



South African Glass and  
Glazing Association

The South African Glass & Glazing Association

**SELECTION GUIDE  
FOR  
GLASS IN FURNITURE**

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## ACKNOWLEDGMENT

We acknowledge with thanks the information provided by:

- DIN 32622 – Aquarien aus Glas
- BS 7376:1990 – Specification of glass in the construction of tables or trolleys
- BS 7449:1991 – Specification for inclusion of glass in the construction of furniture, other than tables or trolleys, including cabinets, shelving systems and wall hung or free standing mirrors.
- AGGA – Australian Glass and Glazing Association
- SAA HB125:1999 – Standards Australia – The Glass and Glazing Handbook
- SABS 0400 – Code of Practice for the application of the National Building Regulations.
- SABS 0137 – Code of Practice for the Installation of Glazing in Buildings

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**1. INTRODUCTION**

In a recent court decision namely *SM Goldstein & Co (Pty) Ltd v Cathkin Park Hotel (Pty) Ltd and Another 200 (4) SA 1019 (SCA)* the court placed a legal duty of care on contractors (i.e. glaziers) that the construction (i.e. material and installation) is safe.

An area which has been identified by SAGGA in respect of glass and glazing which is not covered, directly, by any South African Regulation and SABS Standard is the use of glass in furniture.

Among the more frequent applications are open shelves and tabletops. Glass used in these applications are particularly vulnerable with often high impact forces.

In addition glass used at low levels, such as stereo cabinets doors, create a great risk of harm, especially to children, when broken.

The National Building Regulations in its Code SABS 0400 Part N recognizes that low level glazing within 500mm of the floor needs to be done in safety glazing material i.e. toughened safety glass or laminated safety glass.

This Selection Guide attempts to fill the void in respect of the:

1. Inclusion of glass in the construction of tables or trolleys
2. Inclusion of glass in the construction of furniture, other than tables or trolleys, including cabinets, shelving systems and wall hung or free standing mirrors
3. Inclusion of glass in fish tanks

**2. DEFINITION**

Toughened Glass shall mean Toughened Safety Glass in accordance with SABS 1263 Part I.

Laminated Glass shall mean Laminated Safety Glass in accordance with SABS 1263 Part I.

### 3. SHELVING

When using glass for shelving the most important consideration is to ensure that the glass used has sufficient strength to carry the load placed on the shelf safely.

The BS 7449 Specification for the inclusion of glass in construction of furniture other than tables or trolleys, including cabinets, shelving systems and wall hung or free standing mirrors, provides a method for determining the maximum load that can safely be supported on various lengths and types of glass shelves.

#### 3.1 MATERIAL SELECTION

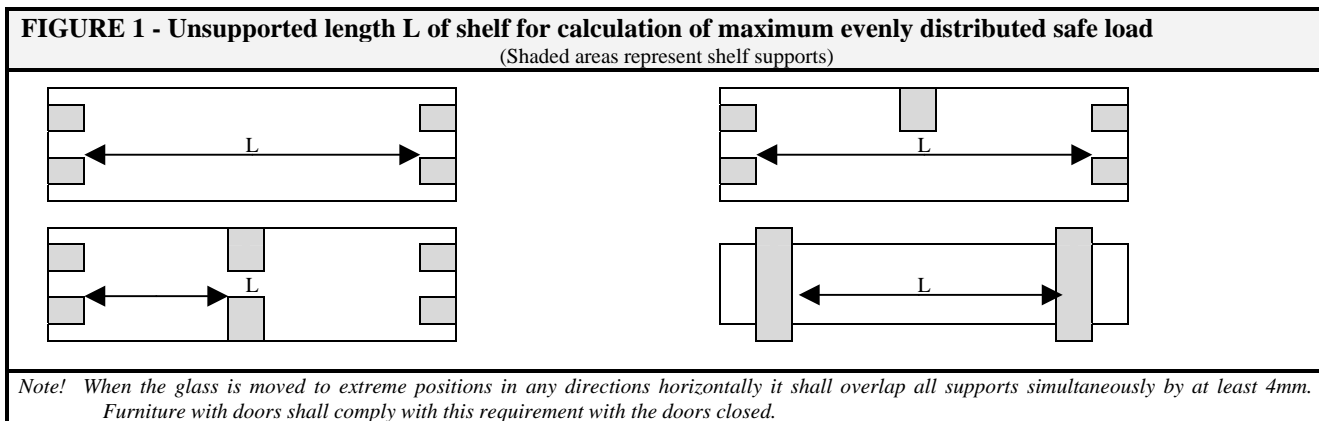
##### 3.1.1 GLASS SHELVES

Table 1 provides the maximum evenly distributed safe load per unit area supported by a glass shelf that can be used in the determination of the safe load for a given unsupported length, thickness and type of glass.

It is recommended that all glass edges are polished all round.

The maximum safe load that a glass shelf could support is a function of the type of glass and its dimensions. Refer Figure 1.

<b>TABLE 1 - Maximum evenly distributed safe load per unit area supported by a glass shelf for determining safe load capacity (in kg/m<sup>2</sup>) for a given supported length, thickness and type of glass</b>																	
Type of glass	Nominal thickness of glass	Maximum evenly distributed safe load (kg/m <sup>2</sup> ) supported by the following lengths of glass (mm)															
		300	400	500	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500
Annealed	4	153	86	55	38	33	28	24	21	19	17	14	11	10	8	7	6
	5	244	137	88	61	52	45	39	34	30	27	22	18	15	13	11	10
	6	356	200	128	89	76	65	57	50	44	40	32	26	22	19	16	14
	8	627	353	226	157	134	115	100	88	78	70	56	47	39	33	29	25
	10	995	559	358	249	212	183	159	140	124	111	90	75	62	53	46	40
	12	1447	813	521	362	308	266	232	203	180	161	130	108	90	77	66	58
Laminated	4	69	39	25	17	15	13	11	10	9	8	6	5	4	4	3	3
	6	166	93	60	41	35	30	27	23	21	18	15	12	10	9	8	7
	8	305	172	110	76	65	56	49	43	38	34	27	23	19	16	14	12
	10	487	274	175	122	104	89	78	69	61	54	44	36	30	26	22	19
	12	711	400	256	178	152	131	114	100	89	79	64	53	44	38	33	28
Toughened	4	988	417	213	123	97	78	63	52	43	37	27	20	13	12	10	8
	5	1991	840	430	249	196	157	127	1010	88	74	54	40	31	24	20	16
	6	2997	1482	759	439	345	276	225	185	154	130	95	71	55	43	35	28
	8	5283	2972	1775	1027	808	647	526	433	361	304	222	167	128	101	81	66
	10	8383	4716	3018	2054	1615	1223	1051	866	722	608	444	333	257	202	162	131
12	12197	6861	4391	3049	2598	2440	1845	1520	1268	1068	778	585	450	354	284	231	



## THE CALCULATION FOR LOADING OF SHELVING

Example:           Material:                    Annealed glass  
                   Shelf dimensions:        Span 1000mm x 200mm depth  
                   Thickness:                 6mm

From Table 1 maximum uniformly distributed load = 32kg/m<sup>2</sup>. In order to obtain the working load for a particular shelf, the shelf depth and the distance between supports is required as shown in Figure 1 and from this the shelf area in m<sup>2</sup>.

For depth of 200mm, shelf area = 1000mm x 200mm = 0.2m<sup>2</sup>.

Maximum load carrying capacity = Maximum uniformly distributed load x shelf area in m<sup>2</sup>.

$$= 32 \times 0.2 = 6.4\text{kg}$$

therefore, shelf is capable of supporting a load of 6.4kg evenly distributed over its surface, or a concentrated load not exceeding 3.2kg.

*Note!!     The maximum concentrated load may be taken as half the maximum evenly distributed load. Glass shelves that are not enclosed shall be toughened safety glass, laminated safety glass or annealed glass with a minimum thickness of 10mm.*

### 3.1.2 HORIZONTAL GLASS SHELVES SUPPORTED OVER THEIR ENTIRE AREA

Glass which is supported over its entire area having an area no greater than 1.5m<sup>2</sup> shall be selected in accordance with Table 2.

It is recommended that all glass edges are polished all round.

TABLE 2 – Nominal thickness of horizontal glass that is supported over its entire area			
Area of glass m <sup>2</sup>	Nominal thickness requirement		
	Annealed glass mm	Toughened glass mm	Laminated Glass mm
≤ 0.5	≥ 4.0	≥ 4.0	≥ 4.0
> 0.5 to ≤ 1.0	≥ 5.0	≥ 4.0	≥ 4.0
> 1.0 to ≤ 1.5	≥ 6.0	≥ 4.0	≥ 4.0
> 1.5	Not allowed	≥ 4.0	≥ 4.0

Glass which is supported over its entire area having an area greater than 1.5m<sup>2</sup> shall be either toughened safety glass or laminated safety glass with a nominal thickness of 4mm.

For plastic materials it is recommended to contact the manufacturer.

## 4. TABLE TOPS

The BS 7376 Specification for the inclusion of glass in the construction of tables or trolleys provides the following methods for material selection:

### 4.1 GLASS NOT SUPPORTED OVER ITS ENTIRE AREA

- 4.1.1 Toughened, laminated or annealed glass shall comply with the relevant nominal thickness given in table 3.
- 4.1.2 Annealed glass shall be supported for not less than 50% of its perimeter; the support shall be in at least two non-adjacent regions and shall be not more than 100mm from the edge of the glass.

<b>TABLE 3 – Nominal thicknesses for glass that is not supported over its entire area</b>			
<b>Area of glass</b>	<b>Nominal thickness requirement</b>		
	<b>Toughened glass</b>	<b>Laminated glass</b>	<b>Annealed glass</b>
<b>m<sup>2</sup></b>	<b>mm</b>	<b>mm</b>	<b>mm</b>
≤ 0.25	≥ 4.0	≥ 6.4	≥ 10.0
> 0.25 to ≤ 0.50	≥ 5.0	≥ 6.4	≥ 10.0
> 0.50 to ≤ 0.75	≥ 6.0	≥ 6.4	≥ 12.0
> 0.75 to ≤ 1.50	≥ 8.0	≥ 8.4	≥ 15.0
> 1.50	≥ 10.0	≥ 10.4	≥ 19.0

4.1.3 For plastic materials it is recommended to contact the manufacturer.

#### **4.2 GLASS SUPPORTED OVER ITS ENTIRE AREA**

4.2.1 Glass, which has an area no greater than 1.5m<sup>2</sup>, shall comply with the relevant nominal thickness given in Table 4.

4.2.2 Glass which has an area greater than 1.5m<sup>2</sup> shall be either toughened or laminated glass with a nominal thickness of 4mm.

4.2.3 All glass edges to be polished all round.

<b>TABLE 4 – Nominal thicknesses of glass that is supported over its entire area</b>			
<b>Area of glass</b>	<b>Nominal thickness requirement</b>		
	<b>Annealed glass</b>	<b>Toughened glass</b>	<b>Laminated glass</b>
<b>m<sup>2</sup></b>	<b>mm</b>	<b>mm</b>	<b>mm</b>
≤ 0.5	≥ 4.0	≥ 4.0	≥ 4.0
> 0.5 to ≤ 1.0	≥ 5.0	≥ 4.0	≥ 4.0
> 1.0 to ≤ 1.5	≥ 6.0	≥ 4.0	≥ 4.0
> 1.50	Not allowed	≥ 4.0	≥ 4.0

#### **5. HINGED DOORS, LIDS OR FLAPS**

5.1 Unframed hinged doors, lids or flaps made of safety glazing material shall be made of toughened glass having a minimum thickness of 4mm. All glass edges to be polished all round.

5.2 Framed hinged doors, lids or flaps made of safety glazing material shall be made of toughened or laminated glass having a minimum thickness of 4mm.

#### **6. MARKING OF SAFETY GLAZING**

6.1 All safety glazing materials shall be permanently marked. Such marking is to be visible after installation in accordance to SABS 1263 Part 1 or be accompanied by a Certificate of Conformance.

## 7. FISH TANKS/UNDERWATER OBSERVATION PANELS

Annealed glass is the preferred choice while toughened glass is only recommended where temperature differences greater than 50°C are present. Even then the thickness of toughened glass shall not be less than that appropriate to annealed glass having to withstand the same pressure.

Laminated glass is regarded unsuitable wherever there is a possibility of water coming into contact with the plastic or resin interlayer. The subsequent risk of delamination must be avoided.

### 7.1 GLASS THICKNESS SELECTION

#### 7.1.1 FRAMELESS FISH TANKS

Small domestic frameless fish tanks having a silicone sealant shall be constructed with a type of silicone having a tensile strength of not less than 1 Mpa and have glass thickness selected in accordance with Tables 5 and 6 which are based on DIN32622 Aquarien aus Glass.

At water height	Length \ Width	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	2000
		300	200	4		6				8							
	300	4		5		6		8									
400	200	4		6				8									
	300	4		5		6		8									
	350	4	5			6		8									
	400	5		6				8									
500	450	6		8				10									
	500	6		8				10									
600	500	8			10				12								
	600	8			10				12								

At water height	Length	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	2000
		300	4		5		6				8						
350	4	5		6		8											
400	5			6				8									
450	5	6			8				10								
500	6		8				10										
600	6	8		10				12									

#### 7.1.2 UNDERWATER OBSERVATION PANELS

For application of this nature a Structural Engineer should check all calculations in respect of water pressure and possible impact forces.

Also consult the glass manufacturer for advise on design and installation recommendations.