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**Subject:**  
**MG SIP BUILDING SYSTEM**

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### Validity

Users of any Agrément certificate should check its status: all currently valid certificates are listed on the website. In addition, check whether the certificate is [Active](#) or [Inactive](#).

The certificate holder is in possession of a confirmation certificate attesting to his status.



**SANS 10400:** *The application of the National Building Regulations*

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### Use

The certificate covers the use of the MG SIP Building System for the erection of single storey buildings in all areas of South Africa for the uses (**SANS 10400**: Table 1 of regulation A (20) (1)) set out below:

- Moderate risk commercial service (B2)
- Low risk commercial service (B3)
- Clinics with overnight stay (E3)
- Small shops (F2)
- Offices (G1)
- Hotel (H1)
- Dormitory (H2)
- Domestic residence (H3)
- Dwelling house and other related outbuildings (H4)
- Hospitality B & B (H5)

This certificate and Agrément South Africa's assessment apply only to the MG SIP Building System that is designed, manufactured and erected as described and illustrated in this certificate, and where the terms and conditions of certification are complied with.

## **General description**

The MG SIP Building System is a combination of innovative and conventional construction method. It is a single storey structure that utilises factory produced wall and roof panels. Walls are 2400 mm x 1200 mm x 125 mm thick lightweight interlocking sandwich panels comprising a polyurethane (PU) core encapsulated in two layers of 11 mm thick oriental strand board (OSB). They are clad internally with 15 mm thick fire-resistant gypsum plasterboard and externally with 12 mm thick medium density Nutek board.

Foundations are cast in-situ concrete surface bed with thickened edge beams. They are in all cases designed by a professional engineer or a competent person.

The roof panels are constructed in the same manner as the wall panels and are clad externally with light or heavyweight cladding. Alternatively roofs are conventional.

Windows are "clisco" type frames and doors frames are made of galvanised pressed steel. Services are conventional.

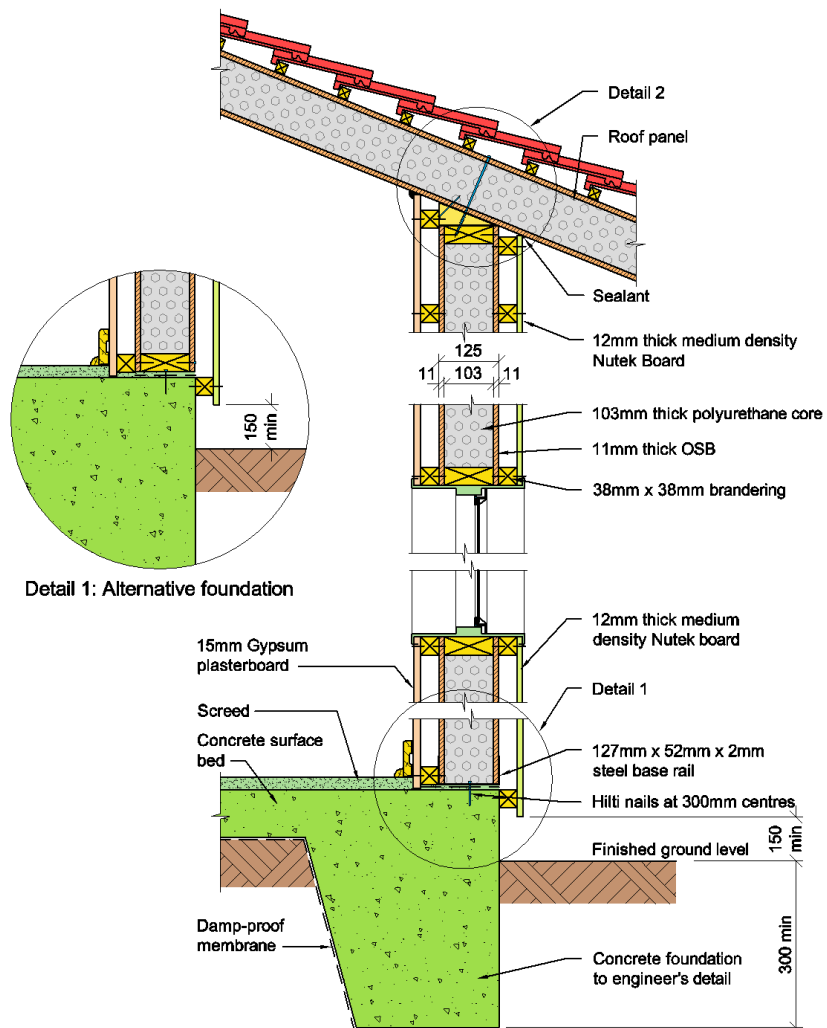


Figure 1: Typical section through foundation, external wall and roof structure

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## PREAMBLE

The certificate is issued by Agrément South Africa in terms of the powers granted to it by the Minister of Public Works. The certificate:

- has been granted after a technical appraisal of the performance of the MG SIP Building System for the [uses](#) covered by the certificate
- is independent of any patent rights that may or may not subsist in the subject of the certificate
- does not relieve the certificate holder from the obligation to obtain the prior approval of the building authority concerned for the use of the subject.

Agrément South Africa considers that the quality and performance of the MG SIP Building System will be satisfactory provided the requirements stipulated in the certificate are adhered to. However, Agrément South Africa does not on behalf of itself, or the state, or any of its employees or agents guarantee such quality or performance.

Responsibility for compliance with the requirements of the certificate and the quality of the finished buildings resides with the certificate holder.

No action for damages, or any other claim whatsoever, lies against Agrément South Africa, its members, the state or any of its employees should the said components and materials fail to comply with the standard set out in the certificate.

Building authorities or users who are in any doubt about any details or variation should contact [Agrément South Africa](#).

The validity of the certificate is reviewed every three years. The certificate shall remain valid as long as Agrément South Africa is satisfied that:

- the certificate holder complies with the general and specific conditions of certification and the technical requirements stipulated in the certificate
- the performance-in-use of the building system is acceptable
- any changes in building legislation, regulations, relevant standards or Agrément performance criteria have not invalidated the technical assessment that formed the basis of certification.

Agrément South Africa reserves the right to withdraw the certificate at any time, should reasonable cause exist.

Notices affecting the validity of this certificate will be published in the *Government Gazette*.

## PART 1: CONDITIONS OF CERTIFICATION

Licensee - any person or company appointed by the certificate holder and registered with Agrément South Africa to construct the MG SIP Building System in accordance with this certificate and authorised by him/her to claim compliance with the certificate. It is the certificate holder's responsibility to ensure that the licensee carries out the work in compliance with this certificate and in accordance with the approved quality system.

The MG SIP Building System described in the certificate must:

- be the responsibility of a structural engineer should the design limitations be exceeded
- be manufactured and constructed by the certificate holder or licensee
- be constructed in accordance with the technical description (see [Part 3](#)) and the certificate holder's detailed specifications and quality management system
- comply with the Conditions of Certification

Any person required to check on details of construction shall refer to the documentation listed above, which are available from the certificate holder.

The MG SIP Building System is a combination of innovative and conventional construction. A change to any one aspect could result in one or more of the other aspects no longer complying with Agrément South Africa's performance criteria. For these reasons, no change may be made to the MG SIP Building System as described and illustrated in this certificate unless such change is approved in writing by Agrément South Africa before it is implemented.

### MG SIP Building System

Tested and approved fit for purpose when constructed as specified in

**CERTIFICATE 2010/370**



### General conditions

#### Marking

A plaque at least 100 mm X 75 mm, with Agrément South Africa's identification logo together with the certificate number of this certificate as depicted must be fixed at an appropriate position to an external wall of all MG SIP Building Systems.

#### Reappraisal

- Must be requested by the certificate holder prior to implementing changes to the Building System
- Will be required by Agrément South Africa if there are changes to the National Building Regulations or to Agrément assessment criteria.

The certificate may be withdrawn if the certificate holder or a registered licensee fails to comply with these requirements.

#### Validity

The continued validity of the certificate is subject to a satisfactory review by Agrément South Africa every three years.

### Quality monitoring

The certificate holder is required to participate in Agrément South Africa's post-certification quality management scheme, which requires:

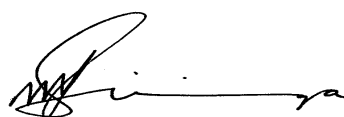
- that the certificate holder shall continue to implement and manage the quality management system approved by Agrément South Africa in the assessment of the MG SIP Building System
- The cooperation of the certificate holder in facilitating post-certification quality monitoring by Agrément South Africa or its authorised agents.

### Requirements of *Supplement to certificates that must be met*

The [Supplement to certificates: good building practice](#) (revised 2001) applies to those conventional aspects of the MG SIP Building System that have not been specifically assessed (see Part 2: *Scope of assessment* on next page). Cognisance should be taken of the recommendations contained in the *Supplement to certificates* to ensure that an acceptable standard of construction is consistently maintained.

On behalf of the Board of Agrément South Africa

Signed

A handwritten signature in black ink, appearing to be 'M. J. ...', written over a horizontal line.

Chairperson  
26 May 2010

## PART 2: ASSESSMENT

### Scope of assessment

The conventional aspects of the construction are subject to the rules of good building practice (typically as described and illustrated in Agrément South Africa's [Supplement to certificates](#) and in the *Home building manual Parts 1, 2 and 3* issued by the National Home Builders Registration Council), and must comply with the National Building Regulations.

The assessment applies to those innovative aspects of the MG SIP Building System described in [Part 3](#) of the certificate. It also applies to those conventional aspects of the Building System which, in the opinion of Agrément South Africa, are influenced by the innovative aspects. The innovative aspects referred to are:

- Wall panels comprising a polyurethane (PU) core encapsulated in two layers of 11 mm thick oriental strand board (OSB). Clad internally with 15 mm thick fire-resistant gypsum plasterboard and externally with 12 mm thick medium density Nutek board.
- Roof panels constructed with the same material as the wall panels
- Method of supporting and fixing the roof structure to wall panels and to ridge timber beams which in turn are supported at the top of the gable wall
- The method of fixing the wall panels to concrete surface beds

This assessment is based on:

- documentation provided by the applicant
- known behavior of the materials used in the building system
- the applicant's quality management system

### The assessment

In the opinion of Agrément South Africa, the MG SIP Building System as described in the certificate is suitable for use for occupancy class [types specified](#) (page 1).

The performance in use of the buildings erected with this system will be such that it will satisfy:

- the relevant requirements for safety and health prescribed by Agrément South Africa
- where stated in Table 1, the requirements of the National Building Regulations
- Agrément South Africa's performance requirements for durability and habitability.

The detailed comments on the assessment are set out in Tables 1, 2 and 3 below. Each aspect of performance was assessed by experts in that field.

For details see Agrément South Africa's [Assessment criteria: building and walling systems](#).

Republic of South Africa. *National Building Regulations*, Government Notice R. 2378, Government Gazette No 12780, Pretoria, South Africa, 12 October 1990

### Compliance with National Building Regulations

The innovative aspects of the MG SIP Building System relate to the National Building Regulations as set out in Table 1. Any regulation not specifically referred to is considered to be outside the scope of this certificate and must be applied by the local authority in the normal manner.

**Table 1: Health and Safety**

<b>Aspects of performance</b>	<b>Opinion of Agrément South Africa</b>	<b>National Building Regulations satisfied</b>
<b><i>Fitness-for-purpose of materials used</i></b>	The quality and suitability of the materials as described in Part 3 meet the requirements of the regulations.	Regulation A13(1)(a): <i>Materials</i>
<b><i>Behaviour in fire</i></b>	Satisfactory. External walls are classified type FR (non-combustible) with fire-resistance ratings of 30 or 60 minutes when clad internally with one or two layers of 15 mm thick gypsum plasterboards, respectively.	<p><i>K4 Walls</i></p> <p>T1 (1) (b), T1 (1) (c) and T1 (1) (d) are satisfied as far as the walls are concerned.</p> <p>Comments made in <u>Supplement to certificates</u> must be taken into account when building plans scrutinised by local authorities, to check compliance with Regulations T 1(1) (a), T1 (1) (d) with regard to spread of smoke, and T1 (1) (e).</p> <p>Deemed-to-satisfy rules TT5.1(c) and TT5.2(c) of Section 3 of <b>SANS 10400</b> have been met.</p> <p>As defined in deemed-to-satisfy rule TT2.1 (a) of Section 3 of <b>SANS 10400</b>, the external walls of MG SIP buildings are classified as non-combustible with fire-resistance rating of 30 or 60 minutes. The building system can also be used for division separation requirements for H3, provided a suitable door assembly with a similar rating is used. The safety distances as set out in the relevant rules of Part T can therefore be applied.</p>
<b><i>Structural strength and stability</i></b>	Satisfactory, provided all the requirements of this certificate are adhered to.	<p>K1, K3 and K4 <i>Walls</i></p> <p>L1 (a) and (b) <i>Roofs</i></p> <p>Regulations B 1 (1) and (2) are deemed to be satisfied. The structural design of the MG SIP Building System is the responsibility of a professional engineer or a proved competent person and deemed-to-satisfy rule BB4 of SANS 10400 is applicable.</p> <p>Regulations H1(1) and (2), <i>Foundations</i>, are deemed-to-be satisfied as follows:</p> <p>All foundations are designed by a professional engineer or competent person and deemed to satisfy rule HH1(a) applies.</p>
<b><i>Water penetration and rising damp</i></b>	Satisfactory. MG SIP Building System buildings meet Agrément South Africa's criteria for resistance to rainwater penetration and rising damp throughout South Africa.	<p>J1 (4) <i>Floors</i></p> <p>K2 <i>Walls</i></p> <p>L1 (a) and (b) <i>Roofs</i></p>

**Table 2: Habitability**

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
<p><b>Thermal performance and energy usage</b></p>	<p>Satisfactory. Maximum summer indoor temperatures in MG SIP Building System dwellings will be less than those experienced in a standard brick house (SBH) and therefore, meets Agrément South Africa’s Thermal requirements in all areas of South Africa.</p> <p>The winter energy heating requirements of a MG SIP Building System dwelling will be much less than that required for the standard brick house (SBH) and therefore, meets Agrément South Africa’s energy requirements in all areas of South Africa.</p>	<p>Agrément South Africa’s opinion is based on the calculated likely maximum indoor air temperature in summer in a 53 m<sup>2</sup> MG SIP Building System in Cape Town, Durban and Johannesburg, and the calculated energy required to maintain an indoor temperature of 16 °C in winter in Cape Town and Johannesburg.</p> <p>When assessing the thermal performance of a dwelling, the calculated performance of the subject is compared with that of the standard brick house. This is of similar size, orientation and fenestration as the MG SIP Building System and has:</p> <ul style="list-style-type: none"> <li>• external walls of 230 mm thick and internal walls of 110 mm brickwork</li> <li>• plastered internal wall surfaces</li> <li>• a concrete floor</li> <li>• a sheeted roof that is fitted with a ceiling without insulation.</li> </ul>
<p><b>Condensation</b></p>	<p>Satisfactory: A MG SIP Building System dwelling performs better than a standard brick house and therefore, meets Agrément South Africa’s condensation requirements in all areas of South Africa.</p>	<p>Condensation is generally a problem in the <a href="#">Southern Coastal Condensation Problem Area</a> (SCCP Area). The assessment of this aspect of performance applies only to dwellings in this area. Agrément South Africa requires that the minimum standard of performance be equivalent to that of the standard brick dwelling, which in itself is not immune to condensation problems.</p>
<p><b>Acoustic performance</b></p>	<p>Satisfactory: Agrément South Africa’s performance criteria for sound attenuation between adjacent rooms and dwellings have been met.</p> <div style="border: 1px solid green; padding: 5px; width: fit-content;"> <p><b>SANS 10218: Part 1:</b> Grading criteria for the airborne sound insulation properties of buildings</p> </div>	<p>Agrément South Africa opinion is based on computer simulation. The <i>in situ</i> airborne sound insulation that is likely to be obtained between adjacent rooms is 40 dB (DnT,w). These values meet Agrément South Africa’s criteria and most of the recommended sound insulation values set out in SANS 10218: Part 1</p> <p>A description of the degree of acoustic privacy that can be expected between specific rooms for various degrees of sound insulation is given in Agrément’s <a href="#">Supplement to certificates</a>.</p>

**Table 2: Habitability (continued)**

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
<b>Durability</b>	Satisfactory, provided normal use and adequate and regular maintenance are applied. In the coastal areas the mild steel panels and sections exposed to the environment (i.e. in contact with the foundation and slab) must be galvanised.	Agrément South Africa's opinion is based on the inspection of buildings erected using this system and knowledge of the construction materials used.

**Table 3: Quality Management System**

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
<b>Quality management system</b>	The certificate holder's quality management system complies with Agrément South Africa's quality management system requirements. If properly applied, it will ensure that quality in manufacture and erection of the MG SIP Building System buildings will be consistently maintained.	Agrément South Africa's requirements are based on <b>SANS 9001</b> .  <div data-bbox="954 1019 1299 1144" style="border: 1px solid green; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>SANS 9001: Quality management systems – Requirements'</b></p> </div>

## PART 3: TECHNICAL DESCRIPTION

### General description

The MG SIP Building System is a combination of innovative and conventional construction methods. It is a single storey structure that utilises factory produced wall and roof panels. Walls are 2400 mm x 1200 mm x 125 mm thick lightweight interlocking sandwich panels comprising a polyurethane (PU) core encapsulated in two layers of 11 mm thick oriental strand board (OSB). They are clad internally with 15 mm thick fire-resistant gypsum plasterboard and externally with 12 mm thick medium density Nutek board. Joints are filled with an acrylic sealant before painting.

Foundations are cast in-situ concrete surface bed with thickened edge beams. They are in all cases designed by a professional engineer or a competent person.

The roof panels are constructed in the same manner as the wall panels and are clad externally with light or heavyweight cladding. Alternatively roofs are conventional.

Windows are “clisco” type frames and doors frames are made of galvanised pressed steel. Services are conventional.

### Design requirements

This certificate covers single storey dwellings which are erected within the dimensional limitations set out below:

- Maximum distance between cross-walls framing into external walls or between and external corner and cross-wall 4,0m
- Minimum of a cross-wall, from the interior face to an external wall to opening (such as a door) 1,0m
- Maximum length at external wall corners and an opening in external walls 1,0m
- Maximum height of eaves wall 3,0m
- Maximum height of the apex of a gable wall 5,5m
- Maximum clear span of roof panels 4,5m

Ridge beam details are the responsibility of a professional engineer

### Description of manufacturing process

The wall panels are manufactured in the factory at Raedene, Johannesburg. The panel production process is fully automated. 2 x 11 mm thick oriental strand boards (OSB) are fixed at 103 mm apart in a specialised jig/ mould. The mould is then placed into a clamping press and then a polyurethane foam injected in between.

Due to the process of polymerization, the PU foam expands and adheres to the inner facings of the boards forming a rigid core.

The mould is subsequently removed from the press, de-moulded and resulting in a complete MG SIP panel.

To ensure that all residual reactions are complete, the panels are allowed to cure fully for a period of at least 24 hours before use.

## Description of erection process

- Foundations and surface bed (figure 1)

A competent person classifies the site in accordance with the site class designation set out in Table 3 of the SAIEG publication *Guidelines for Urban Engineering Geological Investigations*

**SANS 10161:** *the design of foundations for buildings*

In abnormal or problematic ground conditions, foundations are designed by a professional engineer in accordance with the requirement of SANS 10161 and constructed accordingly.

The foundations and surface floor slab are cast in accordance with the plan of the building, using concrete with a minimum compressive strength of 20 MPa at 28 days. The surface is floated to a true and smooth finish.

**SANS 952:** *Polyolefin film for Damp-proofing and waterproofing in buildings*

The foundation slab is cast on a 250 µm micron damp-proof membrane complying with the requirements of SANS 952 or one that is covered by a valid Agrément certificate.

**SANS 317 – Industrial bitumens**

A liberal coat of good quality bituminous paint that complies with the requirements of SANS 317, is applied to the surface along the length and across the width of all proposed walls.

- Walls (figures 1 and 4)

A 127 mm x 52 mm x 2 mm galvanised steel angle profile base rail is bolted with 8 mm Φ x 60 mm expansion bolts at 500 mm centres to the foundation slab. The surfaces in contact with the foundation slab are liberally coated with a bituminous paint.

Alternatively, a 102 mm wide x 75 mm thick timber anchor piece is secured to the surface slab, across the width of all proposed walls with 150 mm long mechanical anchors.

A 76 mm deep recess is created at the bottom of the panels to accommodate the anchor piece and the walls secured from the sides with self-drilling/ tapping screws at 300 mm centres.

The top of the wall panels are secured with an angled timber wall plate, the slope of the roof, which secures the roofs to the walls (figures 1 and 2).

The corner panels are placed in position and braced temporarily inside the base rail. 102 mm x 102 mm timber studs are secured in the base rail at 1000 mm centres and the rest of the panels are slotted in accordingly (figure 5). All vertical joints are sealed with a urethane or similar sealant.

The complete walls are then clad externally with 12 mm thick medium density Nutek boards on 38 mm x 38 mm thick

brandering at 300 mm centres using countersunk drywall screws.

Internally, the walls are clad with 15 mm thick fire-resistant gypsum plasterboards. The boards are fixed onto the MG Sip panels with 38 mm x 38 mm thick brandering at 300 mm centres using countersunk drywall screws.

Screw heads are filled with Eli-bond FR964 epoxy or similar.

Internal walls are placed in positions as above and secured to external walls with mechanical anchors (see figure 5)

- Roof construction (figures 1 and 2)

Roofs comprise 125 mm thick MG SIP panels. The roof panels are overlaid with a vapour permeable membrane. Treated softwood counter panels, 38 mm x 50 mm are then fixed through to the roof panel using stainless-steel screws in accordance with the construction manual and to the professional engineer's design requirements. They are constructed at a minimum slope of 10 and are clad externally with light or heavyweight cladding.

- Windows and doors (figure 6)

Window and door openings are cut out at the factory prior to delivery on site. Windows are "clisco" type and door frames are of galvanised pressed steel.

- Attachment of fittings

Light and medium-weight fittings can be fixed to the cladding or studs with 4 mm and 6 mm self-tapping screws or drywall anchors through the plasterboard

Heavy weight fittings are supported off the floor.

- Services

Services are conventional. Where they run in wall, conduits are pre-fabricated or a chase is formed and the service slid into position.

Alternatively, services are surface mounted.

## Finishes

The joints are sealed with an acrylic sealant prior to covering with a mastic tape before painting.

External walls are finished with two coats of exterior acrylic paint and applied in accordance with the manufacturer's specifications.

Internal wall finishes are subject to the purchaser's requirements but are also applied in accordance with the manufacturer's specifications.

## Walls in wet rooms

Walls in rooms such as bathrooms, laundries, kitchens and shower cubicles, where floors are splashed with water, or where vapour is released into the atmosphere, are treated as follows:

**SANS 801:** *Epoxy-tar paints*

**SANS 912:** *Calcium plumbate primer*

**SANS 580:** *Chloroprene rubber sheet (for waterproofing)*

**SANS 1305:** *Sealing compounds for the building industry, one-component, silicone-rubber-base*

- seepage into the walling is prevented by a plastic skirting, approximately 100 mm high, fully bonded with a chloroprene-type contact adhesive, or by a standard timber skirting with a strip of bitumen-polyurethane foam (Compriband or equivalent) compressed underneath the skirting;
- all drywall screws in the walling are countersunk to the correct depth and spotted with the cementitious material used to fill the joints;
- the steel components at floor level are coated with epoxy tar complying with the requirements of SANS 801, Type 1, or with two layers of calcium plumbate primer complying with SANS 912 or with a good quality bituminous paint applied at a dry film thickness of at least 60 microns;
- wall surfaces, including areas behind baths, shower trays and wash-hand basins, are painted or covered with a coating that is highly impermeable to water, such as two coats of polyurethane paint of the two-part type, or a PVC-type wall cladding attached with a high quality, flexible adhesive recommended by the manufacturer of the wall cladding;
- gypsum plasterboard cladding in shower cubicles and above baths is always tiled. It is first properly sealed with a sealant in accordance with the method specified by Gypsum Industries Limited, or with an adhesive incorporating a special sealant and applied to the entire surface of the plasterboard as tiling proceeds;
- in shower cubicles, the shower trays have a minimum depth of 150 mm and are preferably of formed stainless steel or porcelain. Whether the shower tray is preformed or constructed in-situ, three sides of the tray are least 25 mm higher than the threshold at the entrance side, with a watertight membrane to the underside and sides of the tray. (The waterproofing membrane that is used is either butyl rubber sheet complying with SANS 580, or an ethylene vinyl acetate copolymer sheet such as Hyperlastic). The membrane is sealed at all joints to ensure water-tightness;
- the joint between the bottom edge of the wall tiling or wall covering and the lip of a bath or shower tray is so detailed that any water that splashes onto the wall does not seep behind the bath or tray. The joint between wall tiling and the lip of the bath or the edge of the shower tray is completely sealed all round, with a suitable silicone sealant complying with the requirements of SANS 1305.

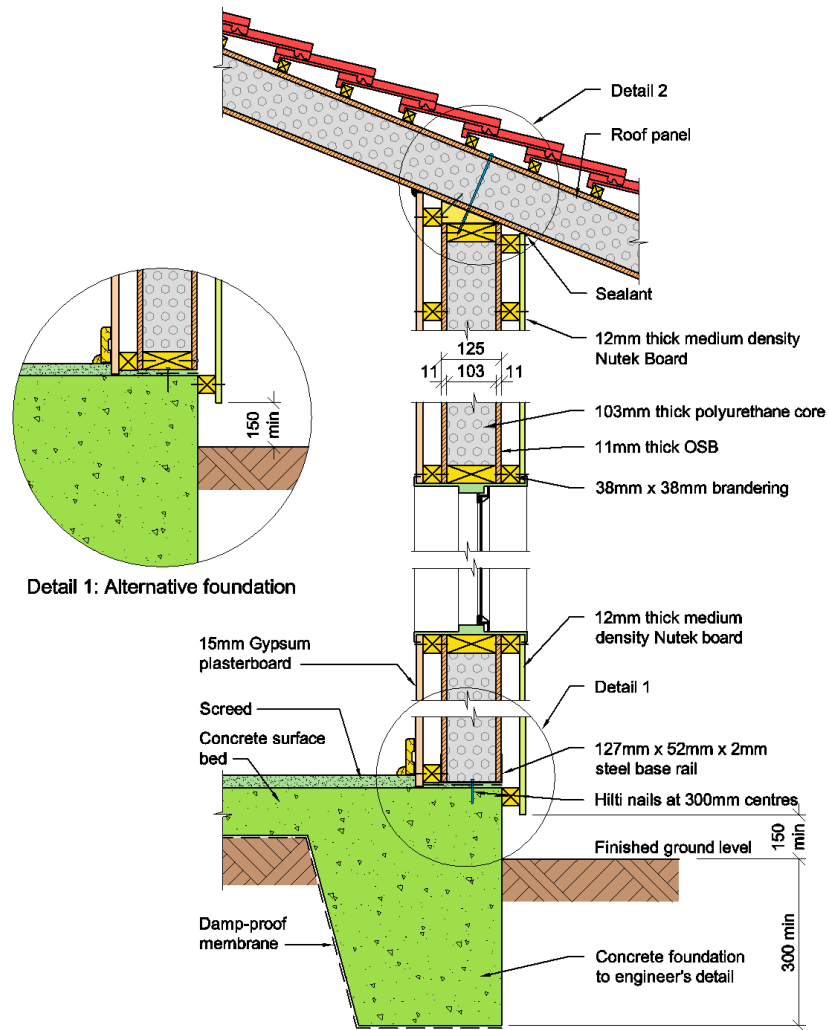
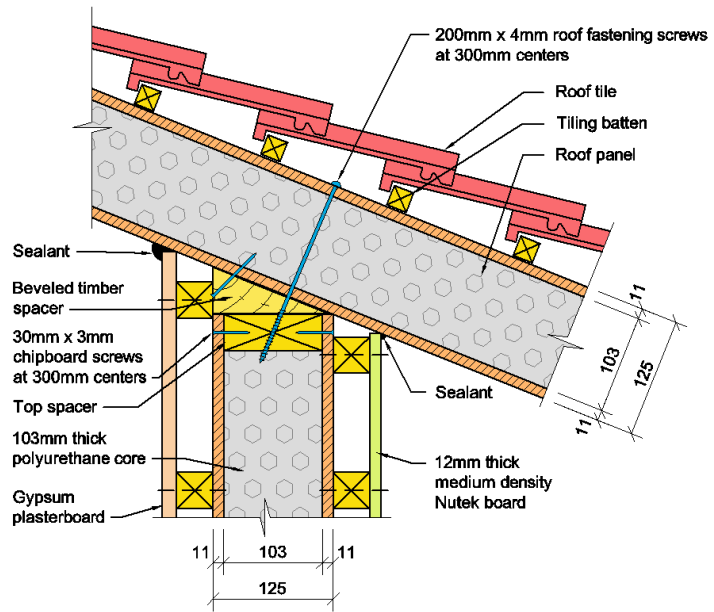
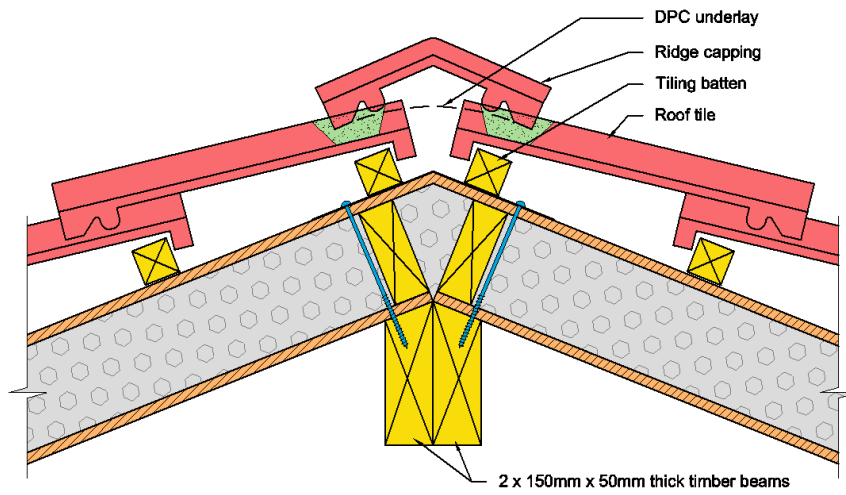


Figure 1: Typical section through foundation, external wall and roof structure



(a) Detail 2: Eaves detail



(b) Ridge connection detail

Figure 2: Roof details

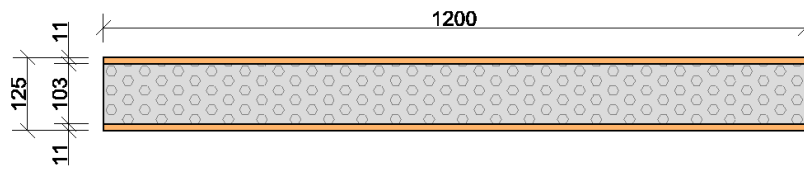
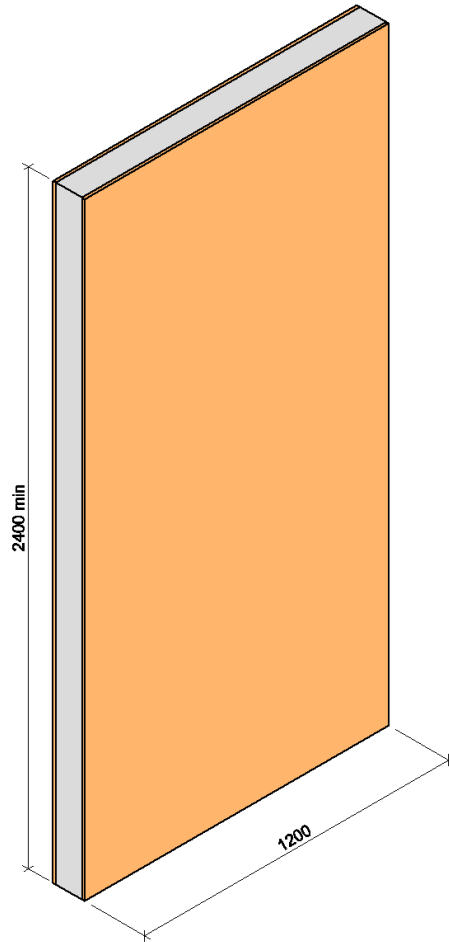
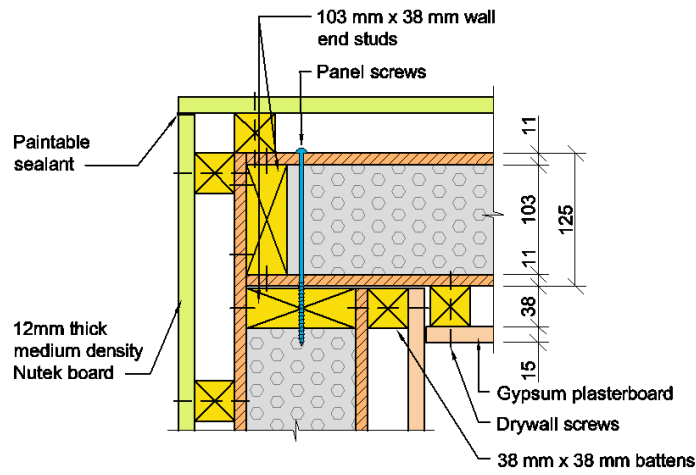
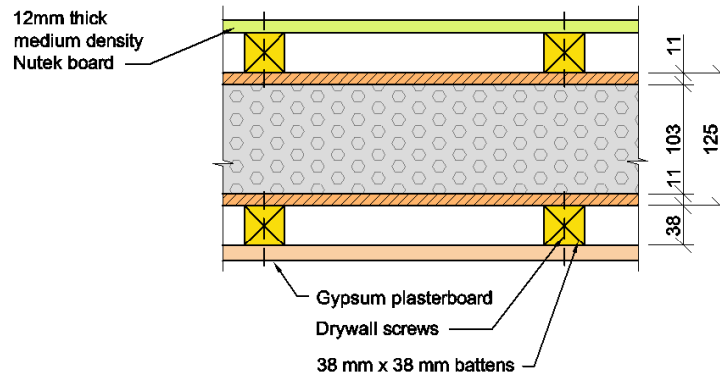


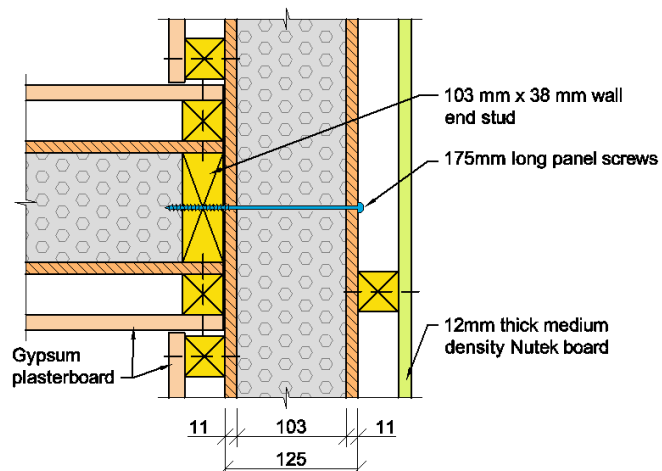
Figure 3: Wall panel plan & isometric view



(a) Typical corner junction

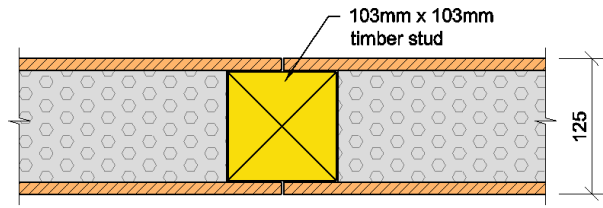


(b) Detail of Gypsum plasterboard fixing

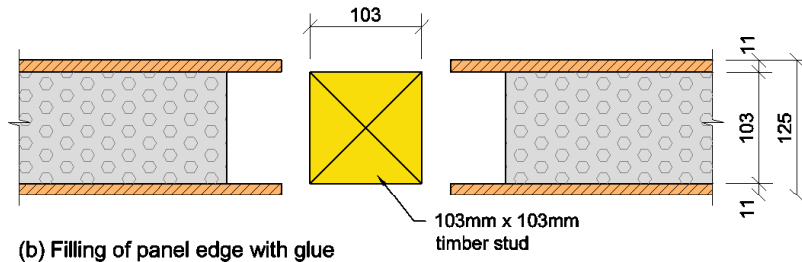


(c) Typical T-junction

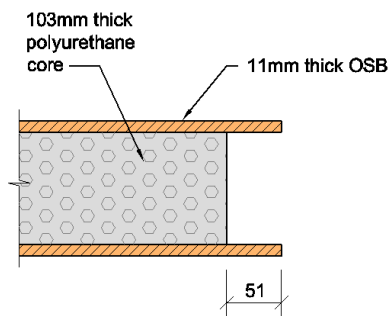
Figure 4: Wall junctions



(a) Straight joint of wall panels

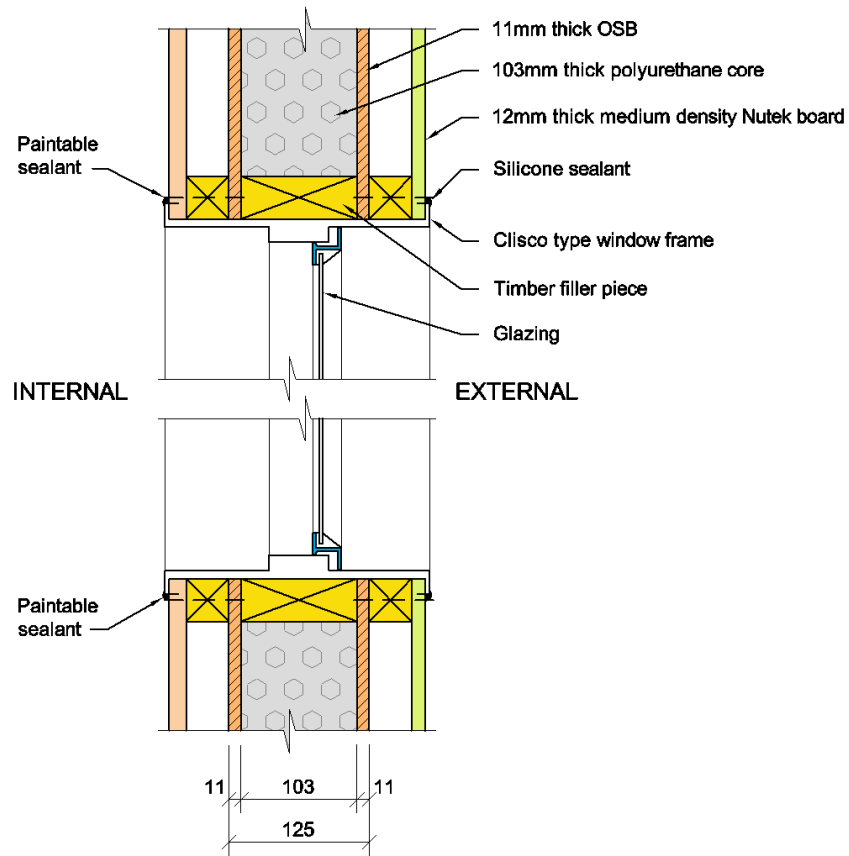


(b) Filling of panel edge with glue

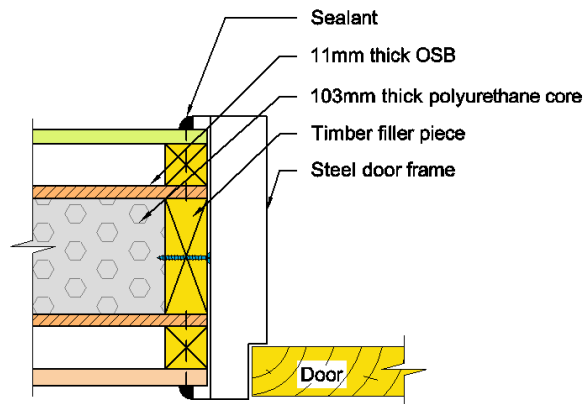


(c) Detail 3: Removing of panel core

Figure 5: Panel fixing details



(a) Vertical section through timber window frame



(b) Horizontal section through timber door

Figure 6: Window and door details