
**Glass in building — Tempered soda
lime silicate safety glass**

*Verre dans la construction — Verre silico-sodo-calciqne de sécurité
trempé*



This document is a preview generated by EMS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Glass products	3
5 Fracture characteristics	3
5.1 General.....	3
5.2 Accidental human impact.....	3
5.3 Fragmentation.....	3
6 Dimensions and tolerances	4
6.1 Nominal thickness and thickness tolerances.....	4
6.2 Width and length (sizes).....	4
6.2.1 General.....	4
6.2.2 Maximum and minimum sizes.....	5
6.2.3 Tolerances and squareness.....	5
6.2.4 Edge deformation produced by vertical tempering.....	5
6.3 Flatness.....	6
6.3.1 General.....	6
6.3.2 Measurement of overall bow.....	8
6.3.3 Measurement of wave or roller wave distortion.....	9
6.3.4 Measurement of edge lift (for horizontally tempered safety glass only).....	10
6.3.5 Measurement of perimeter deformation of glass produced by air cushion toughening process.....	11
6.3.6 Measurement of local distortion (for vertically tempered safety glass only).....	12
6.3.7 Limitation on overall bow, roller waves and edge lift for horizontally tempered safety glass.....	12
6.3.8 Limitation on overall bow, wave and perimeter deformation for tempered safety glass manufactured by air cushion process.....	13
6.3.9 Limitation on overall bow and local distortion for vertically tempered safety glass.....	13
6.3.10 Other distortions.....	14
7 Edge work, holes, notches and cut-outs	14
7.1 General.....	14
7.2 Edge working of glass for tempering.....	14
7.3 Profiled edges.....	15
7.4 Round holes.....	15
7.4.1 General.....	15
7.4.2 Diameter of holes.....	15
7.4.3 Limitations on position of holes.....	15
7.4.4 Tolerances on hole diameters.....	17
7.4.5 Tolerances on position of holes.....	17
7.5 Holes/others.....	18
7.6 Notches and cut-outs.....	18
7.7 Shaped panes.....	19
8 Fragmentation test	19
8.1 General.....	19
8.2 Dimensions and number of test specimens.....	19
8.3 Test procedure.....	19
8.4 Assessment of fragmentation.....	20
8.5 Minimum values from the particle count.....	21

8.6	Selection of the longest particle	22
8.7	Maximum length of the longest particle	22
8.8	Test report	22
9	Other physical characteristics	22
9.1	Optical distortion	22
9.1.1	Tempered safety glass produced by vertical tempering	22
9.1.2	Tempered safety glass produced by horizontal tempering	22
9.2	Anisotropy (iridescence)	22
9.3	Thermal durability	23
9.4	Mechanical strength	23
9.5	Surface pre-stress	23
10	Marking	24
11	Packaging	24
Annex A (normative) Pendulum impact test methods		25
Annex B (informative) Alternative method for the measurement of roller wave distortion		26
Annex C (informative) Example of particle count		28
Annex D (informative) Method for the measurement of the surface pre-stress of tempered safety glass		31
Bibliography		33

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/ TC 160, *Glass in building*, Subcommittee SC 1, *Product considerations*.

Introduction

Tempered soda lime silicate safety glass has a breakage behaviour that is different to annealed glass. This behaviour is a direct result of the high surface pre-stress.

Tempered soda lime silicate safety glass has a known behaviour under accident human impact together with known mechanical and thermal stress resistance.

NOTE 1 ISO/TC 160/SC 2 produces standards for the determination of the design strength of glass and is preparing a design method.

NOTE 2 In Europe, the term “thermally toughened” is used instead of “tempered”.

Glass in building — Tempered soda lime silicate safety glass

1 Scope

This document covers product definitions, product characteristics, i.e. tolerances, flatness, edgework, etc., fracture characteristics, including fragmentation, and the physical and mechanical characteristics of flat tempered soda lime silicate safety glass for use in buildings.

This document does not cover curved (bent) glass according to ISO 11485.

Other requirements, not specified in this document, can apply to thermally toughened soda lime silicate safety glass which is incorporated into assemblies, e.g. laminated glass or insulating glass units, or undergo an additional treatment, e.g. coating. The additional requirements are specified in the appropriate glass product standard. Thermally toughened soda lime silicate safety glass, in this case, does not lose its mechanical or thermal characteristics.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1288-3, *Glass in building — Determination of the bending strength of glass — Part 3: Test with specimen supported at two points (four point bending)*

ISO 11479-1, *Glass in building — Coated glass — Part 1: Physical defects*

ISO 16293-1, *Glass in building — Basic soda lime silicate glass products — Part 1: Definitions and general physical and mechanical properties*

ISO 16293-2:—¹⁾, *Glass in building — Basic soda lime silicate glass products — Part 2: Float glass*

ISO 16293-5:—¹⁾, *Glass in building — Basic soda lime silicate glass products — Part 5: Patterned glass*

ISO 29584, *Glass in building — Pendulum impact testing and classification of safety glass*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

flat tempered safety glass

tempered (thermally toughened) glass which has not been deliberately given a specific profile during manufacture

1) Under preparation.