FIXINOX

INVISIBLE CONNECTORS AND ANCHORS

Sandwich concrete panels

FIXINOX
Belgium | France
Gulf & Middle East

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INTRODUCTION

Architectural precast concrete panels have traditionally consisted of a single layer of factory-manufactured precast concrete that was installed on a building to provide the architectural finish and weather-resistant cladding for the building. Architectural precast concrete sandwich panels consist of two reinforced layers of factory-manufactured precast concrete, which are fabricated with a layer of insulation sandwiched between them.
The type and thickness of insulation contained in sandwich panels varies with the RSI-value required for each building. The insulation is installed under controlled factory conditions and is well protected by the concrete.
Sandwich panels provide a strong, durable, energy efficient, fire resistant cladding system.

ADVANTAGES

Attractive priced technical solution

High quality A4 stainless steel connectors against corrosion

Insulation is not interrupted

- Best possible thermal properties per chosen insulation
- Thermal mass and sustainability benefits Applicable for all usual thickness of insulation layers up to 250mm + 20 mm air

Faster construction time

- Quick installation by highly skilled crews
- Less weather dependent

Simplified and safer construction process

- No in situ concrete casting
- Less waste
- Less materials handling

Architectural façade design flexible

- Many surface finishes and patterns available
- Shop drawing process eliminates on-site surprises

Quality product

- 40 years old technical process
- Off-site manufacture means high quality
- Can be loadbearing or non-loadbearing

1. TECHNICAL INFORMATION

The two layers of the panel are connected by stainless steel connectors, which typically consist of wind and shear connectors. Shear connectors are placed strategically to ensure suitable suspension of the outer leaf. In other words, the outer leaf must be free to expand and contract within its plane. The thermal bridge through the steel connectors is minimal. Importantly the system has the advantage of providing structural integrity without placing any reliance on the insulation for transfer of loading. Consequently, the option exists to use fibrous insulation materials as well as the introduction of a cavity if required. To fully optimise the system, the inner leaf of the sandwich panel would be used as a load-bearing element to support floor units thus offering further economies in the building and minimising the need for coordination of different trades. Precast sandwich wall panels are available in a range of widths, lengths, thickness and exterior finishes


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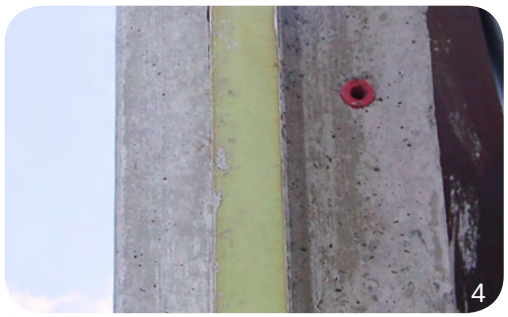
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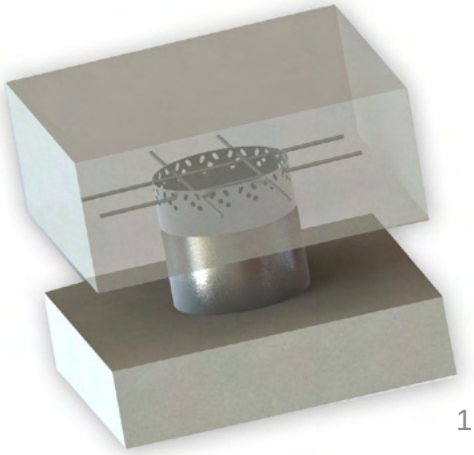
1. Lifting of a precast concrete sandwich panel
2. 30 floors residential tower in NL Eindhoven (100% of the façade is made of precast concrete sandwich panels)
3. Typical sandwich panel with natural bricks casted on the outer layer in the precast formwork
4. The 3 layers that form a sandwich panel

2. ANCHOR TYPES

LOAD BEARING ANCHOR MAIN ANCHOR

The load bearing anchor are designed to transfer the dead weight of the the outer (external) concrete layer onto the inner load bearing layer. They should be arranged in such a way that no constraints are placed on the outer layer. Because of this it important that the load bearing connection consist of only a single or a double stiff anchor. The connection consist then of a single cylinder anchor, two flat anchor or a combination of a cylinder anchor and a flat anchor

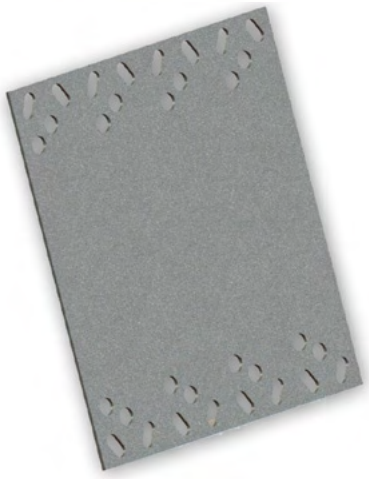


1

TORSION ANCHORS

These anchors made of stainless steel wire pin or flat anchor are needed with single cylinder anchor .

Their purpose is to prevent lateral displacement of the outer layer. This displacement is due to unavoidable eccentricity.



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RETAINING ANCHORS

Retaining anchors are made of stainless steel wire and are positioned horizontally to prevent tensile and compressive wind and demolding load and are layed perimetrically

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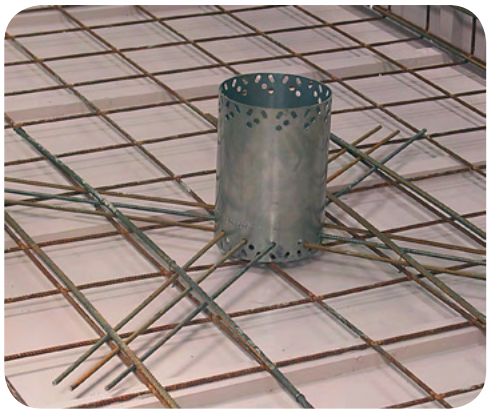
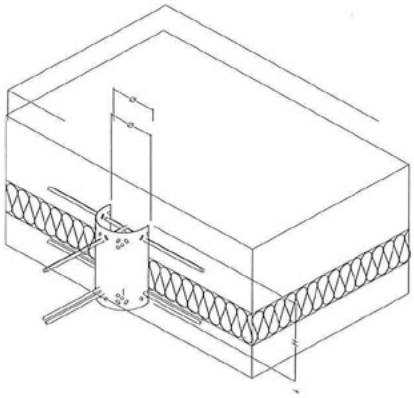
3. CYLINDRICAL SLEEVE ANCHOR



The cylindrical sleeve anchor has a material thickness of 1.5 mm. The ends have round and oval holes. The round holes are for reinforcement bars and the oval holes are for embedding in the concrete. Sleeve anchors are used in the system as supporting anchors. The anchors are stamped for identification with their height and diameter

Required input values to determine load resistance from the tables are the layer structure (with or with no ventilation gap), the facing layer thickness f and the insulation thickness b.

EMBEDDED LENGTH OF THE CYLINDER IN MM

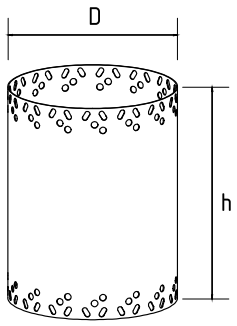
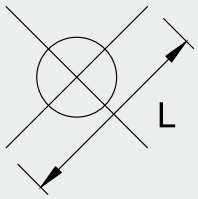
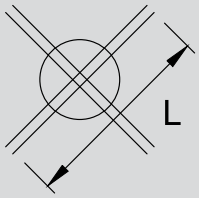


		Cavity (mm)	
		30-90	100-150
External concrete layer thickness f	60	50	55
	70	55	62
	80	60	70
	90	60	70
	100	60	70
	110	60	70
	120	60	70

TOTAL LENGTH OF THE CYLINDER

External concrete layer thickness	Cavity (mm)												
	30	40	50	60	70	80	90	100	110	120	130	140	150
60	h=150							h=225					
70													
80		h=175		h=200			h=225		h=260			h=300	
90													
100													
120													

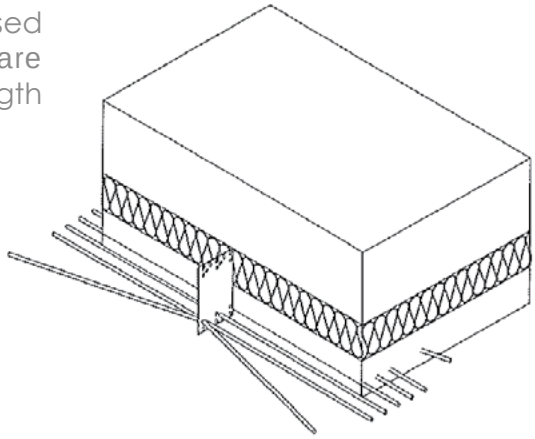
DIAMETER OF CYLINDER AND REINFORCEMENT BARS DIMENSIONS

Reference	Height (mm)	Diameter D (mm)	Re bars	Re bar dimmension
05MA 	150 | 300	51 76 102		2x 2Ø6mm L=500mm
		127 153 178 204 229 255 280		2x 4Ø6mm L=700mm

3. FLAT ANCHORS

Flat anchors are used as shear (gravity) load connectors and torsion anchors simultaneously.

Flat anchors are supplied in the following material thicknesses: 1.5 mm, 2.0 mm or 3.0 mm. Two opposite sides have round and oval holes. The round holes are for the reinforcement bars and the oval holes are for embedding in the concrete. Flat anchors are used in the system as supporting anchors. The anchors are identified with a stamp showing anchor height, length and mat



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INVISIBLE CONNECTORS AND ANCHORS

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