3-dimensional facades made of fibre reinforced concrete

[fibre C]3D
BY RIEDER

The third dimension

The product innovation fibreC 3D enables architects and builders to use three-dimensional freeform elements on facades with complex geometries.

Architectural concrete | “Monolithic Cast“ is a special production technology for concrete panels that enables 3-dimensional cladding elements with faced concrete quality on both sides. Other surface textures such as relief concrete (by the usage of formliners) are available. Each element consists of a uniform and non-seperable unit for a monolithic appearance.

Individual | The modular formwork construction is done based on the architects‘ individual design. Self compacting concrete (SCC) reinforced with fibres is pumped into the formwork to build positive as well as negative forms with dimensional accuracy. The colour of the concrete matrix is variable. The characteristic appearance of concrete creates a creates a vivid and authentic surface on the facade.

Economical solution | fibreC 3D elements have a visual compatibility with fibreC extruded panels. A high repeatability of the produced 3D elements and the combination with flat fibreC panels offer builders an economical solution for the whole building envelope.

Intelligente assembly | Fixing anchors can be integrated during the production process (concealed) or added with screws later on. The optional use of barcode technologies (scanning) provides advantages in logistics.

Service | Rieder offers support for architects and planners from the early planning stage to the realisation of the project and gives advice regarding facade optimisation, fastening methods, logistics solutions and installation.

550 m² fibreC 3D elements with a thickness of 7 cm are cladding the Lontoonkatu 9 project in Helsinki, designed by Kirsi Korhonen and Mika Penttinen Architects. The entire facade was divided into 16 different types of panels with lenghts up to 3.8 m. More than 400 concrete elements with faced concrete quality on both sides offer an interesting view from inside of the building.

Combination of fibreC 3D and extruded fibreC elements

Casted fixing anchors

fibreC 3D element with windows and recesses

Individual formwork construction

Technical data

Colour	variable, colour specification and tolerances to be defined by mock-up
Surface	visible side on one or both panel sides, other surfaces textures on request
Reinforcement	depending on statics alkali-resistant glassfibres and steel or stainless steel
Edge formation	client specific defined by mock-up
Visual characteristics	Because concrete is a natural product, each fibreC 3D panel is regarded as a single piece. Differences in colour, structure and texture are characteristic. Efflorescences or small, visible pores are not defects. The light resistance varies depending on the colour. Differences in the surface appearance, which do not affect the technical characteristics of the panels, are permitted. [Merkblatt Sichtbeton]

Technical Specification	**fibreC 3D**	**Norm**
Size	1500 x 3600 mm	
Special sizes/geometric shapes/surface structures	on request	
Dimensional variation l < 1 m	± 3 mm	
Dimensional variation l > 1 m	± 0.2 % * l; max = 5 mm	
Diagonal difference up to | above 1.5 m	± 3.5 mm | ± 4 mm	
Diagonal difference above 2.5 m | 3.6 m	± 5 mm | ± 6 mm	
Thickness	25 mm - 100 mm	
Tolerance thickness	± 2 mm	
Physical Characteristics		
Tolerances facing up to 600 mm | 1200 mm	± 2 mm | ± 4 mm for flat panels	DIN 18202
Tolerances facing up to 3600 mm	± 8 mm for flat panels	DIN 18202
Swelling	0.384 mm/m	
Shrinkage	0.737 mm/m	
Water absorption	0.34 %	
Bulk density	ca. 2.4 kg/dm³	
Thermal expansion coefficient	4.3 x 10^{-6} 1/°k	DIN 51045
Building material class	A 1 – incombustible	DIN 4102 / ASTM E 136
Bending tensile strength	> 7.5 N/mm²	
Elastic modulus	approx. 23000 N/mm²	
Weather Resistance		
Water impermeability	ok	
Heat-rain-alternate test	ok	EN 12467
Frost resistance	ok	EN 12467
Frost-defrost-alternate test	ok	EN 12467
UV-light resistance	UV- and weatherproof colour pigments	
Fixing	depending on geometry and application	
Fastening visible	screws	
Fastening invisible	casted anchor system	
Substructure	aluminium, steel, stainless steel	
Joint width	min. 8 mm	
Casted anchors	± 5.0 mm	

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