

Test report

Test report relating to a glass product according to European standard EN 410, luminous and solar characteristics, concerning the product marked as: Borosil 3.2 mm clear patterned, manufactured by: Gujarat Borosil Limited

Report number	11822R-11-33296
Date	19 September 2011
Author(s)	M.J.R. Luppens
Client	Gujarat Borosil Limited Village Govali Tehsil Jhagadia District Bharuch 392001 State Gujarat India
Project number	11-33296
Project name	Borosil 3.2 mm clear patterned
Number of pages	10

All rights reserved.

No part of this report may be reproduced, provided to and/or examined by third parties, and/or published by print, photoprint, microfilm, in electronic form or any other means without the explicit previous written consent of TÜV Rheinland Nederland B.V.

In case this report was drafted within the context of an assignment to TÜV Rheinland Nederland B.V, the rights and obligations of contracting parties are subject to the General Terms & Conditions for Advisory, Research and Certification assignments to TÜV Rheinland Nederland B.V and/or the relevant agreement concluded between the contracting parties.

© 2010 TÜV Rheinland Nederland B.V.

Head office Apeldoorn:
Boogschutterstraat 11A
P.O. Box 541
7300 AM Apeldoorn
The Netherlands
Tel. +31 (0)88 888 7 888
Fax +31 (0)88 888 7 879

Location Apeldoorn:
Vissenstraat 6
P.O. Box 541
7300 AM Apeldoorn
The Netherlands
Tel. +31 (0)88 888 7 888
Fax +31 (0)88 888 7 879

Location Enschede:
Josink Esweg 10
P.O. Box 337
7500 AH Enschede
The Netherlands
Tel. +31 (0)88 888 7 888
Fax +31 (0)88 888 7 859

TÜV Rheinland Nederland B.V.
is a registered company at the
Dutch Chamber of Commerce
under number 27288788
info@nl.tuv.com
www.tuv.com/nl

Contents

1 Introduction	3
1.1 Purpose	3
1.2 Description of the samples	3
1.3 Sampling procedure	3
1.4 Application	3
1.5 Method of testing	3
1.6 Put out to contract	3
1.7 Privacy statement	4
1.8 Notifications and accreditations	4
2 Test results	5
3 Conclusion	6
4 References	7
5 Signatures	8
Appendix A, Spectral values	9

1 Introduction

1.1 Purpose

The tests have been performed in order to establish whether or not the product meets the requirements of the European standard EN 410 [1].

1.2 Description of the samples

General

Name of the manufacturer	Gujarat Borosil Limited
Address of the manufacturer	Village Govali Tehsil Jhagadia District Bharuch 392001 State Gujarat India
Production plant of the samples	Village Govali Tehsil Jhagadia District Bharuch 392001 State Gujarat India
Production date	July 2011
Sampling date	July 2011
The product was marked as	Borosil 3.2 mm clear patterned
Dimensions of the samples	300 x 300 mm

Specific

Number of panes in the glazing	1
Thickness of the panes	3.2 mm
Type and position of panes	not applicable
Position of the coating	not applicable
Type of the coating	not applicable
Intermediate layer(s)	not applicable
Application of adhesive foils	not applicable

1.3 Sampling procedure

The test house, acting as notified test body, has had no influence on the sampling procedure.

1.4 Application

The request for testing was submitted by the manufacturer on August 3, 2011. Suborder number: 1403015401.

1.5 Method of testing

All applicable tests have been performed according to the European standard EN 410 [1].

1.6 Put out to contract

No tests were performed at third parties.

1.7 Privacy statement

Due to privacy reasons, the names of involved personnel that executed the tests, are not disclosed in the report. However, this information is available on internal work sheets, test forms etc. in the project file.

1.8 Notifications and accreditations

TÜV Rheinland Nederland B.V. has been notified by the Dutch Ministry of VROM as Notified Test Body (number 1750) and Notified Certification Body (number 0336) for the European Construction Products Directive 89/106/EEC.

TÜV Rheinland Nederland B.V. has been accredited by the Dutch Accreditation Council (RvA) as ISO 17025 Test Laboratory (accreditation number L 484) and EN 45011 Certification Body (accreditation number C058).

TÜV Rheinland Nederland B.V. has been accredited as Technical Service (Laboratory) by RDW competent Administrative Department (Approval Authority) for the Netherlands to grant approvals as mentioned in Directive 70/156/etc. and the 1958 Agreement of the Economic Commission for Europe of the United Nations (UN-ECE) for glass as used in the automotive sector: ECE Regulation 43, safety glazing; EC Directive 92/22, Safety glass; EC Directive 2009/144, Glazing cat. T. (accreditation number RDW-99050043 00).

2 Test results

Test results after performing all applicable tests according to European standard EN 410 [1].

Characteristics	Symbol	Thickness in mm
		3.2 mm
Light transmittance	$\tau_{v, D65}$	0.91
Light reflectance, side 1 (coated, if applicable)	$\rho_{v, D65}$	0.08
Light reflectance, side 2 (uncoated, if applicable)	$\rho'_{v, D65}$	0.08
Solar direct transmittance	τ_e	0.91
Solar direct reflectance, side 1 (coated, if applicable)	ρ_e	0.09
Solar direct reflectance, side 2 (uncoated, if applicable)	ρ'_e	0.09
Total solar energy transmittance (solar factor)	g	0.91
UV- transmittance	τ_{uv}	0.88
General colour rendering index	Ra_{D65T}	99.8
General colour rendering index	Ra_{D65}	99.3
General colour rendering index	$R_{outside}$	99.4
	R_{inside}	

Used instrument:

Manufacturer and type of spectrophotometer	Perkin Elmer, Lambda 900 UV Vis NIR
Reflectance accessory or Integrating sphere (if used)	PE standard; sphere 150 mm (PELA 1039)
Reference material for reflectance	Second Surface Mirror 99000155


3 Conclusion

This report is just a presentation of the test results. Because the standard does not contain requirements, there cannot be a comparison between requirements and test results and therefore a conclusion cannot be made.

4 References

- 1 European standard EN 410:2011 (E),
Glass in building – Determination of luminous and solar characteristics of glazing,
European Committee for Standardization, February 2011.

5 Signatures

Author Mr. M.J.R. Luppens	Signature 
Specialist	
Peer review Mr. T.R. Cruiff	Signature 
Specialist	
Approved by Mr. A.J. Piers, B.Sc.	Signature 
Manager Industrial Services	

Appendix A, Spectral values

Spectral values in the wavelength from (300 to 2500) nm

Wave length nm	Spectral transmittance τ (λ)	Spectral reflectance ρ (λ)	Spectral reflectance ρ (λ)'
	3.2 mm	3.2 mm	3.2 mm
300	0.288426869	0.058934669	0.055985007
320	0.737031409	0.070899222	0.068087506
340	0.909269874	0.082400723	0.079890232
360	0.93470934	0.084807037	0.082778598
380	0.929667424	0.084118692	0.082338763
390	0.929242224	0.084125673	0.082359279
400	0.928495675	0.083843486	0.082156869
410	0.925559963	0.083640131	0.082073292
420	0.923523292	0.083321893	0.081826192
430	0.920667394	0.083104555	0.08163978
440	0.918197125	0.08280967	0.081366636
450	0.916886014	0.082581654	0.081125093
460	0.916032901	0.082371636	0.080988524
470	0.914887411	0.082223217	0.080941673
480	0.913301313	0.082089589	0.080848531
490	0.913371437	0.081909502	0.080559826
500	0.913110859	0.081510883	0.080180541
510	0.912502776	0.081172624	0.080077245
520	0.91175764	0.0811995	0.08008631
530	0.911962113	0.081157981	0.080071434
540	0.911706238	0.080955565	0.079959432
550	0.911524101	0.081020113	0.079883315
560	0.911359355	0.080911008	0.079834237
570	0.911129485	0.08080462	0.079726815
580	0.910727867	0.080763938	0.079620397
590	0.911025096	0.080670032	0.07952125
600	0.911359355	0.080911008	0.079834237
610	0.910207137	0.080493018	0.079473215
620	0.910072548	0.080382143	0.079394928
630	0.910148372	0.080299976	0.079276988
640	0.909558653	0.080204938	0.079219538
650	0.909146937	0.080279475	0.079269997
660	0.909411055	0.08017828	0.079201453
670	0.909411055	0.08017828	0.079201453
680	0.908708159	0.080276559	0.079344625
690	0.907529359	0.080363464	0.079547943
700	0.907342344	0.080687215	0.079953215
710	0.907151122	0.081103619	0.080449195

Continued

Wave length nm	Spectral transmittance τ (λ)	Spectral reflectance ρ (λ)	Spectral reflectance ρ (λ)'
	3.2 mm	3.2 mm	3.2 mm
720	0.906829592	0.081417648	0.081029265
730	0.906504207	0.081665523	0.081338803
740	0.906817651	0.082056715	0.081826219
750	0.905913599	0.082278621	0.082039074
760	0.906773128	0.08251895	0.082371457
770	0.905976459	0.0825795	0.082574448
780	0.906731346	0.082773889	0.08276636
800	0.906183724	0.082897521	0.082879396
850	0.904945916	0.084788191	0.084913064
900	0.90537284	0.087224733	0.086121853
950	0.904569005	0.088314848	0.087702529
1000	0.903551842	0.089487847	0.088455801
1050	0.903567646	0.090919142	0.089839408
1100	0.902772388	0.093880689	0.092345685
1150	0.902203391	0.097272219	0.095291439
1200	0.902178313	0.099952606	0.097009499
1250	0.901536032	0.103955173	0.099835505
1300	0.901287179	0.1082487	0.102842145
1350	0.90126947	0.112431604	0.105876921
1400	0.898725607	0.115910115	0.107966342
1450	0.897282664	0.118387817	0.109575285
1500	0.897979333	0.122170358	0.111887545
1550	0.898492704	0.126160037	0.114269488
1600	0.898141425	0.129107625	0.116366848
1650	0.897953195	0.131776604	0.117817788
1700	0.894345115	0.134659997	0.118843939
1750	0.895364228	0.134430746	0.118614418
1800	0.892682	0.135116419	0.119416701
1850	0.892509446	0.137490336	0.120692463
1900	0.885581377	0.135429167	0.118782171
1950	0.881923628	0.128165513	0.115203882
2000	0.883330754	0.13552178	0.118191358
2050	0.884033909	0.137475487	0.119535186
2100	0.882836138	0.135160396	0.119060646
2200	0.883330754	0.13552178	0.118191358
2300	0.863473747	0.127147549	0.11470352
2400	0.859780243	0.12442542	0.10756748
2500	0.84125008	0.114143298	0.088934008

(This is the end of this report).