elements are sand and lime. Both raw materials are available in an almost unlimited supply. However, the requirements for this type of sand are less stringent than they are for many other applications.



### 1.1 Calcium silicate blocks and elements, environmentally friendly products:

Silka blocks and elements consist mainly of sand (93 %) the remaining component being lime (7 %). The sand is usually extracted quite close to the production facilities. After extraction, redesign and development of the quarried area is undertaken.

### 1.2 Production process

The modern production process starts with the fully automated measuring and mixing of quicklime, sand and water. This mixture is placed in a reactor, where the quicklime is turned into slaked lime within a few hours. This mixture – now called ‘mortar’ – is transported to the press, where it is processed into ‘unfired brick’, which is then placed in an autoclave for hardening. This is done by

means of steam under high pressure, to obtain the end product. The ‘Silka block’ made in this manner does not have any of the qualities of the original raw materials of sand and quicklime, but consists of grains of sand that have been bonded together through calcium silicate hydrate bonds.



### 1.3 Use of Silka blocks

Silka blocks can be used on a large and varied range of projects including housebuilding, commercial and industrial buildings, renovation and agricultural buildings. Blocks are predominantly used for foundations, cellars, load-bearing and non loadbearing internal walls as well as external walls. Xella produces a large range of Silka products including

blocks, chamfered blocks and elements. Silka elements are the subject of this brochure. Advantages of calcium silicate are, among others, good sound insulation (due to a high volume weight /mass), substantial heat accumulation ability, considerable load-bearing capacity and high fire resistance. The 'breathing' qualities of Silka blocks are extremely suited to good

moisture regulation thus contributing to a pleasant living environment.

## 1.4 Silka calcium silicate elements

The elements come in various thicknesses with a working length of 897 mm and in heights of 623 mm and 643 mm. Silka is

a sand-lime product, with a very smooth finish, capable of delivering significant on site time and money savings upon completion.

### Product Range

| Type | Dimension mm | Thickness mm | Mortar consumption per m <sup>2</sup> | Weight (kg)* |                    | Profiling |
|------|--------------|--------------|---------------------------------------|--------------|--------------------|-----------|
|      |              |              |                                       | kg/each      | per m <sup>2</sup> |           |
| E100 | 897x623/643  | 100          | 1.4                                   | 100 / 104    | 178                | T&G       |
| E150 | 897x623/643  | 150          | 2.2                                   | 151 / 156    | 269                | T&G       |
| E175 | 897x623/643  | 175          | 2.5                                   | 176 / 182    | 313                | T&G       |
| E214 | 897x623/643  | 214          | 3.3                                   | 215 / 222    | 383                | T&G       |
| E240 | 897x623/643  | 240          | 3.7                                   | 242 / 249    | 431                | T&G       |
| E300 | 897x623/643  | 300          | 4.7                                   | 302 / 311    | 538                | T&G       |

T&G = tongue and groove

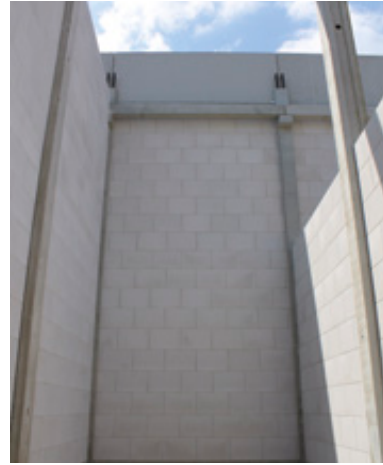
\* exclusive pallet

### General technical data

|  | Unit              |                      |
|--|-------------------|----------------------|
| Dry density                                      | kg/m <sup>3</sup> | 1800                 |
| Dimensional tolerances (l x w x h)               | mm                | ± 2 mm, ±2 mm, ±1 mm |
| Masonry group                                    |                   | Cat. I ; group 1     |
| Normalized mean compressive strength $f_b$       | N/mm <sup>2</sup> | ≥ 20 / ≥ 28          |
| Characteristic compressive strength wall $f_k^*$ | N/mm <sup>2</sup> | 10.2 / 13.6          |
| Thermal conductivity $\lambda_{Uj}$              | W/m.K             | 0.91                 |
| Specific heat c                                  | J/kg.K            | 1000                 |
| Diffusion resistance factor $\mu$                |                   | 5/25                 |
| Coefficient of linear expansion $\alpha$         | m/m.K             | 10x10 <sup>-6</sup>  |
| Coefficient of elasticity E                      | N/mm <sup>2</sup> | 10200 / 13600        |
| Reaction to fire                                 |                   | A1 (non-flammable)   |

\*  $f_k$  in accordance to NA to BS EN 1996 - 3: 2006

$\gamma_m = 2.3$  (material safety factor of Silka elements) not included



## 1.5 Clamping devices and dowels

At the top end of each Silka-element there are 2 holes, every 500 mm, for mechanical lifting and for dowel placement.

### Dowels

Dowels are used for simplifying the exact placement of the Silka elements and to prevent them from 'floating'. The dowels are manufactured from recyclable synthetic material (polypropylene); the blue colour is obtained by adding a cadmium-free colouring agent. A maximum of 1.85 dowels (1 per whole element) is needed per m<sup>2</sup>.





## Chapter 2

# CONSTRUCTION METHODS

Silka walls are composed of standard elements and cut-to-size blocks in accordance with the previously approved wall drawings. The kicker course consists of smaller calcium silicate blocks (standard heights 70, 85, 100, 115, 130, 145 and 160 mm or extra insulating thermoblocks). This allows wall parts to be supplied as semi-prefabricated packages (illustration 1).

### Walls are constructed using

- a small mobile crane and useful tools;
- “thin joint mortar” of traditional composition.

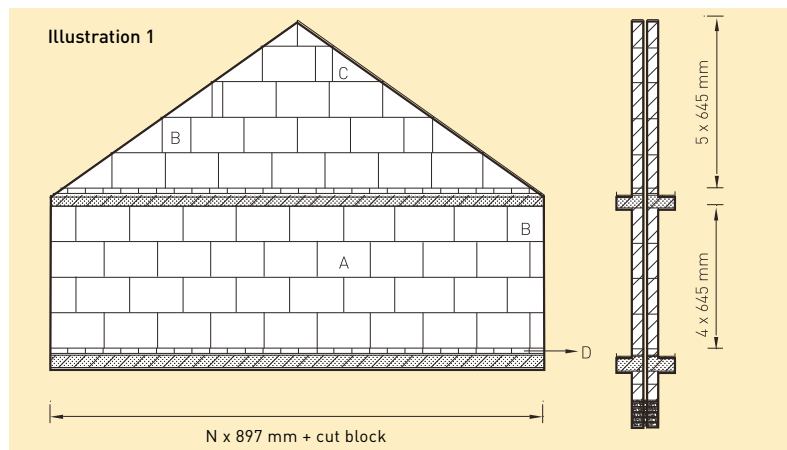
With this building method, smooth walls can be obtained, which are extremely well suited for finishing with:

- a thin layer of plaster;
- tiling straight onto the surface.



arch. Hans Kollhoff





## Advantages of building with Silka calcium silicate elements:

- simple building technique;
- high compressive strength;
- fast, rational and non-intensive labour;
- easy build ability with thin joint mortar;
- thin wall finishing (2-3 mm plaster finish);
- all round use;
- little preparation;
- flexible;
- no large investments in equipment such as formwork and heavy cranes;
- 'slimmer' walls than traditional;
- building techniques versions;
- less building moisture;
- no waste.

- A = elements. These are in standard formats in the working dimensions of 897x625/645 mm in various thickness dimensions.
- B = straight fitting pieces, cut to size from the elements, which makes straight wall endings possible.
- C = slanting fitting pieces, cut from elements to the desired angles and sizes, mainly for use in apexes of gables
- D = kicker course blocks. To be used for construction of the first layer of blocks. This functions as a fitting edge for the elements but also to level out the floors. This layer can also be built using Thermo - kickercourse blocks.

## 2.1 Ordering and delivery procedure

The building system is offered and sold by Xella per nett m<sup>2</sup> per thickness. Price calculations are based on the drawings, which must at least have a scale of 1:100, supplied by the contractor or architect. Included in m<sup>2</sup> price:

- whole elements and cut blocks delivered on an artic vehicle for forklift off-loading;
- cutting of the elements;
- working drawings of walls.

Not included are prices of material aids, thin joint mortar and accessories.

These will be quoted separately. Once the client has placed the order. Xella will produce the working wall drawings of the elements and cut-to-size blocks required for the walls, based on the drawings supplied by the customer.

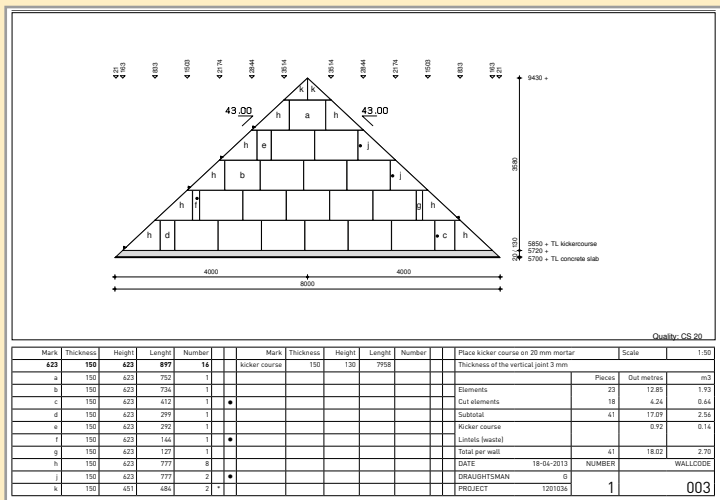
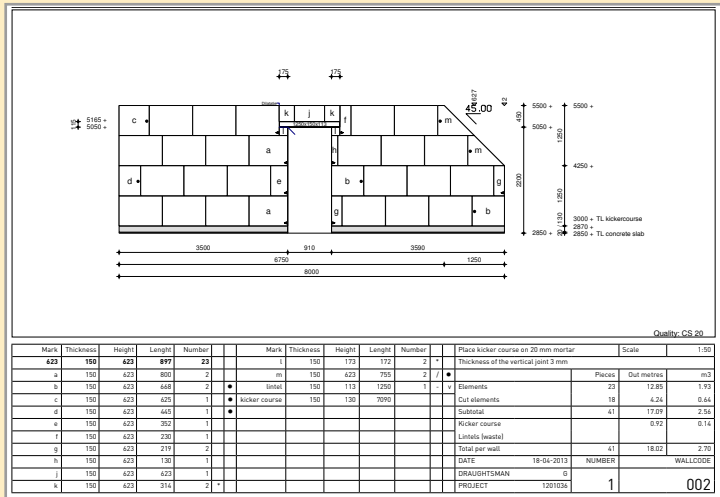
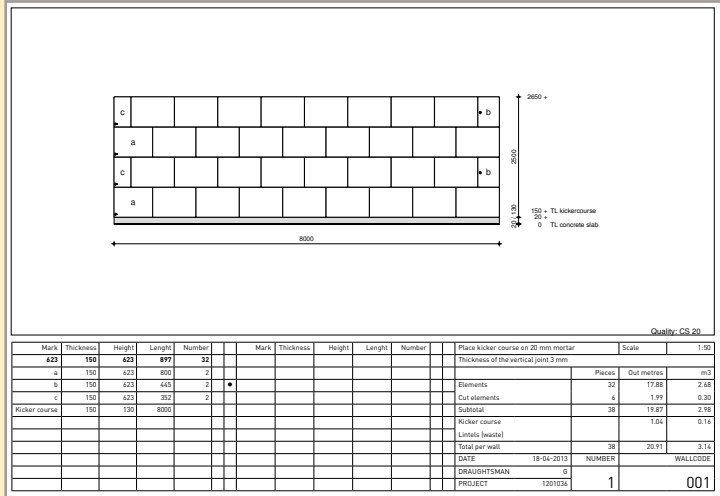


The working drawings of the walls also include the dimensions for the cut-to-size blocks (maximum dimensional tolerances in height and length of cut to size blocks measured across the saw cut: -4 mm to +2 mm). These working drawings are first presented to the client for approval, before cutting can commence.

### Delivery schedule

Delivery takes place based on a schedule. The delivery is affected by direct contact between the client and the logistics department of the supplying factory. Wherever possible, the Silka calcium silicate elements are supplied in full loads. The blocks are offloaded on site, by a fork-lift and should be stored on a level area and kept safe from rising moisture. Both the elements and cut-to-size blocks are delivered on pallets and are shrink-wrapped. Each cut-to-size-block is provided with an identification mark, which corresponds with the marks on the working drawing.

Illustration 2: wall drawings



## 2.2 On-site instructions

A Xella project supervisor can give onsite instructions about building with the Silka calcium silicate elements. Should instructions be required, the client can get in touch with Xella.

If parties concerned have no experience in using the Silka calcium silicate elements, it is of importance that the project supervisor has a meeting with the contractor and the installers well before the actual start of the installation. The instructions are given at the start of the construction process. Topics include working with material aids, such as element stacker, installing of elements and cut to size pieces. If further advise is required a Xella project supervisor can visit the site when the walls are under construction. The project supervisor draws up a report when visiting a site and gives his thoughts about the work methods.

## Schematic overview of the ordering and delivery procedure

### Offer stage

The builder provides the information of the building project to be executed in Silka (including the construction drawing on scale 1:100) and requests a quotation. Based on price calculation, a quotation is made.



### Execution of order

Providing Xella with the order either direct or via builders merchant. Builder will provide Xella with 1:100 scale drawings for the proposed project. Based on the definite work drawings, working drawings of walls are drafted and given to the builder and/or client for approval. Once approved by the client, the necessary cut-to-size blocks and elements are being produced and prepared for transportation.

### Delivery at buyer's option

Delivery of the elements and cut-to-size blocks takes place according to a schedule, agreed and set by the factory and the client.





## 2.3 Materials and tools

The following tools and materials are necessary for this method of construction:



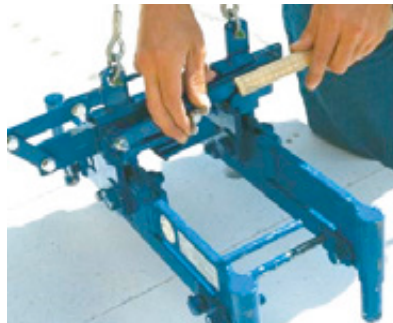
**A.** An element stacker per squad (various models are available).



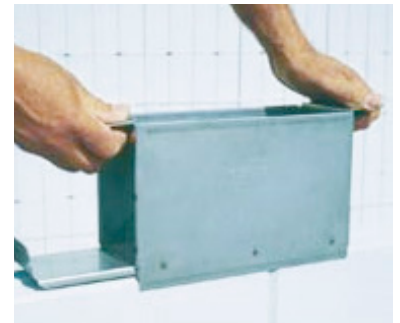
**B.** Approved clamping device for lifting the Silka elements with a element stacker.



**C.** Clamping devices for lifting cut blocks with the element stacker.



**D.** A double clamping device for adjusting two elements simultaneously in an anchorless cavity wall.



**E.** Silka thin bed mortar dispenser, suitable for the thickness of the elements used. An even spread of the correct thickness of mortar can only be achieved by using this thin bed mortar dispenser for bed joints.



**F.** Silka thin bed mortar scoop, designed for the thickness of the elements used, which evenly applies the thin joint mortar to the vertical joints of the elements.



**G.** A spack knife for removing excess mortar.



**H.** A pallet-truck for manoeuvring the pallets

The tools and materials A to D can be hired, on a weekly basis, from the supplying factory. The tools and materials can also be bought directly through Xella.



I. Plastic mortar trough for mixing the thin joint mortar.

**The builder will need to provide the following:**

- a bar or barrel mixer;
- small (masonry) tool;
- a mobile crane for distribution of the heavy materials and for moving the element stacker;
- trestle scaffolding, pallet lifting device etc.;
- even offloading area and scaffold parts to enable offloading of silka calcium silicate elements (for prevention of rising moisture).





## 2.4 Constructing

### 2.4.1 Work sequence

When using the Silka elements, the following work sequence should be followed:

- adjust the necessary corner uprights;
- kicker course construction;
- setting up the element stacker;
- mixing the thin joint mortar;
- erecting the wall;
- removing excess mortar and repairing any wall damage with an appropriate filler;
- shoring the walls.

### 2.4.2 Profile adjustment

Corner uprights are set the same as for laying traditional blocks; the adjusting slats should not interfere with the element stacker.

### 2.4.3 Kicker course construction

The kicker course is constructed using Silka kicker course blocks, specially designed for this purpose as they are completely flat, level and easily adjustable by means of a line, in a general purpose mortar. The vertical joints are filled with thin joint mortar. The kicker course construction should be completely set before placement of the Silka elements can begin.

### Thermo - kickercourse blocks

These special insulating kickercourse blocks have been developed to avoid cold bridging. They offer insulating properties and loadbearing capacity.

### 2.4.4 Distribution plan

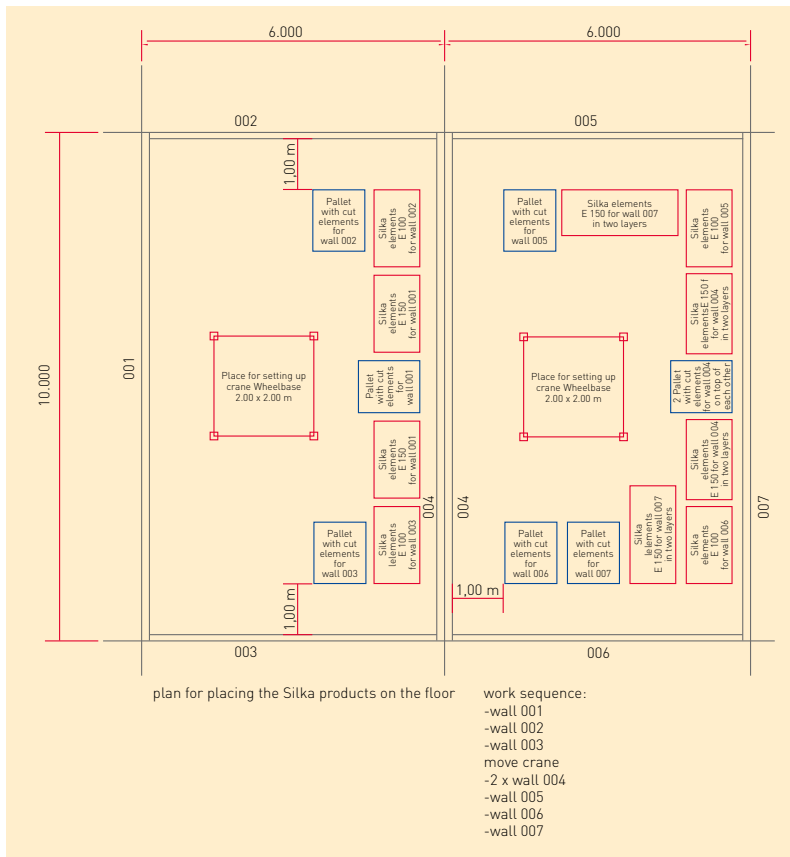
It is vital a distribution plan is drawn up to allow the system to maintain its efficiency. The plan allows the materials to be craned into an appropriate position for efficient construction.

### 2.4.5 Setting up the element stacker

A number of element stackers are available from 1350 kg to just over 2000 kg. The element stackers works on high voltage current (380V - 16A).







### Specifications:

- delivery in bags of 25 kg;
- instructions for use on the packaging;
- setting time about 4 hours;
- the special winter thin joint mortar can be used up to about  $-3^{\circ}$ . (Winter mortar is delivered from about 1 November until 1 April).

### 2.4.6 Thin joint mortar - Silkafix

These are specially developed water retaining mortars for Silka calcium silicate elements and blocks, based on traditional method of preparation. A bed of 2–3 mm mortar is required to lay the blocks; such a technique is known as ‘thin joint mortar’ Silka recommends using only the thin joint mortar, supplied by the factory (Silkafix) and adhering to the instructions on the packaging.

- Silka elements are stacked, as close as possible to the wall to be built, taking into account possible recommendations by the flooring manufacturer. Service pipes should protrude as little as possible (max. 100 mm) above the floor.

Remark: The thin joint mortar must be mixed for about 4 minutes allowing the dry mix to fully bond with the water to a soluble and useable mixture. After 4 minutes a good, smooth, workable mass is created and there is no powder left.



### 2.4.7 Erecting walls

With a squad consisting of two persons, Silka calcium silicate elements can be laid mechanically. One person operates the element stacker, picking up strategically placed elements and bringing them to the wall under construction. The second person sees to the application of thin joint mortar to all joints and ensures that the elements are correctly placed.

The application of thin joint mortar must take place with the aid of the mortar dispenser; the slide of this dispenser must be set to size disposing only of a 2 mm mortar bed. The mortar for the vertical joint is applied with a scoop, from the bottom to the top, on the already adjusted Silka elements. For elements with a thickness of 300 mm, it is recommended that the mortar is applied by the person operating the crane before he cranes the next block to the wall.

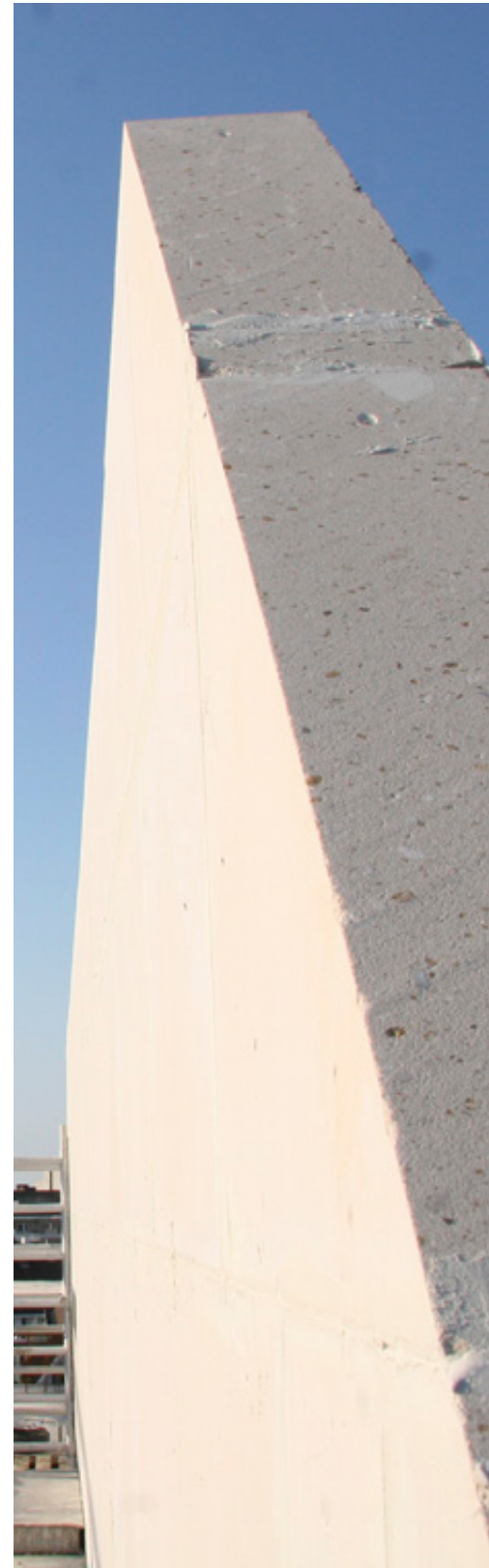
If necessary, the placement of the elements could be tightened up with the use of a heavy rubber hammer to close the vertical joint. Excess mortar must be removed with a spack knife after it has slightly hardened.

### 2.4.8 Scaffold work and shoring

The Silka walls can immediately be erected to the full height of the wall. Depending on weather conditions and the thickness of the walls, it may be necessary to shore walls. The regulations set by health and safety directives must always be adhered with regard to shoring walls as well as scaffolding work.

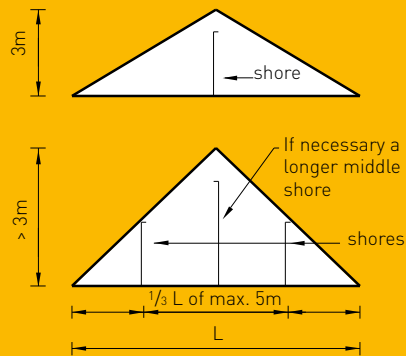
During and after construction, the walls must be prevented from falling down. Walls falling over or sliding down could be caused by wind load (pressure or suction) or because of impact load, which could take place during, for example, assembly of floor slabs.

Calculations by 'TGB Steenconstructies en proefnemingen' (according to European Standard) have shown that a wall with a height of up to 2.70 m and a thickness of up to 214 mm should be supported and properly shored every 5.00 m until the floor on top of the walls (or roof construction respectively) has been placed.





closed tops



## Shoring Walls

As a guideline for closed walls up to 2.50 m high and up to and including 214 mm thick and closed tops, the above mentioned diagrams can be followed. Remark: diagrams are intended for the inland areas; in blustery areas a shoring distance of 4.00 m maximum applies. Suitable as shore are:

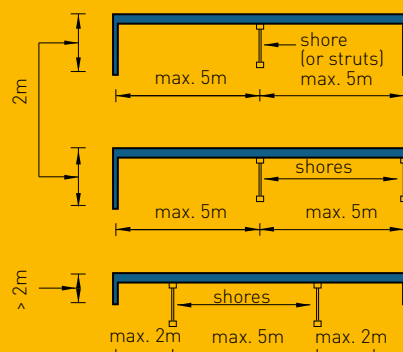
- cross walls with a minimum length of 2.00 m, which have been decently anchored to the wall with the standard clamping;
- shoring as shown on the picture.

### REMARK:

Do not apply the thin joint mortar with the aid of a trowel under any circumstances.



closed walls



Walls with a height of 2.50 m and thickness up to 214 mm



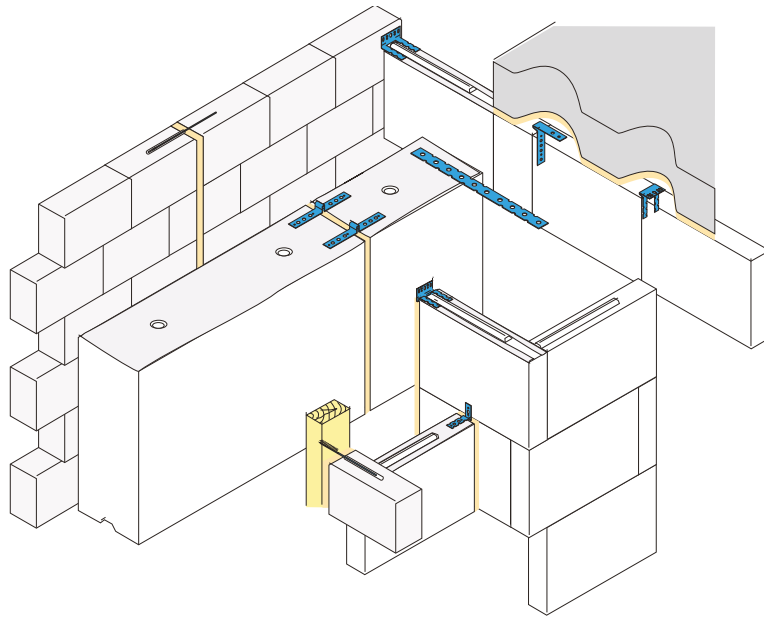
## Chapter 3

# ANCHORING SILKA ELEMENTS



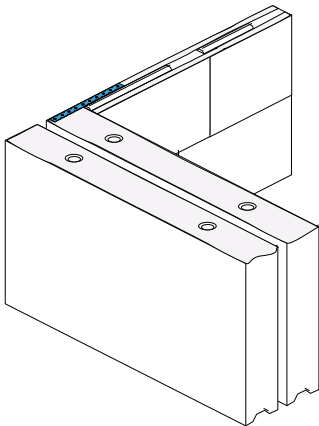
### 3.1 Wall ties

Due to the thin mortar joints ( $\pm 2$  mm), a complete anchoring programme was developed for Silka calcium silicate elements and Silka small blocks. As a result, working with thin joint mortars has become very easy. The following anchors and ties are used in Silka thin joint masonry:



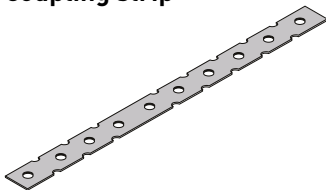
#### 3.1.1 Thin joint mortar coupling strip

These are flat, perforated strip anchors for connecting adjoining walls in a vertical joint. A strip anchor is required for each layer.



1 to 2 anchors every 625 to 645 mm, in consultation with the builder

#### Coupling strip

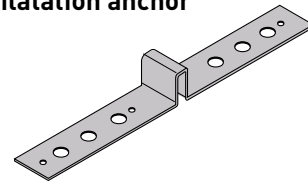


Coupling strip 300 mm

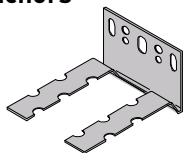
#### 3.1.2 Wall anchors

These anchors, also known as wall ties, are for rigid and flexible joints between partition walls and load-bearing walls. Flexible wall anchors can also be applied in flexible ceiling joints. be applied as a head restraint in flexible ceiling joints.

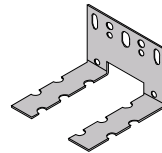
#### Dilatation anchor



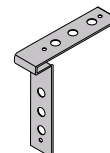
#### Anchors



Dilatation wall anchor



Rigid wall anchor



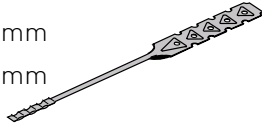
Flexible anchor



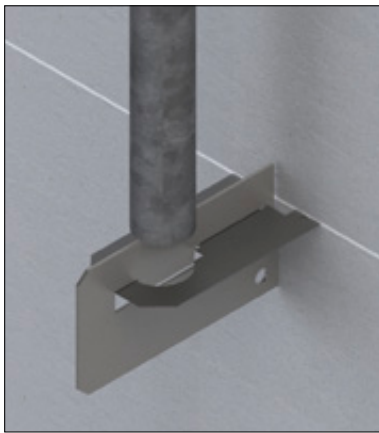
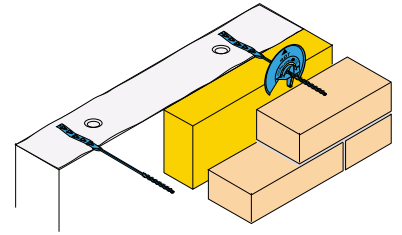
### 3.1.3 Cavity wall anchors

These anchors have a flat strip on one side. They are placed closed side up, to the rebate, in the mortar.

Cavity tie SS  
130 +/- 15 mm  
160 +/- 15 mm



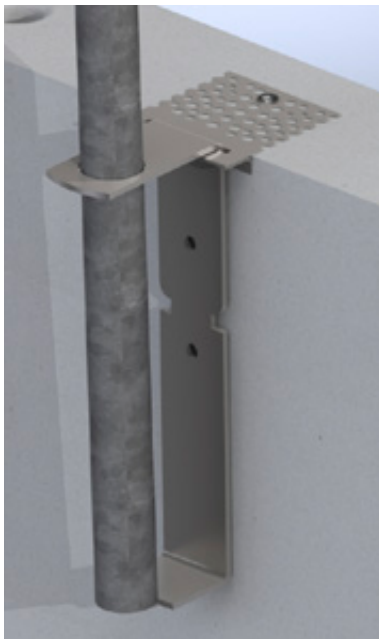
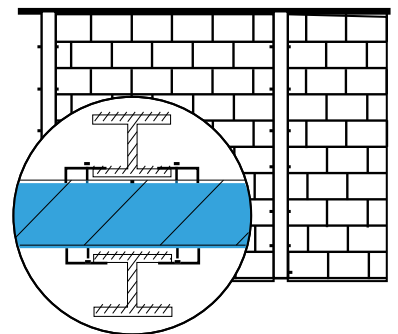
Clip for applying insulation  
LIPCLIP article



### 3.1.4 Railing anchors

Railing anchors were specially developed with a view to the safety regulations. These anchors, which are placed in the bed joints of the inner leaf of the cavity wall, facilitate the placement of a railing by means of scaffolding parts.

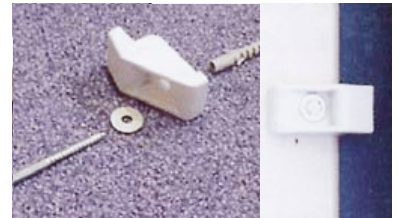
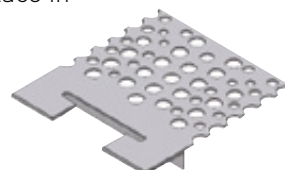
### 3.1.5 Fusible anchors



Railing Clamp Apply for edge security, quantity to the builder's specification.



Railing thin bed mortar plate  
Apply for edge security systems.  
For mounting railing clamp, use 1 plate per clamp. Place in bed joint, between the 2 top layers of elements



Fusible synthetic anchor



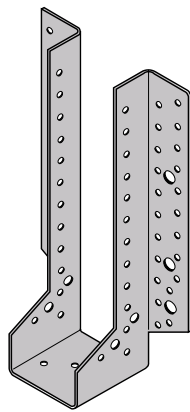
Fusible steel anchor



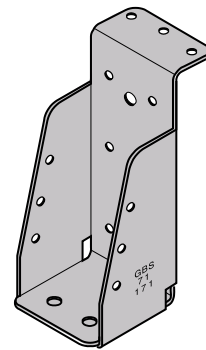


### 3.2 Purlins

Purlins can be supported using special purlin anchors, available on the market. These purlin anchors should be mounted on an eaves purlin, against the bevelled wall.

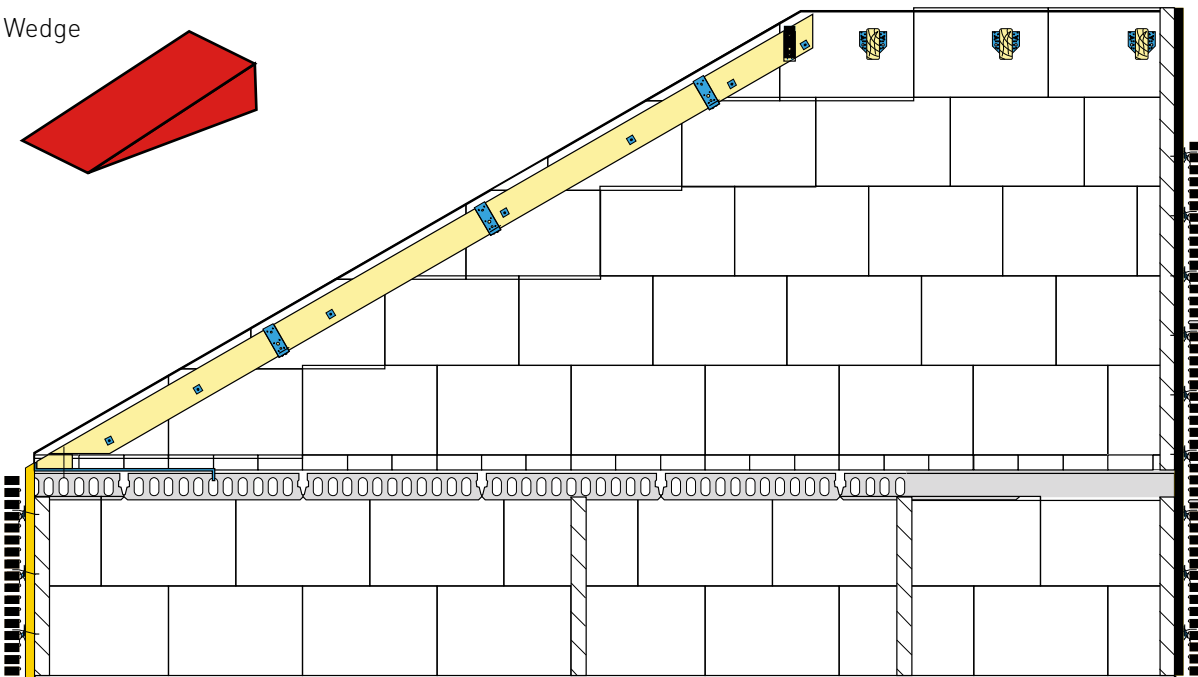
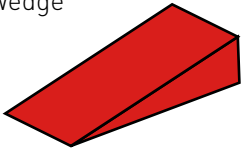


Trimming joist anchor  
(heavy duty)



Joist hanger

Wedge



## Chapter 4

# WORKING IN SUMMER AND WINTER



AIKO - arch. Michiel Verstraete



#### 4.1 Working in summer

In dry periods, the adhesive surfaces of the Silka elements must be moistened before mortar is applied. The mortar should not be applied in excess of 3 m ahead of the last element placed, in order to prevent the mortar from 'burning'. The mortar trough with ready mixed thin joint mortar must be kept out of the full sun, unless the mortar is well covered.



Never scatter salt near calcium silicate. To combat ice and frost, use coarse (breaker) sand.

#### 4.2 Working in winter

Using thin joint mortar is considered to be one of the least frost sensitive activities. This means that work does not have to stop immediately if frost is expected. Of course, frozen elements or elements with ice should not be used. Thanks to the fact that thin joint mortar sets very quickly, the newly erected walls are less sensitive to the consequences of frost than walls built with conventional.

However, precautions should be taken to prevent freezing, such as:

- protecting materials and equipment by covering it with for example a frost protecting cover or by heating and storage in frost free sheds;
- shelter of the building site;
- protecting recently built walls and kicker courses from frost by covering or heating;
- keeping dowel holes clean and water free.

If correct precautions are taken, working with Silka calcium silicate elements can continue until the frostdelay comes into effect.



## Chapter 5

# MOVEMENT JOINTS



### 5.1 Movement joint advice

It could be necessary to include movement joints in the walls, as Silka walls are subject to shrinkage due to loss of moisture. The criteria for the advice on movement joints are:

- wall height;
- wall thickness;
- weakening due to openings;
- impediments.

Advice on movement joints is provided by Xella.



As the wall becomes higher and thicker, it can take more tensile stress/axial tension. If the wall experiences shrinkage and is impeded, this can result in cracks. The impediments are distinguished as follows:

### Horizontal impediments

one-sided:

- all non load-bearing walls;

two-sided:

- all load-bearing walls.

### Vertical impediments

- Slack bending: wall end connected to a cross wall (tooth structure or vertical joint) slimmer than the width of the wall under consideration;
- Stiff bending: wall end connected to a cross wall (tooth structure or vertical joint) wider than the width of the wall under consideration;
- Unimpeded: wall end free.



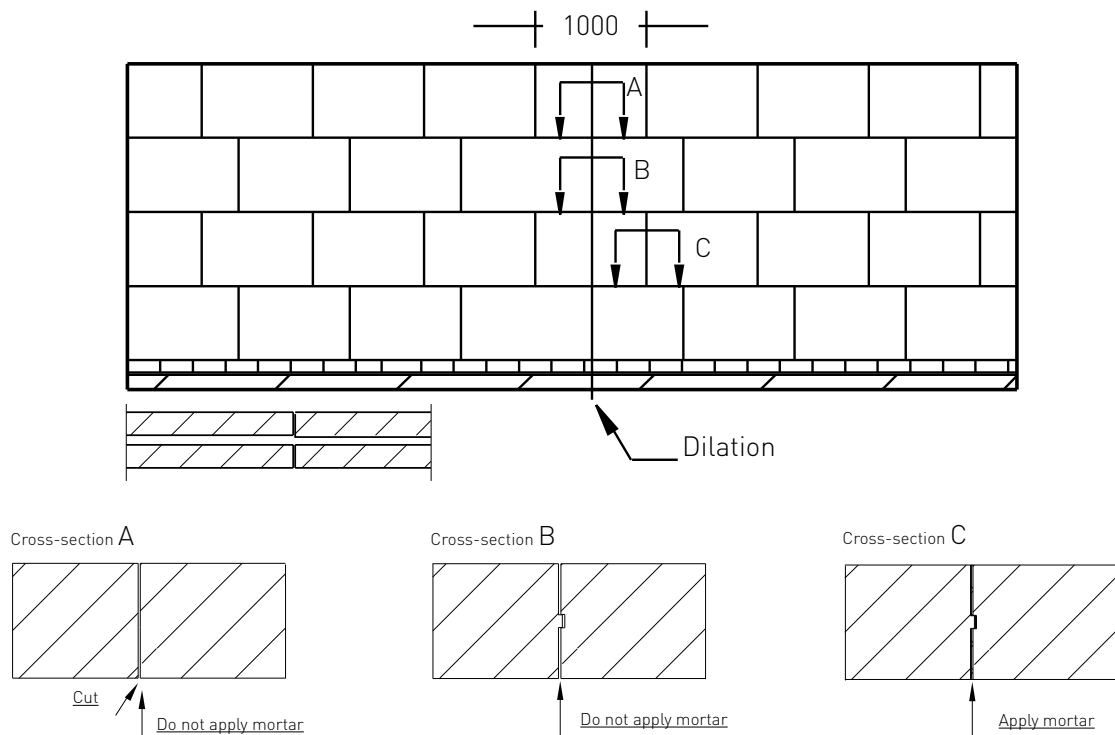


## 5.2 Movement joints

The movement joints indicated on the working drawings of Silka elements are related to possible size reductions of calcium silicate due to drying shrinkage. However, shrinkage of calcium silicate is only a few tenths of millimetres maximum. For walls on deflecting foundations, the deflection of the floor

can also influence the movement in the movement joint. Necessary structural movement joints must be indicated by the builder on site. Silka elements are not manufactured and delivered as fair faced masonry. Nevertheless, it regularly occurs that Silka calcium silicate elements are used to build

fire-resistant partitioning walls, without a finishing plaster. In this case, it is important to bear in mind that the fire resistance is demanded for the whole wall, which means that also the movement joint must be fire resistant.

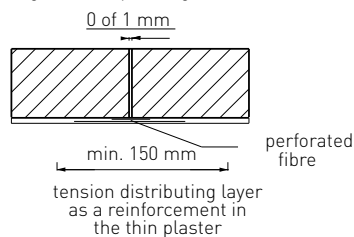


### 5.3 Controlling movement joints

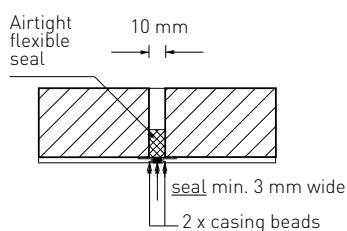
Movement joints come in two kinds:

- “Cold” movement joint with a width of approx. 1 mm, without filling. This type of joint can only be used in walls on non-deflecting foundations and where extra adjustment space is not required (for examples in party walls between houses).

Cold movement joint in loadbearing wall (e.g. house separating wall)



- Movement joint with a width of approx. 10 mm and filled with an elastic and airtight joint sealing. Meant for walls, in which a structural movement joint must be applied and walls in which extra adjustment space is required (for example non load-bearing walls and inner leaf cavity walls in longitudinal outer walls).



### 5.4 Finishing movement joints

“Cold” movement joints can be finished off by directly applying a wide fibreglass tape of min. 150 mm, which has been provided with a perforated fibre of 50 mm in the middle (f.i. Technotape/ Dilatape or equivalent).

If the wall areas differ from each other on either side, the joint must previously be evened out with a thin layer of plaster. This plaster must be hardened out before the self-adhesive fibreglass tape is applied.

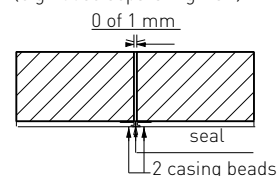
Filled movement joints can remain visible finishing the layer of plaster with a casing bead on both sides of the movement joint. It is important that the casing beads are kept at least 3 mm apart and filled with an airtight and flexible seal, which will remain flexible and can be painted.

“Cold” movement joints in a wall with a layer of plaster, over which a nonelastic layer of paint is applied, can be finished off with 2 casing beads with 1 to 2 mm space, with a hidden elastic seal.



arch. Christian Farber

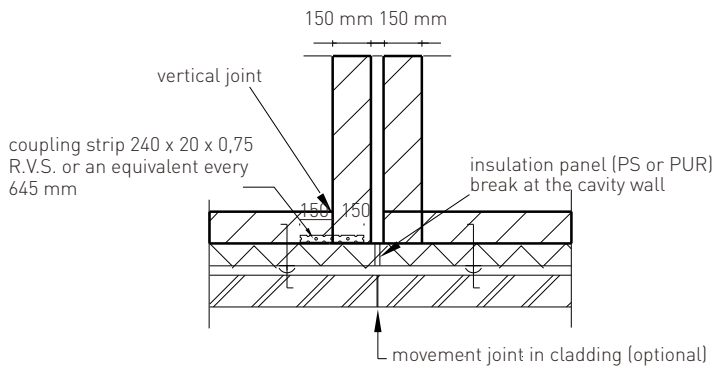
Cold movement joint in loadbearing wall (e.g. house separating wall)











## 6.1 Partitioning wall

When using the Silka calcium silicate elements for party walls between houses it is highly recommended, particularly because of the specific thin finishing of the walls, to build the inner leaf of the cavity walls with Silka elements as well.

### 6.1.1 Silka elements in inner leaf of cavity walls

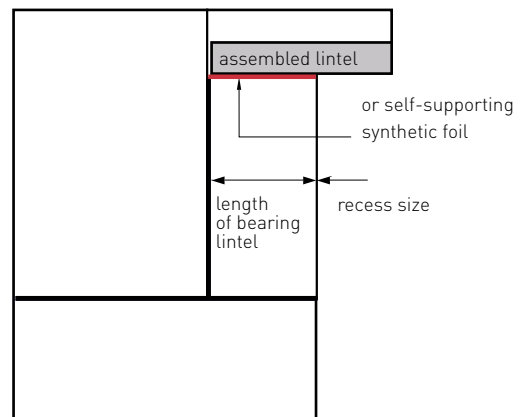
Because of their measurements of 897x623/643 mm, Silka elements are extremely suitable for larger wall surfaces. The inner cavity leaves should be placed simultaneously with the party walls. In simultaneous execution of party walls and inner cavity leaves, complete shells can be achieved. An added advantage is, that the newly built walls are more stable and therefore, more resistant to gusts of wind.

### 6.1.2 Silka thin joint mortar blocks in inner leaf of cavity walls

For smaller tighter areas and spaces, inner leaf cavity walls can also be built with small blocks.

## 6.2 Lintels and frame connections

Preferably door and window frames should run up to the ceiling above. If this is not possible, there are two alternatives: filling the opening above door and window frames with a timber panel up to the ceiling above or having the lintel run across the full height. For window and door openings, a lintel should be used above the opening in a wall. Due to the remaining, 2 mm high, bed joint, it is impossible to add steel bed joint reinforcements in Silka thin joint mortar systems. The Silka range includes lintels with a length up to 1.75 m



The minimal bearing of the lintel depends of the span and the type of lintel. Lintel not to be laid on block gauge. If applying a steel lintel, serration is necessary.

## Chapter 7

# WALL FINISHING & PROJECTS

### 7.1 Thin plastering

Walls made of Silka can be finished with a skim of plaster either manually, mechanically or by means of spray plaster. Before finishing the wall, uneven joints and possible face damage have to be filled with a suitable filler. Skim plaster can subsequently be applied with adhesive gypsum or spray plaster, according to the supplier's specification. Although it is also possible to use a plaster that does not require uneven joints and damages to be filled by hand first. Consult the supplier of the finishing material for advice on this. When applying a spray plaster, the total plaster thickness will be about 3 mm.



**Building guidelines for using thin joint mortar systems**  
**Criteria for surface assessment of calcium silicate walls built with SILKA products**

| Assessment aspect  | Group 1 Elements | Group 2 Hand size blocks | Group 3 Chamfered blocks          |
|--|------------------|--------------------------|-----------------------------------|
| Vertical joints (with regard to the permitted joint width)                                   | no requirements  | no requirements          | permitted deviation ±1 mm at most |
| Bed joints (with regard to the permitted joint width)  | no requirements  | no requirements          | permitted deviation ±1 mm at most |
| Bed joints (longitudinal direction; measured over top block)                                 | no requirements  | no requirements          | permitted deviation 2 mm/m        |
| Levelness: maximum dimensional variation permitted at distances between measuring points of: | 1 m              | 2 mm                     | 3 mm                              |
|  | 4 m              | 3 mm                     | 4 mm                              |
|  | 9 m              | 5 mm                     | 5 mm                              |

**Description of groups:**

Group 1: walls of elements, which can be finished with a plastering system to a maximum thickness of 3 mm.

Group 2: walls of (hand size) blocks, which can be finished with a skim plaster as from 3 mm thick.

Group 3: walls of chamfered blocks, which will not be finished (one or two-sided fair-face work).

Source: BKB (BV Quality declarations Constructions)

**7.2 Tile-work**

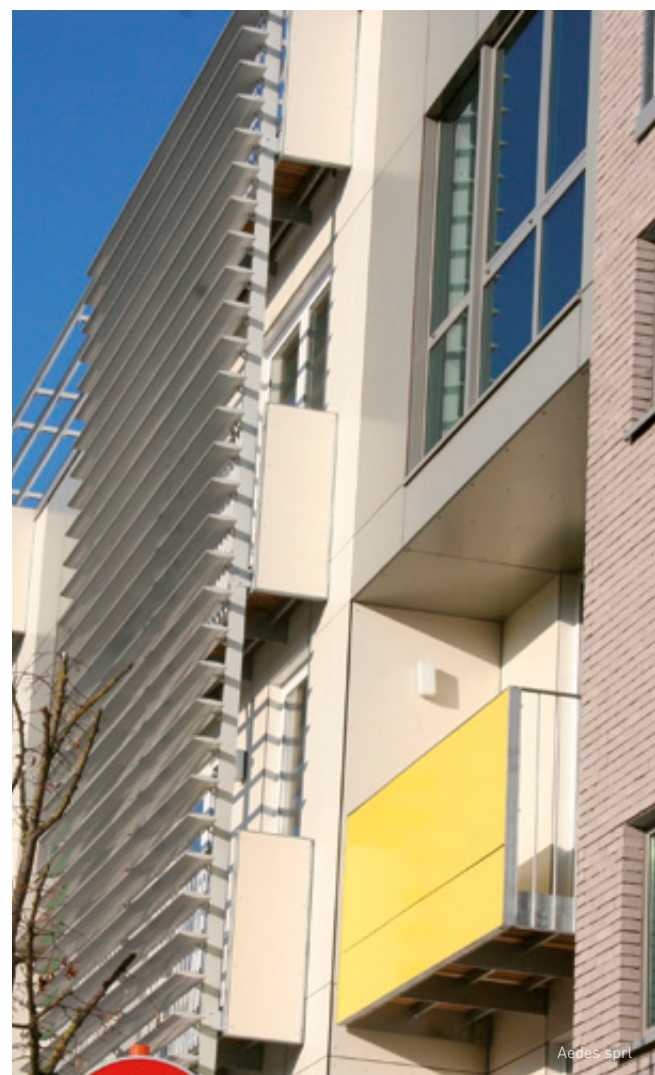
Tiles can be applied straight on to calcium silicate with a tile adhesive with either a cement- or a synthetic base, in accordance with the directions supplied by the manufacturer of the tile adhesive. Should the surface prove to be too uneven, the wall will first have to be evened out with a cement based product. The wall can subsequently be tiled, using a tile adhesive on either cement or synthetic base. Applying tiles to a gypsum wall finish should be avoided under all circumstances, as this can lead to damaged tilework.

**7.3 Multi-storey house building, commercial, office and industrial building**

The higher compressive strength of masonry with Silka elements is specifically adapted for construction of medium high and high buildings up to 10 or 12 storeys.

**Industrial buildings**

There are element stackers available with a hoisting height of 10.5 metres. These machines are very useful for building high walls in industrial buildings.



Aedes sprl



## Chapter 8

# PRODUCT INFORMATION SILKA CALCIUM SILICATE ELEMENTS



### **Product description**

Silka elements are suitable for application in load- and non loadbearing inner leaf cavity walls, party walls or other wall constructions. They are available in various sizes and requirements.

### **Composition**

Raw material: mixture of mainly slaked lime and sand.

### **Method of manufacture**

The mixture is pressed into blocks or elements and after that hardening takes place by means of steam under high pressure.



## Product range Silka elements

| Type | Dimension mm | Thickness mm | Mortar consumption in kg/m <sup>2</sup> | Weight (kg)* |                    | Profiling |
|------|--------------|--------------|---|--------------|--------------------|-----------|
|      |              |              |   | kg/each      | per m <sup>2</sup> |           |
| E100 | 897x623/643  | 100          | 1.4                                     | 100 / 104    | 178                | T&G       |
| E150 | 897x623/643  | 150          | 2.2                                     | 151 / 156    | 269                | T&G       |
| E175 | 897x623/643  | 175          | 2.5                                     | 176 / 182    | 313                | T&G       |
| E214 | 897x623/643  | 214          | 3.3                                     | 215 / 222    | 383                | T&G       |
| E240 | 897x623/643  | 240          | 3.7                                     | 242 / 249    | 431                | T&G       |
| E300 | 897x623/643  | 300          | 4.7                                     | 302 / 311    | 538                | T&G       |

T&G = tongue and groove

\* exclusive pallet

### Shape

Rectangular elements with labyrinth joint. Cut-to-size blocks are cut to the correct size out of elements at the factory.

Element tolerances:

length, width +/- 2 mm;

height +/- 1 mm.

Cut-to-size block tolerances:

length and height: from -4 mm to +2 mm.

### Kicker course blocks

Blocks for the kicker course are produced in standard heights of 70, 85, 100, 115, 130, 145 and 160 mm. Thermo-kickercourse block are available to avoid thermal bridges.

### Appearance

Surface structure: smooth.

Colour: white.

### Mechanical characteristics

fb in accordance with EN 771-2 and BBA n° 08/4553

fb ≥ 20 N/mm<sup>2</sup> (≥CS20) and

fb ≥ 28 N/mm<sup>2</sup> (≥CS28)

## Fire resistance

Silka calcium silicate elements are fireproof. The fire resistance values of a wall with fully filled joints are:

| Thickness wall (mm) | Fire resistance   |
|---------------------|-------------------|
| 100                 | EI 90*, REI 90*   |
| 150                 | EI 240*, REI 240* |
| 175                 | EI 240*, REI 240* |
| 200                 | EI 240*, REI 240* |
| 240                 | EI 240*, REI 240* |
| 300                 | EI 240*, REI 240* |

\* According to NBN EN1996 - 1 - 2 -ANB: 2011 joint horizontally and vertically joined together with thin bed mortar without plaster

### Gases, liquids and solid substances

Water vapour permeability: 5/25

### Thermal characteristics

Linear coefficient of expansion:

$$\alpha = 10 \times 10^{-6} \text{ m/m.K}$$

Thermal conductivity:

$$\lambda_{Uj} = 0.91 \text{ W/m.K}$$

Specific heat  $c = 1000 \text{ J/kg.K}$

### Acoustic qualities

Sound absorption coefficient:

$$\alpha = 0,03 \text{ (500 – 1000 Hz).}$$

The noise reduction of a wall with fully filled joints and finished is:

## Acoustic properties

| Width (mm) | Finish                       | Surface weight (1)                                   | $R_w$       |                          |
|------------|------------------------------|--|-------------|--------------------------|
|            |                              |  | Single wall | Cavity wall construction |
| 100        | no plaster                   | 180 kg/m <sup>2</sup> / $\geq$ 150 kg/m <sup>2</sup> | 45 dB (*)   |                          |
|            | thin plaster coat both sides |  | 45 dB (*)   |                          |
| 150        | no plaster                   | 270 kg/m <sup>2</sup> / $\geq$ 250 kg/m <sup>2</sup> | 50 dB (*)   |                          |
|            | thin plaster coat both sides |  | 50 dB (*)   | 69 dB (*)                |
| 175        | no plaster                   | 315 kg/m <sup>2</sup> / $\geq$ 250 kg/m <sup>2</sup> | 51 dB (*)   |                          |
|            | thin plaster coat both sides |  | 52 dB (*)   |                          |
| 214        | no plaster                   | 385 kg/m <sup>2</sup> / $\geq$ 250 kg/m <sup>2</sup> | 56 dB (*)   |                          |
|            | thin plaster coat both sides |  | 56 dB (*)   |                          |
| 240        | no plaster                   | 432 kg/m <sup>2</sup> / $\geq$ 250 kg/m <sup>2</sup> | 57 dB (**)  |                          |
|            | thin plaster coat both sides |  | 57 dB (**)  |                          |
| 300        | no plaster                   | 540 kg/m <sup>2</sup> / $\geq$ 250 kg/m <sup>2</sup> | 58 dB (*)   |                          |
|            | thin plaster coat both sides |  | 58 dB (*)   |                          |

(\*) the dB values are being tested by the Laboratory of acoustics and heat conductivity of the K.U. Leuven.

(\*\*) the dB values are guideline values

(1) see "acoustic amendments of the structural shell work for terraced houses and appartments by means of cavity walls" TC acoustic, WTCB Files 2012/2

## Application

E 150 to E 300: inner leaf cavity walls and load-bearing constructions in masonry back-up.  
E 100: non load-bearing party walls.

## Building process

**Storage:** on stable, even and non contaminated surface.

**Preparation:** pre-processing check (by client) of the working wall drawings supplied by Xella. Silka elements, cut-to-size blocks and kicker course blocks, which are too dry for processing, should be moistened one day before use.

**Installation:** consult the Silka installation guidelines. The elements are mechanically stacked, according to the working wall drawings, with calcium silicate thin joint mortar, bed joint thickness 2 mm, butt joint thickness 3 mm. Both perp ends and bed joints must be fully filled with mortar.

**Accessories:** Silka thin joint mortar applicators, mortar scoops, clamping devices were developed especially for the processing of Silka elements.

**Movement joints:** movement joints are indicated on the working wall drawings supplied by Xella.

**Finishing:** Silka elements are used in non-fair faced applications and can be prepared for wallpapering by applying a thin skim plaster.



**Workability:** sawing.

## Prices, delivery and guarantees

Silka elements are delivered under CE certification, Silka elements meet the BBA n° 08/4553 requirements.

**Prices and terms of delivery:** according to specification of Xella.

**Delivery time:** standard elements usually from stock, cut-to-size blocks according to specification.

## Technical service

- Technical construction advices;
- Application advices.

The Silka product range from Xella finds its way to all sectors in the building industry, finding use in dwellings, non-residential buildings and renovation. In this connection, Silka blocks have the right properties for use in load-bearing and non load-bearing constructions. In addition to sales and marketing activities.

Xella supplies technical advice on construction and gives information to customers, builders, clients, architects and advisers. If you have any questions about this brochure or the Silka-products and their applications and/or how they can be used in construction, please contact Xella.

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