

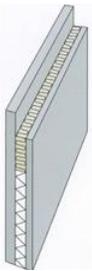
## EXPAN Facades for basement walls



Thermal bridges in basement construction are a classic and complex problem, which has not been less of new, stricter insulation requirements. But EXPAN Sandwich elements of concrete have proven to be an effective and reliable solution that ensures optimal and continuous cavity insulation from the ground floor to the foundation.

### EXPAN Basement walls

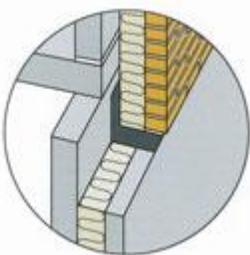
EXPAN Facades for basement walls are produced as horizontal casted sandwich elements with both inner- and outer leaf in concrete. The insulated basement wall comes in sizes up to 3050 x 10000 mm (max. 15 t.) and in thicknesses up to 500 mm. It provides a broad scope, as the above external wall can be a 510 mm cavity wall.



*Sandwich elements of concrete are an efficient and reliable basement solution to ensure optimal and uninterrupted cavity insulation from the ground floor to the foundation.*

The inner leaf is dimensioned to resist the load from the inner leaf from the floors above and additional to resist the horizontal load from the soil pressure. Depending on the depth below ground, backfilling material and compression method the thickness of the inner leaf is selected as minimum  $0.06 \times$  height.

The basement wall elements are insulated with element bats in the upper 600 mm. The other parts of the insulation are pressure resistant polystyrene in a quality that can transmit the soil pressure.



*The outer leaf can be selected both higher and lower than the inner leaf.*

## Flexibility

Basement walls are provided in thicknesses as shown in the table below.

The outer leaf can be selected both higher and lower than the inner leaf. It is possible to rake the outer leaf so that it can follow a sloping terrain.

Recesses for windows and doors can be placed individually. By default the grooves are cast 100 mm wide with 30 mm insulation as thermal bridge interruption.

## Basement walls

Total (mm)	Outer leaf (mm)	Insulation (mm)	Inner leaf (mm)	U-value (W/m <sup>2</sup> K)
340	100	100	140	0,35
340	100	125	115	0,29
360	100	75	185	0,44
360	100	100	160	0,35
360	100	125	135	0,28
380	100	100	180	0,35
380	100	125	155	0,28
400	100	125	175	0,28
400	100	150	150	0,24
420	100	125	195	0,28
420	100	150	170	0,24
420	100	175	145	0,21
450	100	150	200	0,24
450	100	175	175	0,21
450	100	200	150	0,19
480	100	175	205	0,21
480	100	200	180	0,19
480	100	225	155	0,17
500	100	200	200	0,19
500	100	225	175	0,17
500	100	250	150	0,15

Wall tie correction  $\Delta U = 0,006 \text{ W/m}^2\text{K}$  are included in the U-values. Reduced insulation from ribs, grooves and reinforcements are not included. Thermal resistance from soil covering is not included.

## **Installation**

For long wall panels the elements are only supported at top and bottom. The foundation should therefore be designed with the ability to transfer horizontal reaction from the soil pressure. It can typically be solved by placing the basement floor 50 to 80 mm above the plinth. Should the reaction be absorbed by screed, this must be completed before the backfilling takes place.

At the top the horizontal reaction is transmitted to the floor diaphragm. For this purpose dowels or inserts connected to threaded rods are embedded in the top of the element. The floor diaphragm must also be established before backfilling takes place. By transverse walls against each element connection, it is possible to design the elements as trilateral supported by individual assessment, by which the upper support can be dispensed - typically in the stairwells.

Element connections are normally made as casted joints in the inner leaf. The outer leaf connections are made with 16 mm elastic joints - both with or without a chamfer if desired.

Because the basement walls are not designed for water pressure from high groundwater level an effective perimeter drain should be established around the basement.

## **Surface treatment**

By selecting an external moisture seal and drainage system - and based on knowledge of the moisture and soil conditions - it must be ensured that the basement walls are not permanently moisture affected. The element connections are sealed with elastic joints that below the ground are protected with adhered roofing felts. Not soil covered outer leaf can stand as finish plinth.