cast
Characteristics
02/2017
## Technical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>project-specific</td>
</tr>
<tr>
<td>Thickness</td>
<td>30 - 100 mm</td>
</tr>
<tr>
<td>Special sizes</td>
<td>on request</td>
</tr>
<tr>
<td>Tolerance</td>
<td>project-specific based on mock up</td>
</tr>
<tr>
<td>Concrete quality</td>
<td>C35/45</td>
</tr>
<tr>
<td>Material</td>
<td>fibreC 3D</td>
</tr>
<tr>
<td>Exposure class</td>
<td>XC3/XF3/XD3</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>project-specific (carbon, plastic, steel or fiber reinforcement)</td>
</tr>
<tr>
<td>Building material class</td>
<td>A1 - non-combustible</td>
</tr>
<tr>
<td>UV-light resistance</td>
<td>UV-resistant colour pigments</td>
</tr>
<tr>
<td>Surface quality formwork side</td>
<td>exposed concrete class SB 3; other class only by project-specific agreement or by reference sample / mock up</td>
</tr>
<tr>
<td>Surface finish formwork side</td>
<td>smoothed, sanded/polished, sandblasted, bush hammered, acid etch, washed</td>
</tr>
<tr>
<td>Surface finish rear side</td>
<td>sanded, sandblasted, bush hammered, smoothed</td>
</tr>
<tr>
<td>Colours</td>
<td>project-specific, various colours available</td>
</tr>
<tr>
<td>Assembling and weather protection</td>
<td>hydrophobic coating optional</td>
</tr>
<tr>
<td>Fastening</td>
<td>exposed, concealed</td>
</tr>
<tr>
<td>Joint width</td>
<td>project-specific, min. 15 mm</td>
</tr>
</tbody>
</table>

## Colours

### Combination with concrete skin panels

Cast offers a wide range of design options for facades. The selection of different colours and surfaces offers a wide range of designs to meet individual expectations. Special colours (RAL - equivalent) can also be produced on request. The combination of extruded concrete skin panels and cast elements in the same colour is possible and provides an economical solution for the entire building envelope. The different production techniques should be respected when colour matching.

### Natural colours

Cast has a distinct advantage over other colour-treated materials namely the consistent colouring of the whole panel. The mixture of the desired colour is created before the actual production process. The colour becomes part of the product by being added in the blending of the raw materials. Other products are in some cases only superficially treated and coloured, resulting in significant quality differences.

### Colour and UV resistance

Liquid colours for colouring cement-bonded building materials comply with the DIN EN 12878. The pigments used in the liquid colours are light-, UV- and weather-resistant and not soluble in water, alkalis or diluted acids. Factors such as natural fluctuations in raw materials used, panel and air moisture, dirt and light sources must be taken into consideration. The appearance of the elements may even become brighter due to dehydration. Changes caused by age, weather or environment specific influences are natural processes that cannot be influenced from a production point of view and are therefore not considered as material defects. The technical characteristics of the panel are not affected by these.

### Colour differences in production batches

Concrete is a natural material. The characteristics of the raw materials such as the colour of cement can lead to variations in colour within a panel, between individual panels or between different production batches.

Subject to the particular quotation documentation. This document refers to the production technology of the manufacturing plant “Werk 2” in 5751 Maishofen, Austria. It should not be interpreted as a contractual commitment on the part of the manufacturers. Despite careful inspection, no liability can be accepted for the correctness, completeness and topicality of the document. This is particularly true for typographical errors or subsequent changes to technical specifications.
Vivid signs of a natural building material
Concrete is a natural product and Rieder sees it as such, with all its vital signs and characteristics. Living surfaces with the interplay of colour shades and light cloud effects, rather than dead and clinical surfaces are characteristic of cast. Even in the colouring of the concrete matrix, the focus is placed on meeting the ecological requirements of modern design. This is why the production involves natural raw materials to ensure the authenticity of all products. The demand for low porosity, homogeneous colour and strictly uniform smooth surfaces is not part of our sustainable philosophy. We consciously avoid chemical treatment and artificial materials to preserve the authenticity of the „green“ product cast. Colour and texture variations are a feature of our natural product.

Concrete lives
As the panels are not chemically treated or painted, small defects, dents, tension lines, efflorescences or flaws and textures may be visible (data sheet on exposed concrete, DBV-Merkblatt „Sichtbeton“, Version August 2004).

When cement sets, it separates calcium hydroxide. This dissolves in water and can migrate to the concrete surface. When the water evaporates, the calcium hydroxide is returned to the surface and is converted to calcium carbonate (lime). If this natural process is intensified by unfavourable conditions, it leads to deposition of calcium carbonate, which is visible as a white efflorescence. Efflorescences are a natural feature of all cement-bonded composite materials.

Part of nature - resistant & stable
cast is not an artificially created material that exists cut off from the natural cycle of the environment. As adaptable and extraordinary the concrete skin is, it is just as authentic. cast is part of a natural cycle. Influencing variables for possible colour changes are temperature variations and differences in air humidity.

Colour variation
Concrete is hygroscopic. It absorbs moisture and gives it off again. The large format of the panels means that moist spots may dry at different speeds. Visible colour changes may occur between individual panels and within a panel. The visible characteristics of concrete are intensified on matt panel surfaces.

A typical feature of highly-compressed, high-quality concrete surfaces is so-called blue- and green discouloration, which can occur in particular in bright colours or fresh panels. They can be attributed to a natural hardening and drying process of organic substances. Tests and experiences have shown that this blue colouring on the cladding may disappear under the influence of UV radiation and light. This occurs based on the climatic and environmental influences. Heat, insolation and dryness can in particular accelerate the process.

Hydrophobic coating
As a basic protection against environmental influences, cast comes with a transparent hydrophobic impregnation. The opaque hydrophobic coating emphasises the naturalness of the material. The gloss level of the hydrophobic impregnation has a visual influence on the surface appearance. The hydrophobic coating is permeable and therefore breathable. If the cladding panel is applied vertically, it provides solid basic protection against weathering, dust and dirt but not against scratching, pressurised liquids, oil, acids, strong alkaline substances, etc. The hydrophobic coating may be reapplied to achieve increased protection of the panels and to prevent extreme environmental conditions and wear and tear through intensive cleaning.

Note
The surface characteristics described apply to the visible side of the cladding panel. cast sample panels can never reflect all of the above characteristics. In large-scale cladding applications, optical phenomena occur that cannot be detected on small sample panels.

Visual changes like micro-cracks (tension lines) do not affect the technical characteristics of cast. The static functions, the longterm stability and fire resistance are not affected.
Overall impression
The optical overall impression of a building or an element can only be assessed at an adequate range and usual conditions of light. The following inspection ranges have proved oneself in practice:

Building: The adequate range corresponds to the distance that allows the viewer to realize the building with all its significant elements. The main design criteria must be recognizable.

Elements: The adequate range corresponds to the usual viewing distance of the user. The visual inspection should be carried out at a distance of min. 5 meters.

The result should be a harmonious overall impression. Accidental structural irregularities are characteristic for the technology of exposed concrete and should be taken into consideration for the assessment of the overall impression. Deviations, such as differences in colour shade of adjacent formwork or shuttering sections or irregular pore distribution within a surface must not be so large to appear disturbing to an objective viewer.

Single criteria
At the assessment of fair-faced concrete surfaces the overall impression from an usual distance is authoritative. Single criteria are only controlled if the overall impression of the view surfaces does not fulfil the requirements. Tolerated discrepancies in the appearance of the fair-faced concrete surface are: small structural differences for prepared concrete surfaces; colour differences between adjacent layers; clouds, marbling, and small colour variations; cluster of pores; spacer and reinforcement which become apparent; dark stripes and little bleeding at formwork joints; anchor holes; dragged water effects in a small number and size; single lime flags and blooming; discolourations on the bottom sides of horizontal elements as a result of rust deposits on the formwork; edge breaking at the design with sharp edges; small crippling.

Requirements that cannot be implemented with certainty for reasons of production methods are: completely uniform colouring of all visible surfaces | completely uniform pore structure (pore size and distribution), visible surfaces without pores | in-situ concrete components without efflorescence

References
Fachvereinigung Deutscher Betonfertigteilebau e.V.:

Deutscher Beton- und Bautechnik-Verein E.V.:
DBV-Merkblatt „Sichtbeton“; Berlin August 2008; www.betonverein.de

Verein Deutscher Zementwerke e.V.:
VDZ-Merkblatt H 8: Sichtbeton – Techniken der Flächengestaltung 1.09/7; Düsseldorf 2009; www.beton.org

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