



CHAPTER I

**General Specification
for
Glazed Architectural Products
(Including Energy Efficiency Design for Fenestration)**

August 2012

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ACKNOWLEDGEMENTS

- ➔ **Aluminium Verlag – Düsseldorf**
Fensterbau mit Aluminium – Walter Schmidt
- ➔ **American Architectural Manufacturers Association**
Metal Curtain Walls/Windows and Sliding Glass Doors/Aluminium Store Front and Entrances/Skylights and Space Enclosures
- ➔ **ASTM International E1300**
- ➔ **Koninklijk Technicum PBNA**
Staalconstructies 43A.VR
- ➔ **South African Bureau of Standards**
SANS 10160, SANS 10137, SANS 10400, SANS 204, SANS 613 and SANS 549
- ➔ **Southern African Institute of Steel Construction**
Southern African Steel Construction Handbook
- ➔ **Verlag Stahleisen M.B.H. Düsseldorf**
Stahl im Hochbau
- ➔ **Building Code Australia**
BCA 2007 Volume 1 & 2
- ➔ **W.W. Norton & Company**
Window Systems for High Performance Buildings
- ➔ **Lawrence Berkeley National Laboratory**
Therm/Windows/Resfen/Optics
- ➔ **National Fenestration Rating Council**
Procedure Manuals

Note: This Selection Guide replaces the following AAAMSA Publication which is hereby withdrawn in its entirety:

- ➔ Selection Guide for Glazed Architectural Aluminium Products – Introducing Energy Efficiency in Fenestration – June 2008

Any information contained in Selection Guides of earlier dates, which contradicts with data contained in this manual, is information superseded by this publication

AAAMSA – April 2012

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1. GENERAL SPECIFICATION FOR GLAZED ARCHITECTURAL PRODUCTS

1.1. FRAMING MATERIAL - ALUMINIUM

1.1.1 EXTRUSIONS

Extruded aluminium sections shall be fabricated from alloy 6063 or 6061 in temper T5 or T6 all in accordance with the latest edition of BS EN 755 - "Aluminium and its alloys – extruded rod/bar, tube and profiles."

The extruded section shall be of such quality and strength that the section properties of the load bearing profiles meet the requirements as laid down in Section 1.3.

1.1.2 SHEET

Ancillary members such as sills, flashings, infill panels and the like which may be formed from flat sheet material shall be fabricated from aluminium alloy 1200 or 3004 or 5251 of appropriate temper, all in accordance with the latest edition of BS EN 573 - "Aluminium and Aluminium Alloys."

1.1.3 FINISHES

The successful tenderer shall submit the AAAMSA Surface Finishing Certificate confirming that all anodising and/or powder coating and/or coil coating has been processed in accordance with relevant local and/or international standards.

1.1.4 ANODISING

All architectural anodising shall be in strict accordance with SANS 999. Specifications shall include colour, anodic film thickness (μ) and geographical location.

The specific purchasing conditions contained in SANS 999 shall be deemed to be incorporated in this specification.

A Certificate of conformance is to be forwarded, confirming that all anodising has been processed as aforementioned.

1.1.5 POWDER COATING

All architectural powder coating shall be in strict accordance with SANS 1796. Furthermore the powder applied shall be in strict accordance with SANS 1578. Specifications shall include colour, colour code, and if required, choice of powder manufacturer.

The specific purchasing conditions contained in SANS 1796 shall be deemed to be incorporated in this specification.

The powder manufacturer shall issue a powder guarantee of a minimum of 15 years. The specific conditions contained in this guarantee, shall form part of the powder coating "process" and may only be applied by an approved powder applicator.

All aluminium shall be pre-treated in accordance with SANS 1796 so as to ensure excellent adherence properties.

1.1.6 COIL COATING (Painted Aluminium Sheet)

All coil coating of architectural aluminium flat sheet products shall be in strict accordance with:

- ❖ ASTM D2247 in respect of Humidity Resistance
- ❖ ASTM G53 and ASTM D3361 in respect of Accelerated Weathering
- ❖ ASTM B117 in respect of Acid Salt Spray
- ❖ ASTM D4145 in respect of Formability
- ❖ ASTM D3363 in respect of Pencil Hardness
- ❖ ASTM D523 in respect of Specular Gloss
- ❖ ASTM D2794 in respect of Reverse Impact

All coil coated architectural aluminium flat products are to be provided with a manufacturer's extended guarantee in respect of substrate and painted surface (20-years subject to manufacturers performance guarantee conditions).

1.2 FRAMING MATERIAL – Other

1.2.1 PVCu PROFILES

The material of the profiles shall be an effective PVCu material. Only entirely virgin material shall be used. The material of the profiles shall comply with SANS 1553-1 “PVCu profiles for window and door frames”.

1.2.2 ROLLED MILD STEEL SECTIONS

The hot rolled mild steel sections shall comply with SANS 727 “Windows and doors made from rolled mild steel sections”.

Note 1: SANS 727 makes provision for gaps between opening vents and framing of up to 2.5mm. The air leakage as specified in SANS 10400:XA “Energy Efficiency in Buildings” and SANS 613 “Fenestration products – Mechanical Performance Criteria” will not be met should no weather seals be evident in the mild steel products.

Note 2: Specifiers should verify that the mild steel sections are of dimensions prescribed in SANS 727.

1.2.3 TIMBER

Proper solid wood should be used, free of decay and insect infestation. Components can either be produced from solid or laminated wood, in which case acceptable glue for exterior applications should be used. The most common used wood species are Pine, Okoume or Maranti.

1.2.3.1 Finishes

All wooden products must be properly coated with at least one coat on all six sides’ prior installation.

1.2.4 POLYMER CONCRETE

Filled Polymer concrete frames must comply with minimum safety, heat distortion and compressive strengths. Polymer material must comply with SANS 713:2007

1.3 GLASS & GLAZING

Glass/specialized plastic glazing materials shall be (*Architect to specify*).

Glazing shall be executed strictly in conformance with glass manufacturer's recommendations and all in accordance with the National Building Regulations Parts B, N, T, SANS 10137, SANS 10400 and SANS 1263.

All safety glass and glazing materials (individual panes) shall be permanently marked in such a way that such marking will be visible after installation of glazing.

The successful Tenderer shall submit the AAAMSA Glass & Glazing Certificate confirming that glazing has been installed in accordance with SANS 10137 and SANS 10400 and ensuring that Safety Glazing Materials have been installed and individually marked in the mandatory safety glazing areas.

A warranty is to be provided that the manufacturer of the laminated safety glass and/or the hermetically sealed glazing units warrants the product against delamination and colour degradation for a period of not less than 5 (five) years.

In case of structural glazing written proof is to be provided that all stages of fabrication and installation have been executed with disciplined quality assurance in accordance with the relevant part of SABS ISO 9000.

Written confirmation of compatibility of structural sealant with extrusion surface, glazing tape and glass is to be supplied by the structural sealant manufacturer together with the regular relevant test reports regarding the adhesion of the sealant to the aluminium frame in accordance with ASTM/C 794-80 (Standard Test for Adhesion-in-Peel of Elastomeric Joint Sealants).

1.4. CONSTRUCTION (Irrespective of framing material used)

1.4.1 DESIGN (Wind load, air and water penetration)

1.4.1.1 The Design Wind pressure is (*Architect and/or Structural Engineer to provide*).

1.4.1.2 The plastic, shrinkage and creep deflections of floor slabs are (*Structural Engineer to provide this information if relevant in case of curtain walling /window walling*).

1.4.1.3 Tenderers should allow for thermal movement due to an atmospheric temperature range of -10°C to 35°C. (*Architect to confirm*).

1.4.1.4 Opening vents are to be tested in accordance with SANS 613/AAAMSA Performance Test Criteria for performance category (*A1, A2, A3, A4, A5 and A6*) *must be specified by Architect*).

Tenderers are to submit relevant AAAMSA Performance Test Certificate testifying that their products meet the requirements of the specified Performance Class Designation with their tenders, alternatively, prior to commencing work on site in case of non-standard product configurations, irrespective of framing materials used.

TABLE 1.1: AAAMSA Test Performance Criteria (SANS 613)

Test	Class Designation						Requirement
	A1	A2	A3	A4	A5	A6	
Deflection (positive and negative) under uniform loading Pa (the design wind load)	1000Pa	1500Pa	2000Pa	2500Pa	3,000Pa	3500Pa	Maximum deflection 1/175 of span ⁽²⁾
Structural proof loading 1.5 x Uniform loading	1500Pa	2250Pa	3000Pa	3750Pa	4500Pa	5250Pa	No failure allowed
Water resistance under a pressure of x Pa	x=200Pa	x=300Pa	x=400Pa	x=500Pa	x=600Pa	x=750Pa	No leakage when subjected to a flow of 0.05 l/s/m ²
Air leakage through specimen under a pressure difference of 75Pa	y = 2	y = 2	y = 2	y = 2	y = 2	y = 2	Not more than y = l/s/m ² for all categories ⁽¹⁾

(1) For fixed glazing y = 0,3 l/s per m². For swing doors and revolving doors 5l/s/m² (SANS 204, SANS 613)
(2) For spans greater than 4115mm, but less than 12,2m deflection shall be limited to 1/240th of span plus 6mm.

1.4.2 DESIGN (Energy Efficiency)

1.4.2.1 Buildings with up to 15% fenestration area to net floor area per storey are deemed-to-satisfy the minimum energy performance requirements (SANS 10400-XA). (*Architect to determine ratio fenestration area/net floor area*).

1.4.2.2 Buildings with a fenestration area to net floor area per storey that exceeds 15% shall comply with the requirements for fenestration in accordance with SANS 204 (*Architect/Mechanical Engineer to specify*).

1.4.2.3 Tenderers are to provide the SAFIERA Energy Rating Certification confirming the U-value, Solar Heat Gain Coefficient and Visible Transmittance for the relevant glazed architectural products.

1.4.2.4 When tested in accordance with SANS 613/AAAMSA Performance Test Criteria air infiltration, irrespective of framing material, shall be limited to:

- 2l/s/m² for openable windows, doors and roof lights,
- 0,3l/s/m² for fixed windows, curtain walls and window walls,
- 5l/s/m² for revolving doors and swing doors.

1.4.2.5 ROOF LIGHTS (a.k.a. Skylights) (SANS 204)

Roof lights serving a habitable room, public area or an interconnecting space such as a corridor, hallway or stairway shall:

- a) If the total area of roof lights is more than 1.5% but not more than 10% of the floor area or space they serve, the roof lights must comply with table 1.2; and
- b) If the total area of roof lights is more than 10% of the floor area of the room or space they serve, roof lights can only be used where
 1. Compliance with the natural lighting requirement, in accordance with SANS 10400-O, can only be achieved by installing a roof light;
 2. The transparent and translucent elements of the roof lights, including any imperforate ceiling diffuser achieves and SHGC of not more than 0.25 and a total U-value of not more than 2.0.

Note: The thermal performance of an imperforate ceiling diffuser may be included in the total U-value of a roof light.

Table 1.2 Roof lights – Thermal performance of transparent and translucent elements						
1	2	3	4	5	6	7
Roof light shaft index*	Total area of roof lights serving the room or space as percentage of the floor area of the room or space					
	1.5% to 3%		3% to 5%		5% to 10%	
	SHGC	Total U-value W/m ² /K	SHGC	Total U-value W/m ² /K	SHGC	Total U-value W/m ² /K
	<0.5	≤0.75	≤0.50	≤5.0	≤0.25	≤2.5
	1.5<1.0	-	≤0.70		≤0.35	
1.0<2.5	-	-	≤0.45			
>2.5	-	-	-			
Note 1 – The total area of roof lights is the combined area for all roof lights serving the room or space						
Note 2 – The area of a roof light is the area of the roof opening that allows light to enter the building						
*The roof light shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.						

1.4.3 DESIGN – SHOWER ENCLOSURES

1.4.3.1 Shower enclosures should be manufactured in compliance with SANS 549 “Shower Enclosures for Domestic purposes”.

1.4.3.2 The performance of installed shower enclosures shall be in compliance with SANS 549 in respect of structural stability, water retention, finishing and hardware durability.

1.4.3.3 Glazing materials shall comply with the requirements as detailed in SANS 10400-N “Glazing”.

1.5 MANUFACTURE

1.5.1 Joints in aluminium frames and sashes shall be made by mechanical means and are to be sealed to prevent water penetration.

1.5.2 PVCu framing shall be in accordance with SANS 1553-2 “Windows with framing made from PVCu profiles.

1.5.3 Windows and doors made from rolled mild steel sections shall comply with SANS 727.

1.5.4 Final products shall be free from all sharp edges, burring and the like.

1.5.5 Hardware and fittings shall be removable without removing the frames from the structure and must be compatible with the framing.

1.5.6 Sliding members shall be constructed so that no metal-to-metal sliding contact occurs.

1.6 FITTINGS

- 1.6.1 Weather seals shall be of materials that are compatible with framing materials and shall be such that any degradation, shrinking, warping or adherence to sliding or closing surfaces does not impair the performance of the installation.
- 1.6.2 Glazing beads, gaskets and glazing compounds shall be of materials that are compatible with the framing materials, the glass and other glazing materials. Putty glazing is not to be used in conjunction with aluminium and PVCu framing.
- 1.6.3 Hardware, bearing devices and fittings in general must be made of materials resistant to atmospheric corrosion for all inland installations, but when installed in highly corrosive environments, such as coastal or in proximity of a corrosive industrial environment, all said fittings must be made from non-corrosive materials and shall be of a design so as to be accessible for adjustment, repair and replacement after the windows etc. have been installed.
- 1.6.4 Fastenings shall be of material, which is compatible with framing materials and its finishes.

1.7 INSTALLATION

- 1.7.1 The fenestration shall be installed such that they are securely anchored, sealed and undamaged and meet in all respects with the mechanical performance criteria as set out in Section 1.3.1.
- 1.7.2 The glass shall be installed strictly in accordance with the glass manufacturer's specifications.
- 1.7.3 The frames and glass are to be installed in accordance with the main contractor's building programme and the exposed surfaces are to be protected by means of low tack adhesive tape against mortar droppings and other non-mechanical damage.

1.8 INSPECTION

Inspection of installed frames and glass shall, amongst others, be carried out according to the following criteria:

1.8.1 SCRATCHES AND BLEMISHES

This inspection will be viewed at a distance of three metres under normal lighting conditions, i.e. reasonable lighting conditions under which the project is normally viewed.

1.8.2 FENESTRATION

Scratches on framing are defined as being a mark on the surface, which penetrates the powder coated, anodised or painted surface, thereby exposing the base material.

If visible when viewed from a distance of three metres under normal lighting conditions, the product may be rejected. Flaws/Stains, paint runs or other indication that mars the aesthetic appearance of aluminium, which is visible when viewed from a distance of three metres under normal lighting conditions, may cause the product to be rejected.

1.8.3 GLASS AND PLASTICS

In laminated glass interlayer bubbles larger than 1.5mm diameter will not be allowed. Larger clusters or close spacing of smaller bubbles will also be disallowed.

If visible when viewed from a distance of three metres under normal lighting conditions scratches in glass and plastics will not be acceptable.

1.9 QUALITY ASSURANCE

1.9.1 AT PLAN APPROVAL STAGE:

NOTE:

Government Gazette # 31084 dated 30 May 2008 declared regulations, as set out, to come into operation on 1 October 2008.

Government Gazette # 34463 dated 22 July 2011 declared regulation XA, as set out, to come into operation on 9 November 2011.

The above Gazettes not only introduced Energy Efficiency in Buildings but also compelled participants in the building industry to reliably demonstrate, or predict with certainty, to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400 (Regulation AZ4 (1)(b)(ii))

This is reinforced by regulation A2 (1)(g) which requires any person intending to erect any building to submit to the local authority a declaration in the relevant portion of Form 1 contained in SANS 10400-A as to how the applicable functional regulation (i.e. National Building Regulations) shall be satisfied.

1.9.1.1 Obtain copy of AAAMSA Performance Compliance Report from the Aluminium System Suppliers or

1.9.1.2 Obtain a copy of the appropriate AAAMSA Performance Test Certificate from the Manufacturer/Specialist Contractor supplying/installing the Glazed Architectural Products.

1.9.2 PRIOR COMMENCEMENT OF ANY SITE WORK:

1.9.2.1 Obtain a copy of the appropriate AAAMSA Performance Test Certificate from the Manufacturer/Specialist Contractor supplying/installing the Glazed Architectural Products.

1.9.2.2 Obtain a copy of the appropriate SAFIERA Energy Rating Certification.

1.9.2.3 Obtain a full set of detailed manufacturing drawings/manuals relevant to the installed products.

1.9.3 UPON COMPLETION OF ALL SITE WORK (AT HANDOVER)

1.9.3.1 Obtain the following certificates:

- a) AAAMSA Performance Test Certificate
- b) AAAMSA or SAGGA Glass & Glazing Certificate
- c) AAAMSA Surface Finishing Certificate
- d) AAAMSA or SASA Skylight System Certificate (when applicable)
- e) AAAMSA Architectural Product Certificate (in the event drawings are not provided)
- f) SAFIERA Energy Rating Certification

1.10 GENERAL

1.10.1 This General Specification for Glazed Architectural Products replaces all previous publications.

1.10.2 Attention is drawn to SANS 10160-3 Wind Action which has profoundly changed the method for the determination of wind action on buildings/fenestration. In terms of SANS 10400-N wind action on fenestration (glazing) must be determined by a Competent Person (Structures).

1.10.3 AAAMSA has withdrawn all its recommendations to determine wind load on glazing in view of paragraph 1.10.2 above.

1.10.4 The requirements for Energy Efficient Design for Fenestration have been based on SANS 10400-XA and SANS 204.