

Evidence of Performance

regarding the requirements for float
glass
according to EN 572

Test Report 605 32401



Client **Orient Glass Industrial Group
(China) Co., Ltd.**
Orient Glass Industrial Zone
Qingdao,

523965 Shandong
China

Product	Float glass according to EN 572-2
Product designation	Float glass, clear
Dimensions (W x L)	300 mm x 300 mm
Nominal thickness	3, 4, 5, 6, 8, 10, 12, 15, 19 mm



Thickness

Chemical composition



Light transmittance

The product **Float glass**, clear, meets the requirements given in EN 572-2

Basis

DIN EN 572-1 : 2004-09
Glass in building – basic products – Part 1: Definitions and general physical and mechanical properties

DIN EN 572-2 : 2004-09
Glass in building – basic products – Part 2: Float glass

DIN EN 572-9 : 2005-01
Glass in building - Basic soda lime silicate glass - Part 9 - Evaluation of conformity

DIN EN 410 : 1998-10;
Glass in building, determination of luminous and solar characteristics of glazing

Instructions for use

The present test report serves to demonstrate the properties of clear float glass compared to the requirements of DIN EN 572-2.

It serves as an ITT (initial type test) – report according to DIN EN 572-9

Validity

The data and results given relate solely to the tested and described specimen.

Testing of thickness, chemical composition and light transmittance does not allow any statement to be made on further characteristics of the tested product regarding performance and quality.

Notes on publication

The ift-Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies.

The cover sheet can be used as abstract.

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The report contains a total of 6 page/s

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15. November 2006

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1 Object

1.1 Description of test specimen

Product	Float glass
Manufacturer	Noval Glass Industrial Group (Qingdao) Co., Ltd.
Date of manufacturing	September 2007
Product designation	Float glass, clear
Dimensions (W x L)	300 x 300 mm ²
Nominal thickness	3, 4, 5, 6, 8, 10, 12,15, 19 mm

The description is based on inspecting of the test specimen at **ift**. Article designations / numbers were given by the client.

For the determination of the spectral data according EN 410 test specimen of single panes were used with the dimension 70 mm x 40 mm. Three single panes were cut out from the 3 mm, 6 mm, 12 mm specimens.

2 Procedure

2.1 Sampling

Sampling was made by the client

Number	4 pieces of each thickness,
Delivered	19 September 2006 by the client
Registry No.	20640

2.2 Process

Technical basics

DIN EN 572-1 : 2004-09	Glass in building – basic products – Part 1: Definitions and general physical and mechanical properties
DIN EN 572-2 : 2004-09	Glass in building – basic products – Part 2: Float glass
DIN EN 572-9 : 2005-01	Glass in building - Basic soda lime silicate glass - Part 9 - Evaluation of conformity
DIN EN 410 : 1998-10	Glass in building, determination of luminous and solar characteristics of glazing

Boundary conditions Correspond to the demands of the standard

Deviations There are no deviations from the test procedure or test conditions



The spectral measurements were carried out with the 3 mm, 6 mm, 12 mm thick single pane specimen. The pane thickness 4 mm, 5 mm, 8 mm, 10 mm were calculated according EN 410 Annex A. Basis for the calculation were the measured values for 3 mm, 6 mm, 12 mm.

2.3 Test equipment

Digital measuring slide	Device number: 22853
IR-Spectrometer	Equipment No 22133
Type	Shimadzu UV-3102PC with LISR-3100, Integration sphere Ø150 mm
Measured range	190 nm to 2500 nm
Resolution	variable, 2 nm was selected
Climatic conditions	approx 20 °C, 50 % RH
Reflection standard	calibrated reflection standard, Fa. Labsphere; aluminium mirror
Averaging	average of three samples

The measurement of chemical composition was made by company TNO, Eindhoven, Netherlands, by XRF analysis according to the following description.

The analysis has been done by Philips Material Analysis by the XRF method. The composition of the glass, as an identification analysis, is executed on the sample using the analysis programme IQ+. IQ+ is, comparable with Uni-Quant, a software package that calculates a semi quantitative composition, using a series of overview scans detecting the elements mentioned below:

F, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Cs, Ba, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Th, Pa, U, Np, Pu en Am.

The elements have been calculated as being present as their stoichiometric oxides and are normalised to 100%. According the composition calculated by IQ+, the glass could be classified as a soda lime silicate glass. Therefore the quantification of the composition is done by analysing the glass again using a calibration system for the analysis of all types of soda lime and boron-silicate glasses. This calibration system foresees in the analysis of the elements Na, Mg, Al, Si, P, S, Cl, K, Ca, Ti, Cr, Mn, Fe, Zn, As, Zr, Sb, Ba and Pb. The IQ+ analysis did not detect other elements with a concentration > 100 ppm, these are not analysed by the calibration system.

2.4 Testing

Date/Period	20 September 2006 to 16 November 2006
Testing personnel	Oliver Manns, Michael Freinberger, ift Rosenheim

3 Detailed results

3.1 Thickness

The measurement was carried out on 3 samples of each thickness. The measuring points (mp) were located in the center of each side. The results are given in table 1.

Table 1 Thickness

Nom. Thickness	Thickness in mm pane 1				Average pane 1	Thickness in mm pane 2				Average pane 2	Thickness in mm pane 3				Average pane 3	Overall Average
	mp 1.1	mp 1.2	mp 1.3	mp 1.4		mp 2.1	mp 2.2	mp 2.3	mp 2.4		mp 3.1	mp 3.2	mp 3.3	mp 3.4		
3 mm	3,01	3,11	3,03	3,03	3,05	2,96	3,02	2,97	2,95	2,98	3,02	3,04	3,02	3,04	3,03	3,02
4 mm	4,11	4,15	4,11	4,10	4,12	4,12	4,10	4,08	4,10	4,10	4,06	4,04	4,07	4,09	4,07	4,09
5 mm	4,98	5,02	4,92	4,92	4,96	5,05	5,08	5,00	4,98	5,03	4,94	4,92	4,90	4,93	4,92	4,97
6 mm	6,01	6,01	6,04	6,05	6,03	6,01	5,99	6,03	6,00	6,01	5,98	5,99	5,99	5,97	5,98	6,01
8 mm	7,85	7,89	7,86	7,84	7,86	7,89	7,82	7,83	7,85	7,85	7,93	7,83	7,83	7,88	7,87	7,86
10 mm	10,02	10,03	9,93	10,00	10,00	9,99	10,01	9,94	10,00	9,99	9,92	9,93	9,91	9,98	9,94	9,97
12 mm	12,01	11,93	11,97	11,99	11,98	12,05	12,04	12,04	12,05	12,05	12,05	12,00	12,03	12,03	12,03	12,02

3.2 Chemical composition

The analysis was made on a sheet of clear float glass, thickness 6 mm. The results gained according to the description above are presented in table 2.

Table 2 Chemical composition

Oxide	6 mm clear float glass	Range EN 572-1	Result
Silicon dioxide	72,3 %	69 – 74 %	ok
Calcium oxide	8.7 %	5 – 14 %	ok
Sodium oxide	13.6 %	10 – 16 %	ok
Magnesium oxide	3.7 %	0 – 6 %	ok
Aluminium oxide	1.0 %	0 – 3 %	ok
Others	0.7 %	0 – 5 %	ok

3.3 Value of light transmittance and light reflection

Table 3 radiation properties of the single pane

Thickness	l_v	λ_v	l_e	λ_e
3 mm	0,91	0,08	0,87	0,08
4 mm	0,90	0,08	0,85	0,08
5 mm	0,90	0,08	0,83	0,08
6 mm	0,89	0,08	0,81	0,08
8 mm	0,88	0,08	0,79	0,07
10 mm	0,88	0,08	0,76	0,07
12 mm	0,87	0,08	0,74	0,07

Signs and symbols:

l_v	light transmittance
λ_v	light reflectance
l_e	solar direct transmittance
λ_e	solar direct reflectance

Table 4 Product aspects to belong to the classification of soda-lime silicate glass

No.	Product aspect	Requirement /result	Fulfilled
1	Chemical composition	EN 572-1 / see table 2	o.k.
2	Thickness	EN 572-2 / see table 1*)	
	3 mm	$\pm 0.2 / 0,11$	o.k.
	4 mm	$\pm 0.2 / 0,15$	o.k.
	5 mm	$\pm 0.2 / -0,10$	o.k.
	6 mm	$\pm 0.2 / 0,05$	o.k.
	8 mm	$\pm 0.3 / -0,18$	o.k.
	10 mm	$\pm 0.3 / -0,09$	o.k.
	12 mm	$\pm 0.3 / -0,07$	o.k.
3	Light transmittance	EN 572-2 / see table 3	
	3 mm	0,88 / 0,91	o.k.
	4 mm	0,87 / 0,90	o.k.
	5 mm	0,86 / 0,90	o.k.
	6 mm	0,85 / 0,89	o.k.
	8 mm	0,83 / 0,88	o.k.
	10 mm	0,81 / 0,88	o.k.
	12 mm	0,79 / 0,87	o.k.

*) maximum deviation of a single value



The evaluation of the results show that all requirements for the product

**Clear float glass
manufactured by the company
Orient Glass (China) Co., Ltd**

are fulfilled.