

Glass in Furniture and Similar Applications

GANZ Code of Practice - GF1



Glass Association of New Zealand

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FOREWORD & DISCLAIMER

This Code of Practice has been developed to address the lack of availability of any similar New Zealand documents for the selection of glass for use in furniture and similar applications. Whereas the New Zealand Building Code specifies how glass must be used and the Land Transport regulations govern the use of glass in vehicles, there are no specific laws governing the use of glass in furniture and similar applications.

The practical issues associated with furniture glass are often different to those relating to window glass, and this document reflects the collective view of a wide range of industry experts, both from within New Zealand and abroad.

The guidance offered is both conservative and practical - a difficult balance to achieve when the overall aim is safety of the user. It must always be remembered that glass is a hazardous material which can inflict very serious personal injury. Selecting appropriate thicknesses and choosing safety glasses, such as laminated and toughened glass, reduce the risk but does not eliminate it entirely. Similarly, using the furniture glass in a manner it was not designed for (such as using a glass table top to stand upon) is strongly discouraged.

This guidance document is offered in good faith, but the wide range of circumstances that can contribute to personal injury necessitate the Glass Association of New Zealand, and the Window Association of New Zealand (Incorporated), its officers and members disclaiming all liability in respect to any action that might arise as a result of reliance on this publication.

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REFERENCES & RELATED DOCUMENTS

Reference is made in this document to the following:

NEW ZEALAND STANDARDS

NZS 4223 Glazing in buildings

Part 1:2008 Glass Selection and Glazing

Part 3:1999 Human Impact Safety requirements

NZS 5261 The installation of gas burning appliances and equipment

AUSTRALIAN STANDARDS

AS/NZS 2208 Safety glazing materials in buildings

AS/NZS 4667 Quality requirements for cut to size and processed glass

AS/NZS 4668 Glossary of terms used in the glass and glazing industry

BRITISH STANDARDS

BS 3193 Thermally toughened glass for use in domestic appliances

BS 4875 Strength and stability of furniture

Part 5: Methods for determination of strength of tables and trolleys

Part 6: Methods for determination of stability of tables and trolleys

Part 8: Methods for determination of stability of storage furniture

BS 5459 Specification for performance requirements and tests for office furniture
Part 3: Storage furniture

BS 7376 Inclusion of glass in the construction of tables or trolleys

BS 7449 Inclusion of glass in the construction of furniture, other than tables or trolleys, including cabinets, shelving system and wall hung or free standing mirrors

BS EN 1730 Domestic furniture - Tables - Test methods for determination of strength, durability and stability

ISO STANDARDS

ISO 15717 Kitchen equipment - Safety requirements and tests methods for kitchen cabinets and worktops

1 SCOPE

1.1

This code specifies minimum requirements for the selection of glass, greater than 0.06m², to be used in all parts of all buildings, including kitchens and bathrooms, as follows:

- Furniture
- Tables and worktops
- Trolleys
- Cabinets (including refrigeration display cabinets)
- Shelving
- Vanities & Basins
- Splash-backs and wall cladding
- Wall hung, fixed or other mirrors (not covered by NZS 4223 Part 3)
- Internal Glass fitments (not defined above)

1.2

Thermally toughened glass panels for use in domestic appliances are excluded and covered in BS 3193 (NZS 7841)

1.3

Curved or bent glass are excluded

Note. Due the complex nature of the strength of curved glass, tables can not be provided. However, as a conservative approach the maximum areas for flat glass can be applied to curved glass.

1.4

Risk - The application of the requirements of this code will reduce the risk of injury caused by exposure to glass in buildings as required by NZBC Clause F2. Hazardous Building Materials

The use of Grade A safety glazing material in any application in accordance with the relevant table will also meet the requirements of Clause F2 (refer F2.3.3 (a)) but may exceed the requirements of this Code.

Note. The requirements of NZBC Clause F2 may not apply to furniture

1.4

Glazing Materials

Glass thickness determined from this Code apply only to glass conforming to NZS 4223, AS/NZS 4667 and AS/NZS 2208

2 DEFINITIONS

2.1

The definitions set in NZS 4223 and AS/NZS 4668 shall apply to this Code and in addition the following shall apply:

SPLASH BACK. Backing panel to a cooking or washing area to protect the walls from splashes and enable easy cleaning.

Note. The panel may also be required to protect the wall from burning and may require compliance with other standards such as NZS 5261: The installation of gas burning appliances and equipment.

FITMENT. Piece of fixed furniture

UNBACKED GLASS. Glass, which either has no backing immediately behind its entire area or has a backing that does not retain its integrity or is cracked or broken when tested as described in Appendix A of BS 7449

ENCLOSED SHELF

A shelf that is completely enclosed within the cabinet when the cabinet doors are closed

FILM BACKED GLASS OR MIRROR.

Glass backed with an adhesive plastic film to protect the surface and/or make it a safety organic glazing material in accordance with AS/NZS 2208

3 GENERAL

3.1 Edge Finish

Exposed edges of glass shall be edge worked mitred or bevelled. (Refer AS/NZS 4668 Appendix B). The most common edgework for furniture is a Flat Polish (FP) edge

Note. It is recommended that the edges of mirrors, laminated glass and/or film-backed glass be protected from moisture.

3.2 Holes

Holes drilled in glass for the use of fixings must make allowance for grommets and washers to ensure no glass to metal contact.

3.3 Material contact

There shall be no metal to glass, stone to glass, or glass to glass contact and the materials shall be separated by at least a 0.5 mm suitable gasket material, bump-on, or a suitable UV or similar glue.

Note. Allowance shall be made for any difference in thermal expansion of glass and the surrounding material having regard for the manufacturing tolerances.

3.4 Glass Support

Glass can be considered supported if it complies with the following

- (a) Edge support with a minimum 6mm overlap
- (b) Point support of 36 mm² horizontal area (includes bump-ons)
- (c) Clamp support with mechanical clamp fixing through the glass that has a bearing area around one or both sides of the hole of 30mm diameter or 900 mm².
- (d) Adhesive support provided by adhesive tape and sealant or UV glue, provided the products have been tested and approved for use by the manufacturer.
- (e) Hole fixing support with proprietary fixings to the manufacturer's specification.
- (f) Channel support for static or sliding glass contained in a rebate or groove shall have edge cover at least equal to the glass thickness with a minimum of 5mm

3.5 Film backed glass

When film is used on the back of glass to protect it or make it a safety glazing material, the film must not be used as the adhesive surface unless manufacturers test results show it is fit for purpose.

3.6 Substitution

Grade A or B safety glass may be directly substituted in circumstances where ordinary annealed glass is permitted to the same limits of the annealed glass or to the alternative allowance of the type of safety glass selected.

4 HORIZONTAL GLASS SUPPORTED OVER ITS ENTIRE AREA

4.1

Glass which has an area no greater than 3.5m² shall comply with Table 1

4.2

Glass which has an area greater than 3.5m², shall comply with Table 1 except annealed glass that shall be subject to specific design

5 HORIZONTAL GLASS NOT SUPPORTED OVER ITS ENTIRE AREA

5.1

Annealed glass continuously supported on all four edges shall comply with Table 3.

5.2

Annealed glass, other than that covered in 5.1, shall comply with Table 2.

5.3

Toughened and laminated safety glass shall comply with Table 2.

6 NON HORIZONTAL GLASS SUPPORTED OVER ITS ENTIRE AREA

6.1

Glass and mirror that is fully backed by and completely adhered to a solid material or wall, by screws or adhesive tapes, compounds or sealants, shall be Grade A or B Safety Glazing Material or annealed glass in accordance with Table 1.

7 NON HORIZONTAL GLASS NOT SUPPORTED OVER ITS ENTIRE AREA

7.1

Unbacked glass or mirror, which has a maximum dimension of 1000mm, shall be Grade A or B safety glazing material or annealed glass in accordance with Table 1 subject to the following:

- (a) Fully framed. Annealed glass not less than 4mm thickness
- (b) Partly framed or unframed. Annealed glass not less than 5mm thickness

7.2

Unbacked glass or mirror, which has a maximum dimension greater than 1000mm, shall be Grade A or B safety glazing material, and specific design shall apply to the application.

Note. If the specific design criteria are unknown use a design pressure of 0.45KPa ULS.

8 HINGED DOORS, SLIDING DOORS, LIDS OR FLAPS

8.1

For fully framed glass components Table 2 shall be used.

8.2

For unframed or partly framed glass components toughened safety glass in accordance with Table 2 shall be used.

8.3

For proprietary systems the glass type and thickness shall be in accordance with the manufacturer's recommendations for the application.

Note. For hinged glass components with notches or holes, toughened safety glass is recommended.

9 SHELVES

9.1 Maximum safe load

The maximum evenly distributed safe load of a glass shelf shall be determined in accordance with Appendix A.

Note The safe load should be marked on the label (see clause 12)

9.2 Shelves subject to human impact

Shelves that are subject to human impact shall be Safety Glazing Material in accordance with Appendix A.

Note. Glass subject to human impact is that within 2m of the floor level and not protected from impact by a barrier or other means.

9.3 Other shelves

Shelves that are enclosed, or not subject to human impact, can be annealed glass or safety glass in accordance with Appendix A.

9.4 Support of glass shelves

9.4.1

The glass supports shall overlap the edges of the glass simultaneously by at equal the glass thickness.

9.4.2

A shelf shall be retained if the furniture or shelving system of which it is part can be tilted in any direction by 30 degrees to the horizontal.

9.4.3

A shelf shall not tip and the supports shall remain intact when a load, equivalent to 50% of the maximum evenly distributed safe load and covering an area of 75mm x 75mm, is placed at any position on it for at least 10 seconds.

10 VANITIES & BASINS

- 10.3 Vanity glass without basin cut outs, notches and holes must comply with Table 1 or Table 2
- 10.4 Vanity glass with basin cut outs, notches and holes are subject to specific design by the manufacturer but must not be less than 12mm annealed or laminated safety glass or 8mm toughened safety glass.
- 10.5 Vanity glass with basins cast or slumped in one piece must be heat treated glass. (i.e. heat strengthened or toughened)

Note *Vanity glass may be subject to thermal stress due to hot and cold water or items placed on the glass and toughened safety glass is recommended for such applications.*

11 SPLASH BACKS & WALL CLADDING

- 11.1 Splash backs and wall cladding must comply with clause 4,5,6,&7

Note 1 *The glass may be subject to thermal stress due to hot and cold water or items placed on the glass and toughened safety glass is recommended for such applications.*

Note 2 *The glass will often have notches and holes for switches, plugs and other protrusions. These can cause weak points in the glass and lead to breakage, so toughened glass is recommended for such applications*

Note 3 *Glass used behind or adjacent to gas appliances may require special fire resistant backings and/or other gas fitting rules may apply (refer NZS 5261)*

12 MARKING

This section is optional but is recommended by GANZ

12.1

Each panel of glass and mirror should be legibly marked to certify it's compliance with this Code of Practice.

12.2

All glass and mirror should be clearly marked with the following information either permanently or with an adhesive label, which cannot be removed without destroying the label:

- (a) The name, registered trademark or code of the manufacturer or supplier
- (b) The type of glazing material used. This may in the form of a code, such as A for Annealed T for Toughened or L for Laminated, OC for organic coated (film backed) as indicated by the relevant compliance Standard (AS/NZS 2208)
- (c) The Standard or Code of Practice in which the glass complies with if applicable (e.g. GANZ "Code GF1, AS/NZS 2208, BS 7449, BS 7376)
- (d) If applicable the classification relating to the test behavior. (e.g. A for Grade A, B for Grade B)

Note

The label should be applied by the manufacturer and removed by the retailer or by persons receiving the finished product.

12.3 Other Marking

Manufacturers can give additional information concerning the use and care of the glass if applicable

This information can include but not be limited to the following

- (a) The safe load in kilograms for each shelf
- (b) Do not place very hot or very cold items against, on or in close proximity to the glass surface unless an adequate insulating material is used.
- (c) Do not strike the glass with hard or pointed items
- (d) Use only proprietary glass cleaners or warm soapy water and squeegee dry
- (e) Do not sit or stand on any glass surfaces
- (f) Do not use the glass surface as a chopping surface
- (g) It is essential the product is fixed with the fixings provided

Such marking should be in the form of a removable label or sticker

Furniture Glass Selection Tables

Table 1. Minimum nominal thickness for horizontal glass supported over its entire area

Glass Area M2	Annealed Glass	Toughened Safety Glass	Laminated Safety Glass	Film Backed Safety Glass
Less than 0.50	4 mm	4 mm	6 mm	4 mm
0.50 to 1.0	5 mm	4 mm	6 mm	4 mm
1.1 to 1.5	5 mm	4 mm	6 mm	5 mm
1.6 to 2.0	6 mm	5 mm	6 mm	5mm
2.1 to 2.5	8 mm	5 mm	6 mm	6 mm
2.6 to 3.0	10 mm	6 mm	8 mm	8 mm
3.1 to 3.5	12 mm	8 mm	10 mm	10 mm
Over 3.5	SD	10 mm Min	12 mm Min	12 mm Min

SD = Specific Design

Laminated glass thickness excludes the interlayer thickness (6 mm =2x3mm)

Table 2. Minimum nominal thickness for horizontal glass not supported over its entire area

Glass Area m2	Annealed Glass	Toughened Glass	Laminated Glass
Less than 0.25	10 mm	4 mm	6 mm
0.25 to 0.50	10 mm	5 mm	6 mm
0.51 to 0.75	12 mm	6 mm	6 mm
0.76 to 1.0	15 mm	8 mm	8 mm
1.1 to 1.5	15 mm	8 mm	8 mm
1.5+	19 mm	10 mm	10 mm
Over 3.5	SD	SD	SD

SD = Specific Design

Glass must be supported for not less than 50% of the perimeter. The support shall be in at least two non-adjacent regions and shall not be more than 100 from the edges of the glass.

Laminated glass thickness excludes the interlayer thickness (6 mm =2x3mm)

An adjustment of 1.5 times the m2 area above will apply for double glazing.

Table 3.

Annealed Glass
4 EDGE SUPPORT TABLE TOPS

2.00								15	15	15	15	15	15	15
1.75							15	15	15	15	15	15	15	15
1.50						15	15	15	15	15	15	15	15	15
1.25					12	15	15	15	15	15	15	15	15	15
1.00				12	12	12	15	15	15	15	15	15	15	15
0.75			12	12	12	12	12	12	12	12	12	12	12	12
0.50		10	10	12	12	12	12	12	12	12	12	12	12	12
0.25	8	8	8	8	8	8	8	8	8	8	8	8	8	8
0.00	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50

LONG SIDE m MAX

Based on medium term design load of 1KN central point load

Calculation based on Strand 7 FEA computer software

Maximum Design Stresses taken from NZS 4223:Part1:2008

Appendix A - Determination of maximum distributed safe load of a glass shelf

Maximum evenly distributed safe loading kg/m2 for the following unsupported lengths														
Type of Glass	Nominal thickness (mm)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Annealed	4	153	86	55	38	28	21	17	14	11	10	8	7	6
	5	244	137	88	61	45	34	27	22	18	15	13	11	10
	6	356	200	128	89	65	50	40	32	26	22	19	16	14
	8	627	353	226	157	115	88	70	56	47	39	33	29	25
	10	995	559	358	249	183	140	111	90	74	62	53	46	40
	12	1447	814	521	362	266	203	161	130	108	90	77	66	58
Laminated	4	69	39	25	17	13	10	8	6	5	4	4	3	3
	6	166	93	60	41	30	23	18	15	12	10	9	8	7
	8	305	172	110	76	56	43	34	27	23	19	16	14	12
	10	487	274	175	122	89	69	54	44	36	30	26	22	19
	12	711	400	256	178	131	100	79	64	53	44	38	33	28
Toughened	4	988	417	213	123	78	52	37	27	20	15	12	10	8
	5	1991	840	430	249	157	105	74	54	40	31	24	20	16
	6	2997	1482	759	439	276	185	130	95	71	55	43	35	28
	8	5283	2972	1775	1027	647	433	304	222	167	128	101	81	66
	10	8383	4716	3018	2054	1293	866	608	444	333	257	202	162	131
	12	12197	6861	4391	3049	2240	1520	1068	778	585	450	354	284	231
Cast	4	129	73	47	32	24	18	14	12	10	8	7	6	5
	6	320	180	115	80	59	45	36	29	24	20	17	15	13
	10	895	503	322	224	164	126	99	81	67	56	48	41	36

APPENDIX B (informative)

PERFORMANCE REFERENCE SPECIFICATIONS

Glass in furniture and similar applications may be required to comply with the performance requirements of a relevant international standard, such as those listed in the related documents.

The following sections give a guide to the performance requirements of some of these standards

A1

Furniture that is not office furniture, and which incorporates glass, shall either pass the tests described in BS EN 1730 or BS 4875: Part 8 or shall be supplied with wall fixings

A2

Furniture that is office furniture, and which incorporates glass, shall either comply with the over balancing requirements in 4.2 of BS 5459 at test level G or be supplied with wall fixing

A3

When glass is unsupported at its edge, for example in a pedestal table, the table or trolley shall pass the vertical and horizontal static load tests given in BS 4875:Part 5 at test level 2 and the stability tests described in BS 4875:Part 6

A4

Tables and trolleys with Grade A or B safety glass shall pass the vertical static load test and vertical impact test given in BS 4875: Part 5 at test level 2. In addition the vertical impact test rectangular tops shall also be impacted 10 times at test level 2 as close as possible to the corner and 10 times at test level 2 at the geometric corner.

When the longest span does not exist, for example as in a round table, the "center of the edge of the longest span" shall be a point on the periphery as far away from point's supports as possible.

A5

Tables and trolleys without safety glass shall pass the vertical static load test and vertical impact test given in BS 4875: Part 5 at test level 5 and the stability tests in BS4875: Part 6. In addition the vertical impact test rectangular tops shall also be impacted 10 times at test level 5 as close as possible to the corner and 10 times at test level 5 at the geometric corner.

When the longest span does not exist, for example as in a round table, the "center of the edge of the longest span" shall be a point on the periphery as far away from point supports as possible.

A6

When a hinged component incorporating glass is tested by the methods described in BS 5459: Part 3, there shall be no damage to the glass and the component shall not become wholly or partially detached from the unit either by structural failure of the hinge or slippage in a hinge mounting.

A7

Kitchen Cabinets and worktops shall comply with the test methods defined in ISO 15717.