CONTURAN
Specification
Technical properties

BarteltGLASBerlin

Short description:	**CONTURAN**® is a mineral glass with anti-reflective coating on both sides
Intended use:	Front panels, for public displays, e.g. train destination displays
Glass type:	CONTURAN® Standard (CS) - Float glass CONTURAN® Magic (CM) - Float glass, low-iron oxide CONTURAN® Grey (CG) Float glass, grey (contrast-enhancing) CONTURAN® Protect Standard (CPS) Anti-reflective laminated glass, consisting of 2 panes with anti-reflective coating on one side CONTURAN® Standard CONTURAN® Protect Magic (CPM) Anti-reflective laminated glass, consisting of 2 panes with anti-reflective coating on one side CONTURAN® Magic CONTURAN® Protect Grey (CPG)Anti-reflective laminated glass, consisting of 2 panes with anti-reflective coating on one side CONTURAN® Grey CONTURAN Protect® Standard, - Magic and - Grey meets the requirements for laminated safety glass (VSG) according to ISO 12543-2 / EN 14449.
Finishing options:	Edge processing, therm. or chem. pre-tensioning, hole drilling and cut-outs, digital printing, wet painting, composite manufacturing
Test and inspection conditions:	In general, the inspection is based on the view through the glazing, i.e. the view of the background and not the view from above. The remaining clear glass area in the installed state is evaluated. Testing is carried out in diffuse daylight from a distance of at least 1.5 m (depending on the type of use) for a period of up to 30 seconds per m². Alternatively, the following test is permissible: The glass to be assessed is placed vertically in front of and parallel to a dark (black or matt grey) background and exposed to diffuse daylight or equivalent light. The viewer is at a distance of 1.5 m in front of the pane and looks at it from an angle of 90° (with the matt background on the other side of the glass pane). Defects that are bothersome when viewed in this way must be marked. The assessment is subsequently carried out according to specification. For exterior glazing with free weathering of the glass edges, changes in the colour impression may occur in the area approx. 15 mm from the edge due to the hygroscopic property of the PVB film, depending on the product and the ambient conditions. These changes are permissible. .

The following properties are mainly based on current standards and guidelines or the latest measurement methods. We reserve the right to adapt the data to the state of the art.

Requirements that deviate from this specification must be regulated with a **written** customer agreement.

0. Quality zone:

0.1 Ground or polished edge - entire surface

0.2 Cut edge or hemmed edge - edge area of 5mm all around is not taken into account

1. Geometry

1.1 Maximum dimensions 3770 mm x 1770 mm

Standard tolerances for length, width and diameter							
TYPE	Thickness / mm	Edge length / mm					
		Cut edge or hemmed edge			Ground / polished edge		
		≤ 1000	> 1000 - 1770	> 1770	≤ 1000	> 1000 - 1770	> 1770
CS, CM, CG	≤ 4	± 0.5	± 1.0	± 2.0	± 1.5	± 1.5	± 2.0
	> 4 - ≤ 6	± 1.0	± 1.0	± 2.0	± 1.5	± 2.0	± 2.5
	> 6 - ≤ 12	± 1.5	± 1.5	± 2.0	± 2.0	± 2.5	± 3.0
CPS, CPM, CPG***	≤ 6	± 2.0	± 2.0	± 2.5	± 1.5	± 1.5	± 2.0
	> 6 - ≤ 12	± 2.0	± 2.5	± 3.0	± 1.5	± 2.0	± 2.5
	> 12	± 3.0	± 3.0	± 3.5	± 2.0	± 2.5	± 3.0

For laminated safety glass made of toughened glass, the tolerances of the cut edge apply, in which the offset after the lamination is taken into account.

1.2 Perpendicularity

Standard tolerances for perpendicularity (difference between diagonals) in mm					
TYPE	Thickness / mm	Cut edge or hemmed edge		Ground/polished edge	
		Edge length / mm		Edge length / mm	
		≤ 1500	> 1500	≤ 1500	> 1500
CS, CM, CG	≤ 6	3.0	3.5	3.0	3.5
	> 6	3.0	3.5	4.0	4.5
CPS, CPM, CPG***	≤ 8	6	8	4.5	5.0
	> 8	7	9	5.0	6.0

*** For laminated safety glass made of toughened glass, the tolerances of the cut edge apply, in which the offset after the lamination is taken into account.

1.3 Drill holes

Standard tolerances:

Diameter	Tolerance
Ø ≤ 30 mm	± 1.0 mm
Ø > 30 mm	± 2.0 mm

Position of the hole:

- ≤ 1000 mm from the reference point ± 1.5 mm
- > 1000 mm from reference point: ± 2.0 mm

1.4 Thickness

Nominal thickness (mm)	Thickness tolerance (mm)
CS, CM, CG (2.0 to 6.0)	± 0.2
CS, CM, CG (8.0 to 12.0)	± 0.3
CPS, CPM, CPG	Depending on the composite structure

1.5 Flatness (after pretensioning):

Maximum dimensions for thermal toughening
2800 mm x 1770 mm

Edge length	Deviation
≤ 300 mm	1.0 mm max.
> 300 mm ... ≤ 700 mm	2.0 mm max.
> 700 mm ... ≤ 1000 mm	3.0 mm max.
> 1000 mm ... ≤ 1500 mm	4.5 mm max.
> 1500 mm ... ≤ 2000 mm	6.0 mm max.
> 2000 mm ... ≤ 2800 mm	8.5 mm max.

2. Glass defects (quality zone)

2.1 Inclusions (bubbles, stones, lumps)*:

Error size core	Error size incl. yard	per surface m²
≤ 0.2 mm	≤ 1.0 mm	permissible, provided that no accumulation**
> 0.2 - ≤ 0.5 mm	≤ 3.0 mm	6 pieces permissible
> 0.5 - ≤ 2.0 mm	≤ 6.0 mm	2 pieces permissible
> 2.0 mm		Not permissible

* A point-shaped fault consists of a core generally enclosed by a yard.
The permissibility increases by a factor of 0.5 / pane for multiple glazing (laminated safety glass, insulating glass).
An accumulation is present if at least 10 defect features are present within a circular area of ≤ 50 mm are present.

3. Surface defects

3.1 Scratch*:

Width / mm	Length / mm	per surface m²
≤ 0.05	≤ 80.0	permissible
> 0.05 - ≤ 0.2	≤ 60.0	5 pieces permissible
> 0.20 - ≤ 0.3	≤ 30.0	5 pieces permissible
> 0.30 - ≤ 0.40	≤ 10.0	5 pieces permissible
> 0.40	-	Not permissible

* Hair scratches (wipers) remain unnoticed

3.2 Scraper, print mark, imprints:

Error size	per surface m²
≤ 1.0 mm	permissible, provided that no accumulation*
> 1.0 - ≤ 2.0 mm	3 pieces (minimum distance = 50 mm) permissible
> 2.0 - ≤ 3.0 mm	2 pieces (minimum distance = 50 mm) permissible
> 3.0 mm	Not permissible

* No accumulations allowed.
Accumulation is defined as an accumulation of more than 5 unobserved and admissible defects considered to be within a 50 mm diameter test range..

3.3 Open bubbles: - for non-thermally toughened glasses: s. 2.1 Inclusions
- for thermally toughened glass: not permitted

3.4 Crumbs, glass splinters (adhering): s. 2.1 Inclusions

4. Edge / Margin errors

4.1 Edge processing

- Cut edge
- Seamed edge
- Ground edge
- Polished edge
- C-grinding (on request)

- Hem width: 1.0 mm Tolerance ± 0.7 mm

4.2 Finishing (edge)

Product	Width/mm	Edge shape	Assessment
CS,CM,CG	≤ 2.0	Cut edge, hemmed edge	permissible
CS,CM,CG CPS, CPM, CPG	≤ 0.5	Ground edge	permissible
		Polished edge	
		C-grind	
CPS,CPM, CPG	≤ 3.0	Cut edge, hemmed edge	permissible

Shell out (drilling): ≤ Hem width permissible
≤ 1.5 mm for non-edged holes permissible

4.3 Tear-off / Inlet: not permitted

4.4 Bare point: Ground or polished edge not permissible

5.0 Coating defects

5.1 Interference points: see 3.2 Scraper

5.2 Inhomogeneity: Colour variations below the limit value curve permissible
(Reflection curves according to PCE CONTURAN® SCHOTT Antireflective®)

5.3 Printing: according to drawing or customer specifications

5.3.1 Test and inspection conditions:
In general, the view through the glass is decisive in the examination. The test is carried out from a distance of at least 1.5 m in diffuse daylight.

5.4 Pinholes (defects in the printing)

Error size	permissible errors per 100 cm2 print area
≤ 0.5 mm	permissible, provided that no accumulation**
> 0.5 mm - ≤ 2.0 mm	3 piece
> 2.0 mm	Not permissible

* Accumulation is defined as an accumulation of more than 5 unnoticed and permissible errors considered to be within a test range of 50 mm diameter.

The repair of defects is permissible. The repaired defects must not be visible from the view side from a distance of 2 m.

5.5 Dirt (particles, lint) in the printing

Dirt inclusions in the printing remain unnoticed as long as they are not visible from a distance of 2 m from the front
. For visible dirt inclusions see 5.4 Pinholes

6. Contamination

6.1 Foreign matter (organic) / Coating: permissible, if wipeable

6.2 Conveyor belt imprint: to be agreed if required

6.3 Suction cup impression: to be agreed if required

6.4 Water stain/drops: permissible, if wipeable

6.6 Roll impression, centre print line, Reversal stripes (after thermal toughening): permissible if, in compliance with the testing and Vision conditions not visible

7. VSG assembly error

7.1 Inclusions in the film/laminate (bubbles/dirt/fluff...) s. 2.1 Inclusions

7.2 Intermediate stratification

Error length	Edge shape	Border area
≤ 3.0 mm	Cut edge, hemmed edge	permissible
≤ 1.5 mm	Ground or polished edge	permissible

Film overhangs are permissible (can be reworked manually if necessary)

8. Thermal and mechanical properties

8.1 The thermally toughened glass corresponds to: ESG - EN 12150-1,-2
TVG - EN 1863-1,-2

8.2 Permanent marking: without, or by arrangement

9. Packing

9.1 Packaging and shipping guideline: Packaging and shipping shall be carried out in accordance with transport and production aspects or by order-related agreement.

General cleaning instructions: See cleaning instructions for interference-optical coated glasses