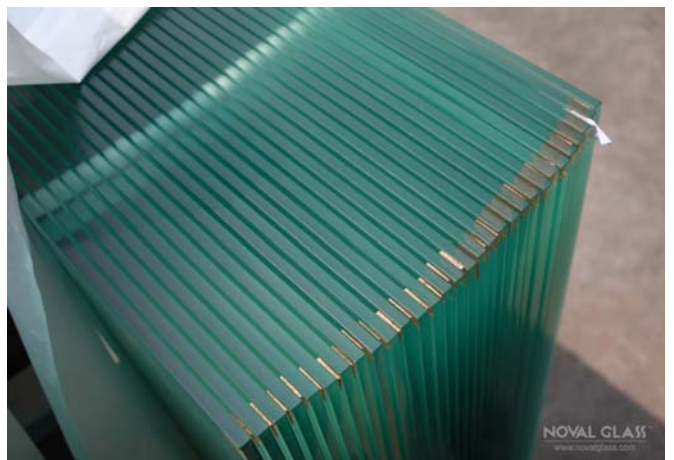
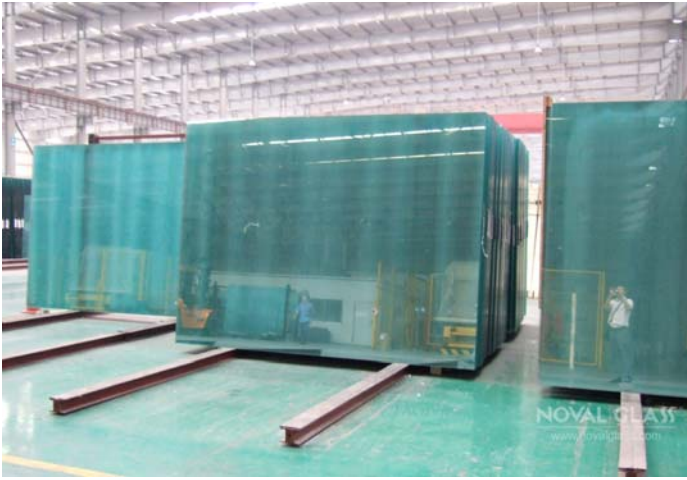


Noval Tempered Glass

Protect from injury for complete peace of mind

Tempered/Toughened safety glass processing schemes



Tempered/Toughened safety glass pressing schemes





Standards and Regulations

For sizing complying with current national regulations, see “Determining the thickness of glass”. For Noval safety glass, Noval decorative glass and patterned glass, the size and choice of thickness must consider the depth of the pattern on the chosen reference. In some cases, the presence of a deep design will require a thicker glass.

Noval safety glass complies with the requirements of standard BS EN 12150. Noval safety glass bears permanent marking the processing site and the relative EN standard BS EN 12150, Noval safety glass carries the relevant CE marking as required

Do you know ?

- Toughened glass cannot be drilled or edgeworked in any manner. Sandblasting or other surface treatments should be carried out prior to toughening as per AS1288 - 1994. Deep sandblasted patterns greater than 1mm are not permissible;
- Toughened glass ordered to templates must be accompanied with a full scale template made to the correct dimensions. These must be made from a rigid material. Orders submitted with complex drawings and sizes to avoid template construction will either be rejected or executed at the customer's risk;
- Minimum edgework finish on toughened glass up to 12mm is a standard arrissed edge. Minimum edgework on greater thicknesses should be a flat ground edge;
- Slight distortion or bowing may occur after toughening but is largely controllable. It will vary with substance, tint, surface treatment, size and shape of the glass. Ceramic painted, sandblasted or reflective coated glass has a greater tendency to bow and special tolerances would be advised.

For more information, Pls contact Noval Glass:

Tel: 0086-532-8275-1111 Fax: 0086-532-8275-5222

Website: www.novalglass.com or Contact: service@novalglass.com

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P.O. Box 6235
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The Netherlands

TNO report

www.tno-quality.nl

TQS-RAP-07-2411

Noval Glass (Qingdao) CO.,LTD
EN 12600 Pendulum test
Thermally toughened soda lime silicate safety
glass (5; 6; 8 and 10 mm enamelled)T +31 40 265 00 00
F +31 40 265 03 02

Date	September 17, 2007
Author(s)	L. van der Ven – le Comte, B.Sc.
Assignor	Noval Glass (Qingdao) CO.,LTD Qingdao Economic Technical Development Zone Qingdao, Peoples Republic of China
Project number	E07.0768
Number of pages	11 (incl. appendices)

The classification designation Ongebruikbaar is equivalent to Unclassified, Stg. Confidencieel is equivalent to Confidential and Stg. Geheim is equivalent to Secret.

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Contents

1	Introduction	3
2	Experimental.....	4
2.1	Delivered samples and materials	4
2.2	Testing Laboratory information	4
2.3	Test Results	4
3	Signature	7

1 Introduction

Noval Glass (Qingdao) CO.,LTD has commissioned TNO Quality Services BV with initial type testing according to the EN12600.

It is to the manufacturer's responsibility that the samples delivered for initial type test are representative to the production and that normal production variations are included in the test samples. If any changes in applied materials or other deviation of the system description are introduced, the validity of this initial type test report shall be evaluated on validity. This could mean new tests or additional tests. According to the rules this decision and full responsibility belongs to the manufacturer. The system description is the base document for this evaluation.

For any other manufacturer this initial type test (ITT) report is not automatically valid. The manufacturer for this ITT report is defined as Beijing Northglass Safety Glass CO.,LTD.

TNO is a fully Notified Test Laboratory for EN tests for the CPD guideline 89/106/EEG under Lab.no. 1750 at the Technical Committee of the European Commission in Brussels. This report has been issued under this reference.

The following chapters describe the tested configuration(s), the results and the conclusions.

2 Experimental

2.1 Delivered samples and materials

The following samples were delivered for the Pendulum test - Impact test method and classification for flat glass (EN 12600):

Production plant of the samples (j) : Noval Glass (Qingdao) CO.,LTD
 Production date : 23-09-2007
 Commercial product name (k) : TT soda lime silicate safety glass (EN12150)
 Type and nominal thickness (a) : Thermally toughened soda lime silicate glass,
 5; 6; 8 and 10 mm (enamelled)
 Dimensions of the test pieces (b) : 876 ± mm by 1938 ± 5 mm
 Intermediate layer (configuration) (l) : n.a.
 Applied films (clamped) (f) : n.a.

2.2 Testing Laboratory information

Testing laboratory (g) : Qingdao Economic Technical Development
 Zone Qingdao,
 Peoples Republic of China

Notified Test Laboratory number (h) : CGSC is working under the responsibility of
 TNO Quality Services BV Not. Lab 1750
 (CPD guideline 89/106/EEG)

Calibration of test ridge (e) : 11-06-2005

2.3 Test Results

All samples have been tested by the China Safety Global Certification Center (CSGC) which is an approved test body and appointed by Certification and Accreditation of the P.R China (CNCA) and accredited by China National Accreditation Board for Certifiers (CNAB).

5 mm:

Testing date (i) : September 2007
 Average thickness : 5 mm

impact: glass side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	breakage < 4b
1200	breakage < 4b	breakage < 4b	breakage < 4b	-

Classification (d): 1(C)3

impact: enamelled side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	breakage < 4b	no breakage	breakage < 4b	no breakage

Classification (d): 1(C)2

6mm

Testing date (i) : September 2007

Average thickness : 6 mm

impact: glass side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	breakage < 4b	breakage < 4b	breakage < 4b	breakage < 4b

Classification (d): 1(C)2

impact: enamelled side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	no breakage	breakage < 4b	no breakage	no breakage

Classification (d): 1(C)2

8mm
 Testing date (i) : September 2007
 Average thickness : 8 mm

impact: glass side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	breakage < 4b	breakage < 4b	breakage < 4b	breakage < 4b

Classification (d): 1(C)2

impact: enamelled side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	no breakage	no breakage	breakage < 4b	no breakage

Classification (d): 1(C)2

10mm
 Testing date (i) : September 2007
 Average thickness : 10 mm

impact: glass side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	breakage < 4b	breakage < 4b	breakage < 4b	breakage < 4b

Classification (d): 1(C)2

impact: enamelled side

Drop height [mm]	Test 1 result	Test 2 result	Test 3 result	Test 4 result
190	no breakage	no breakage	no breakage	no breakage
450	no breakage	no breakage	no breakage	no breakage
1200	no breakage	no breakage	no breakage	no breakage

Classification (d): 1(C)1

3 Signature

Eindhoven, September 2007



L. van der Ven – le Comte
Author

TNO Quality Services BV



A.J. Piers, B.Sc.
Business Unit Manager Glass



TNO Quality Services BV
P.O. Box 6235
5600 HE Eindhoven
The Netherlands
Lab no. 1750

Summary of report

Date: 24-9-2007

EN 12600
Pendulum test – Impact test method and classification for flat glass

for details, see test report

Producer: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Under responsibility of: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Product:
Thermally toughened soda lime silicate safety glass
(enamelled)
(5 mm)

Test Result:

1(C)3

(impact: glass side)

1(C)2

(impact: enamelled side)

The tested samples are complying with the requirements of EN12600.

Signature:

L. van der Ven - le Comte
Project leader

A.J. Piers
Programme leader



TNO Quality Services BV
P.O. Box 6235
5600 HE Eindhoven
The Netherlands
Lab.no. 1750

Summary of report

Date: 24-9-2007

EN 12600
Pendulum test – Impact test method and classification
for flat glass

for details, see test report

Producer: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Under responsibility of: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Product:
Thermally toughened soda lime silicate safety glass
(enamelled)
(6 mm)

Test Result:

1(C)2

(impact: glass side)

1(C)2

(impact: enamelled side)

The tested samples are complying with the requirements of EN12600.

Signature:

L. van der Ven - le Comte
Project leader

A.J. Piers
Programme leader



TNO Quality Services BV
P.O. Box 6235
5600 HE Eindhoven
The Netherlands
Lab.no. 1750

Summary of report

Date: 24-9-2007

EN 12600
Pendulum test – Impact test method and classification for flat glass

for details, see test report

Producer: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Under responsibility of: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Product:
Thermally toughened soda lime silicate safety glass
(enamelled)
(8 mm)

Test Result:

1(C)2

(impact: glass side)

1(C)2

(impact: enamelled side)

The tested samples are complying with the requirements of EN12600.

Signature:

L. van der Ven - le Comte
Project leader

A.J. Piers
Programme leader



TNO Quality Services BV
P.O. Box 6235
5600 HE Eindhoven
The Netherlands
Lab.no. 1750

Summary of report

Date: 24-9-2007

EN 12600
Pendulum test – Impact test method and classification for flat glass

for details, see test report

Producer: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Under responsibility of: Noval Glass (Qingdao) CO.,LTD
Qingdao Economic Technical Development Zone Qingdao,
Peoples Republic of China

Product:
Thermally toughened soda lime silicate safety glass
(enamelled)
(10 mm)

Test Result:

1(C)2

(impact: glass side)

1(C)1

(impact: enamelled side)

The tested samples are complying with the requirements of EN12600.

Signature:

L. van der Ven - le Comte
Project leader

A.J. Piers
Programme leader