

## Code of practice No 1

### about fair-faced concrete surfaces (surface appearance) of precast elements made of concrete and reinforced concrete(06/2005)

#### 1 Generals

The building material concrete with its natural basic materials and its manifold field of application allows a wide range of possibilities for a pleasant, economical and individual design.

The production of precast concrete elements in a plant offers good conditions for an even quality of the surface. Being vastly weather-independent and considering the given consistent production conditions as well as the usually stationary position of the formwork, it is advantageous using precast concrete elements.

Precast concrete elements allow fair-faced concrete surfaces with high quality, which can be easily maintained compared to a lot of other building materials.

The "code of practice exposed concrete" [1] applies for fair-faced concrete surfaces of in-situ concrete.

#### 2 Term

According to DIN 18217 [2] exposed concrete is qualified as a constant visible concrete surface with special requirements on the surface appearance.

#### 3 Planning and submission (bidding)

##### 3.1 Planning

The fair-faced concrete surface is the consistently visible part, which shows the criteria of design and production and affects authoritative the architectural effects of a construction element or a building. Scopes for design are, single or in combination:

- with formwork (polished or structured) designed concrete surface,
- prepared concrete surface (e.g. rubbing-off, smoothing, brushing and according to DIN 18500 [3] washing, fine washing, acidulating, blasting, flame-blasting, grinding, fine grinding, stone cutting)
- colourful designed concrete surface (e.g. with cements, granulation, pigments, paintwork).

The more rough and structured a fair-faced concrete surface is planned, the less clouds, marbling and fissures are noticeable.

Sample surfaces can be used for coordinating the surface character. Before building starts reference surfaces are chosen from the sample surfaces[1].

The joints between the formwork elements are visible and therefore to consider by designing. Element- and dummy joints can be used as design characteristics. It is recommended to put chamfers on the edges of precast concrete products to minimize the danger of edge breaking.

Concerning fair-faced concrete surfaces which are exposed to weather the influence of the weather conditions on the appearance shall be considered (e.g. reduction of dirt settlements by the use of controlled surface drainage of the rain and hydrophobic treatment).

##### 3.2 Submission (bidding)

Only asking for "exposed concrete" in the performance specifications does not suffice. Before building starts there must exist a clear and practicable performance description, taking into consideration the criteria mentioned in chapter 3.1, which must (if necessary be explained by drawings) give reference surfaces or indices to similar performances.

Therefore the reference to already finished buildings is a great help. Comparing the reference surfaces or finished buildings it must be considered, that the designated surface of the chosen reference surface will only conform if there are similar starting conditions (contour, dimensions, basic materials, composition of concrete, formwork, handling, curing, weather conditions, age of concrete etc.).

Requirements to the fill-in side (side without formwork) must be described specially. Sharp-edged design needs higher complexity and must be considered in particular.

The classification in classes of exposed concrete according to [1] is usually not necessary for using precast concrete products.

## 4 Realization

The dimension tolerances fixed in DIN 18202 [4] and DIN 18203 - 1 [5] apply.

For all highest diligence cavities can come off during the realization of exposed concrete. According to DIN 18217 patching which is appropriate for the material and professional is allowed.

For all greatest handicraft skill patched places stay visual in general. Therefore it is to proof and to balance carefully if one can abandon patching of small optical cavities.

## 5 Assessment and acceptance

### 5.1 Generals

Because of the natural basic materials and unavoidable tolerances during production each precast concrete product is a unique. The single elements of a building can only fulfil special single criteria within an acceptable scope of the building material.

Concrete „ages“ and fouls like every other building material, i.e. structure and colour can change in the course of time. Changing weather conditions can cause differences in the appearance.

### 5.2 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, which allows to realize the building with its significant elements. In doing so, authoritative criteria of the design must be noticeable.

Element:

The adequate range corresponds to the usual distance of the user. A self contained overall impression should arise. Accidental irregularities are characteristic for the technology of exposed concrete and shall be considered at the assessment of the overall impression.

### 5.3 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;
- clouds, marbling, and small colour variations;
- cluster of pores;
- spacer and reinforcement which become apparent;
- dark stripes and little bleeding at formwork joints;
- dragged water effects in a small number and size;
- single lime flags and blooming;
- edge breaking at the design with sharp edges;
- small crippling.

Such requirements are technically not or not unerring producible:

- constant colour at all view surfaces of the building;
- non-porous view surfaces;
- constant structure of pores (size and spreading);
- surface without fissures.

## 6 Bodies of regulation

[1] Deutscher Beton- und Bautechnik-Verein e.V.; Bundesverband der Deutschen Zementindustrie e.V.: Code of practice exposed concrete

[2] DIN 18217 Concrete areas and formwork shell

[3] DIN 18500 Cast stones; terminology, requirements, testing, inspection

[4] DIN 18202 Tolerances in building construction - Buildings

[5] DIN 18203 - 1: Tolerances in building construction –part 1: Prefabricated components made of concrete, reinforced concrete and prestressed concrete

Publisher:

Fachvereinigung Deutscher Betonfertigteiltbau e.V. – Schloßallee 10 – 53179 Bonn

Internet: [www.fdb-fertigteiltbau.de](http://www.fdb-fertigteiltbau.de) – E-Mail: [info@fdb-fertigteiltbau.de](mailto:info@fdb-fertigteiltbau.de)