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Authorised and
notified according
to Article 10 of
the Council Directive
(89/106/EEC) of
21 December
1988 on the
approximation of
laws, regulations
and administrative
provisions of
Member States
relating to
construction products.



European Technical Approval ETA-11/0065

Trade name:

Octagon Sunbloc System (ICF Standard System)

Holder of approval:

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Generic type and use of construction product:

Insulated Concrete Formwork

Valid from: to:

25 May 2011

24 May 2016

Manufacturing plant:

SCA Foam Products (Formerly Tuscarora Ltd)
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This European Technical Approval contains:

12 pages plus 2 Annexes which form an integral part of the document



European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- Council Directive 89/106/EEC of 21 December 1988 [Construction Products Directive (CPD)] on the approximation of laws, regulations and administrative provisions of Member States relating to construction products⁽¹⁾, modified by the Council Directive 93/68/EEC of 22 July 1993⁽²⁾
- UK implementation of CPD Statutory Instruments 1991, No 1620. The Building and Building Construction Products Regulations 1991 — made 15 July 1991, laid before Parliament 22 July 1991, coming into force 27 December 1991, and amended by the Construction Products (Amendment) Regulations 1994 (Statutory Instruments 1994, No 3051)
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC⁽³⁾
- Guideline for European Technical Approval of *Non-loadbearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete* ETAG 009, edition June 2002.

2 The British Board of Agrément is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by the British Board of Agrément, in particular after information by the Commission on the basis of Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European Technical Approval, including transmission by electronic means, shall be in full. However, partial reproduction can be made with the written consent of the British Board of Agrément. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6 The European Technical Approval is issued by the approval body in its official language. This version should correspond to the version circulated within EOTA. Translations into other languages have to be designated as such.

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of the system

The Octagon Sunbloc System (ICF Standard System) is a system of permanent formwork comprising factory assembled units, consisting of two expanded polystyrene (EPS) panels, each 55 mm thick, mechanically fixed together using an arrangement of high impact polystyrene (HIPS) acrylonitrile-butadiene-styrene (ABS) spacers moulded into each panel at production stage. Various form components are available within the range as described in this section allowing a single width of 250 mm to be formed. The components are:

- EPS forms — the EPS elements are flame-retardant and are available in two grades, white (standard EPS) and grey (Neopor). Both grades are in a single thickness of 55 mm giving a nominal 140 mm thick concrete core
- spacers — ABS (acrylonitrile-butadiene-styrene) or HIPS (high impact polystyrene) form tie/spacers at 150 mm centres and moulded into the EPS panels at time of manufacture. The spacer is designed with slots to receive horizontal reinforcement and the flanges, built into the EPS forms, incorporate a plug that can be used to screw-fix lightweight finishes such as plasterboard and weatherproofing systems subject to load limitations (further information is given in the ETA holder's data sheets).

The screw fixing points can be located by centring on the 'sun' motif on the sides of the forms. The upper and lower surfaces of the EPS forms incorporate small castellations so that adjoining forms effectively lock together without fixings. Forms other than the brick ledge forms can be used either way up. The spacers run full height of the form and serve to hold the forms together and prevent lifting during the concrete pour. The inner surfaces of the EPS panels feature vertical, dovetail grooves that allow full bonding with the concrete and provide locks for the end caps. The outer surfaces are lightly grooved vertically at 50 mm centres to aid cutting and trimming. The forms interlock and build up horizontally and vertically into a tight rigid formwork. The wall is formed by filling the forms with concrete. The formwork is used in conjunction with:

- concrete — for plain walls, grade C25 conforming to compressive strength classes C20/25 or C25/30 given in EN 206-1 : 2000, Table 7, or for reinforced concrete grade C30 conforming to compressive strength class C30/37 given in EN 206-1 : 2000, Table 7, depending on above- or below-ground use
- aggregate — a recommended maximum size of 10 mm aggregate used in concrete walls where pumpable grade mixes are used. The concrete can contain an admixture complying with EN 934-2 : 2001 to allow placement by hand or line pump and nozzle. Hand rodding can be used with care.

Components and finishes used in conjunction with the formwork, but not covered by this ETA, are:

- steel reinforcement — where required, should comply with applicable national rules

(1) Official Journal of the European Communities No L40, 11.2.1989, p12.

(2) Official Journal of the European Communities No L220, 30.8.1993, p1.

(3) Official Journal of the European Communities No L17, 20.1.1994, p34.

- external render — either:
 - cement-based render of two or three coats of cement/sand/polymer rendering mix, with the basecoat reinforced with stainless steel or galvanized expanded lath screw-fixed to the polypropylene flanges in the form, or
 - acrylic-based render of two coats of proprietary rendering mix with glassfibre filament or nylon fibre mesh reinforcement within the basecoat applied directly to the surface of the EPS form
- external masonry — may be brickwork or stonework fixed in accordance with national regulations. The type of masonry unit shall be to the relevant part of EN 771 and, where masonry tests are required, they shall be to the relevant part(s) of EN 1052. Other external finishes can be applied subject to fixing requirements and load limitations
- internal finish — typically 12.5 mm thick plasterboard fixed directly to the polypropylene flanges with a plaster skim coat or taped joints. Other lining systems can be applied (such as vinyl, steel, wood and cement particle board) subject to load limitations
- brickwork/stonework wall ties to EN 845-1 : 2003
- trestle supports — patent systems or effective bracing and propping.

1.2 Intended use

The system is for use in forming loadbearing and non-loadbearing internal or external walls. Once filled on site with concrete, the EPS formwork remains as a permanent part of the wall and so contributes to the overall thermal resistance of the completed wall construction. During the pouring and casting of the concrete infill, the formwork resists the pressure of wet concrete through the inherent strength and interlocking action of castellated horizontal joints and tying action of high impact polystyrene spacers moulded into the EPS forms.

When using this type of construction below ground, a waterproofing membrane, according to applicable national rules and compatible with the EPS, should be provided on the external surface of the formwork. The membrane should be applied in accordance with the manufacturer's installation instructions, including correct detailing, and be protected from damage using an impact-resistant protective layer.

1.3 Intended life

The provisions made for the elements in this ETA are based on an assumed working life for the system of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or approved body, but are to be used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The system's components are available in the range given in Annex 1, Table 1 of this ETA and have the characteristics listed in Annex 2. The characteristic values and respective tolerances for the components

of the system (see Annex 1, Figure 1) are stated in the manufacturer's *Installation Manual*.

The composition of the components of the system and the manufacturing and quality control procedures are deposited with the British Board of Agrément.

The ETA is issued for the system on the basis of the product composition held by the British Board of Agrément (BBA).

Changes to the components of the system or in the production process of the components, that could result in the details held by the BBA being incorrect, should be notified to the BBA before the changes are introduced. The BBA will decide whether the changes affect the ETA and consequently the validity of the CE marking and whether further assessment and alterations to the ETA are required.

2.2 Methods of verification

The assessment of the fitness of the shuttering system for the intended use has been made in compliance with ETAG 009 *Guideline for European Technical Approval of Non-loadbearing Permanent Shuttering Kits/systems based on Shuttering Elements or Blocks of Insulating Materials and sometimes Concrete*, Edition June 2002. The ETA is issued for the Octagon Sunbloc ICF System shuttering kit on the basis of agreed information, deposited with the BBA, which identifies the shuttering kit that has been assessed and evaluated. Changes to the production process of the kit or the components which could result in this deposited information being incorrect, shall be notified to the BBA before the changes are introduced. The BBA will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and, if so, whether further assessment and/or alterations to the ETA shall be necessary.

2.2.1 Essential Requirement 1 – Mechanical resistance and stability

2.2.1.1 Resulting structural pattern

Walls made with the Octagon Sunbloc System shuttering elements are walls of continuous type as defined in ETAG 009, paragraph 2.2.

2.2.1.2 Efficiency of filling

The requirements according to ETAG 009, section 5.1.2, are met through observation of the method and technique of filling of the shuttering system with concrete on an agreed construction site. The efficient filling without bursting of the shuttering system and without voids or any uncovered reinforcement in the concrete core is possible.

2.2.1.3 Resistance to filling pressure

The resistance-to-filling pressure has been determined by observation of the finished shuttering elements both during and on completion of filling. The requirements in respect of cracking and failure of the system elements and horizontal bowing of shuttering not exceeding 5 mm are also satisfactorily met.

2.2.1.4 Possibility of steel reinforcement

The instructions in the Octagon Sunbloc ICF *Installation Manual* are appropriate to install steel reinforcement for walls according to EN 1992-1-1 : 2004 or corresponding national rules.

2.2.2 ER 2 Safety in case of fire

2.2.2.1 Reaction to fire

Euroclass F, No Performance Determined (NPD).

2.2.2.2 Resistance to fire

With the minimum thickness of the continuous concrete core for the 250 mm overall wall width being 140 mm, the fire-resistance class of walls, with a minimum concrete strength of C20/25 according to ETAG 009, Annex C, Table 1, is REI 90. This classification is valid for walls without openings (eg for windows and doors).

2.2.3 ER 3 Hygiene, health and the environment

2.2.3.1 Content and/or release of dangerous substances

According to the manufacturer's declaration, the shuttering elements of the Octagon Sunbloc ICF System, taking account of Directive 67/548/EEC, Regulation (EC) No 1272/2008 *Indicative list of dangerous substances*, do not contain any dangerous substances.

In addition to the specific clauses relating to dangerous substances given in this ETA, there may be other requirements applicable to the products (eg transposed European legislation and national laws, regulations and administrative provisions). Such requirements need to be complied with when and where they apply, to meet the provisions of the Construction Products Directive (CPD).

2.2.3.2 Water vapour permeability

The tabulated design value of water vapour diffusion resistance coefficient of expanded polystyrene (EPS), according to EN 12524 : 2000, is $\mu = 60$. The values for the water vapour diffusion resistance of concrete depending on density and type are also tabulated in EN 12524 : 2000.

2.2.4 ER 4 Safety in use

2.2.4.1 Bond strength between the shuttering leaves and the concrete core

The expanded concrete is effectively bonded to the concrete core by mechanical interlocking of the internal vertical dovetail slots and the concrete.

2.2.4.2 Resistance to filling pressure

The resistance to filling pressure has been determined by observation of lower sections of the shuttering leaves and is satisfactory for filling up to heights of approximately three metres in one lift.

2.2.4.3 Safety against personal injury by contact

As delivered on site the shuttering elements do not have sharp or cutting edges. Because of the soft surface of the shuttering leaves there is no risk of abrasion or of cutting to people.

2.2.5 ER 5 Protection against noise

2.2.5.1 Airborne sound insulation

The NPD option in ETAG 009, Table 3, is used.

2.2.5.2 Sound absorption

The NPD option in ETAG 009, Table 3, is used.

2.2.6 ER 6 Energy economy and heat retention

2.2.6.1 Thermal resistance

The nominal value of the thermal resistance R of the 'the wall' elements, when filled with concrete, can be determined in accordance with EN ISO 6946 : 1996, EN 13163 : 2001 and EN 12524 : 2000. Once

moulded and cured, the EPS has a nominal density of $25 \text{ kg}\cdot\text{m}^{-3}$ with a nominal thermal conductivity of $0.034 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ for the white (Standard) EPS and $0.030 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ for the grey (Neopor) EPS.

2.2.6.2 Heat capacity

The values of heat capacity of concrete and expanded polystyrene are tabulated in EN 12524 : 2000.

2.2.7 Aspects of durability and serviceability

2.2.7.1 Physical agent

No effect.

2.2.7.2 Chemical agent

No effect.

2.2.7.3 Biological agent

No effect.

2.2.7.4 Resistance to normal use damage

Generally the shuttering is protected by internal and external finishes in service.

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity applied to this product shall be that laid down in the CPD, Annex III, 2(ii) (referred to as System 2+).

3.2 Responsibilities

3.2.1 Tasks for the manufacturer — Factory production control

The manufacturer continues to operate a factory production control system. All elements, requirements and provisions adopted by the manufacturer are documented. This ensures the product conforms with this ETA.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan⁽⁴⁾. The raw materials shall be subject to agreed controls and tests by the manufacturer before acceptance. Checks on incoming materials, such as polystyrene bead and solid polypropylene spacers, shall include control of the certificates of conformity presented by suppliers (comparison with nominal values) by verifying dimensions and determining material properties, eg chemical composition and physical properties.

The manufactured components are checked for dimensional compliance and visually for surface and other defects. The frequency of controls and tests conducted during production and on the finished panel is laid down in the prescribed test plan, taking account of the manufacturing process.

The results of factory production control are recorded and evaluated. The records include at least:

- designation of the product
- type of control or testing
- date of manufacture of the product and dates of testing of the product or basic material and components
- result of control and testing and, if appropriate, comparison with requirements

(4) The prescribed test plan is deposited with the British Board of Agrément and is made available to the approved bodies involved in the conformity attestation process.

- signature of person responsible for factory production control.

The records shall be presented to the inspection body involved in the continuous surveillance. Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan included in the technical documentation of this ETA.

3.2.2 Tasks for approved bodies

3.2.2.1 Initial type-testing of the product

For initial type-testing⁽⁵⁾ the results of tests, assessments and calculations performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary type-testing has to be agreed between the British Board of Agrément and the approved body involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular the staff and equipment, and the factory production control, are suitable to ensure a continuous and orderly manufacturing of the system components with the specifications given in part II, section 2, and the accompanying Annexes to this ETA.

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least once a year for routine inspections. It shall be verified that the system of factory production control and the specified manufacturing processes are maintained, taking account of the prescribed test plan.

The results of continuous surveillance shall be made available on demand from the approved body to the British Board of Agrément. Where the provisions of the European Technical Approval and the prescribed test plan are no longer fulfilled, the certificate of conformity shall be withdrawn by the certification body.

3.3 CE marking

The CE marking shall be affixed to the packaging of the panels. The CE symbol shall be accompanied by the following information:

- identification number of the notification body
- identification of the product
- name or identification mark of manufacturer
- the last two digits of the year in which the CE marking was affixed
- number of the European Technical Approval
- number of the EC certificate of conformity.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

Ahotoha Octagon Sunbloc (ICF System) is produced in a heat-moulded chamber where the dimensions, castellations and spacer positions are controlled by

the template of the mould. The shuttering elements are manufactured in accordance with the ETA using the manufacturing processes as identified in the inspection of the plant by the British Board of Agrément and the approved body and laid down in the technical documentation. Tolerances for dimensional stability are maintained by curing the EPS forms in elevated-temperature ovens, in accordance with the agreed Quality Plan.

4.2 Packaging, transport and storage

The panels are wrapped in plastic sheet bearing the manufacturer's name, product type, dimensions, quantity, date of fabrication and batch reference details. In relation to transportation and storage, the panels should be treated as conventional insulation products.

4.3 Installation

4.3.1 Formwork

In accordance with the ETA holder's installation instructions, the formwork must be plumbed using a proprietary trestle system, incorporating adjustable screw jacks and platform. These systems can be adjusted both prior to and during the concrete pour to maintain the vertical alignment of the wall assembly.

It is essential that effective bracing and propping of walls takes place during construction to ensure stability, level, straightness and plumb of walls. The Certificate holder is able to advise on the provision of propping systems.

Typically, the bracing and alignment systems are placed on one side of the formwork (usually the inside face) during construction, however, for very long walls or walls greater than one storey in height, bracing on two sides is recommended. On exposed sites or in adverse weather conditions additional temporary support should be provided.

4.3.2 Concreting

Ready-mixed concrete shall be to the relevant parts of EN 206-1 : 2004 with control according to Annex C of this Standard. Whenever possible, concrete shall be purchased under an approved scheme where there is continuous certification and testing of the supplier. Where such schemes/controls are not available, it is the responsibility of the purchaser of the concrete to ensure fitness for purpose.

Concrete, typically compressive strength class C30/37 for reinforced concrete above ground or for basement walls, and C20/25 or C25/30 for plain concrete, is specified to BS EN 206-1 : 2000 (Table 7). A pumpable grade should normally be specified. The recommended aggregate (rounded) size is 10 mm. An admixture complying with EN 934-2 : 2009 or EN 480-1 : 2006 should be used to allow placement generally by free-flow mixes.

4.3.3 Criteria

The fitness for use of the system can be assumed if the panels are installed correctly in accordance with the following requirements:

- installation is carried out under the direction of personnel trained and qualified and verified as competent to install the product by the ETA holder or its agent

(5) In the context of ETAG 009, initial type-testing may be by testing and/or by calculation.

- installation is in accordance with the manufacturer's specifications and drawings prepared for that purpose, and the appropriate tools are used
- the specified panels and trestles are used.

5 Use, maintenance and repair

The assessment of the fitness for use is based on the assumption that maintenance is not required during the assumed intended working life. Should repair prove necessary before concreting, replacement is advised. If required after concreting then cutting out and face replacement or foam spray repair is advisable.



On behalf of the British Board of Agrément

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Greg Cooper
Chief Executive

Date of issue: 25 May 2011

ANNEX 1 PRODUCT RANGE

Table 1 Components

Component	Material	Dimension (mm)			
		Length	Width	Height	Thickness
Standard block	EPS	1200	250	250	—
Halfheight block	EPS	1200	250	125	—
Lintel block	EPS	1200	250	125	—
Corner block (small)	EPS	400	250	250	—
Corner block (large)	EPS	1000	250	250	—
Floor edge block	EPS	1200	250	125	—
Brick ledge	EPS	1200	350	250	—
Stop end	EPS	250	150	—	50
Spacer/web	PS-HI ⁽¹⁾	—	—	—	—

(1) High impact polystyrene.

Table 2 Product performance and characteristics

Property	Performance
Structural pattern	Continuous
Filling efficiency	Satisfactory
Steel reinforcement	Possible
Reaction to fire (insulation)	Class F to EN 13501-1 : 2003
Dangerous substances	None
Water vapour permeability	A μ design value of 60 may be taken for the EPS in accordance with EN 12524 : 2000
Filling pressure resistance	Formwork needs verticality adjustment/checks during filling
Thermal properties	Using the following thermal conductivity (λ in $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) data: $\lambda = 0.034$ (white) ⁽¹⁾ ; $\lambda = 0.030$ (grey) ⁽¹⁾

(1) Source of information: EN ISO 6946 : 1996.

ANNEX 2 CONSTRUCTION DETAILS

Figure 1 Octagon Sunbloc elements

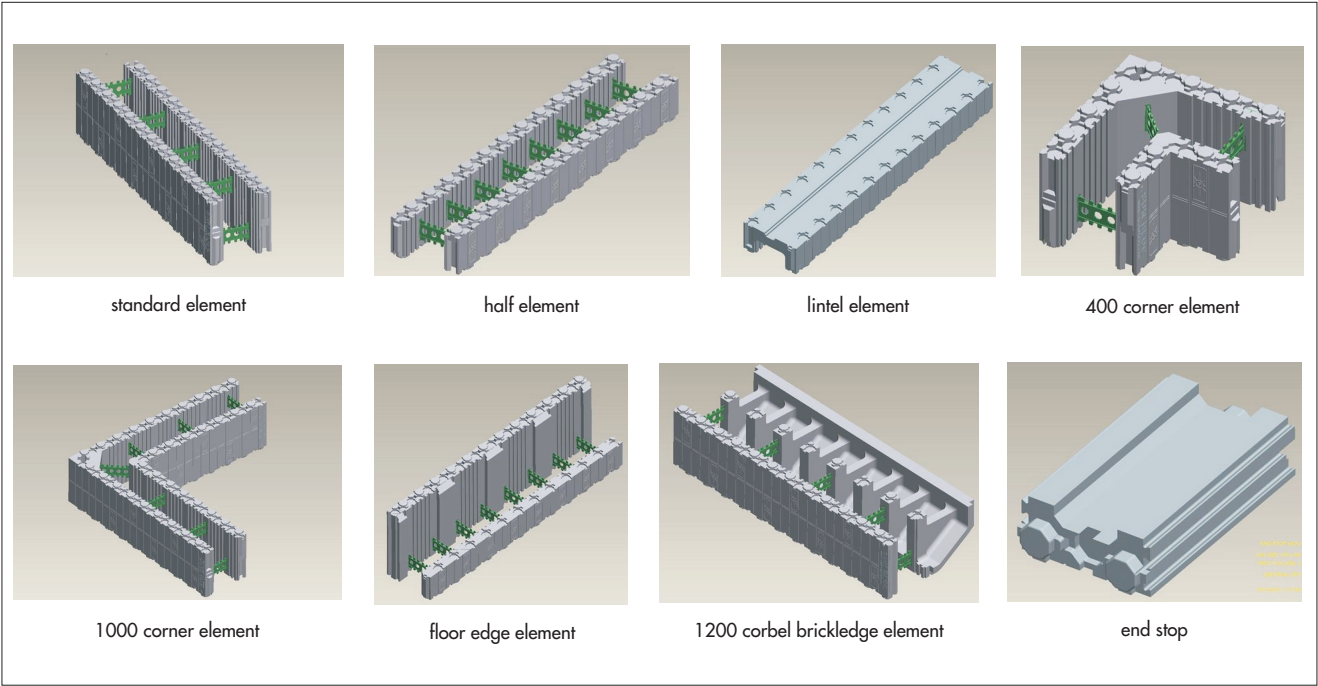
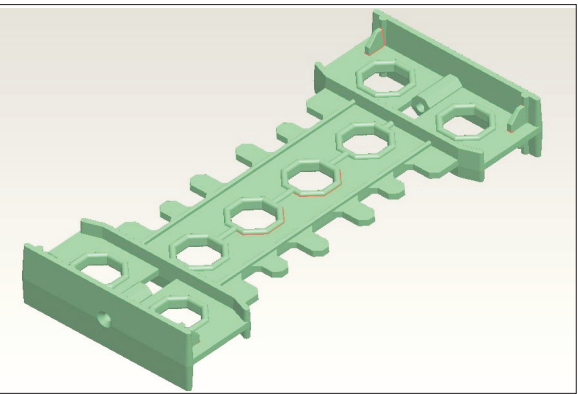
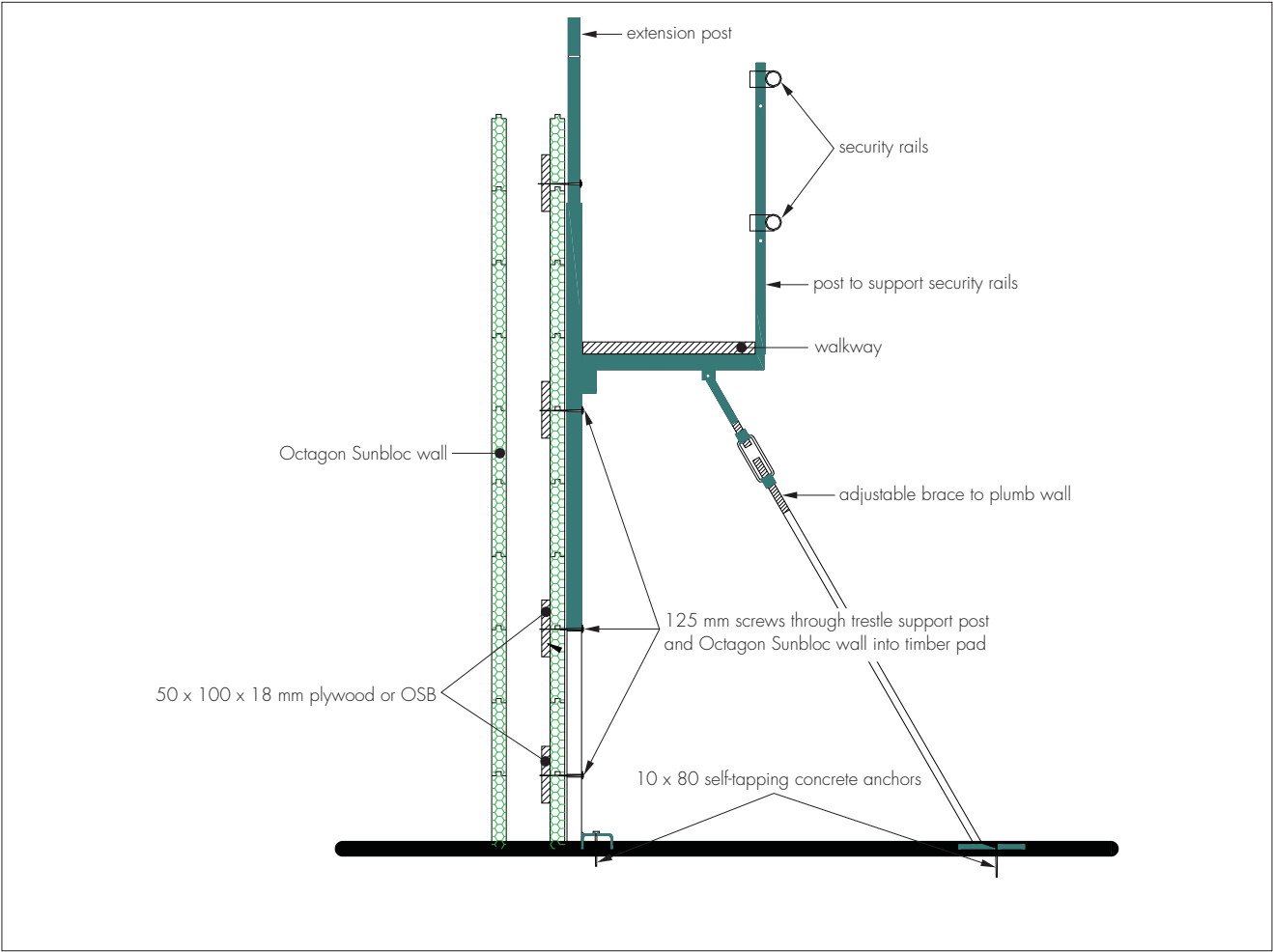


Figure 2 Spacer



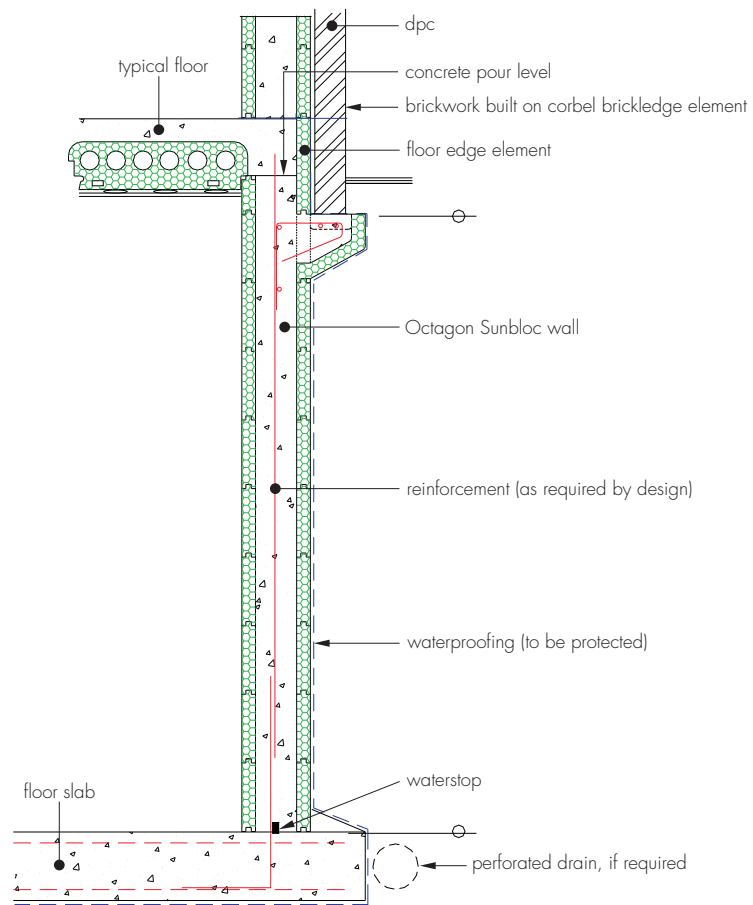
ANNEX 2 PRODUCT RANGE (continued)

Figure 3 Propping/support system



ANNEX 2 PRODUCT RANGE (continued)

Figure 4 Typical retaining/basement wall detail



ANNEX 2 PRODUCT RANGE (continued)

Figure 5 Typical wall and timber floor and roof fixing detail

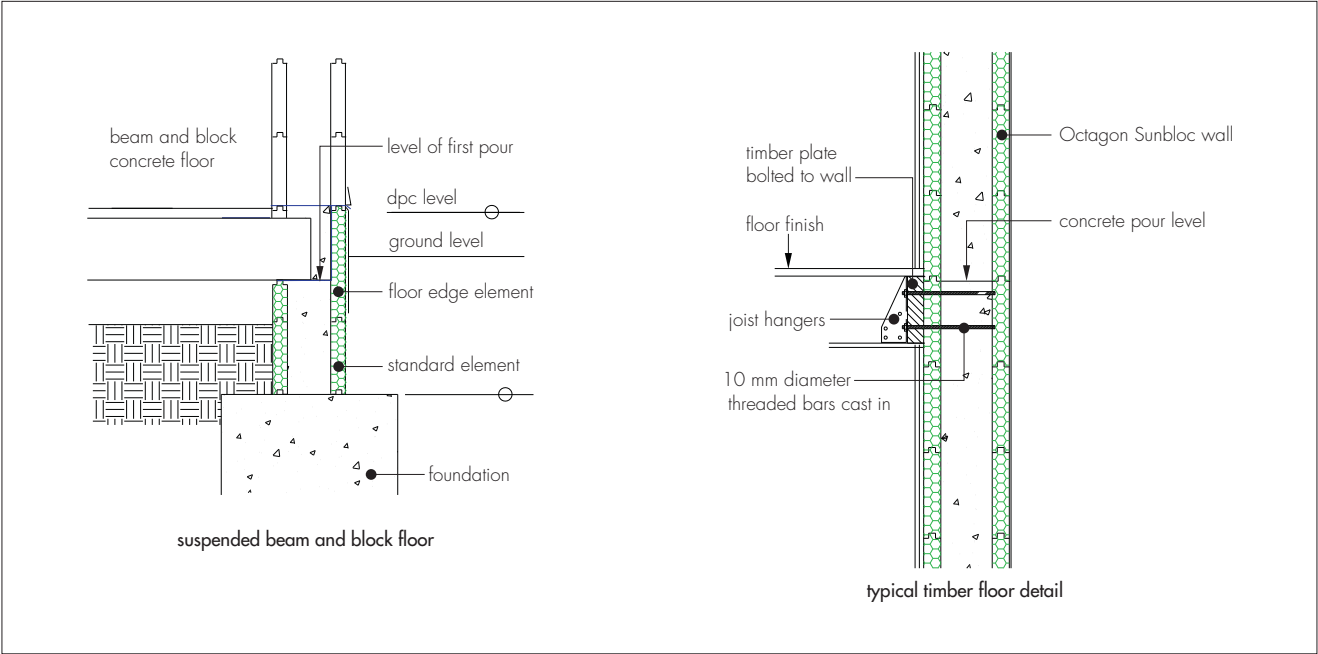
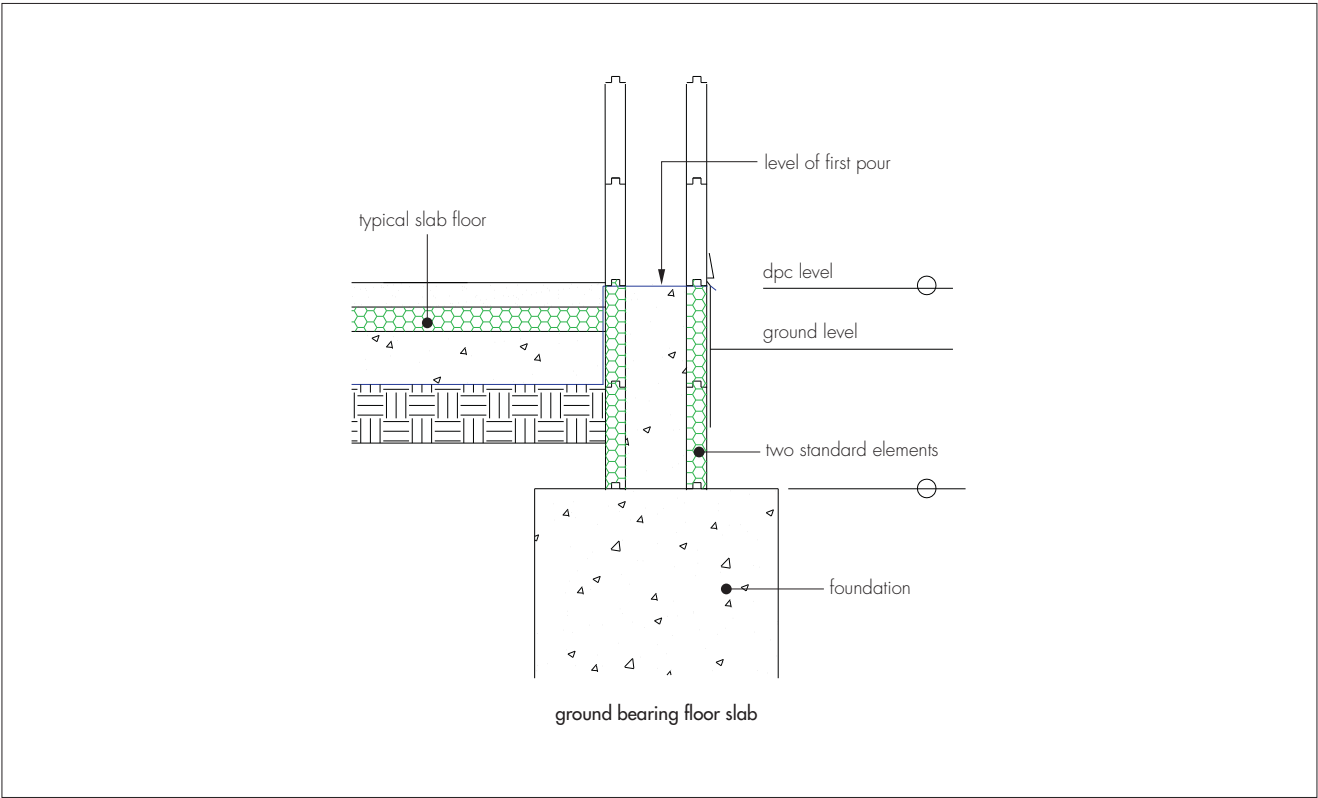


Figure 6 Typical foundation detail



ANNEX 2 PRODUCT RANGE (continued)

Figure 7 Typical structural window framing

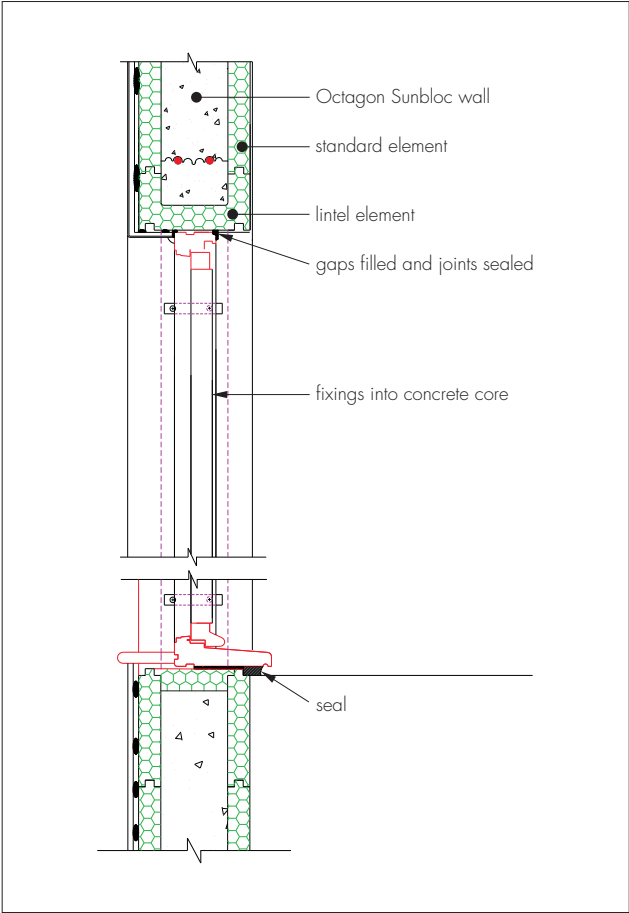
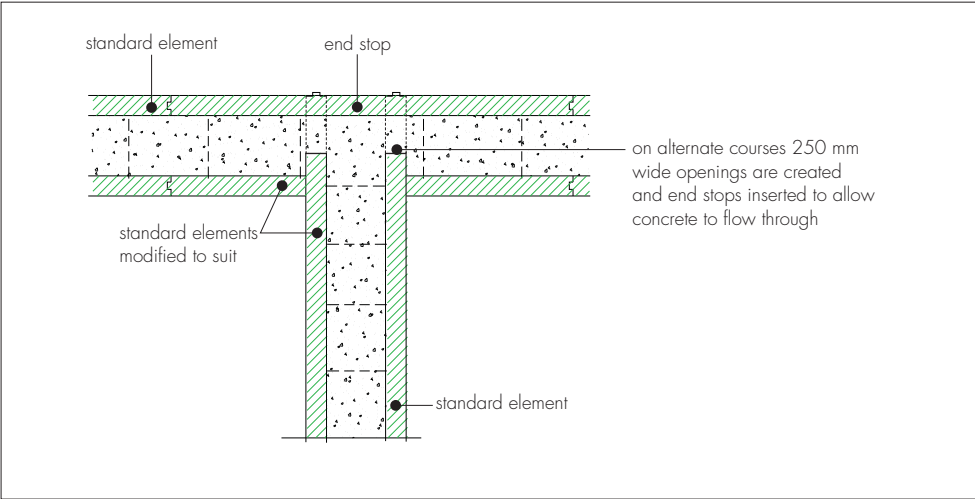


Figure 8 Plan of internal/external wall





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