

Subject:
UCO Solidwall Building System

Certificate holder:
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The master copy of this document appears on the website:

<http://www.agrement.co.za>

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.



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Use

The certificate covers the use of UCO Solidwall Building System in all areas of South Africa for the erection of single storey buildings for the uses set out below (Table 1 of Regulation A (20) (1) :

- Places of instruction(A3)
- Moderate risk commercial (B2)
- Low risk commercial services (B3)
- Small shops(F2)
- Other institutional (residential)(E3)
- Offices (G1)
- domestic residence (H3)
- dwelling house and related out buildings (H4)
- Moderate risk storage (J2)
- Low risk storage (J3)

This certificate and Agrément South Africa's assessment apply only to UCO Solidwall 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

**SANS 517: Light
steel-framed buildings**

The UCO Solidwall Building system consists of a cold rolled light gauge steel frame that is designed and erected in accordance with SANS 517.

The frames are usually between 2.4 m to 3.0 m high and studs at 600 mm spacing's or as determined by the design engineer. The frame is manufactured from 0.8 mm thick galvanised steel lipped channel 90 mm x 41 mm x 9.6 mm.

The external and internal composite walls comprise of a 6 mm - 9 mm UCO Flexabord (fibre-cement board) on both sides encapsulating a EPS beaded concrete core infill with a density of 900 kg/m³.The overall thickness of the composite wall is 102 mm thick.

Doors and window frames can either be galvanised steel, aluminium or timber.

The roof trusses are constructed from light gauge galvanised steel channel sections with light or heavy weight cladding.

The walls are finished with a layer of Gamma Trowel-On plaster, 1.1 mm - 2.4 mm thick on both sides.

All other services are conventional and conduit holes are pre-drilled in the frame.

The foundations and the floor slab are conventional and are always the responsibility of a registered competent professional engineer.

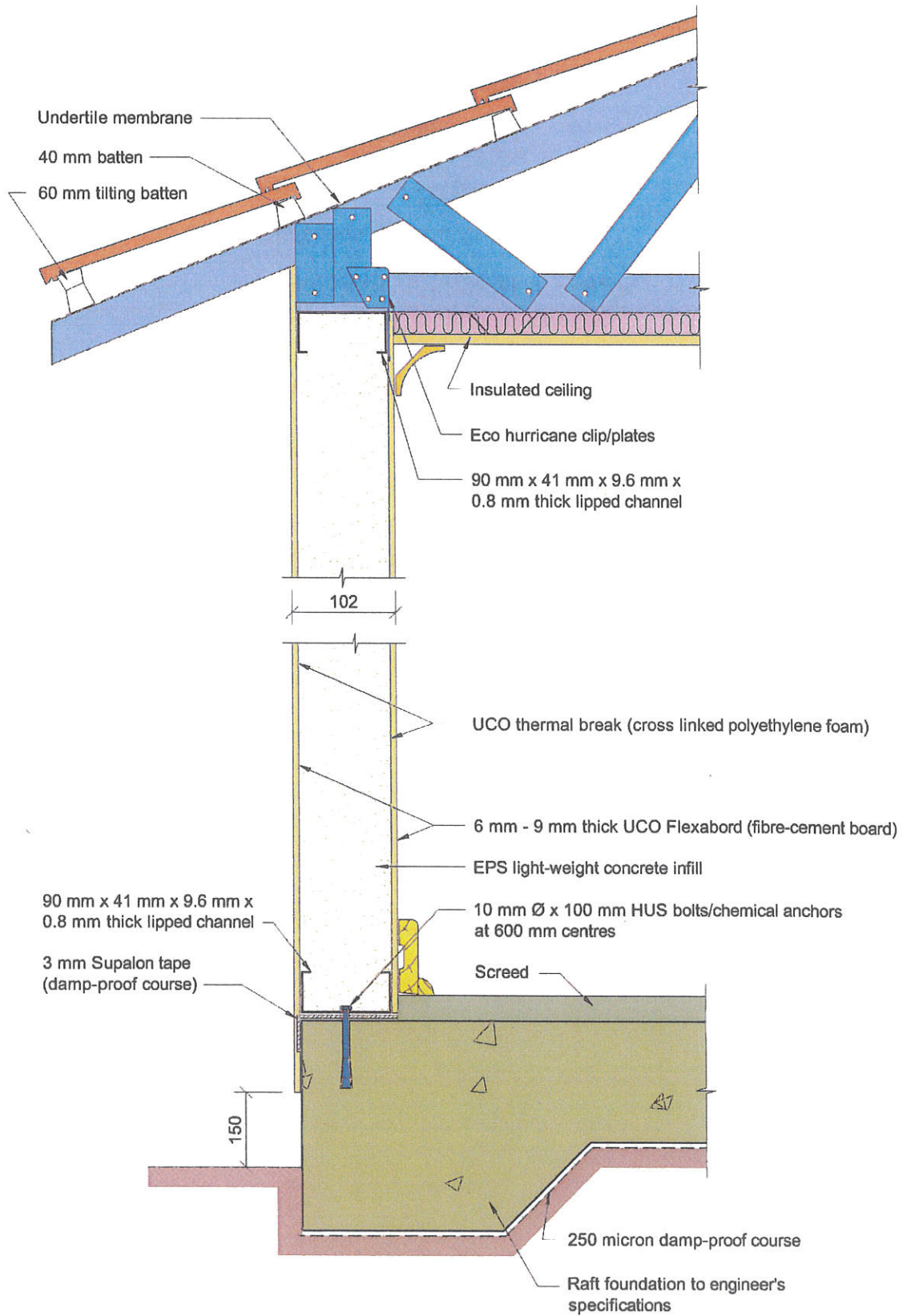


Figure 1: Typical section through external wall

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PREAMBLE

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

- has been granted after a technical appraisal of the performance of UCO Solidwall 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, and
- 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 UCO Solidwall Building System will be satisfactory provided that the requirements stipulated in this 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 this 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 this certificate.

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

The validity of this 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 subject is acceptable, and
- any changes in building legislation, regulations, relevant standards or Agrément performance criteria have not invalidated the technical assessment which 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 UCO Solidwall buildings in accordance with this certificate and authorised by him to claim compliance with the certificate. It is the certificate holder's responsibility to ensure that the licensee carries out the works in compliance with this certificate and in accordance with the approved quality system.

The UCO Solidwall Building System described in this certificate must:

- be designed, manufactured and erected by the certificate holder or a licensee
- be constructed in accordance with the technical description (see [Part 3](#)) and the certificate holder's detailed specifications and quality management document
- comply with the Conditions of Certification.

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

The UCO Solidwall 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 UCO Solidwall Building System as described and illustrated in this certificate unless such change is approved in writing by Agrément South Africa before it is implemented.

General conditions

This certificate covers single-storey buildings that comply with the dimensional and structural limitations as set out in Part 3 of this certificate:

- should those design limitations be exceeded, the structural design becomes the responsibility of a registered professional competent engineer who will prepare a rational design that:
 - will ensure the structural integrity of the entire building
 - adheres to construction details within this certificate
- for which the professional engineer monitors those aspects of the works that are covered by the rational design, to verify that the design is being correctly interpreted and that the construction techniques that are being used are appropriate to the stability of the subject.

Marking

The product packaging and promotional literature must be suitably marked with Agrément South Africa's identification logo together with the number as illustrated in this certificate.

Reappraisal

- must be requested by the certificate holder before making changes to the product
- will be required by Agrément South Africa if there are changes to the National Building Regulations or to Agrément criteria.

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

UCO Solidwall Building System

Tested and approved fit for purpose when constructed as specified in

CERTIFICATE 2012/407



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

which case the certificate can no longer be used to demonstrate compliance with the National Building Regulations.

Validity

The continued validity of this 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 UCO Solidwall Building System
- the co-operation 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 UCO Solidwall Building Systems 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

25 July 2012

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 & 3* issued by the National Home Builders Registration Council), and must comply with the National Building Regulations.

This assessment applies to those innovative aspects of the UCO Solidwall 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:

- the use of light gauge steel structure with UCO Flexabord (fibre cement) cladding and EPS concrete infill

Assessment

In the opinion of Agrément South Africa, the system as described in the certificate is suitable for the construction of buildings of the [types specified](#) (page 1).

The performance in use of buildings erected with this system will be such that they 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 criteria and requirements for durability and habitability.

Agrément South Africa's detailed comments on the assessment are set out in Tables 1 and 2 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](#)

Compliance with the National Building Regulations

The innovative aspects of the UCO Solidwall Building System must comply with 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: Performance

Aspects of performance	Opinion of Agrément South Africa	National Building Regulations satisfied
<i>Fitness-for-purpose of materials used</i>	The materials described in Part 3 meet the requirements of the regulations.	A13(1)(a) <i>Materials</i>
<i>Behaviour in fire</i>	The UCO Solidwall Building System wall is classified as type FR (non-combustible) with a fire resistance rating of 60 minutes for all load bearing elements and 120 minutes for non-load bearing elements.	<p>K4 <i>Walls</i> J1(1)b <i>Floors</i> L2 <i>Roofs</i></p> <p>T1 (1)(b) and T1(1)(c). as far as the walls are concerned, T1(1)(d) is satisfied.</p> <p>Comments made in <u>Supplement to certificates</u> must be taken into account when building plans are scrutinised by local authorities, to check compliance with Regulations T1 (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 SANS 10400 have been met.</p> <p>As defined in deemed-to-satisfy rule TT2.1 (a) of Section 3 of SANS 10400, the external walls of UCO Solidwall buildings are classified as non-combustible with fire-resistance rating of 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>
<i>Structural performance</i>	Satisfactory.	<p>J1(1) <i>Floors</i> K1, K3, K4 <i>Walls</i> L1 (b) and (c) <i>Roofs</i></p> <p>Regulations B1(1) and (2) are deemed to be satisfied when UCO Solidwall Building System is built in accordance with the Technical description see Part 3. When these rules are not complied with, the structural design of each building is the responsibility of a professional engineer or approved 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>H1 (2) in all buildings where foundations are designed by a professional engineer or approved competent person and deemed-to-satisfy rule HH1(a) applies.</p>
<i>Water penetration and rising damp</i>	Satisfactory UCO Solidwall Building System buildings meet Agrément South Africa's criteria for resistance to rainwater penetration and rising damp throughout South Africa.	<p>K2 <i>Walls</i> J1(2) and J1 (4) <i>Floors</i> L1 (b) <i>Roofs</i></p>

Table 2: Habitability

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
Thermal performance	Satisfactory. Maximum summer temperatures in UCO Solidwall Building Systems with insulated ceilings will be less than those experienced in a standard brick house .	Agrément South Africa's opinion is based on the calculated likely maximum indoor air temperature in summer in a 53 m ² UCO Solidwall 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. 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 UCO Solidwall Building System dwelling and has:
Energy usage	The energy required to heat UCO Solidwall Building System with insulated ceilings in winter will be less than that required for a standard brick house.	<ul style="list-style-type: none"> • external walls of 230 mm brick and internal walls of 110 mm brickwork; • plastered internal wall surfaces; • a concrete floor; • a sheeted roof that is fitted with a ceiling without insulation.
Condensation	Satisfactory. UCO Solidwall Building Systems perform better than the standard brick house.	Condensation is generally a problem in the Southern Coastal Condensation Problem Area (SCCP Area). The assessment of this aspect of performance 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 is itself not immune to condensation problems.
Acoustic performance	Satisfactory. Agrément South Africa's performance criteria for sound attenuation between adjacent rooms and between adjacent dwellings have been met. <div style="border: 1px solid black; padding: 2px; display: inline-block;">SANS 10218: Part 1 – Acoustical properties of buildings</div>	Agrément South Africa's opinion is based on data from <i>in-situ</i> airborne sound attenuation tests. The <i>in-situ</i> airborne sound insulation that is likely to be obtained between adjacent rooms is: 47dB (D _{nt} W) These values meet Agrément South Africa's criteria and most of the recommended sound insulation values set out in SANS 0218: Part 1 . A description of the degree of acoustic privacy that can be expected between specific rooms for various degrees of sound insulation is given in Supplement to certificates .
Durability	Given regular and adequate maintenance, the durability of UCO Solidwall Building System will be similar to that of conventionally constructed buildings.	Agrément South Africa's opinion is based on inspections of UCO Solidwall Building System buildings; knowledge of the materials used in the construction of UCO Solidwall Building System and from experience gained in the evaluation of building systems of a similar nature. In coastal areas and areas with an aggressive environment additional maintenance will be required.

Table 3: Quality management system

Aspects of performance	Opinion of Agrément South Africa	Explanatory notes
Quality management system	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 Installation of UCO Solidwall Building System will be maintained consistently.	Agrément South Africa's requirements are based on SANS 9001 . <div style="border: 1px solid black; padding: 5px; width: fit-content;"> SANS 9001: Quality management systems – Requirements' </div>

PART 3: TECHNICAL DESCRIPTION

General description

The UCO Solidwall Building system consists of a cold rolled light gauge steel frame that is designed and erected in accordance with SANS 517.

The frames are usually between 2.4 m to 3 m high and studs at 600 mm spacing's or as determined by the design engineer. The frame is manufactured from 0.8 mm thick galvanised steel lipped channel 90 mm x 41 mm x 9.6 mm.

The external and internal composite walls comprise of a 6 mm – 9 mm UCO Flexabord (fibre-cement board) on both sides encapsulating a EPS beaded concrete core infill with a density of 900 kg/m³.The overall thickness of the composite wall is 102 mm thick.

Doors and window frames can either be galvanised steel, aluminium or timber.

The roof trusses are constructed from light gauge galvanised steel channel sections with light or heavy weight cladding.

The walls are finished with a layer of Gamma Trowel-On plaster, 1.1 mm - 2.4 mm thick on both sides.

All other services are conventional and conduit holes are pre-drilled in the frame.

The foundations and the floor slab are conventional and are always the responsibility of a registered competent professional engineer.

Manufacture

Steel Frame

SANS 10162-2:
Cold-formed steel
structures structural
members

The light gauge steel frame members are designed in accordance with **SANS 517**, code and have grade strength of 550 MPa minimum yield strength and Z275 coating.

The external and internal wall frames are assembled in the factory or on site. Lipped sections are used as the members of the frame. The channels are pre-designed and pre-punched, and each section is marked to ensure accurate assembly and 10 x 16 self drilling tek screws at 20 mm centres are used to fix the members together. **(Fig 4)**

Firstly the bottom plate of the frame is fixed to the ends studs and then the top plate is fixed to the frame. Back to back studs placed at 600 mm centres are used to support the noggins.

For window, head and sill plate are connected to the stud which is connected to the bottom plate and for door openings, a head plate (lintel) is connected to the bottom plate.

All frame and bracings design and assembly must comply with the requirements of **SANS 517**.

Cladding

The UCO Flexabords (fibre-cement boards) are pulp based and are manufactured by UAC BERHAD (5149-H) in Malaysia.

Handling, Transportation & Storage

The components of the Building System must be transported under conditions that protect their original condition.

Erection

Foundations and surface bed details are convention and are the responsibility of a registered professional competent engineer who 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 952:
Polyolefin film for damp- and
waterproofing in buildings

The damp-proof membrane which complies with the requirements of SANS 952 or is covered by a valid Agrément certificates must be laid beneath the surface bed

The bottom plate of the external wall frame acts as a channel that is fixed down to the foundation with a 10 mm x 100 mm long self drilling screw at 600 mm centers as per SANS 517. **(Fig 1)**

The internal wall frame is fixed in the same manner as the external frame. Corner frame to frame junctions are fixed with 10 x 16 mm self drilling screws at 500 mm centers. **(Fig 3)**

Once the frame steel work is completely fixed, leveled and squared and the UCO Thermal Break is fixed to all external studs and noggins, the UCO Flexabord (Fibre-cement boards) are fixed to the inside and outside of the frame with 25 mm self drilling screws at 200 mm vertically and 300 mm horizontally. An external bracing system which later removed is installed, and 50 mm holes are drilled in the external boards between the studs. The cavity in the frame is then filled with EPS Beaded concrete pumped to roof height through the holes.

The mix proportions and density of the EPS Beaded concrete is tested in accordance with manufacturers' standards and must have a density of 900 kg/m³.

Once the cavity has been filled the holes are sealed off and the light weight concrete is left to cure. After curing, the joints of the panels are flushed with UCO-SC flush jointing compound.

Fittings

Light-weight and medium-weight fittings are fixed to the studs with UCO self-embedding head screws (self-tapping screws).

Heavy-weight fittings (e.g. geysers etc.) must be floor mounted.

Roof construction

Light gauge galvanised steel roof trusses are lifted into position and tied down to the steel wall panels with hurricane clips (or similar bracket). Both the roof truss and wall panel are screwed with 10 x 16 mm wafertek screws then the 30 mm bracing straps are screwed to the trusses.

After the bracing the undertile membrane is then also "screwed" to the trusses, the purlins/top hats are then placed on top of the undertile and screwed to the trusses, straightening the undertile.

The roof coverage (either tiles or sheeting) are then placed on top of the purlins/top hats and screwed down.

Ceilings comprise a 6 mm thick UCO Flexabord (fibre-cement board) and are always insulated.

Windows and doors

Windows are fit into position by clips that are attached to the window frame.

The engaging clips are designed to seat the window parallel and square with the steel members. If the window needs adjustment the clips can be shimmed to correct the offset. If necessary the clips can be fixed into the surrounding steelwork.

The internal frame is carefully pressed into the clips of the external frame.

The frames are tapped together using a rubber hammer.

The frames are clipped when the rubber seals are deformed against the boarding. (Fig 5)

The sill is fixed onto the external frame using the ferrules provided.

Fittings of the doors follow the same operation as for windows with the exception that the marked clips must be fixed to the steelwork.

Finishes

External and internal walls are finished with one coat level screed primer and one coat of Gamma Trowel-On permanent plasticized acrylic bound protective and decorative interior/exterior coating with a plaster-like textured finish applied in accordance with the manufacturer's specifications.

Walls in wet areas

Walls in wet areas 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:

- 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;
- the steel components at floor level are coated 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

SANS 317 Industrial bitumen

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 as recommended by the manufacturer of the wall cladding;

- in shower cubicles, the propriety shower trays have a minimum depth of 150 mm and are watertight. Whether the shower tray is preformed or constructed *in-situ*, three sides of the tray are at 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 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**.

SANS 580: Chloroprene rubber sheet (for waterproofing)

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

Maintenance, renovation and replacement

The coating of the walls of the building system will require regular maintenance. The surfaces must be sound, dry and cleaned before any maintenance coat can be applied.

In case of damage or replacement of the UCO Flexabords (fibre-cement boards), the new boards must be installed in accordance to the prescribed methods in this certificate.

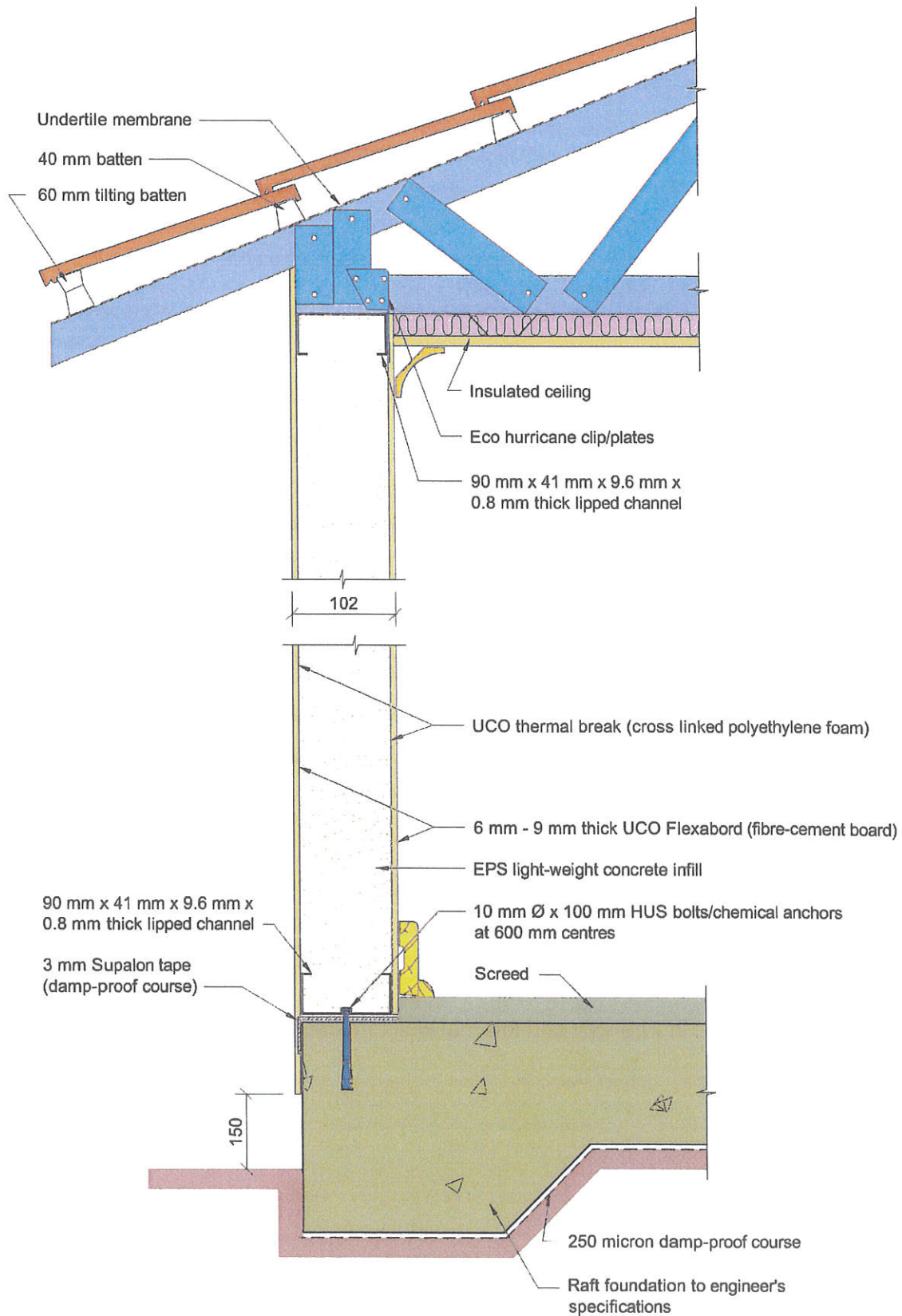


Figure 1: Typical section through external wall

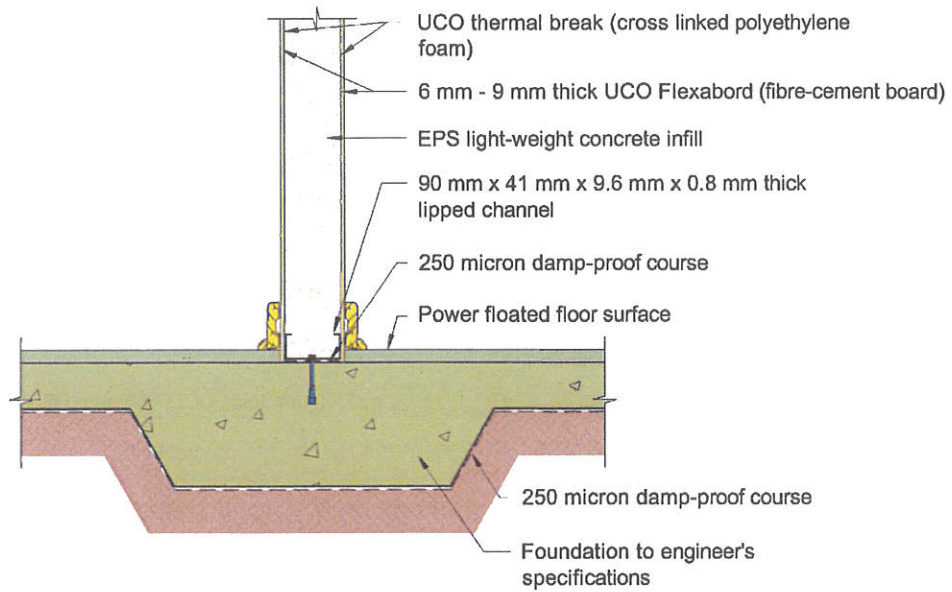
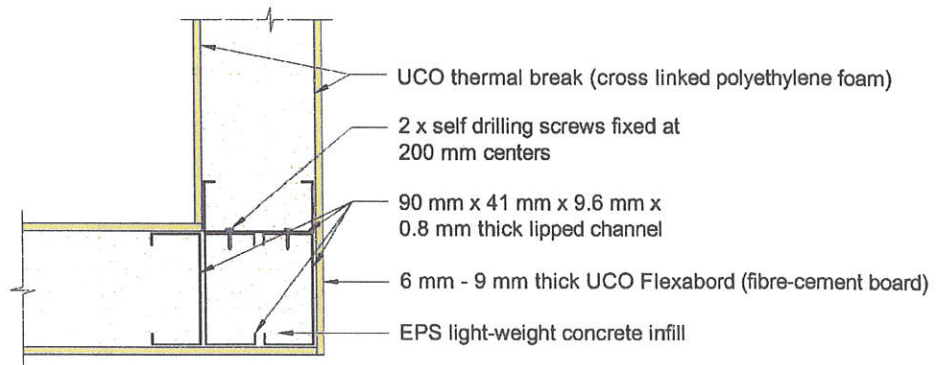
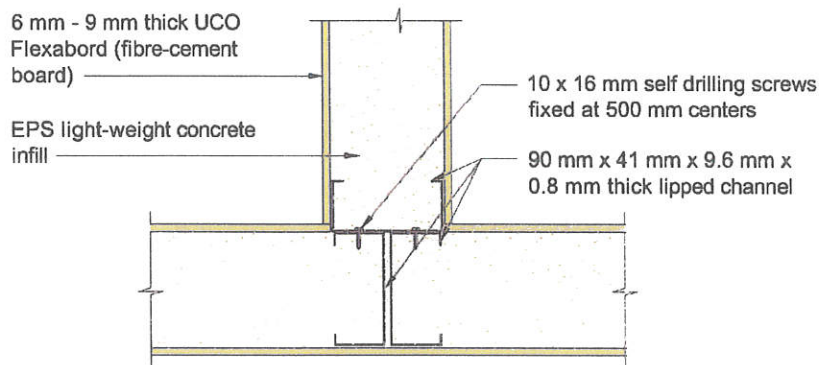


Figure 2: Fire wall and internal wall foundation detail



(a) Corner junction



(b) T-junction

Figure 3: Typical wall junction details

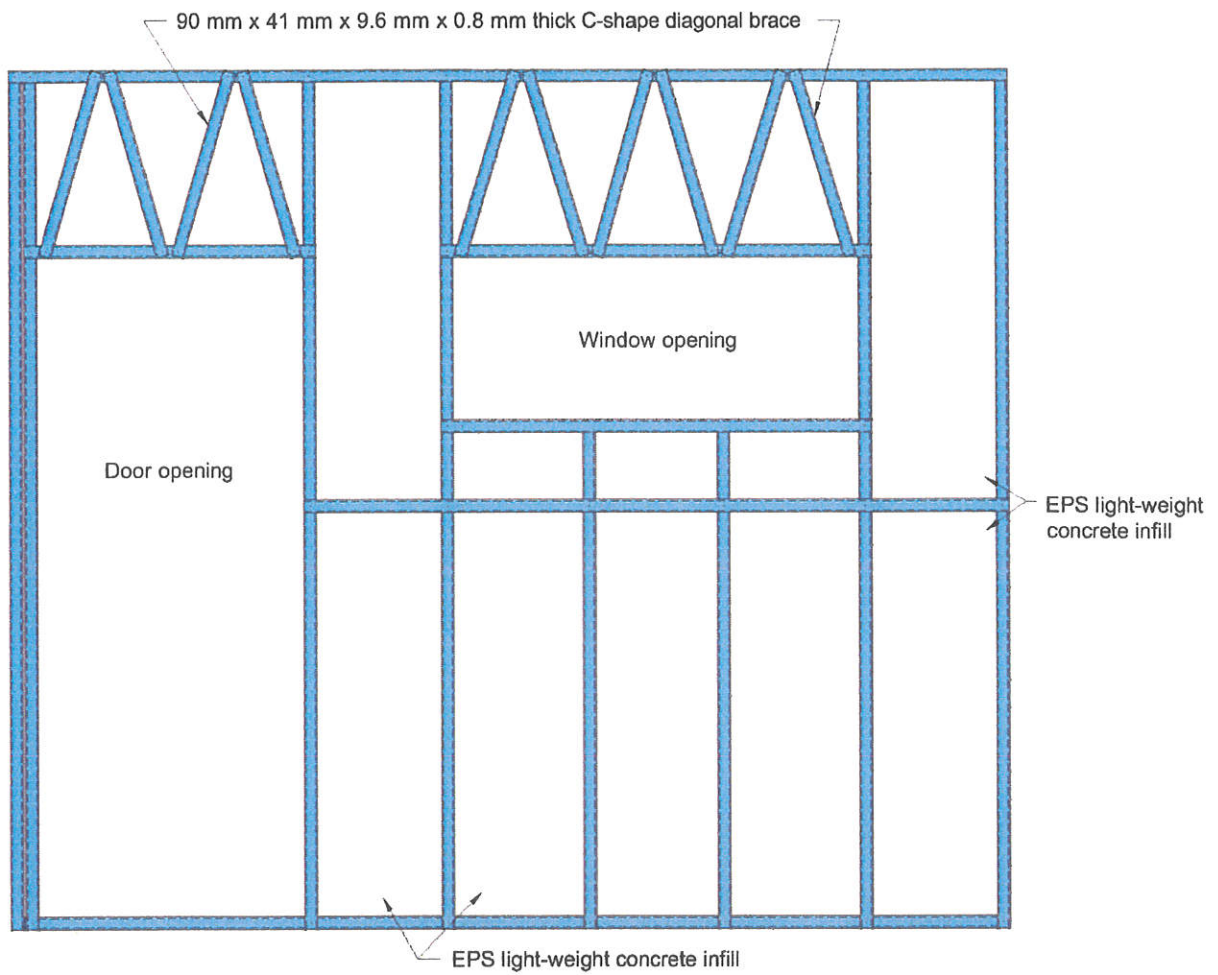


Figure 4: Typical section showing members around window and door openings

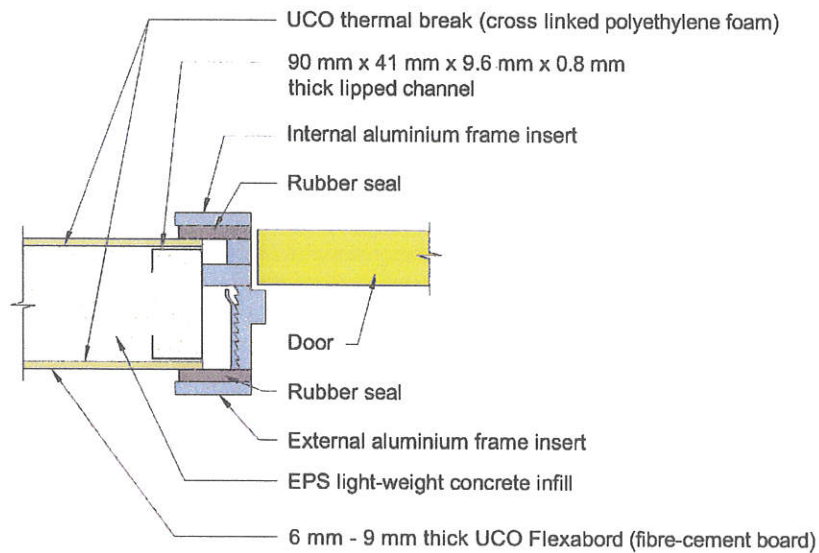
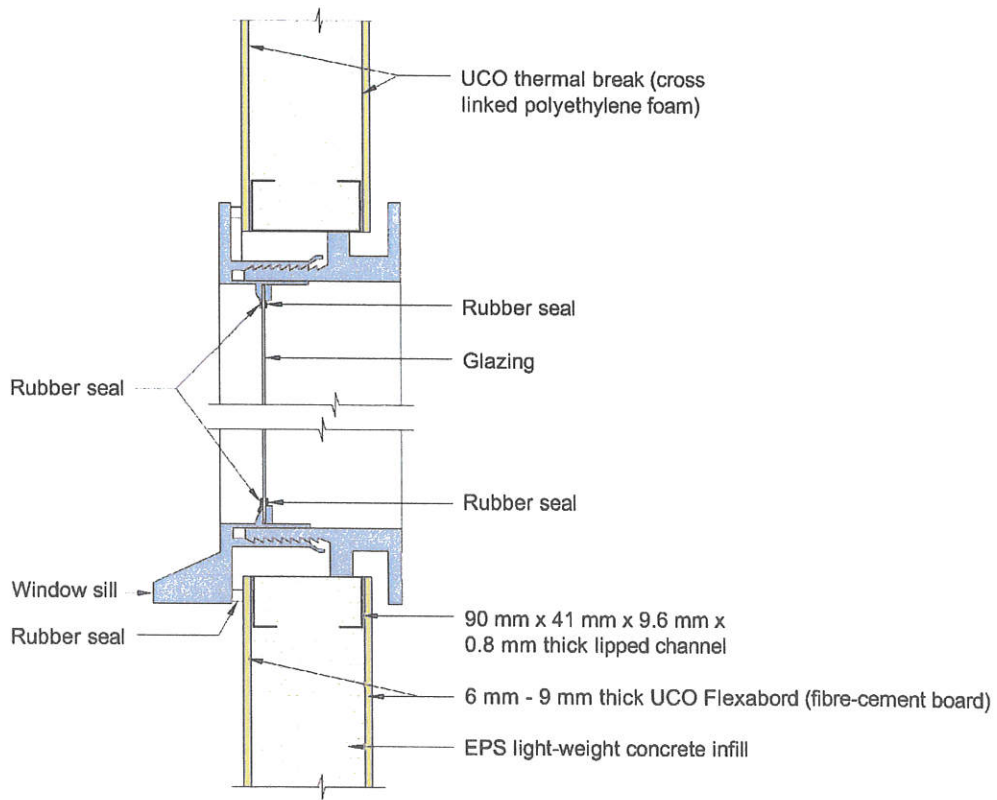


Figure 5: Typical window and door details