

Design guide to separating distances during construction

Product Paper 4

Product assemblies to achieve different category levels of structural timber frame

Version 5.5 | December 2023 | Authored by Martin Milner

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Revision history

Version 2.0, October 2013 - solutions, solution matrix and combinations added

Version 3.0, October 2014 - editing on rules, Combination 5 added and CLT reference

Version 4.0, December 2015 - F3 updated and J10 added

Version 5.0, December 2016 - above 600m² removed, S4b added to P19, Site Safe logo updated, insulation notes added to P7, updated notes on non-wood based boards, plus flat roofs added

Revision 5.1, June 2017 - note added about performance of products for purposes other than fire robustness

Revision 5.2, August 2018 - PP5 added to Background/additional guidance, amends to tables 3.2 and 3.4, and new system F3 (Wolf) added

Revision 5.3, October 2019 - Rockwool product names: ProRox SL920 to Timber Frame Slab, ProRox SL930 to RW3

Revision 5.4, October 2023 - new STA branding update, note on avoiding humid conditions and mould, wall W7 adjusted, plus minor adjustments removing non-members and outdated solutions

Revision 5.5, December 2023 - correction to W7

1. Introduction and background

This document is to be read in conjunction with the STA guidance Design guide to separating distances during construction, parts 1, 2, 3 and 4.

This product paper is for the timber frame supply chain. It provides a set of wall and floor assemblies which, when combined, will provide the performance needed to achieve a specific category of timber frame e.g. Category A, B1, B2, B3 or C (C1 and C2) or CLT. The definition of assembly is a product that is delivered out of the factory from the manufacturer without additional works on site or in the case of floors delivered as loose elements for assembly on site before the next wall level is erected.

The combination of floor and wall assemblies allows the timber frame supply chain to respond to client design requirements on the category of timber frame needed to fulfil the off the site risk assessment appraisal for the project.

The STA Guidance document 'Design guide to separating distances during construction - For timber buildings above 600m² total floor area, parts 1, 2, 3 and 4', provides the client and project designers with the tools to select a category of timber frame suitable for the separation distance being considered. The procurement of timber frame will involve timber frame companies providing a Category A, B1, B2, B3 or C1, C2 frame or CLT. The STA guidance provides generic advice on the timber frame assembly to achieve a specific category of timber frame (Figure 3.2 in the guidance). This product paper provides the options for walls and floors to achieve the category required.

It is recommended that the timber frame design team shall provide confirmation, as part of their CDM regulation duties, that the appropriate assembly in their design submission complies with the category of timber frame required in the procurement documents, and that this is carried through to production drawings. The appendix in this paper provides a proforma for self-certification on the assembly selection process and Figure 4.1 shows a diagrammatic flow chart on the steps in the process from concept to the project starting on site.

In using this paper the timber frame designers must be familiar with the STA guidance parts 1 to 4 and the products listed on the STA website that have been reviewed to comply with the fire testing and performance required for products in a timber frame assembly.

This product paper provides generic advice relating to fire robustness during construction and no other performance criteria is presented. The STA do not take responsibility for the performance of products and it is the responsibility of the specifier to ensure the products are suitable for the building design.

Background

The information provided in this paper is the deliverable from the research undertaken by the STA and the supply chain industry to find a flexible approach to different combinations of materials and systems to achieve categories of timber frame. The research involved an extensive test programme and review overseen by HSL, FERMI and Milner Associates. The programme and as delivered outputs have been presented to the timber frame working group that includes HSE, CFOA, FPA, FBU, ABI and the STA. Further consultation has been undertaken across the timber frame industry sectors.

Testing of timber frame build methods, (i.e. wall and floor panels) has demonstrated that radiant heat and growth of fire can be influenced by the materials which make up the structure, or elements that form part of the as delivered timber frame assembly. The STA, in conjunction with members of the timber frame working group have developed a test method that can be used to categorise different types of timber frame construction.

Supporting Technical Papers 1 to 3 provide information on the tests, methodology and frame categories (available from the STA website).

The research undertaken has enabled each wall and floor assembly to be awarded points which when the floor and wall points are added together correspond to a category.

CLT products are not included in this paper as the combination of ignitable surface but resistance to flame spread currently requires more research to determine appropriate points. CLT products require fire engineering review for inclusion with other products.

Additional guidance on materials and applications is available from STA members in the following papers:

Product Paper 1, 2 and 3

Technical Note 7.2

Product Paper 5; separation distances for buildings with a floor area less than 250m², which does not currently have fire risk mitigation solutions. For risk mitigation for buildings during construction use this product paper in conjunction with the main STA fire safety guidance parts 2 and 3.

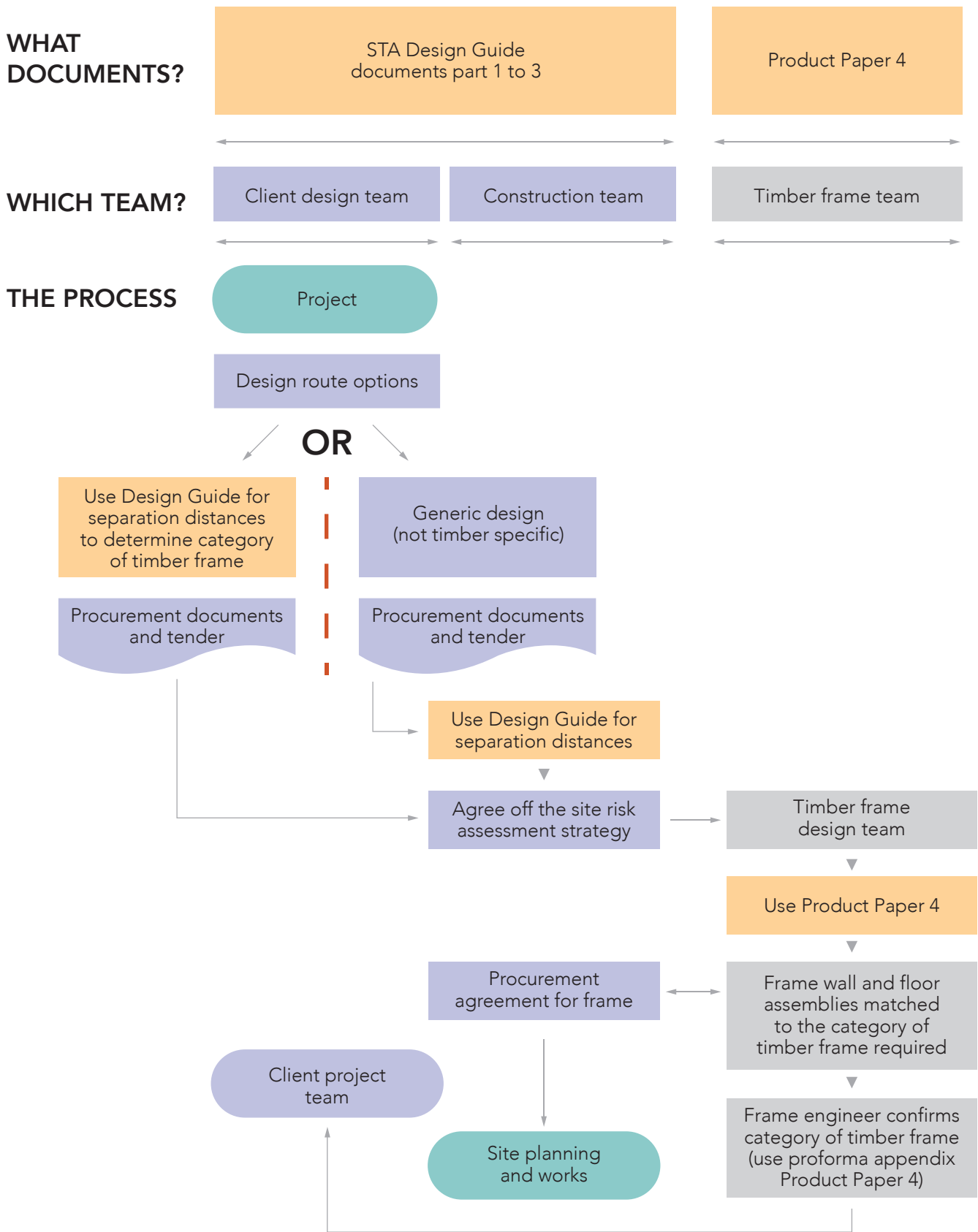


Figure 4.1: Process understanding of where the Product Paper 4 fits into selection of category of timber frame

Level of guidance and technical papers - target users

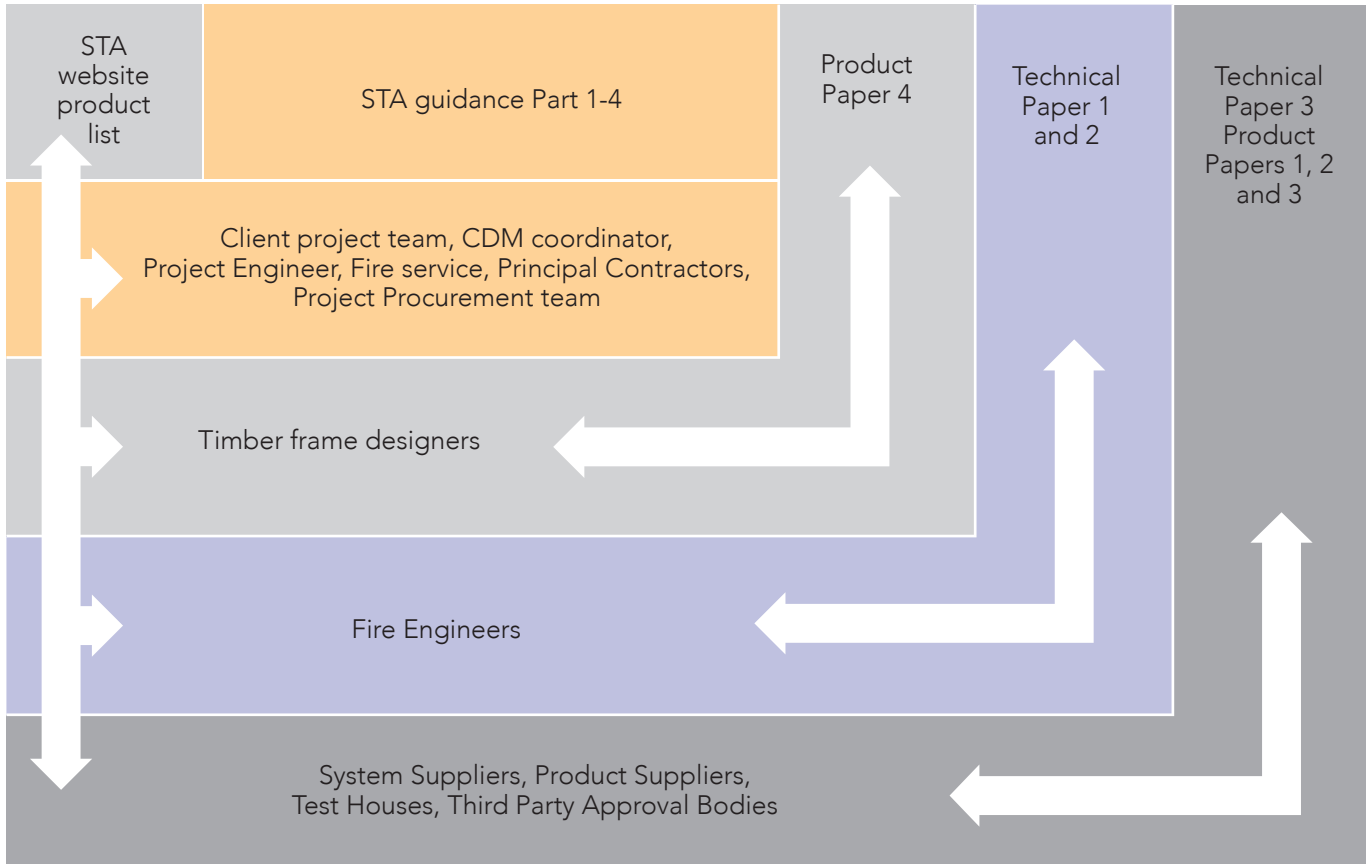


Table 4.2: Diagrammatic explanation of where STA Guidance and supporting papers are used

2. Build assemblies compliance

Assemblies that comply with each type of category to reduce separating distances

Once a category of timber frame has been determined, in accordance with the STA guidance document 'Design guide, parts 1, 2 and 3', then this paper can be used to provide solutions to match the required category.

Timber frame designers can select appropriate wall and floor/flat roof assemblies to match the total points needed for the category of timber frame they are to comply with. Please note that the points do not hold any significance other than providing a means to differentiate performance needed to match the category of timber frame.

The timber frame designer will, through the project design quality documents and processes, confirm that the category of timber frame being proposed is at the required level for the project as requested in the procurement documents. The use of the proforma self-certification document in the appendix can be used to confirm to the project team that the correct product assembly has been selected from this paper.

Details are for fire robustness for separating distances only. The project design team to ensure the full solution addresses thermal, acoustics strength, durability and safety. The table below provides the minimum points² needed to be achieved for each category.

CATEGORY	MINIMUM TOTAL POINTS FOR WALL + FLOOR/FLAT ROOF ³ ASSEMBLY	MINIMUM POINTS FOR THE FLOOR/FLAT ROOF ³ ASSEMBLY ALONE ¹
A	<3	
B1	3	1
B2	5	1
B3	6	1
C1/2	7	2

NOTE 1: The floor assembly has a significant bearing on the spread of fire and minimum values are needed to ensure that a high level wall does not allow a higher level of category.

NOTE 2: The points do not represent anything other than a means to differentiate the different category of timber frame compliance.

NOTE 3: In the context of this paper a flat roof is one with a pitch less than 15 degrees

NOTE: Category CLT is not included in this guidance.

Trapped moisture and avoiding mould

Avoiding mould

Where full category C2 frames are involved and the weather conditions are such that moisture is likely to be present, the lack of free ventilation within the enclosed room can create conditions for mould to form on material faces. To avoid mould and entrapped moisture ventilation is to be built-in. Window covers and fire door enclosures may have a slot of 25mm width by the window/door, or 50mm diameter holes at 300mm centres up to 0.05m² in the window/door or equivalent in each window/door. It is also advisable that where moisture has been allowed to enter into the room in question, then it is dried out by appropriate forced ventilation.

Care points to consider:

1. Is there ventilation in the room being enclosed?
2. Has the fire engineer/fire assessment specified products and addressed moisture threats during construction?
3. Can ventilation be included in the build process?
4. Can temporary waterproofing be undertaken to avoid moisture build up?

Avoiding defective materials

Where risk mitigation materials are used, the manufacturer shall be consulted regarding the impact of weather and if exposed conditions will create moisture build-up and entrap water within the product, which may cause serviceability problems in use.

Care points to consider:

1. Can the materials be kept dry, or exposed only for several days, not weeks?
2. Have the materials been checked for compliance with the method of building?
3. Have the following been appropriately answered by the manufacturer/supplier of the products used:
 - If the product becomes wet, will it release the moisture?
 - If the product becomes wet, will it change the material characteristics such as strength, stiffness and thickness?
 - Will material leach from the product that may cause other materials touching or near to the board to become affected?
 - Is there third-party approval, or acceptance of the product through experience?
 - What extra care is needed for the product in use?
 - What are the remedial works needed if the product becomes wet?

Follow-on trades and timber frame handover care points

1. The follow-on installation process shall check that the structure does not have excess moisture trapped within the materials.
2. The follow-on trades should have approval to proceed from the Principal Contractor, based on handover documentation that confirms that the moisture content in the framing is at or below the requirements of the project specifications.
3. It is common practice to see specification state that the timber frame to have moisture contents below 20% before enclosure; however, this value is based on whitewood/redwood in certain temperature and humidity conditions. The timber framer shall provide guidance as to the appropriate level of moisture content taking account that some products may record higher or lower moisture contents depending on their make up and environment in which they are placed.
4. It is advisable not to enclose or continue work without the Principal Designers approval if moisture content is found to be above 20%.

3. Rules for assemblies in categories B and C

3.1 Product types

Deck types

Minimum 15mm board (OSB, plywood) or 18mm chipboard unless noted otherwise; design may require larger sections.

Joist, rafter and stud types

PICTORIAL REPRESENTATION	BRIEF DESCRIPTION
	Rectangular timber based product sections
	I joists Timber based flanges with thin timber board webs
	Open Joists Timber based flanges with steel plate connected webs

NOTE: Timber based products are those with a charring rate of 0.67mm/min to BS 5268-pt 4.1. For example: sawn timber, Glu-laminated, Laminated Veneer Lumber and Laminated Strand Lumber. Minimum thickness of joists 38mm. Rim board minimum thickness is 25mm. Where specific joist types are required the type of joist will be stated in the tables.

Sheathing types

Unless referenced alternatives in Product Paper 4 minimum thickness of boards to be:

- Non-combustible Euro Class A1 - 9mm
- Limited combustibility Euro Class A2 - 12.5 and 15mm depending on application (see tables in section 4)
- Timber based - 9mm

All non-standard timber (outside of EN standards) and non-timber sheathing to comply with FC Build. See STA Product Paper 3 and also see note on 'Performance of products' on Page 10 of this document.

NOTE: FC Build is a name given to the quality check process for this specific application.

Insulation types

Generic types of insulation are difficult to attain as each product manufacture has different performances. For the purposes of this paper only mineral wool insulation - stone wool or glass wool material can be treated as generic.

Other types of insulation materials such as FR EPS, PUR, PIR and Phenolic should comply with the FI Build checklist. See STA Product Paper 2.

NOTE: *FI Build is a name given to the quality check process for this specific application.*

Type references to insulation in this paper refer to the response to fire and heat from a fire.

Type FI Build 1 - Melts under heat and has combustible gases e.g. EPS, PUR, wood wool, cellulose

Type FI Build 2 - Shrinks under heat and may have combustible gases e.g. PIR and phenolic foam

Type FI Build 3 - Maintains volume and does not combust e.g. stone wool

References supporting papers

FR Build - refers to flame retardant and intumescent coatings.

See STA guidance parts 1-3 and Product Paper 1 on the STA website.

FI Build - refers to the insulation standard. See STA guidance parts 1-3 and Product Paper 2 on the STA website.

FC Build - refers to the sheathing and decking standard.

See STA guidance parts 1-3 and Product Paper 3 on the STA website and note below on performance of products.

A1 & A2 - refers to EN reaction-to-Fire classifications for contribution to fire growth in accordance with EN 13501-1. A1 utilises EN 1182 and EN 1716 tests and is typically referenced as 'Non-Combustible'. A2 utilises EN 1716 and EN 13823 testing and is referenced typically 'Limited Combustible'

NOTE: *In the Scottish 2013 Technical Handbooks, Domestic Section 2 Fire classifies this as non-combustible as well as A1.*

Products can also be classified under the currently accepted British Standards with non-combustible products proven to tests to BS 476-4:1970 Fire tests on building materials and structures or BS 476-11:1982 Fire tests on building materials and structures - method for assessing the heat emission from building materials.

Also for limited combustibility products test compliance to BS 476-11:1982 is required as an alternative to European classification.

Performance of products

Please note that this guidance is for fire robustness and not for all other aspects of the product use in the building.

All boards and treatments are to be checked by the specifier for suitability of use; in particular compatibility with fasteners and durability in-service to account for any moisture variations - and how it reacts to relative humidity changes in cavity situations.

It is recommended by the STA that all products should have a third party certification for their end-use application.

3.2 Rules for floors in category B or C

LOCATION / ELEMENT	APPLICATION
Compartment floors	Basic structural floor select from section 4.1
Intermediate floors and stair well openings, lift shaft openings	<p>Select from section 4.1</p> <p>Stair well openings can be left open when stairs are present providing the exposed floor zone perimeter is FR Build protected or boarded with A1/A2 boards or where temporary decks are required within the void before stairs are installed to be as the floor construction or FR treated joists and deck</p> <p>Note for Category C structures the stair void presents a break in the pseudo horizontal compartmentation, however, stair void area to protection of walls and floors means that there is little potential for fire spread under this category and the stair void does not invalidate the assumptions made in the fire load to determine the radiant heat</p> <p>For lift shaft openings it is assumed that the shaft walls are protected in accordance to the frame classification requirements for the walls</p>
Joists and decking in Category C and roofs below 15 degree pitch	<p>For Category C the floor is to provide a level of resistance to the spread of fire into the compartment floor above</p> <p>Testing has shown that where joists are exposed it is the horizontal decking that presents the most significant risk for fire spread. Category C performance has been proven using decking comprising non-combustible boards - or boards with FR Build treatments, or where the use of appropriate Rockwool underlay has been applied to the untreated deck board</p> <p>The use of butt jointed boards has been tested and suitable where non-combustible boards or FR fully treated boards are used. Tongue and groove boards will be required where only underside surfaces are FR treated or directly protected by boards on one side (except where Rockwool underlay has been adopted to cover the joints)</p> <p>The nominal "compartmentation" of the floor is based on the decking material providing an initial barrier to the spread of fire. The floor joists are there to provide support to the decking. For most floors failure of the joist will result in collapse of the decking which would mean failure of the Category C model being considered</p> <p>For this reason FR Build rectangular sections have been proven to provide resistance to fire and maintain sufficient strength for the Category C fire condition. Testing of specifically designed and enhanced engineered joists i.e. I-joists and metal web joists, has proven to provide the robustness needed for the Category C criteria</p> <p>Alternatives will be enclosed joists with a suitable fire resistance covering that, where appropriate, has been tested</p> <p>Attic trusses of pitch between 15-55 degrees to be considered as "standard" truss and treated as a truss would be</p>

3.2 Rules for floors in category B or C cont.../

LOCATION / ELEMENT	APPLICATION
Service voids and holes	<p>For all openings greater than 50mm by 50mm, or equivalent, temporary infill is required to stop vertical fire spread</p> <p>Holes and gaps can be filled using stone wool insulation material of at least 50mm thickness</p>
Rim beams, header joists and perimeter blocking in fire compartmentation walls	<p>A vertical barrier to each fire compartment is required to be robust and not allow fire to migrate and spread into hidden cavities from where it can grow undetected. The use of stone wool packed within any rim beam cavity or FR Build treatments, or protection with boards of limited combustibility along the fire compartment wall has been found in tests to provide robust barriers</p> <p>Rim beams to be externally FR Build treated, or non-combustible waistband required</p>
Timber beams in floors/roofs	<p>The beams are to be treated as the floor joists/roof rafters</p> <p>Where exposed untreated large section timber beams are required assessment by an engineer is required for accidental load bearing capacity after charring</p> <p>Single glulam beams within the floor zone - no treatment required</p>

3.3 Rules for walls in category B or C

LOCATION / ELEMENT	APPLICATION
Sole plates	No FR Build treatment required
Head binders/wall plates	To be FR Build when used in conjunction with an FR build wall frame solution. Where internal walls adopt a non-combustible board on untreated studs, the head binder is also untreated and can be exposed
External wall panels	Select from section 4.2, 4.3, 4.4, 5.2 or for full systems section 6 NOTE: Risk mitigation sheathing to be over the full area of the external wall. At floor zones a waistband with a similar fire risk mitigation protection is to be provided, unless a fire engineering risk assessment can demonstrate otherwise
Internal load bearing walls	Select from section 4.2, 4.3, 4.4, 5.2 or for full systems section 6 Or - for unsheathed walls to be FR Build vertical and horizontal timbers, unless fire engineering risk assessment on an alternative has been provided
Party walls when used as a fire compartmentation	Select wall type from section 4.2 to 4.4 with minimum points of 5, or full wall and floor systems as given in section 6, or FR Build sheathing and timber frame with full fill mineral wool (FI Build type 2 or 3) in the party wall cavity. In all cases no combustible boarding, that is not FR Build compliant, is to be exposed during the construction process
Party walls not used as fire compartmentation	As internal load bearing walls
Parapet walls to roofs	The same as for an external wall. Select from section 4.2 to 4.4
Doors in fire compartmentation walls	Temporary fire doors may be constructed using weather resistant limited combustibility board, or non-combustible boards over a timber frame, or 30 min standard fire doors. Smoke seals are not required, unless it is a protected escape route. See STA Advice Note 7, Part 5 - Escape Routes Door to have a self-closure mechanism to frame
Window openings	Only Category C2 require temporary non-combustible or limited combustible boards over the opening and over the installed window until the room in which the windows is placed has a building regulation compliant fire protection of at least 30mins lining to the walls or an engineer's report providing an alternative strategy Note Category C2 specification is required to continue to at least 5m from a receiver face Gaps under doors and windows with category C enclosure - maximum gap allowable is 25mm

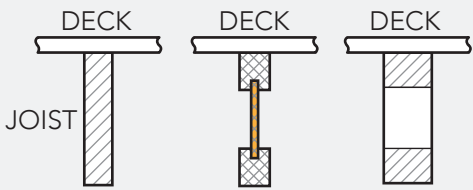
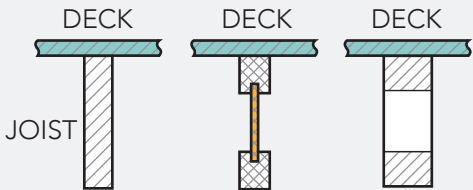
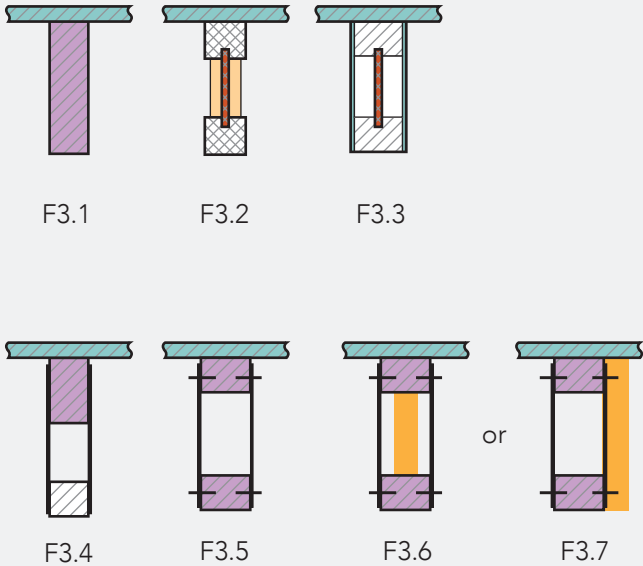
3.4 Rules for roofs in category B or C

LOCATION / ELEMENT	APPLICATION
For roof pitch less than 15 degrees	To be treated as the relevant category floor assembly. Trussed rafters, unless demonstrated by a fire risk assessment, to be treated in the same way as solid joists
For roof pitched roofs greater than 15 degrees	Standard timber components, including sarking
Room in the roof and Mansard roofs less than 55 degrees pitch	For Category C can be regarded as a pitched roof except where the emitter frame external wall line is 5 m or less from the receiver building then sarking and roof boarding shall be minimum FR Build or A1 or A2 boarding (all non combustible boards referenced in this paper are acceptable)
Room in the roof and Mansard roofs greater than 55 degrees pitch	Risk mitigation roof taken as an additional storey with treatment as the storey levels below. See Product Paper 5 for buildings less than 250m ² floor area - the pitch threshold is 50 degrees due to the increased sensitivity of smaller buildings and the reduced separation distances

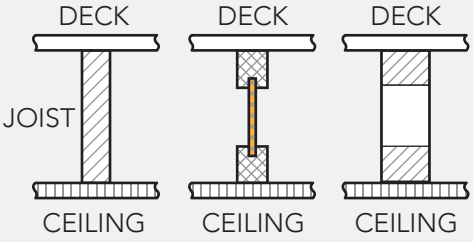

4. Allocation of points for assemblies

4.1 Floor and flat roof assemblies (open and closed panel elements)

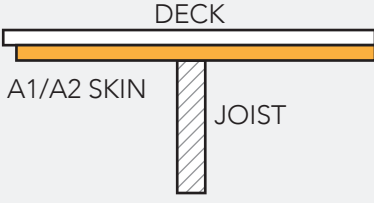
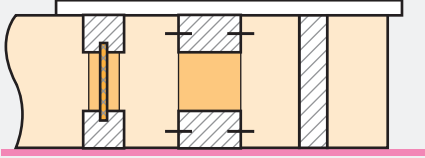
Details are for fire robustness for separating distances only. The project design team to ensure the full solution addresses thermal, acoustics strength, durability and safety.

REF	CONSTRUCTION OF FLOOR ELEMENTS	POINTS
F1	 <p>DECK - Not treated JOIST - Not treated</p>	0
F2	 <p>DECK - FR Build treatment JOIST - Untreated NOTE: Structural check on wall stability if floor diaphragm is absent under a fire condition</p>	1
F3	 <p>DECK¹ - FR Build treatment. JOIST - options as: F3.1 - FR Build solid rectangular F3.2 - I joist Rockwool web fill min 58mm flange F3.3 - I joist moisture resistant A1 or A2 board F3.4 - Finger jointed Metal-Web FR Build treatment to top flange F3.5 - MiTek Posi-Joist Fire-Safe or ITW SpaceJoist Category C or Wolf Systems Ltd easi-joist Category C F3.6 - MiTek Posi-Joist and Fire-Safe Plus F3.7</p> <p>See Appendix 2 for joist technical descriptions and make up.</p> <p>¹ See alternative product listing section 4.1.2</p>	2

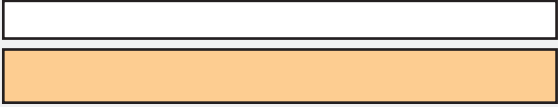
4.1 Floor and flat roof assemblies (open and closed panel elements) cont.../

REF	CONSTRUCTION OF FLOOR ELEMENTS	POINTS
F4	 <p>DECK - Not treated JOIST - Not treated CEILING² - A2 board 12.5mm minimum or 9mm A1 board</p> <p>Construction notes:</p> <ol style="list-style-type: none"> Board to be correctly screwed to the joists for fire resistance to manufactures instruction This solution can be temporary or permanent solution, but the process and installation must occur before any additional timber frame walls are installed above the floor level Durability and sensitivity to the weather conditions of the construction shall be considered. H&S issues can arise if non weather resistant products are used, become wet and fall off the floor structure <p>² See alternative product listing section 4.1.2</p>	2
F5	 <p>DECK - A1/A2 structural (minimum of 15 mm) JOIST³ - Solid untreated</p> <p>NOTE: <i>The designer shall ensure the decking is structurally appropriate and suitable to walk over during wet weather and does not become a slip hazard. See Product Paper 3 for compliance. Third party approval required for application</i></p> <p>³ See alternative product listing section 4.1.2</p>	2

4.1 Floor and flat roof assemblies (open and closed panel elements) cont.../

REF	CONSTRUCTION OF FLOOR ELEMENTS	POINTS
F6	 <p>The diagram shows a cross-section of a floor assembly. At the top is a horizontal layer labeled 'DECK'. Below it is another horizontal layer labeled 'A1/A2 SKIN'. This skin is supported by a vertical 'JOIST' that passes through it. The joist is shown with a hatched pattern.</p> <p>DECK - Not treated DECK UNDERSIDE SKIN² - 9mm minimum A1 board or 12.5mm A2 board JOIST³ - Solid, not treated Note: A1/A2 skin structural compatibility in terms of deflection not causing cracking. Top surface shall not be sensitive to the weather conditions of the construction by moisture build up at the interface of the skin and board. <i>Third party approval required for application</i></p> <p>^{2,3} See alternative product listing section 4.1.2</p>	2
F7	 <p>The diagram shows a cross-section of a floor assembly. At the top is a horizontal layer labeled 'DECK'. Below it is a vertical 'JOIST'. The joist is supported by a base. Below the joist is a layer of 'INSULATION'. At the bottom is a layer labeled 'CEILING'.</p> <p>DECK - Not treated JOIST - Options I joist (58mm flange) with Stone wool web fill, Metal Web with Stone wool web fill, solid joist all not FR Build treated INSULATION - Type 2/3 mineral wool base full depth of floor void and secured CEILING - Fire spread resistant membrane that has been tested to room test Note: <i>Durability and suitability for weather conditions during construction to be considered with suitable inspection criteria to ensure insulation and structure has not become wet. This construction is assumed to arrive on site pre constructed. Onsite applications will require full installation prior to the next floor level walls being erected</i></p>	2

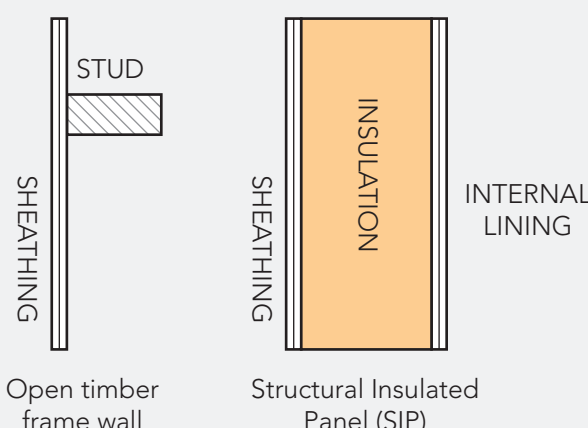
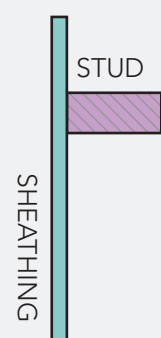
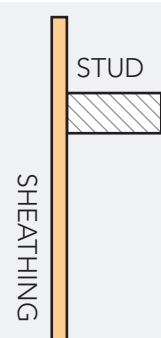
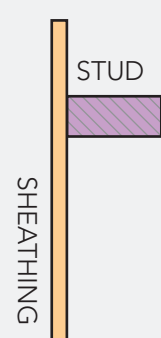
4.2 Floor and flat roof assemblies (alternative products)

<p>¹ Alternatives for the FR Build decking Rockwool 40mm decking protect</p> 	<p>Untreated decking plus 40mm Rockwool RW3, or current equivalent Rockwool product, fixed below the deck</p>
<p>² Alternatives for the ceiling board/deck underside in F4/F6</p>	<p>Fermacell 10mm board RCM Y wall 6mm board Resistant XS 6.5mm board</p>
<p>³ Alternatives for the joists in F5/F6</p>	<p>F3.2 - I joist Rockwool web fill min 58mm flange F3.3 - I joist moisture resistant A1 or A2 board F3.4 - Finger jointed Metal Web FR Build Treatment to top flange F3.5 MiTek Posi-Joist Fire-Safe or ITW SpaceJoist Category C or Wolf Systems Ltd easi joist Category C F3.6 and F3.7 - MiTek Posi-Joist Fire-Safe Plus See Appendix 2 for joist descriptions</p>

† For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

4.3 Wall assemblies (open panel elements)

Details are for fire robustness for separating distances only. The project design team to ensure the full solution addresses thermal, acoustics strength, durability and safety.

REF	Construction of floor elements	POINTS	
W1	 <p>Open timber frame wall</p> <p>Structural Insulated Panel (SIP)</p>	<p>Standard open timber frame panel</p> <p>STUD - Not FR Build treated</p> <p>SHEATHING - Timber not treated</p> <p>OR</p> <p>Standard Structural Insulated Panel (SIP) with untreated timber board facings</p> <p>OR</p> <p>Standard massive wood elements such as CLT</p>	0
W2		<p>Open timber frame panel</p> <p>SHEATHING - FR Build treated min 9mm</p> <p>STUD - FR Build treated</p>	2
W3		<p>Open timber frame panel</p> <p>STUD - Not FR Build treated</p> <p>SHEATHING⁴ - 9mm A1 or 12.5mm A2</p> <p>⁴ See alternative product listing</p>	5
W4		<p>Open timber frame panel</p> <p>STUD - FR Build treated</p> <p>SHEATHING⁴ - 9mm A1 or 12.5mm A2</p> <p>⁴ See alternative product listing</p>	5

4.4 Wall assemblies (alternative products for open panels)

⁴ Alternatives for the sheathing board in W3 and W4[†]

Resistant XS min 6.5mm board

See note relating to 'Performance of products' on Page 10

- † For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

4.5 Wall assemblies (pre-insulated panel elements)

REF	Construction of floor elements	POINTS	
W5		<p>STUD - Not FR Build treated</p> <p>INSULATION - FI Build min Type 1</p> <p>SHEATHING⁵ - FR Build treated - min 9mm</p> <p>NOTE: <i>Insulation to be tight fitting and retention of insulation by clips or equal required</i></p> <p>⁵ See alternative product listing</p>	2
W6		<p>STUD - FR Build treated</p> <p>INSULATION - FI Build min Type 2</p> <p>SHEATHING⁵ - FR Build treated - min 9mm</p> <p>NOTE: <i>Insulation to be tight fitting and retention of insulation by clips or equal required</i></p> <p>⁵ See alternative product listing</p>	3
W7		<p>STUD - Not FR Build treated</p> <p>INSULATION - FI Build min Type 3</p> <p>SHEATHING⁵ - FR Build treated - min 9mm</p> <p>NOTE: <i>Insulation to be tight fitting and retention of insulation by clips or equal required</i></p> <p>⁵ See alternative product listing</p>	4
W8		<p>STUD - FR Build treated</p> <p>INSULATION - FI Build min Type 2</p> <p>SHEATHING⁵ - FR Build treated - min 9mm</p> <p>INTERNAL LINING - 9mm A1 or 12mm A2 board</p> <p>NOTE: <i>Insulation to be tight fitting and retention of insulation by clips or equal required</i></p> <p>⁵ See alternative product listing</p>	5

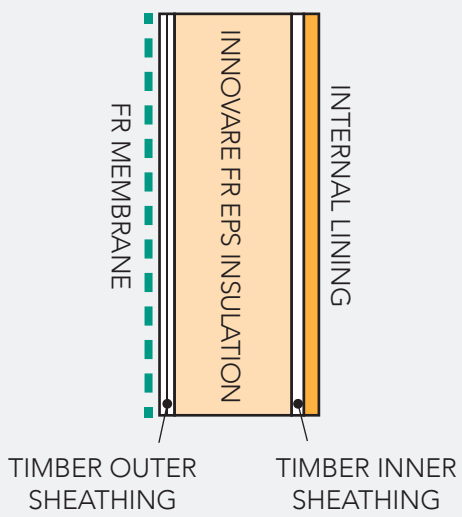
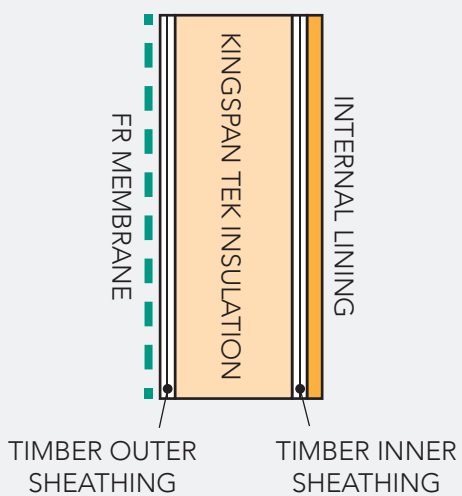
4.6 Wall assemblies (alternative products for pre-insulated panels)

⁴ Alternatives for the internal lining board in W8 [†]	<i>Resistant XS min 6.5mm board</i> <i>See note relating to 'Performance of products' on Page 10</i>
⁵ Alternatives for the sheathing board in W5, W6, W7 and external W8 [†]	<i>Fermacell min 10mm board</i> <i>RCM Y wall min 6mm board</i> <i>Resistant XS min 6.5mm board</i> <i>Norbord 9mm OSB treated with NoBurn intumescent both sides</i> <i>Norbord composite with external outer face 3mm Resistant MgO laminated to 9mm Norbord OSB/3</i> <i>SmartPly FR OSB/3 min 11mm</i> <i>See note relating to 'Performance of products' on Page 10</i>

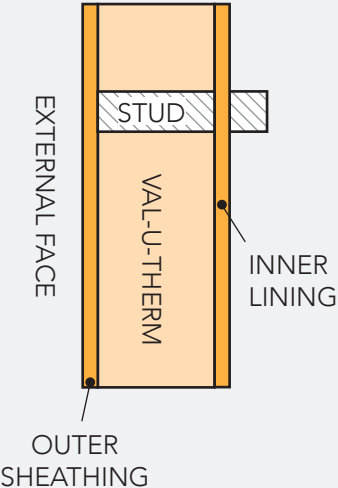
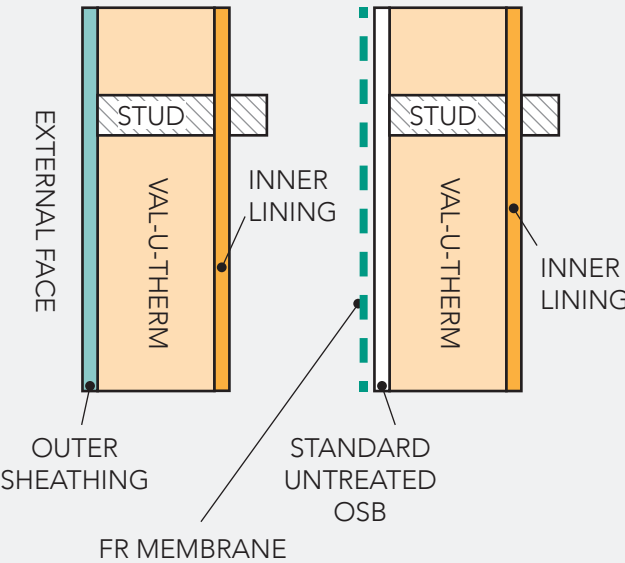
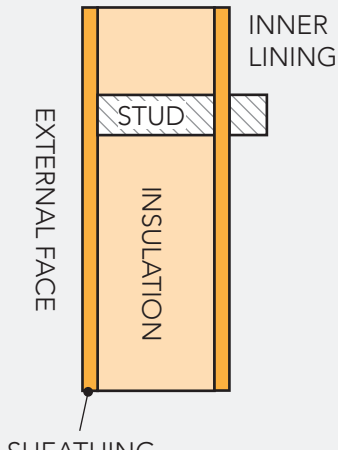
[†] For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

4.7 System wall assemblies

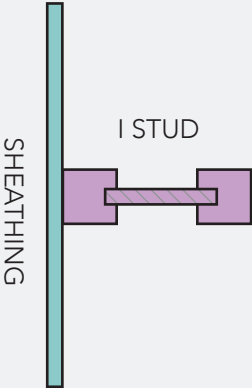
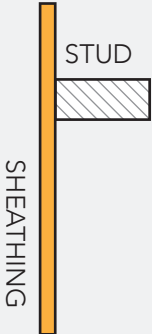
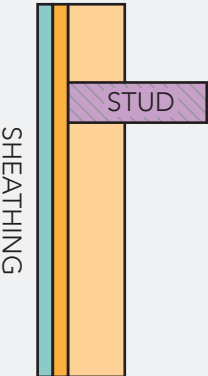
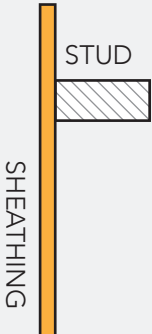
Details are for fire robustness for separating distances only. The project design team to ensure the full solution addresses thermal, acoustics strength, durability and safety.

REF	CONSTRUCTION OF FLOOR ELEMENTS	POINTS	
S1	SYSTEM NO LONGER AVAILABLE		
S2	 <p>FR MEMBRANE</p> <p>INNOVARE FR EPS INSULATION</p> <p>INTERNAL LINING</p> <p>TIMBER OUTER SHEATHING</p> <p>TIMBER INNER SHEATHING</p>	<p>COMPANY SYSTEM BY INNOVARE</p> <ul style="list-style-type: none"> - Structural Insulated Panel with pre fitted over clad lining <p>EXTERNAL MEMBRANE⁶</p> <ul style="list-style-type: none"> - As tested flame resistant breather membrane secured to the SIPtimber inner SIP boarding <p>INTERNAL LINING - 15mm A2 board secured to the SIP timber boarding</p> <p>All board fixings at manufactures recommended fixings for fire resistant performance</p> <p>⁶ See alternative product listing</p>	5
S3	 <p>FR MEMBRANE</p> <p>KINGSPAN TEK INSULATION</p> <p>INTERNAL LINING</p> <p>TIMBER OUTER SHEATHING</p> <p>TIMBER INNER SHEATHING</p>	<p>COMPANY SYSTEM BY KINGSPAN TEK</p> <ul style="list-style-type: none"> - Structural Insulated Panel with pre fitted over clad lining <p>EXTERNAL MEMBRANE⁶</p> <ul style="list-style-type: none"> - Tested flame resistant breather membrane secured to the SIP timber boarding <p>INTERNAL LINING⁴ - 9mm A1 board or 12.5mm A2 board secured to the SIP inner sheathing board</p> <p>All board fixings at manufactures recommended fixings</p> <p>^{4, 6} See alternative product listing</p>	5

4.7 System wall assemblies cont.../

<p>S4a</p>		<p>VAL-U-THERM - Pre insulated and pre clad wall panels STUD - Not FR Build treated INNER LINING⁴ - Internal lining 9mm A1 board OUTER SHEATHING⁶ 9mm A1 board INSULATION - Val-U-Therm UNTREATED BATTENS - 38mm by 45mm All board fixings at manufactures recommended fixings for fire resistant performance ^{4, 6} See alternative product listing</p>	<p>5</p>
<p>S4b</p>		<p>VAL-U-THERM - Pre insulated and pre clad wall panels STUD - Not FR Build treated INNER LINING⁴ - Internal lining 9mm A1 board OR 9mm SmartPly OSB3 with 9mm A1 or 12.5mm A2 board over clad (room facing) OUTER SHEATHING[†] Min 11mm SmartPly FR OSB3 INSULATION - Val-U-Therm UNTREATED BATTENS - 38mm by 45mm All board fixings at manufactures recommended fixings for fire resistant performance ⁴ See alternative product listing</p>	<p>5</p>
<p>S5</p>		<p>DONALDSON TIMBER SYSTEMS - Sigma II Closed Panel Building System STUDS - Not FR Build treated INNER LINING⁴ - Internal 9mm A1 board or 12.5mm A2 board OUTER SHEATHING⁶ - 9mm A1 board 12.5mm A2 board INSULATION - Sigma II Cavity Insulation UNTREATED BATTENS - 38mm by 25mm ^{4, 6} See alternative product listing</p>	<p>5</p>

4.7 System wall assemblies cont.../

S6		<p>ENGINEERED WOOD PRODUCTS COMMITTEE - I joist wall</p> <p>STUDS - FR Build treated 220 by 45 I joist</p> <p>SHEATHING - FR Build 9mm ply</p> <p>NO INSULATION</p> <p>UNTREATED BATTENS</p> <p>- Open panel frame</p>	3
S7		<p>BESPOKE OPEN TIMBER FRAME PANEL</p> <p>STUD - Not FR Build treated</p> <p>SHEATHING - 10mm Fermacell board</p> <p>OR</p> <p>6mm RCM Calcium Silicate</p>	4
S8		<p>NORBORD WALL SYSTEM</p> <p>SHEATHING - Norbord composite. Inner face 3mm resistant® board. Outer face 9mm Norbord No Burn® OSB</p> <p>STUD - FR Build treated</p> <p>INSULATION - Rockwool® 40mm Rockwool RW3 stapled to sheathing</p> <p>NOTE: Combination 4 in section 6 for Category C compliance</p>	4
S9		<p>UNILIN WALL SYSTEM</p> <p>STUD - Not FR Build treated</p> <p>SHEATHING - 12mm Hydroflame</p>	2

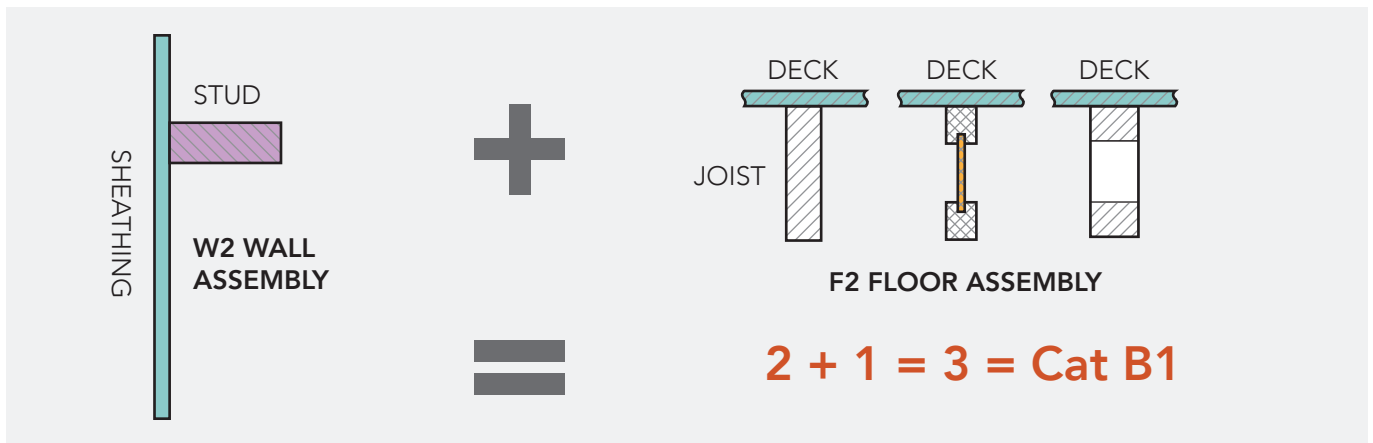
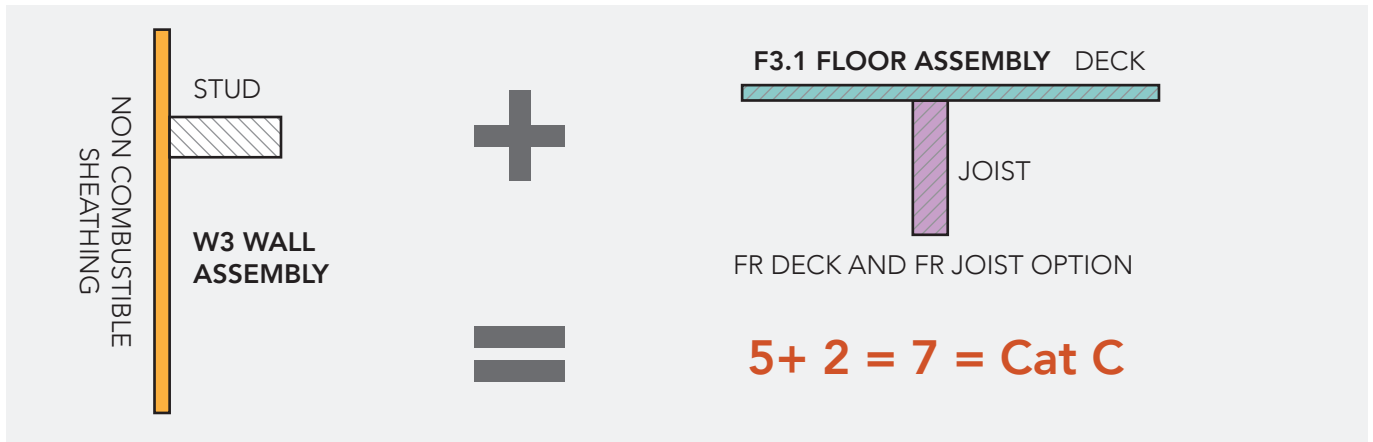
4.8 Wall assemblies (alternative products for system walls)

⁴ Alternatives for the internal lining board [†]	Resistant XS min 6.5mm board <i>See note relating to 'Performance of products' on Page 10</i>
⁶ Alternatives for the sheathing board [†]	Fermacell min 10mm board RCM Y wall min 6mm Resistant XS min 6.5mm board <i>See note relating to 'Performance of products' on Page 10</i>

[†] For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

5. Examples of points and assemblies

5.1 How the numbers work



5.2 Matrix of solutions

For ease of selection the following provides an easy route to product selection.

W1		FLOOR ASSEMBLIES						
		F1	F2	F3	F4 ⁷	F5	F6	F7
WALL ASSEMBLIES	W1	A	A	A	A	A	A	A
	W2	A	B1	B1	B1	B1	B1	B1
	W5	A	B1	B1	B1	B1	B1	B1
	W6	A	B1	B2	B2	B2	B2	B2
	S6	A	B1	B2	B2	B2	B2	B2
	W7	A	B2	B3	B3	B3	B3	B3
	S7	A	B2	B3	C ⁹	B3	B3	B3
	S8	A	B2	B3	C ⁸	B3	B3	B3
	W3	A	B3	C	C	C	C	C
	W4	A	B3	C	C	C	C	C
	W8	B3 ¹⁰	B3	C	C	C	C	C
	S2	A	B3	C	C	C	C	C
	S3	A	B3	C	C	C	C	C
	S4	A	B3	C	C	C	C	C
	S5	A	B3	C	C	C	C	C

Table of floor and wall combinations for selection of category to reduce separating distances

NOTE 7:

See section 6 for Category C combinations using F4 floor

NOTE 8:

S8 and F4 floor tested to Category C - see section 6

NOTE 9:

S7 and F4 floor tested to Category C - see section 6

NOTE 10:

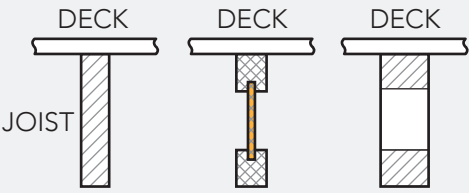
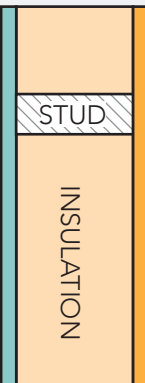
W8 and F1 floor tested to Category B3 - see section 6

6. Wall and floor systems as tested

Tests using the STA small room test as given in Technical Paper 2 and 3 have resulted in specific combinations that are not given in the assembly combinations. The following provides the classifications of tests as submitted to the STA but not suitable for interchangeable assembly approach subject to further testing and research.

Details are for fire robustness for separating distances only. The project design team to ensure the full solution addresses thermal, acoustics strength, durability and safety.

Combination 1 - STA B3 solution

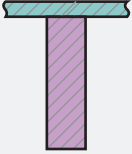
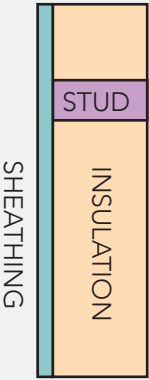
CONSTRUCTION	DETAIL	CATEGORY OF CONSTRUCTION
<p>Floor</p>  <p>Wall</p> 	<p>Floor Not FR Build treated floor structure (reference F1)</p> <p>Wall STUD - Not FR Build treated INSULATION - FI Build Type minimum type 1 INTERNAL LINING⁴ - A1 board 9mm or A2 board 12.5mm SHEATHING⁵ - External min FR Build treated - 9mm or A1/ 12.5mm A2 boards Note: structural checks on wall stability if floor diaphragm is absent</p>	<p>B3</p>

Alternative products for Combination 1

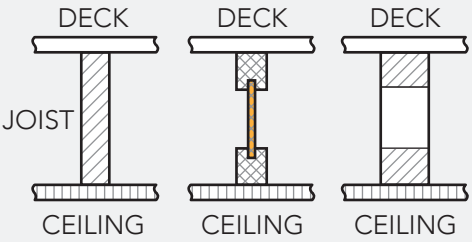
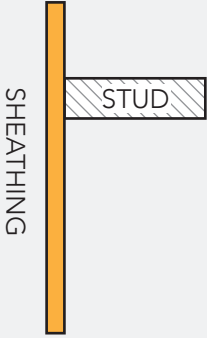
Alternatives for the interal linings [†]	Duncryne Econicboard min 6mm IWS min 7mm fast board Resistant XS min 6.5mm board <i>See note relating to 'Performance of products' on Page 10</i>
⁵ Alternative products for Combination 1 sheathing [†]	Duncryne Econicboard min 6mm board Fermacell min 10mm board IWS min 7mm fast board RCM Y wall min 6mm board Resistant XS min 6.5mm board Norbord 9mm OSB treated with NoBurn intumescent both sides Norbord composite with external outer face 3mm Resistant MgO laminated to 9mm OSB/3 SmartPly FR OSB/3 min 11mm <i>See note relating to 'Performance of products' on Page 10</i>

[†] For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

Combination 2 - SmartPly floor wall system

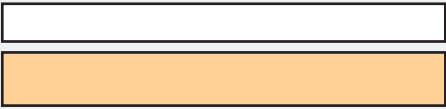
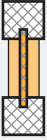
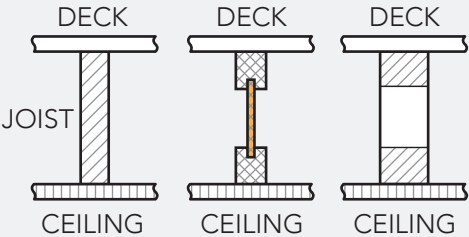
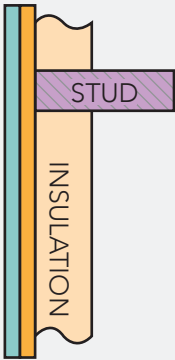
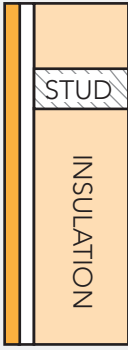
CONSTRUCTION	DETAIL	CATEGORY OF CONSTRUCTION
<p>Floor</p>  <p>Wall</p> 	<p>Floor DECK - SmartPly FR Build OSB/3 min 15mm JOIST - F3.1 FR Build solid rectangular Note: all F3 joist solutions are acceptable</p> <p>Walls SHEATHING - SmartPly FR OSB/3 min 11mm STUD - FR Build treated INSULATION - Type 3 insulation - Stone wool full fill</p>	<p>B3</p>

Combination 3 - Fermacell open panel solution

CONSTRUCTION	DETAIL	CATEGORY OF CONSTRUCTION
<p>Floor</p>  <p>Wall</p> 	<p>Floor</p> <p>DECK - Not FR Build treated JOIST - Not FR Build treated CEILING - 10mm Fermacell board[†]</p> <p>Walls</p> <p>Open timber frame panel STUD - Not FR Build treated SHEATHING - Fermacell 10mm board[†]</p> <p><i>See note relating to 'Performance of products' on Page 10</i></p>	<p>C</p>

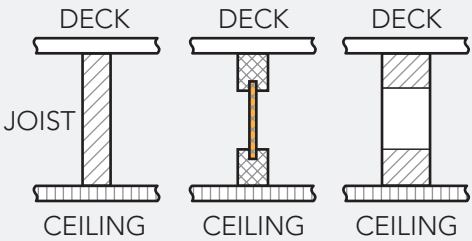
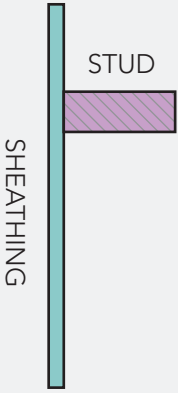
† For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted.

Combination 4 - Norbord/Rockwool floor and wall system

CONSTRUCTION	DETAIL	CATEGORY OF CONSTRUCTION
<p>Floor Decking - Rockwool 40mm decking protect</p>  <p>Plus J8 (see appendix)</p>  <p>or F4 floor assembly</p>  <p>Wall</p>  <p>OR</p> 	<p>Floor DECK - Norbord 15mm OSB/3 decking with 40mm Rockwool ProRox SL 930 to underside. JOIST - I joist minimum flange width of 58mm not FR Build treated but web protected by min 25mm rock wool Rockwool ProRox SL 930 fitted tight between flanges and secured by staples top and bottom OR F4 floor assembly</p> <p>Walls SHEATHING - Norbord composite. Inner face 3mm resistant® board. Outer face 9mm Norbord NoBurn® OSB STUD - FR Build treated INSULATION - 40mm Rockwool ProRox SL 930 - stapled to sheathing</p> <p>OR</p> <p>SHEATHING - Norbord composite 9mm thick Norbord OSB/3 laminated to 3mm thick resistant multi-pro MgO board on the exposed face STUD - untreated INSULATION - Rockwool® full fill</p>	<p>C</p>

† For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer’s third party certificates and product data sheets are to be consulted.

Combination 5 - UNILIN wall and floor frame system

CONSTRUCTION	DETAIL	CATEGORY OF CONSTRUCTION
<p>Floor</p>  <p>Wall</p> 	<p>Floor</p> <p>DECK - Not FR Build treated JOIST - Not FR Build treated CEILING - 12.5mm plaster board</p> <p>Walls</p> <p>Open timber frame panel SHEATHING - 12mm Hydroflame STUD - FR Build treated</p>	<p>B3</p>

7. Appendices

Appendix 1: STA proforma for self-certification of product assembly

STA member certification of product assemblies to comply with the category level of timber frame

This document is to be completed by the STA timber frame company and submitted to the prime contractor. A copy of the document is to be held on the construction site for inspection.

Project details

Project reference

Fabricator Member

Project reference

Principal contractor

Timber Frame designer

Project brief description

Risk assessment details

Project site radiant heat risk assessment report reference or reference to STA guidance parts 1, 2 and 3

Category of timber frame required:

- Category A - location reference drawing to be attached
- Category B - location reference drawing to be attached
- Category C - location reference drawing to be attached
- Category CLT - location reference drawing to be attached

Product assembly compliance certification

It is recorded that the timber frame design includes for the required category of timber frame noted in the off the site radiant heat risk assessment report requirements. The product assemblies have been checked against the STA Guidance parts 1, 2, 3 and 4 and where noted against either a third party approved system or as identified in the STA Product Paper 4.

Appendix 1 continued.../

Summary of product assembly types adopted in the design

External walls

- 1
- 2
- 3
- 4
- 5
- 6

Internal load bearing walls

- 1
- 2
- 3
- 4
- 5
- 6

Fire compartmentation walls

- 1
- 2
- 3

Fire doors in fire compartmentation walls

Appendix 1 continued.../

Floors

Roof

Specific product reference for identification

Flame retardant / intumescent supplier

Confirm STA website listed YES

Colour






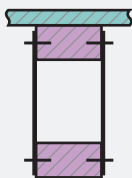
Non-combustible boarding description †

Limited combustible boarding description

Insulation description

† For non-wood based boards refer to STA Technical Note 7.2 and Product Paper 3, which are to be followed, together with all health and safety considerations when handling the material. The manufacturer's third party certificates and product data sheets are to be consulted. In addition see note relating to 'Performance of products' on Page 10.

Appendix 2: Floor joist types and description

REF	DESCRIPTION	DRAWING REF
J1	Not FR Build treated joist	
J2	Not FR Build treated I joist	
J3	Not FR Build treated metal web joist	
J4	FR Build treated joist rectangular section	
J5	FR Build finger jointed metal web FR Build treated top flange engineered for spans using top flange to span only under accidental load + charring rate.	
J6	MiTek Posi-Joist Fire-Safe metal web 1 47 mm thick FR treated TR26 chords 2 Posi-Strut webs 3 Enhanced fixings of the webs to the chords	

Appendix 2: Floor joist types and description cont.../

REF	DESCRIPTION	DRAWING REF
J7	<p>MiTek Posi-Joist Fire-Safe Plus metal web</p> <ol style="list-style-type: none"> 47mm thick FR treated TR26 chords Posi-Strut webs Enhanced fixings of the webs to the chords 30mm Rockwool Timber Frame Slab batt fixed between the webs of the Posi-Joists or to one face of the Posi-Joist 	
J8	<p>Norbord/Rockwool I Joist</p> <p>Not FR Build treated I joist with 25mm Rockwool RW3 , or current equivalent product, each side of web, minimum flange size 58mm</p>	
J9	<p>Untreated I joist with 12.5mm moisture resistant plasterboard board across flanges screwed to flange at 230mm centres or nailed at 150mm centres</p> <p>Alternative bespoke boards:</p> <p>Fermacell min 10mm board RCM Y wall min 6mm Resistant XS min 6.5mm board</p> <p><i>See note relating to 'Performance of products' on Page 10</i></p>	
J10	<p>ITW SpaceJoist Category C</p> <ol style="list-style-type: none"> 47 mm thick FR treated TR26 chords SpaceJoist webs SJ9, SJ10, SJ12 Placement ITW 35mm length, 3.4mm diameter square twist nails 	
J11	<p>Wolf Systems Ltd - easi-joist Category C</p> <ol style="list-style-type: none"> 47mm thick FR treated TR26 chords Wolf Systems - WS 200, 250, 300 Placement nail 38mm length, 3.7mm diameter square twisted nails 	

This product paper provides generic advice relating to fire robustness during construction and no other performance criteria is presented. The STA do not take responsibility for the performance of products and it is the responsibility of the specifier to ensure the products are suitable.

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