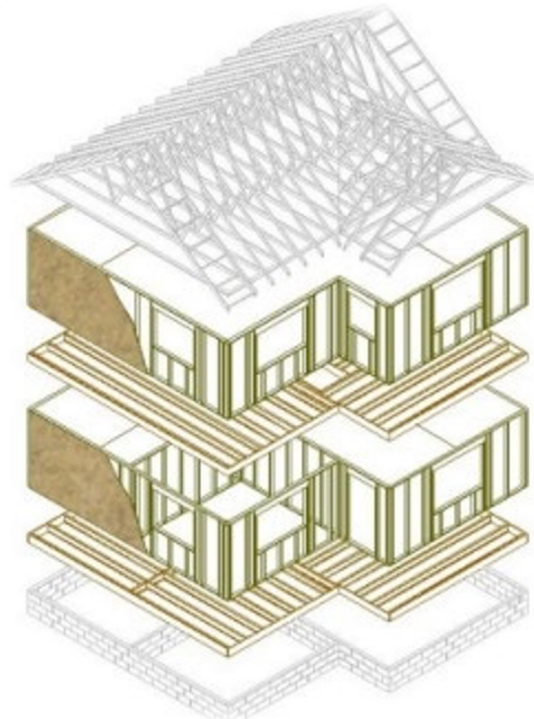




ITFMA

FastHouse®



**Timber Frame Construction  
Proper Detailing of Timber  
Frame to IS 440**





- Est 1991
- 17 manufacturers
- 15 supply chain members
- TF growth from 37% 2019 - 48% in 2023.  
Expected could achieve up to 70%-85% share

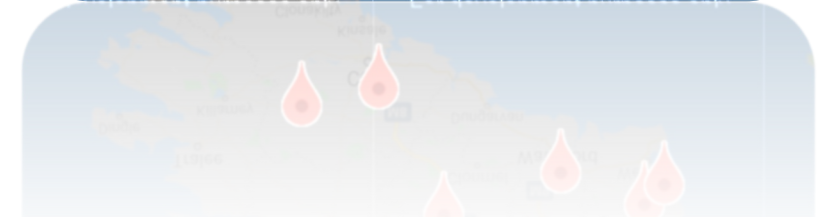
#### OUR OBJECTIVES:

- ✓ To provide a quality and exceptional service/product to the market
- ✓ To protect and develop our market
- ✓ To encourage architect, engineers and specifiers to choose timber frame
- ✓ To offer professional advice and technical information
- ✓ To support our members by providing a range of services





- ✓ Trade Association for the timber frame manufacturing industry in Ireland
- ✓ Membership is synonymous with professionalism and quality
- ✓ Works with NSAI as a stakeholder developing standards such as IS 440 and Timber Committee.
- ✓ Works with DHLPG with fire testing and developing guidance documents – Supplementary TGD-B Part 1& 2
- ✓ Works in Eurocode Mirror Groups
- ✓ Developing a Timber Frame Erectors Scheme



# Why timber frame increasing in popularity ?

Faster, leaner, smarter methods of construction



Up to 70% faster than traditional



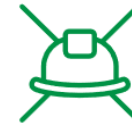
Reduced build time on site



Reduced preliminaries and program costs



Predictability in costs, programme and product



Reduced site labour, costs, and reliability on trades



Less dependency on weather

Helping

Address the housing shortage

Reduce the construction timeframe

Tackle the shortage of skilled construction workers

Remove the risk of failure in design, materials and workmanship



Reduced material waste and site storage requirement



Certainty on build program



Factory controlled construction



Precision Engineered through digital design



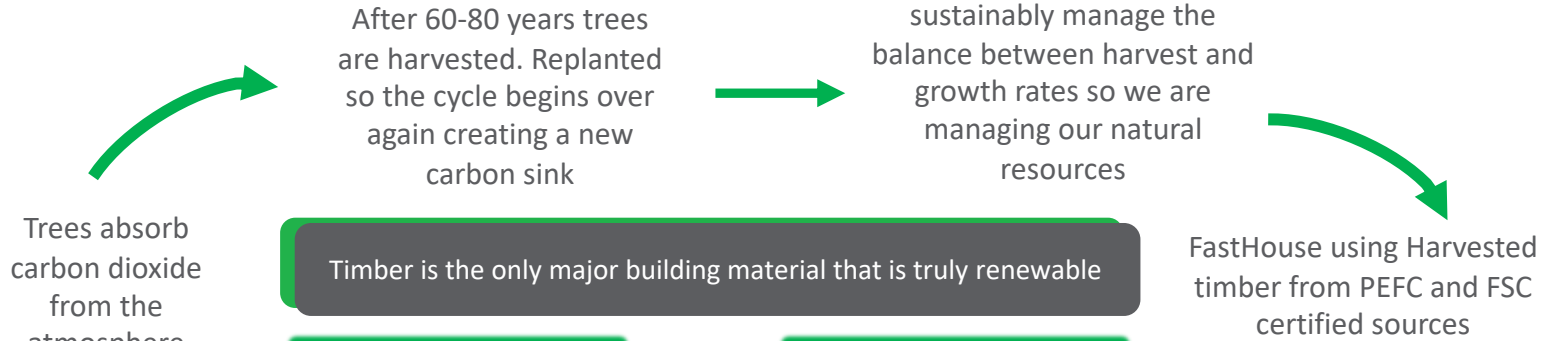
Fewer snags and defects with added quality assurance



Increased levels of health & safety with less hazards

# Timberframe the most sustainable MMC

## Carbon Capture & storage



Timber is the only major building material that is truly renewable



**PHOTOSYNTHESIS**

$\text{CO}_2$  +  $\text{H}_2\text{O}$  + LIGHT →  $\text{C}_6\text{H}_{12}\text{O}_6$  +  $\text{O}_2$

CARBON DIOXIDE + WATER → GLUCOSE + OXYGEN

50% OF THE DRY WEIGHT OF WOOD IS STORED CARBON



PEFC - Chain of Custody ISO 14001

# Low Carbon & Housing Crisis

## Pressures to significantly reduce carbon emission

Government emissions commitments:

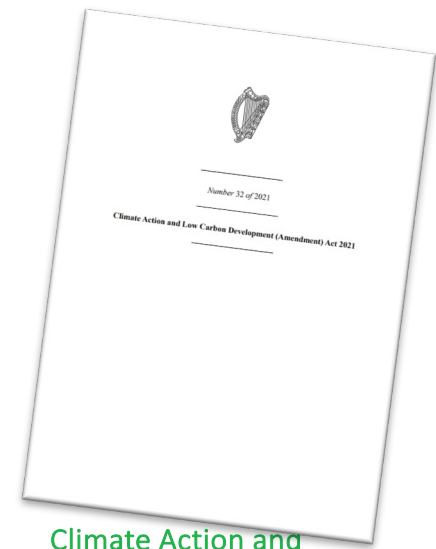
- net zero carbon by 2050
- 50% reduction in carbon emissions by 2030

Ireland faces fines of €600m a year from the EU for failing to meet renewable energy targets - construction sector

RIAI reducing operational energy, embodied carbon by 40 per cent by 2030



IGBC report



Climate Action and Low Carbon Development (Amendment) Act 2021



RIAI 2030 Climate challenge



## MMC – Timber Systems



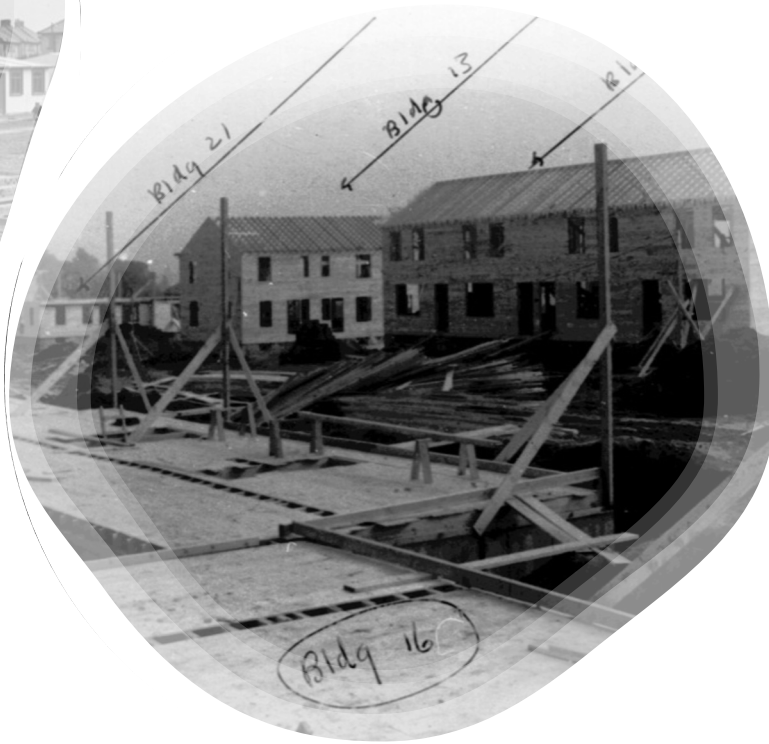
Modular 3D Volumetric



Panelised 2D - Post & Beam CLT



Panelised 2D - Platform



**Is traditional panelised timber frame a MMC??**



## ACCREDITATIONS – Quality Standards

Integrated Management System structured around these standards:

ISO International Standards ensure that our products & services are safe, reliable and of an extremely high quality.

ACCREDITATION	DESCRIPTION
ISO 9001	Quality Management System
ISO 14001	Environmental Management System
OHSAS 18001	Health & Safety Management System
PEFC	Chain of Custody of Forest Based Products
IS 440 2009	Irish Timber Frame Construction, dwellings & other buildings
PrEN 14732	European Standard for Timber Structures, prefab walls, floor and roof elements



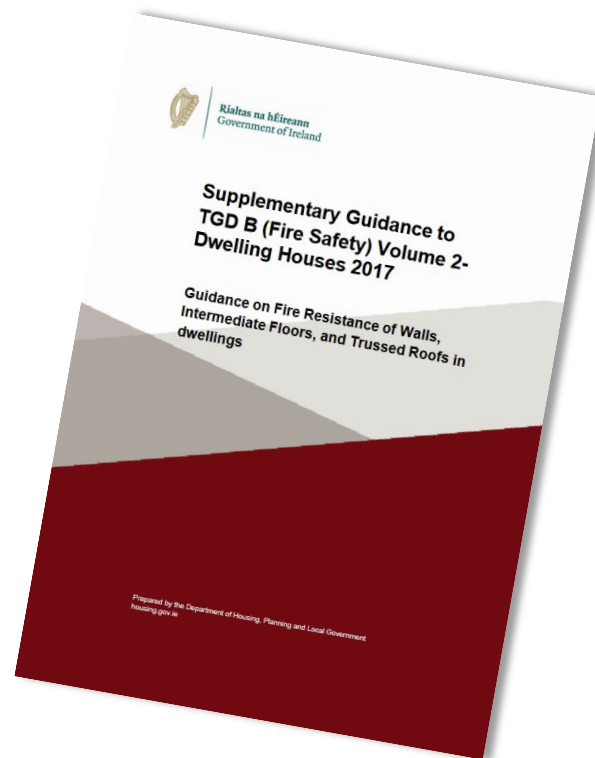
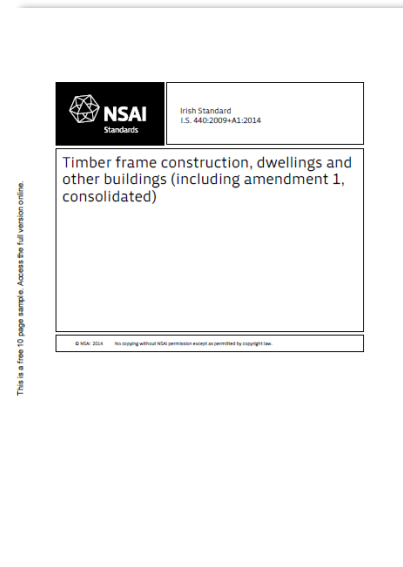


## Compliance



# Method of Compliance

- ✓ Don't need an Irish Agrément Certificate as we have a National technical specification Irish Standard (I.S.440)
- ✓ TGD's Statutory & Prima Facie evidence of compliance
- ✓ Standard Recommendations, methods, specifications
- ✓ Acceptable Construction Details
- ✓ Design/Calculations/Test
- ✓ Well Trial & Tested form of construction



## Supplementary Guidance to TGD B (Fire Safety) Volume 2-Dwelling Houses 2017

- provisions for timberframe fire resistance wall's, intermediate floors, and trussed roofs

2024 Supplementary Guidance Document 2  
1 hour construction assemblies

---

## Irish Standard I.S. 440 –

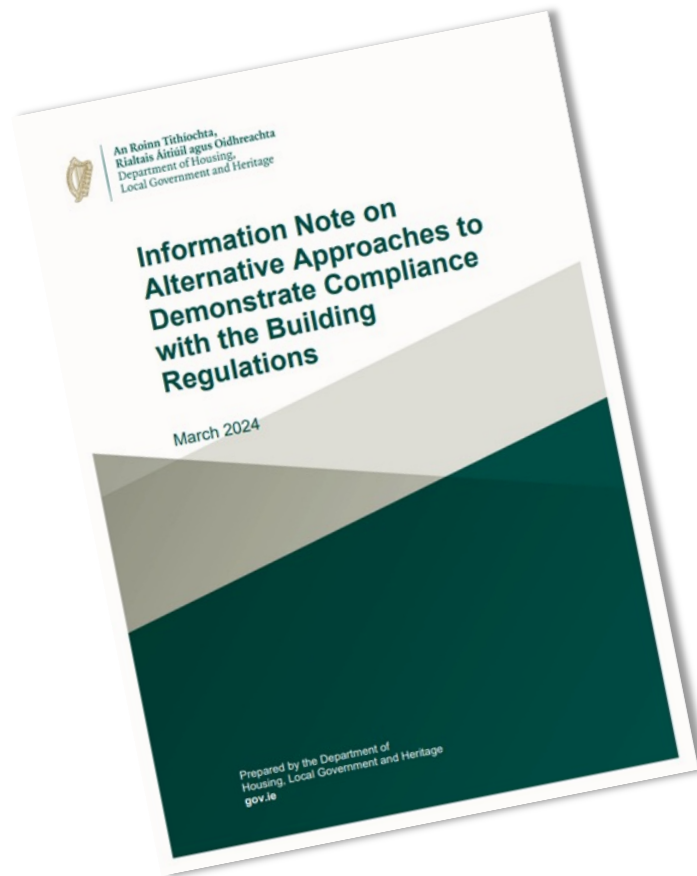
Published 2009, revised in 2014  
to I.S.440:2009+A1:2014



- ‘Timber frame construction, dwellings and other buildings’
- NSAI to assess and certify manufacturers **for compliance** with I.S. 440 and the Building Regulations
- Timber frame construction which does not fall within the scope or specification of I.S. 440 may demonstrate compliance with the Building Regulations by means of an **Alternative Approach**
- **2024 Amendment**

Design Life of between 50 and 60 years  
With proper Maintenance there is no limit to actual  
buildings life

## Alternative Approach to compliance



### Typically used for:

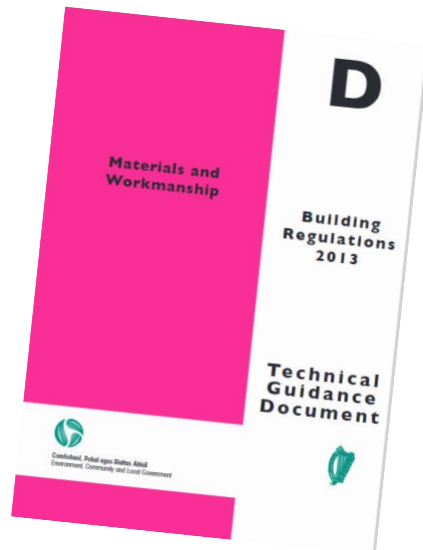
- Buildings with unusual occupancies or high levels of complexity
  - Very large or very tall buildings
  - Buildings that incorporate MMC
  - Engineered timber buildings
- 
- ✓ Local building control authority should be consultation
  - ✓ Statutory Fire Safety Certificate application

## Alternative standards / approvals from other jurisdictions



- 3<sup>rd</sup> Party certification by an independent approval body
- Alternative prescriptive standards from other jurisdictions

### Part D of the Second Schedule to the Building Regulations



#### Materials and workmanship

D1 All works to which these Regulations apply shall be carried out with proper materials and in a workmanlike manner.

...

#### Definition for this Part

D3 In this Part,

“proper materials” means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

(a) bear a CE Marking in accordance with the provisions of the Construction Products Regulation;

(b) comply with an appropriate harmonised standard or European Technical Assessment in accordance with the provisions of the Construction Products Regulation; or


(c) comply with an appropriate Irish Standard or Irish Agrément Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability.

“Agreement on the European Economic Area” means the Agreement on the European Economic Area between the European Union, its Member States and the Republic of Iceland, the Principality of Liechtenstein and the Kingdom of Norway as published in the Official Journal of the European Communities (O.J. No. L1, 03.01.1994, page 3).

“Construction Products Regulation” means Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

# Alternative standards





IRISH AGRÉMENT BOARD  
 CERTIFICATE NO. 06/0161  
 Greenspan System Sales Ireland Limited,  
 Ballynahill, Co. Limerick.  
 Tel: 069 82222  
 Fax: 069 82226  
 E-mail: [info@greenspan.ie](mailto:info@greenspan.ie)  
 Website: [www.greenspan.ie](http://www.greenspan.ie)

## Aquapanel Exterior Cement Board System

**Panneaux de façade  
Verkleidungsplatten**

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals. NSAI Agrément Certificates establish proof that the certified products are 'proper materials' suitable for their intended use under Irish site conditions, and in accordance with the Building Regulations 1997 to 2014.

**PRODUCT DESCRIPTION:**  
 This Certificate relates to Aquapanel Exterior Cement Board System, comprised of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, designed for fire and water resistant external cladding with other specific and complementary components to form an Aquapanel ventilated system for use as an exterior wall cladding in timber frame houses and apartments (Detail Sheet 1) and steel frame houses and apartments (Detail Sheet 2) of up to six storeys in height (Detail Sheet 3). The system is certified for use on structures that meet NSAI standards and comply with the Building Regulations 1997 to 2014. The system can also be used for penthouses which have a paved area for inspection and maintenance. This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2014.

**MANUFACTURE AND MARKETING:**  
 The product is manufactured by:  
 Knauf Aquapanel GmbH & Co. KG,  
 Kipperstrasse 19,  
 D-44147 Dortmund,  
 Germany,  
 Tel: 0049 231 8005521  
 Fax: 0049 231 8005531

The product is marketed by:  
 Greenspan System Sales Ireland Limited,  
 Ballynahill,  
 Co. Limerick,  
 Tel: 069 82222  
 Fax: 069 82226  
 E-mail: [info@greenspan.ie](mailto:info@greenspan.ie)  
 Website: [www.greenspan.ie](http://www.greenspan.ie)

**USE:**  
 The Aquapanel Exterior Cement Board as certified in this NSAI Agrément Certificate is for use as an exterior wall panel system in timber frame and steel frame buildings of up to six storeys in height – this includes detached, semi-detached and terraced houses.

Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at <http://www.nsa.ie/>





Kiwa Ltd  
 Unit 5 Prime Park Way  
 Prime Enterprise Park  
 Derby  
 DE1 3GB  
 +44 (0)1532 363333  
 uk.brenquiries@kiwa.com  
 www.kiwa.co.uk/bda

BAW-23-278-S-A-UK  
**BDA Agrément®**  
 Wetherby Timber Frame Cavity  
 Rail Carrier Board System  
 Uninsulated Façade Cladding  
 System

Wetherby Building Systems Ltd  
 1 Keel Grove Road  
 Colton  
 Warrington  
 WA3 5GS  
 +44 (0)1942 717100  
 info@wbs-td.co.uk  
 www.wbs-td.co.uk

### SCOPE OF AGRÉMENT

This BDA Agrément® (hereinafter 'Agrément') relates to Wetherby Timber Frame Cavity Rail Carrier Board System (hereinafter the 'System'). The System is a mechanically fixed façade cladding system finished with brick slips, acrylic brick slips or silicone render finish. The System is for installation above damp-proof course (hereinafter 'DPC') level on external sheathed structural timber-frame (hereinafter 'STF') supporting walls, or above or below DPC level on buildings of modular off-site manufacture (hereinafter 'OSM'). The System is for existing and new residential and non-residential buildings.

### DESCRIPTION

The System consists of render carrier boards, mechanically fixed into timber battens or galvanised-steel rails (hereinafter 'spacer support battens/rails'), which are mechanically fixed into the sheathing boards that form the outer face of the STF supporting wall. This forms a drained and partially ventilated cavity between the sheathing boards and the render carrier board. The resultant cavity shall have a minimum depth of 15 mm. If required, the cavity can be formed to a maximum depth of 50 mm, depending on the profile of the spacer support battens/rails used. The System can incorporate silicone, brick slip or acrylic brick slip finishes:

- adhesive and primer is applied before the application of a silicone finish;
- adhesive is applied before the application of the brick slip or acrylic brick slip finishes; the brick slips are then pointed with mortar.

### ILLUSTRATION




### THIRD-PARTY ACCEPTANCE

See Section 3.3 (Third-Party Acceptance).

### STATEMENT

It is the opinion of Kiwa Ltd. that the System is safe and fit for its intended use, provided it is specified, installed and used in accordance with this Agrément.

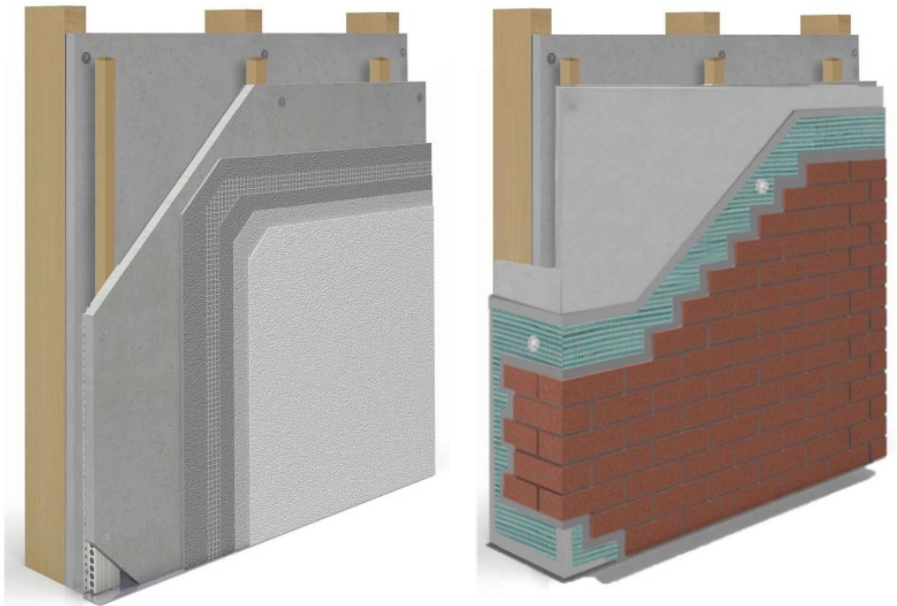
Craig Devine  
 Operations Manager, Building Products



Alphoe Mithra CEng FIMMM MBA  
 Business Unit Manager, Building Products



© 2022 Kiwa Ltd. 0016161001 BAW-23-278-S-A-UK



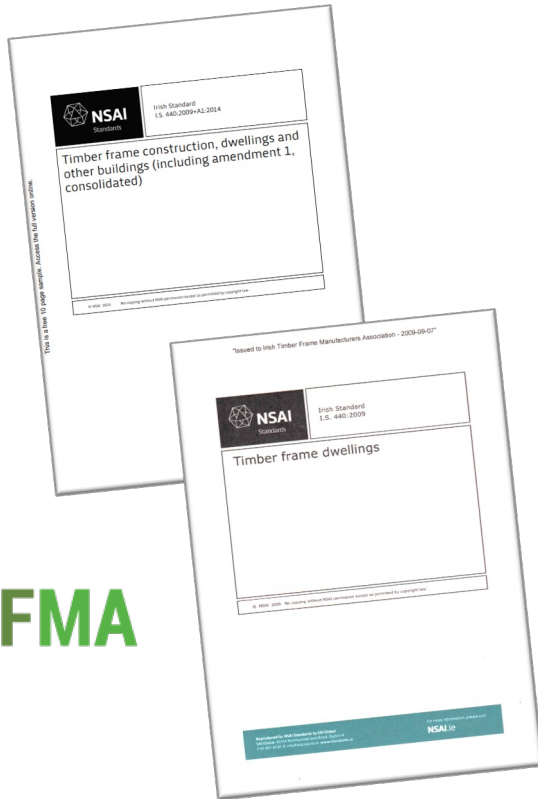
### 3.2.5 Ireland

#### Building Regulations 1997 and subsequent amendments

In order to demonstrate compliance with Irish Building Regulations, this BDA Agrément® certifies that the System complies with the requirements of a recognised document and indicates it is suitable for its intended purpose and use.

- A1(1)(2) Structure - the System can sustain and transmit combined dead and wind loads to the supporting wall
- B3(3) Internal fire spread (structural) - the System can adequately inhibit the unseen and smoke within concealed spaces
- B4 External fire spread - the System can adequately resist the spread of fire over walls and from one building to another
- B8(3) Internal fire spread (structural) - the System can adequately inhibit the unseen and smoke within concealed spaces
- B9 External fire spread - the System can adequately resist the spread of fire over walls and from one building to another for dwelling houses
- C4 Resistance to weather and ground moisture – a wall incorporating the System can contribute to adequately protecting a building from the passage of moisture from precipitation
- D1 Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application, and can be installed to give a satisfactory performance

## Irish Standard I.S. 440 – The scope of application of I.S. 440



### Scope:

- max number of 4 –maxi height to top floor 10 m
- max fire resistance 60 minutes, demonstrated by test
- drained & ventilated cavity
- designed in accordance with the relevant Eurocodes
- panels manufactured using mechanical fasteners
- factory assembled or elements not possible to make offsite may be installed on site provided IS440 still followed
- max stud centres 610 mm;
- includes interface between frame and other elements e.g. external cladding.

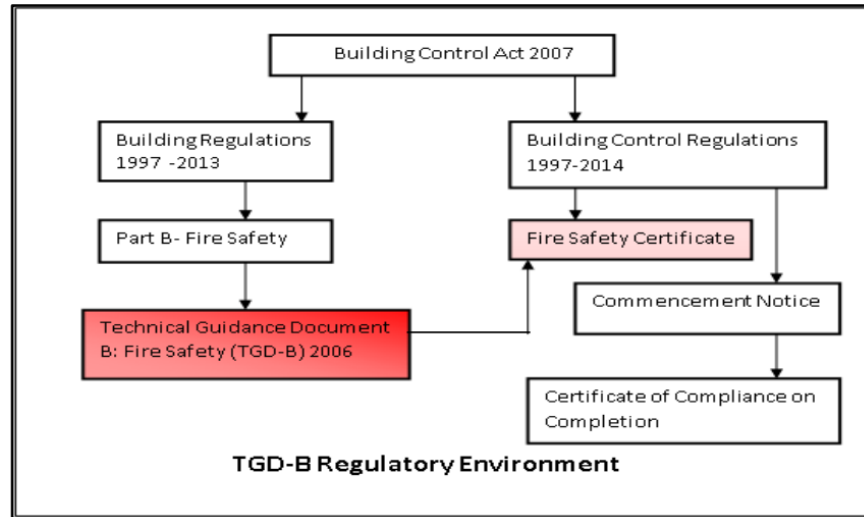
### Excluded:

- substructure, foundations,
- wall panels fabricated on site
- external envelope: cladding, roof coverings
- windows, external doors and the flashings around them



# Compliance – Fire

## Technical Guidance Document Part B: Fire Safety - 2 volumes



### 1 - Building other than dwellings

- Purpose group 1(c) Flat or maisonette
- Parts B1-B5
- BS 5588: Part 1: 1990



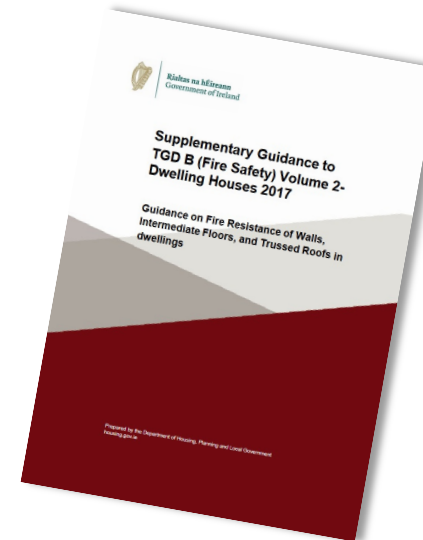
### 2 - Dwelling Houses

Volume 2 -Deals solely with dwelling houses, relating non-complex houses of normal design and construction - Parts B6-B11

Only single storey flat permitted (not duplex),

#### Purpose groups

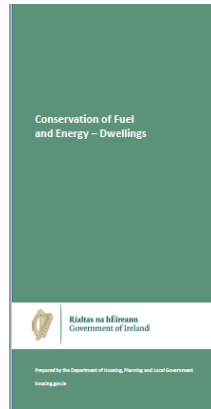
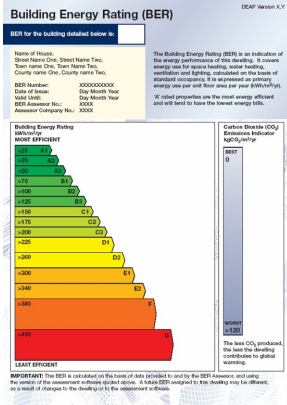
- 1(a). Dwelling house with no storey with a floor level >4.5m above ground level
- 1(b). Dwelling Houses with one Floor >4.5m above ground level



### Supplementary Guidance to TGD B (Fire Safety) Volume 2-Dwelling Houses 2017

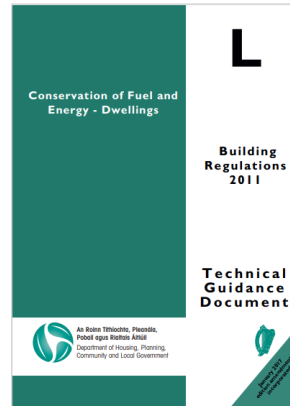
- provisions for timberframe fire resistance wall's, intermediate floors, and trussed roofs

# Impact of changes to Part L



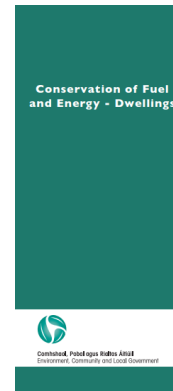
Roof 0.16  
Walls 0.18  
Gr Floor 0.18  
Windows 1.4

**L**  
Building Regulations 2019  
Technical Guidance Document



Roof 0.16  
Walls 0.21  
Gr Floor 0.21  
Windows 1.6

NZEB



Roof 0.16  
Walls 0.21  
Gr Floor 0.21  
Windows 1.6

**L**  
Building Regulations 2011  
Technical Guidance Document



Roof 0.16  
Walls 0.27  
Gr Floor 0.25  
Windows 2.0

**L**  
Building Regulations 2007  
Technical Guidance Document

Building Regulations 2002

Technical Guidance Document L

Conservation of Fuel and Energy DWELLINGS



Roof 0.16  
Walls 0.27  
Gr Floor 0.25  
Windows 2.2

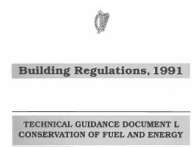
Building Regulations 1997

Technical Guidance Document L

Conservation of Fuel and Energy

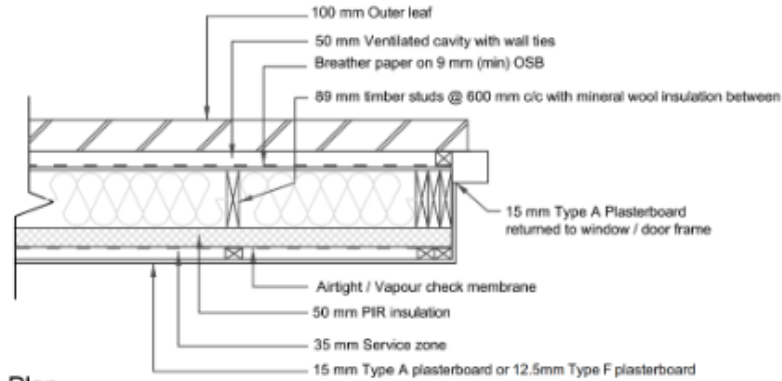


Roof 0.25  
Walls 0.45  
Gr Floor 0.45  
Windows 3.3



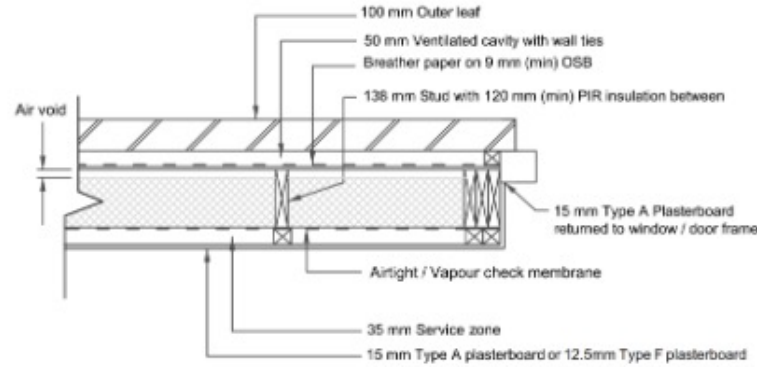
Roof 0.35  
Walls 0.55  
Gr Floor 0.45

Part L has 6 Changes since inception in 1991



Plan

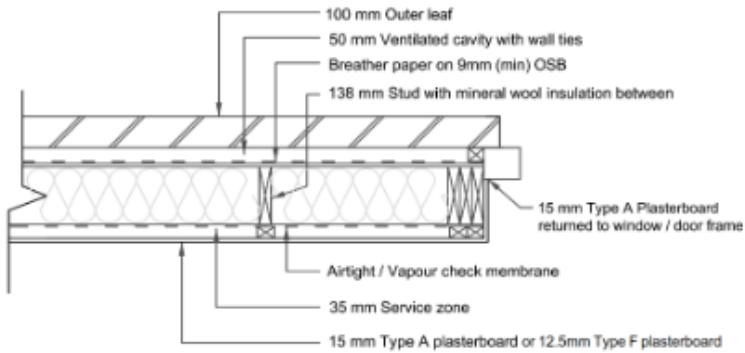
Figure 1 Wall Type 1 (WT1) - Service Cavity Wall



Plan

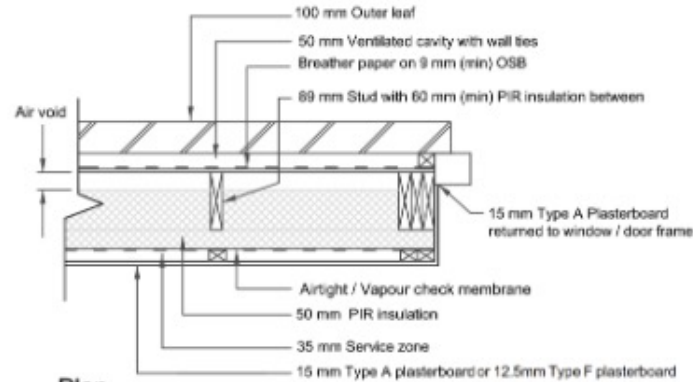
Figure 3 Wall Type 3 (WT3) - Service Cavity Wall

2\*12.5mm Type F Plasterboard FR60



Plan

Figure 2 Wall Type 2 (WT2) - Service Cavity Wall



Plan

Figure 4 Wall Type 4 (WT4) - Service Cavity Wall



## Carbon Analysis – Semi D House Type - Changing just External wall types

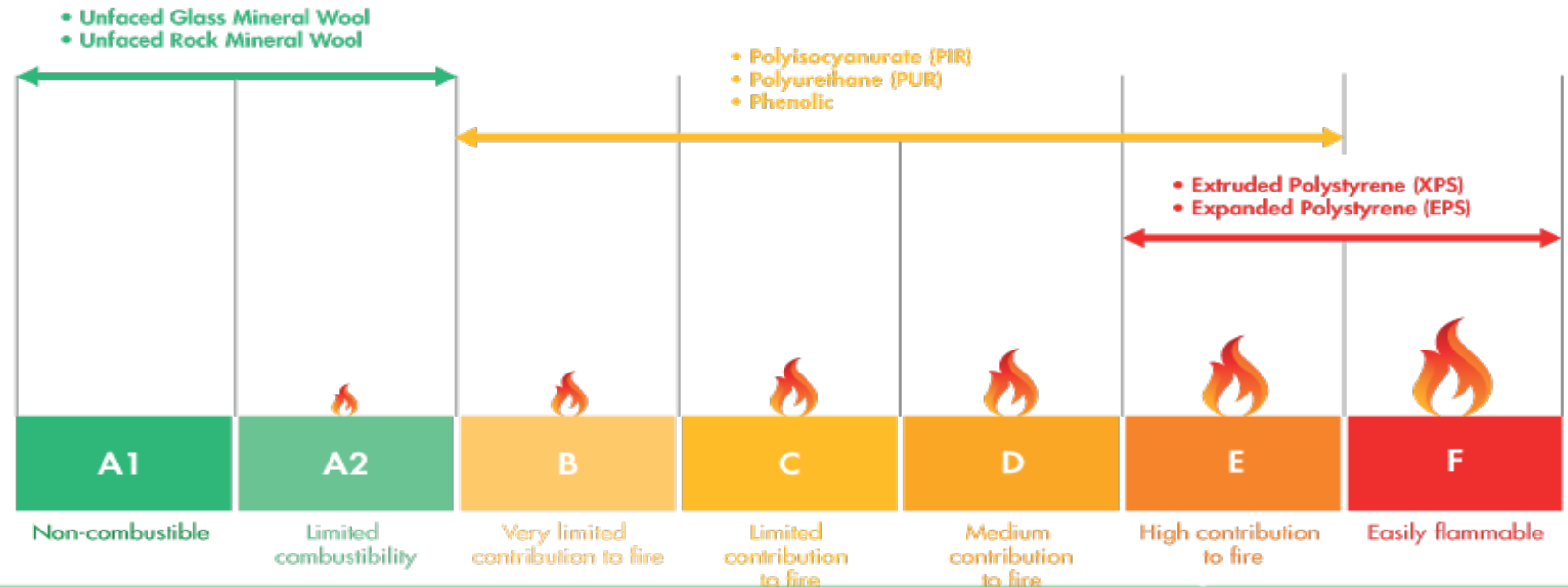
	Standard details	With FH new mineral wool wall	Standard details	With FH new mineral wool wall
	kgCO <sub>2</sub> e/m <sup>2</sup> GIA		Total tonnes CO <sub>2</sub> e	
Cradle to practical completion	229.5	223.4	53.9	52.5
<b>Cradle to grave</b>	<b>348.3</b>	<b>341.6</b>	<b>81.8</b>	<b>80.3</b>
Stored CO <sub>2</sub>	137.9	131.1	32.4	30.8
<b>Operational carbon emissions (over 50-year lifespan)</b>	<b>315.0</b>		<b>74.0</b>	
RIAI operational target achieved	Business as usual			
<b>RIAI embodied target achieved</b>	<b>2030</b>			
Combined operational and embodied (over 50 year lifespan)			155.8	154.3
	kg CO <sub>2</sub> e/m <sup>2</sup> wall area		Total tonnes CO <sub>2</sub> e reduction in pair of HT-Bs	
<b>per m<sup>2</sup> of wall area, exc. A<sub>5</sub> and C<sub>1</sub></b>	<b>57.6</b>	<b>50.3</b>	-	<b>-1.57</b>
	kg CO <sub>2</sub> e reduction per m <sup>2</sup> of wall			
	-7.3			



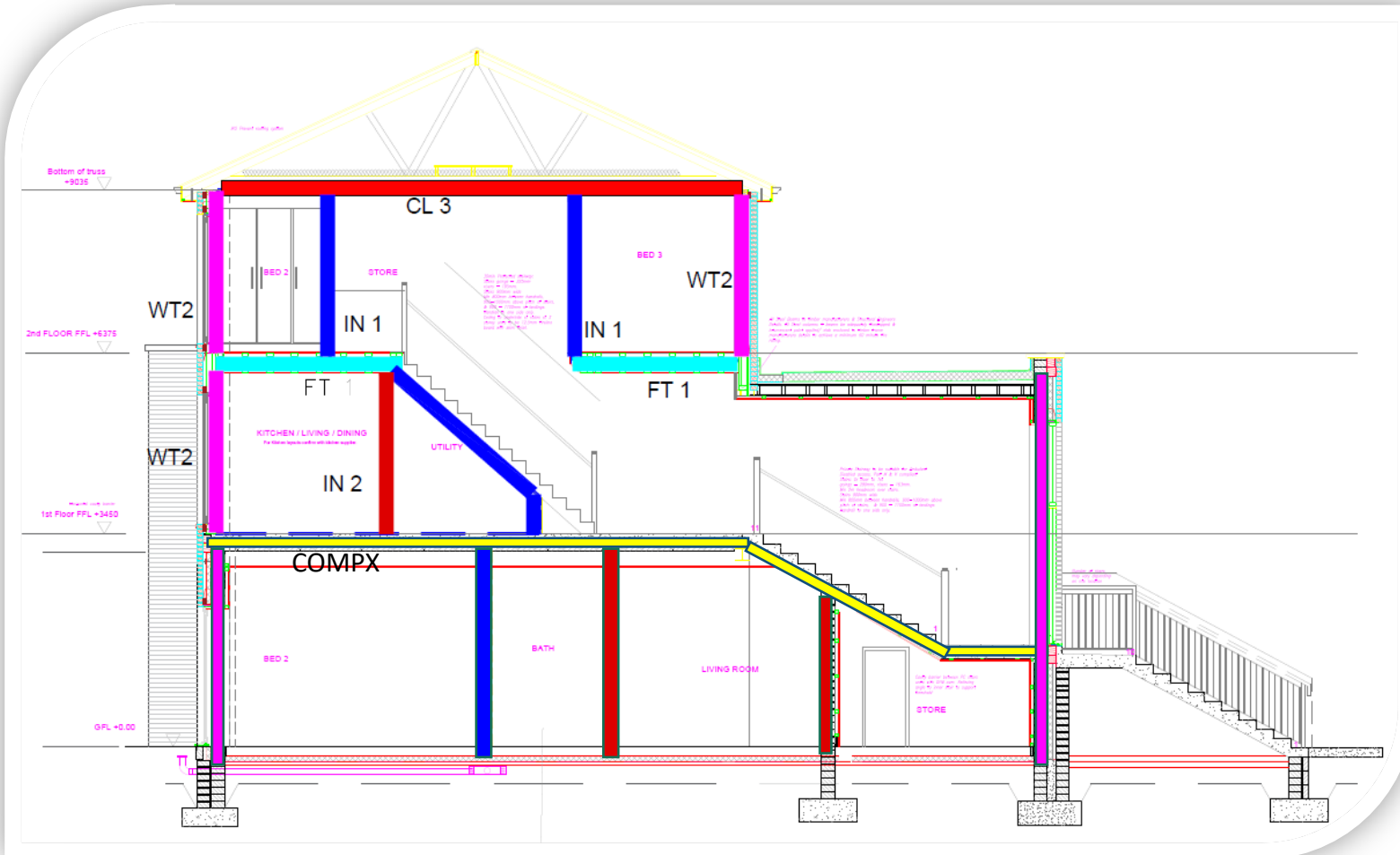
## External Wall Fabric - Wool over PIR

- ♻️ WT1 wall (Timber, mineral wool/PIR, masonry) = 7.4 tonne CO2 saving over Block/BRICK and 8.1 tonne saving over ICF
- ♻️ WT6 wall (Timber, mineral wool ONLY, masonry) = 11.1 tonne CO2 saving over Block/BRICK and 11.9 tonne saving over ICF
- ♻️ 14.65 % whole house Carbon reduction

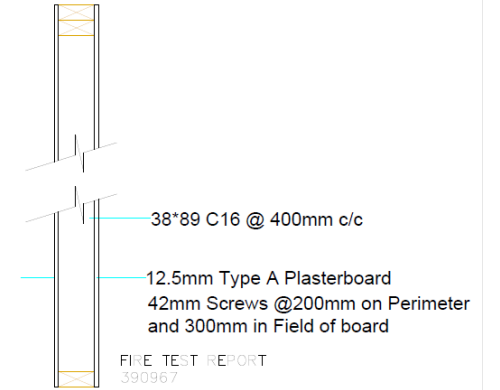
Safety (Fire & Smoke)  
Acoustics



## Internal wall assemblies

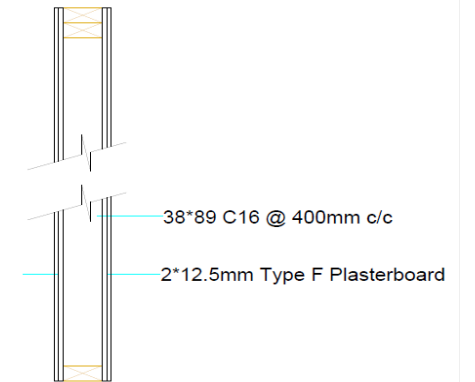


12.5mm Type A  
Plasterboard



**IN 1** -Internal Wall NLB @ 400mm c/c -30min

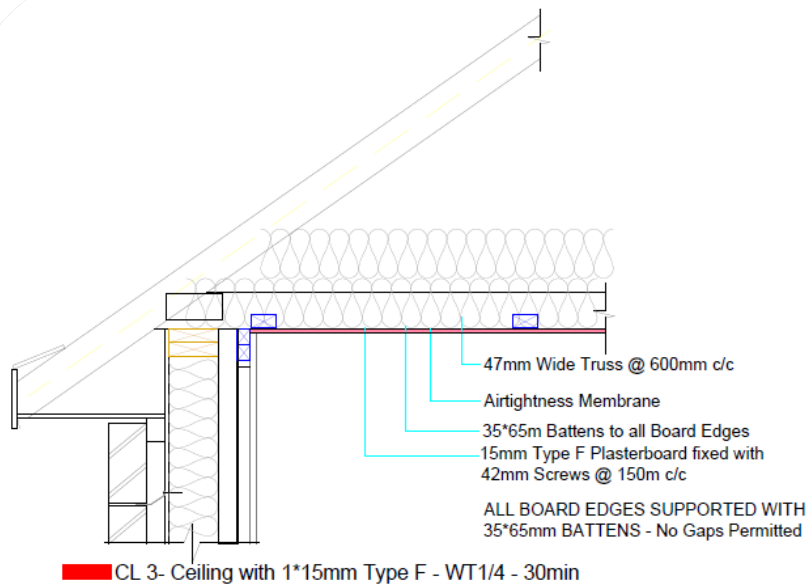
2\*12.5mm Type F  
Plasterboard



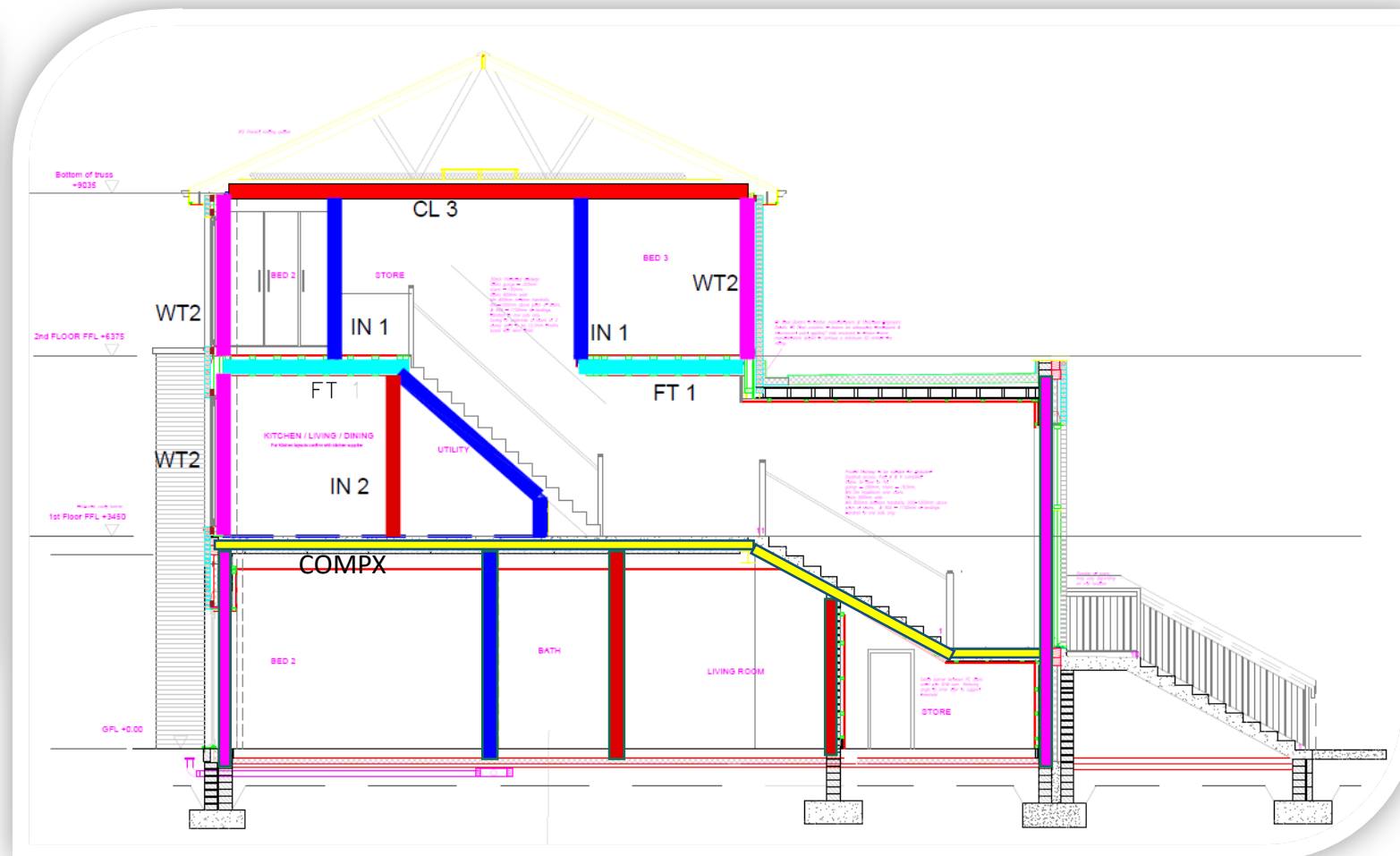
**IN 2** -Internal Load Bearing Wall @ 400mm c/c  
-60min

**FIRE ASSEMBLIES**

## Roof truss / ceiling assembly

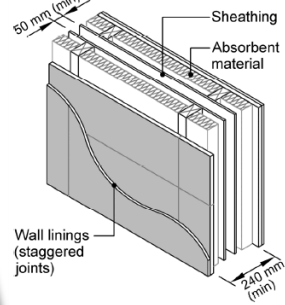


35mm wide trusses @ 600 c/c  
 Require Counter Batten (35x65mm) @ 400c/c and all board edges to be bridged.



## Tested wall assemblies

### Twin leaf timber frame with sheathing



#### B) WT 4B - Twin leaf timber frame with sheathing

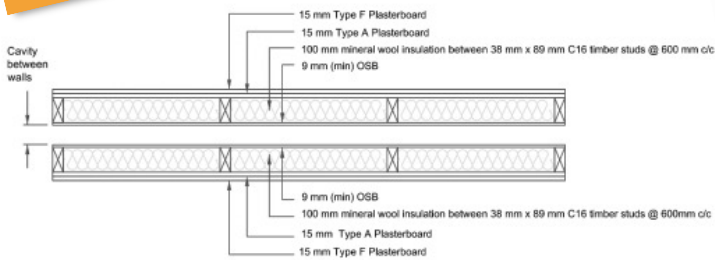
##### Specification

**Wall width:** 240 mm (min) between inner faces of the wall linings. 50 mm (min) gap between inner sheathing faces. (Twin leaves must not be bridged by diagonal bracing).

**Wall lining:** two or more layers of gypsum based board with staggered joints (total nominal mass per unit area 22 kg/m<sup>2</sup> (min) both sides).

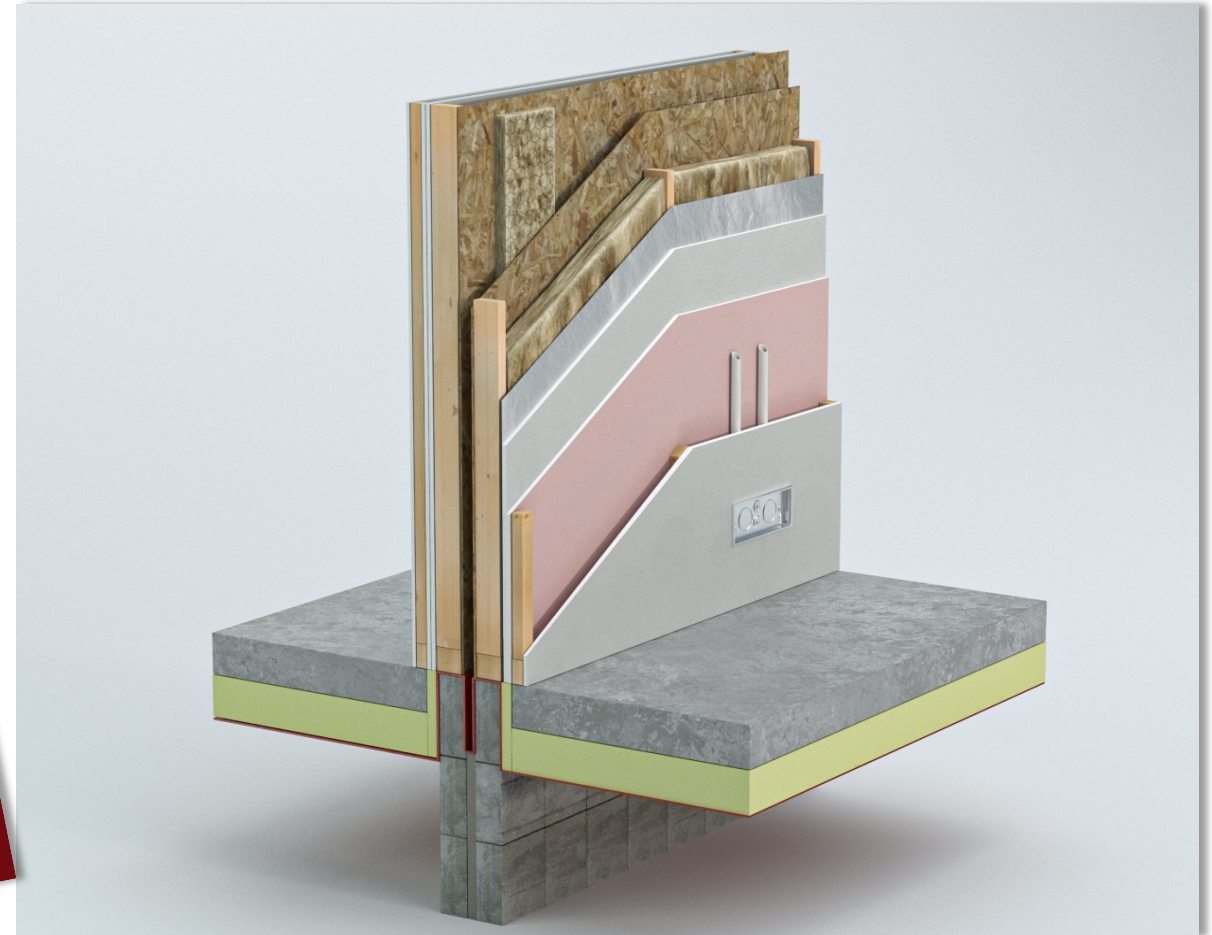
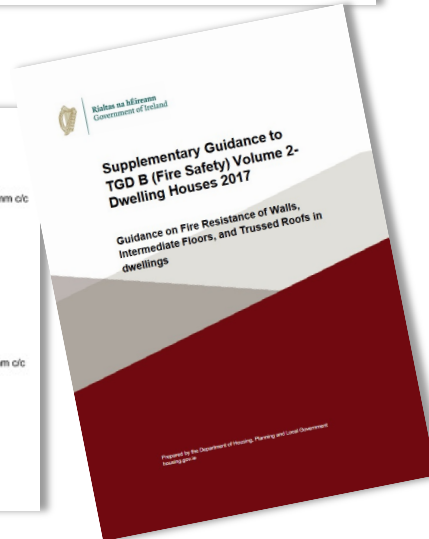
**Absorbent material:** 60mm (min) mineral wool batts/ quilt (paper faced, unfaced or wire reinforced) both sides (density 10-60 kg/m<sup>3</sup>).

**Ties:** Ties between frames (no more than 40 mm x 3 mm) at 1200 mm (min) c/c horizontally, one tie per storey height vertically.



Plan

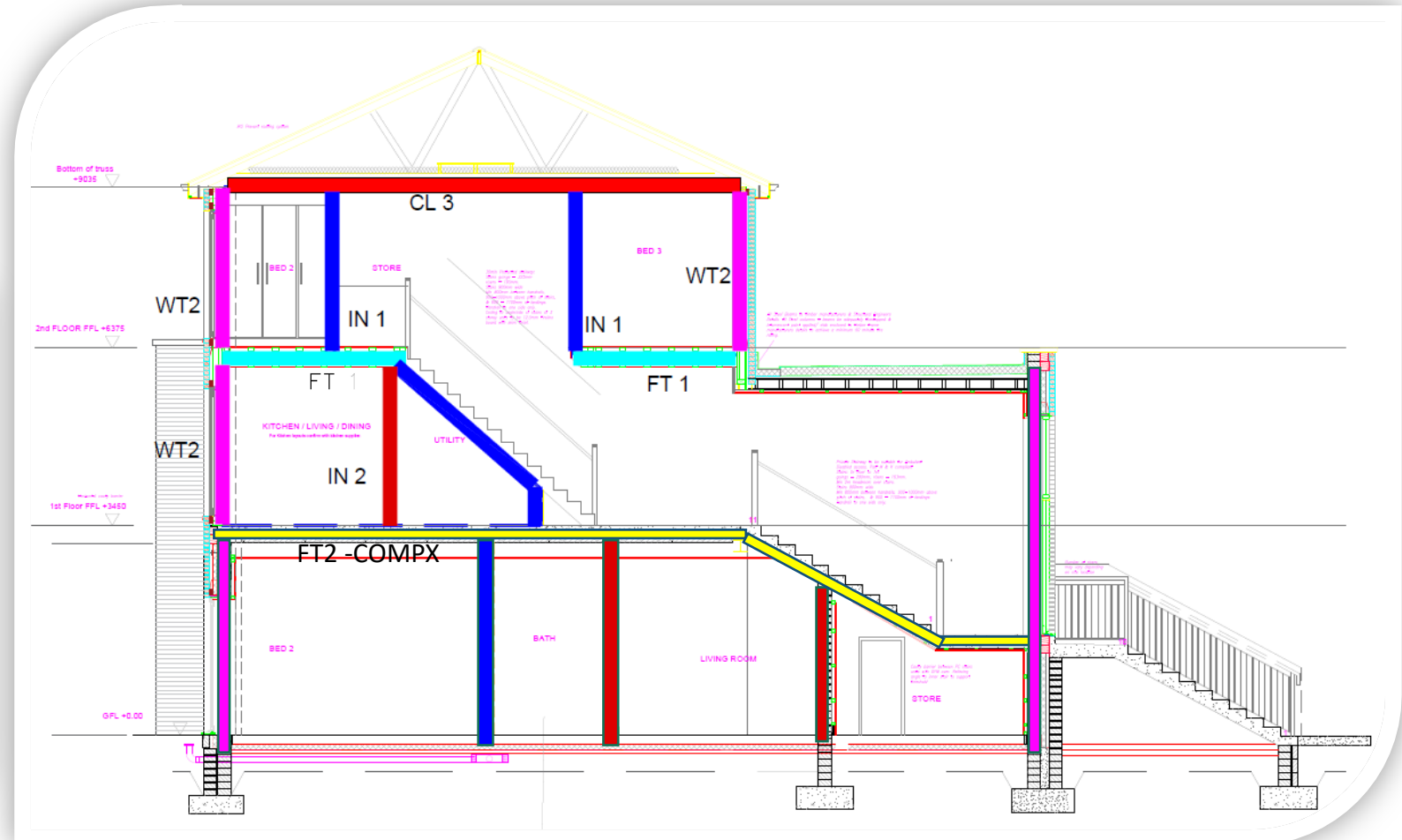
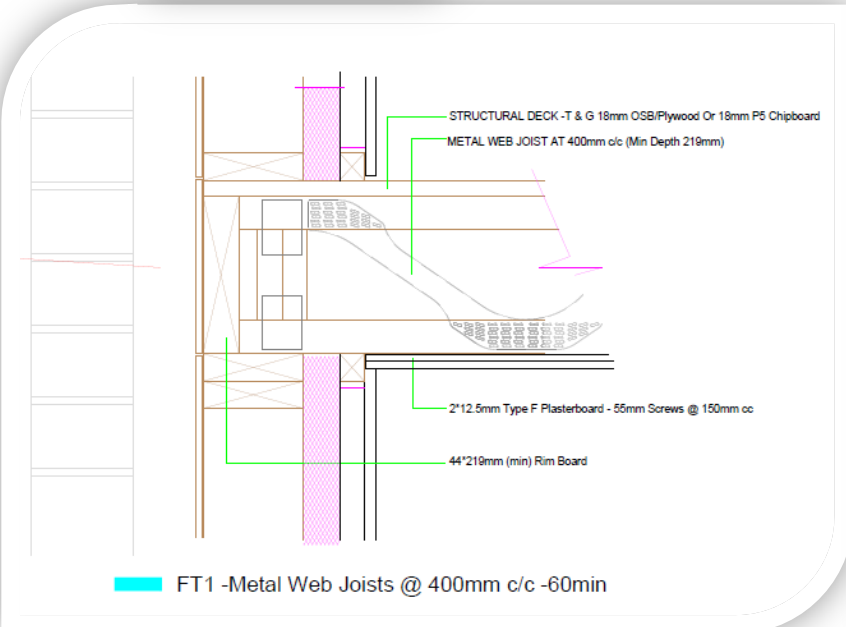
Figure 5 Separating Wall Type 1 (SWT1)

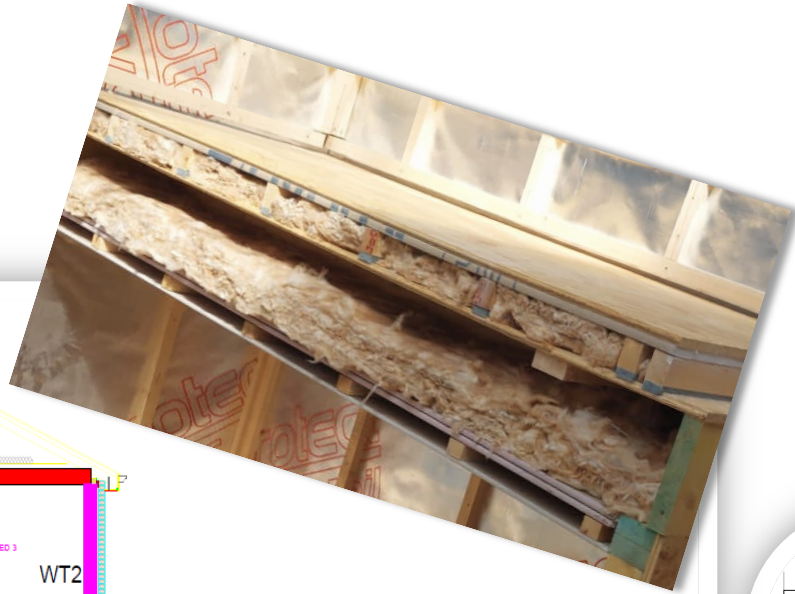




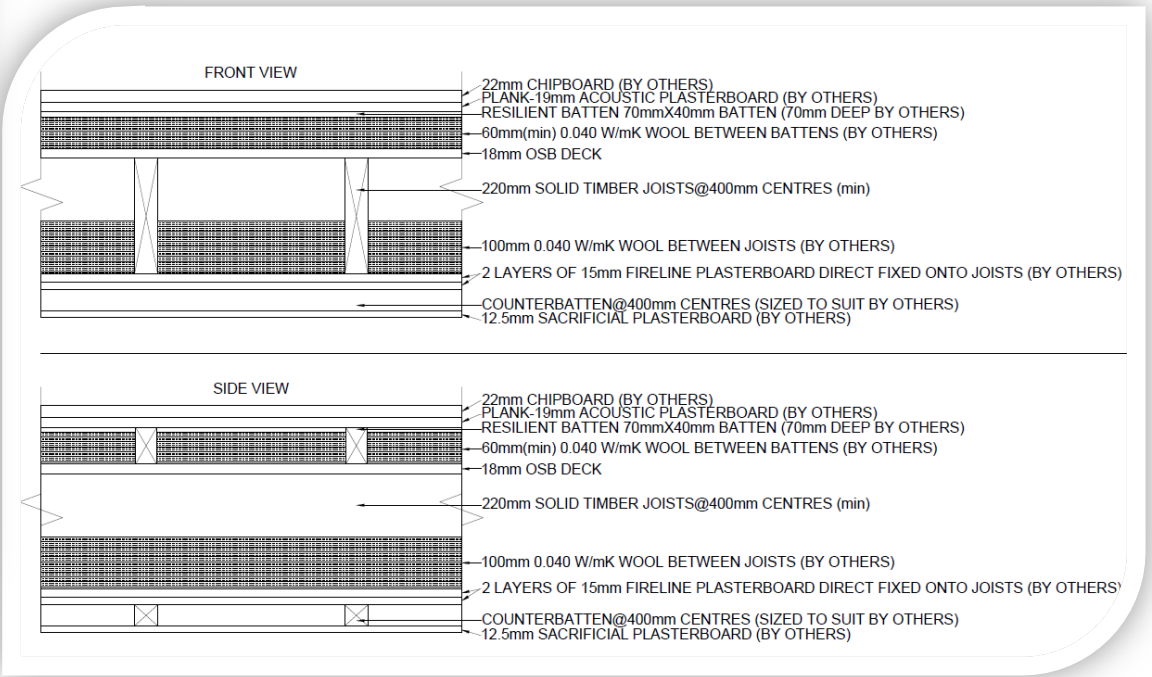
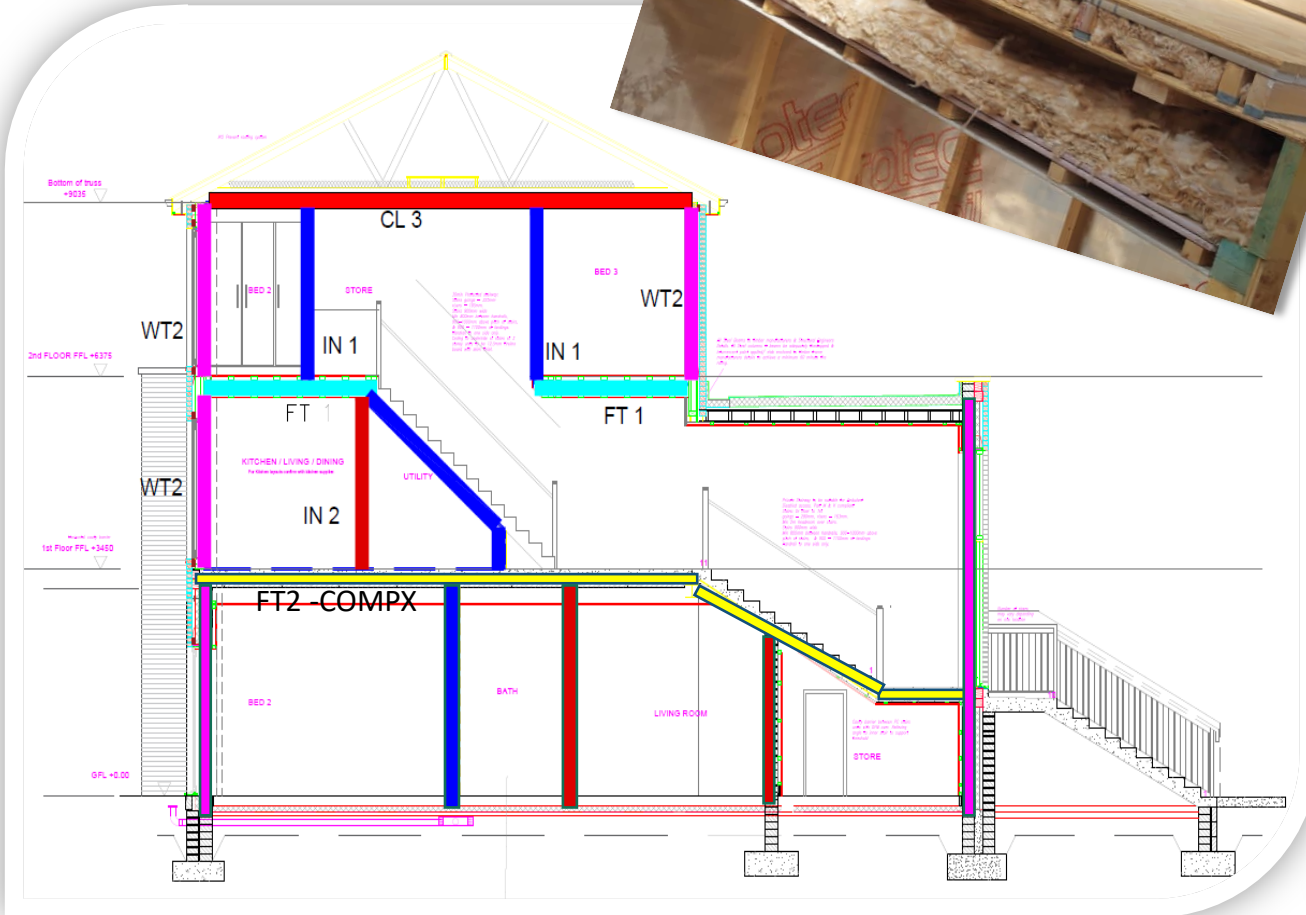
## Floor cassette / ceiling assembly Standard FR60

Note: No cavity barrier  
required between 1st and  
2nd floors





## Floor cassette / ceiling assembly Compartment FR60



FT2 -COMPX

# FIRE ASSEMBLIES

## Floor Type 3 (FT 3)

Floating layer on timber base with ceiling under

The specific provisions of test for fire resistance for new elements of structure, etc.

Part of Building	Minimum provisions when tested to relevant parts of BS 476 (minutes) <sup>1</sup>			Method of Exposure
	Load Bearing Capacity	Integrity	Insulation	
Any floor within duplexes / houses	30	15	15	From underside
Compartment Floors	60	60	60	From underside
External walls	30	30	15	From inside <sup>2</sup>
Separating walls	60	60	60	From each side



## COMPX Tested FR60

Fire tested system aligns with requirements of Part E

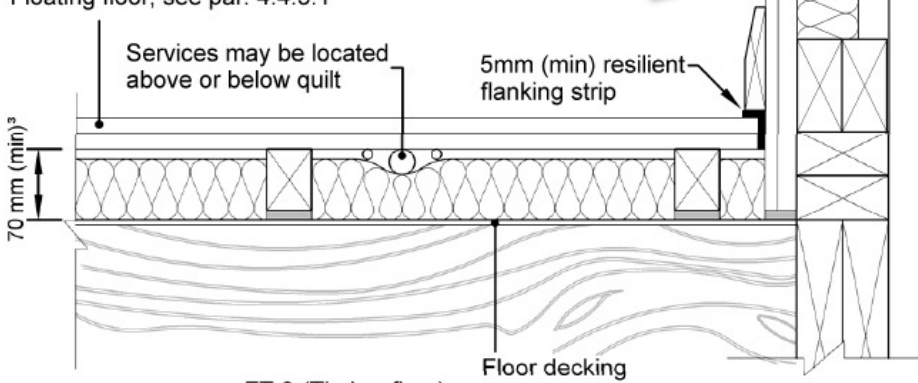
**Table 1 Sound performance levels (Par. 1.1.1)**

Separating construction	Airborne sound insulation $D_{nT,w}$ dB	Impact sound insulation $L'_{nT,w}$ dB
Walls	53 (min)	-
Floors (including stairs with a separating function)	53 (min)	58 (max)

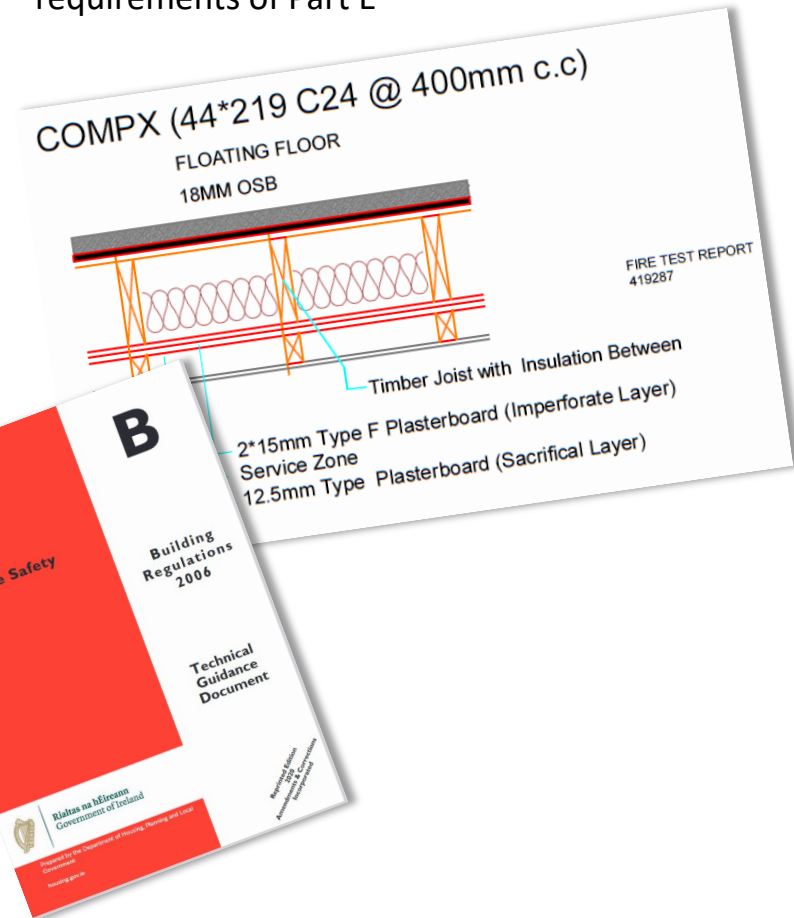
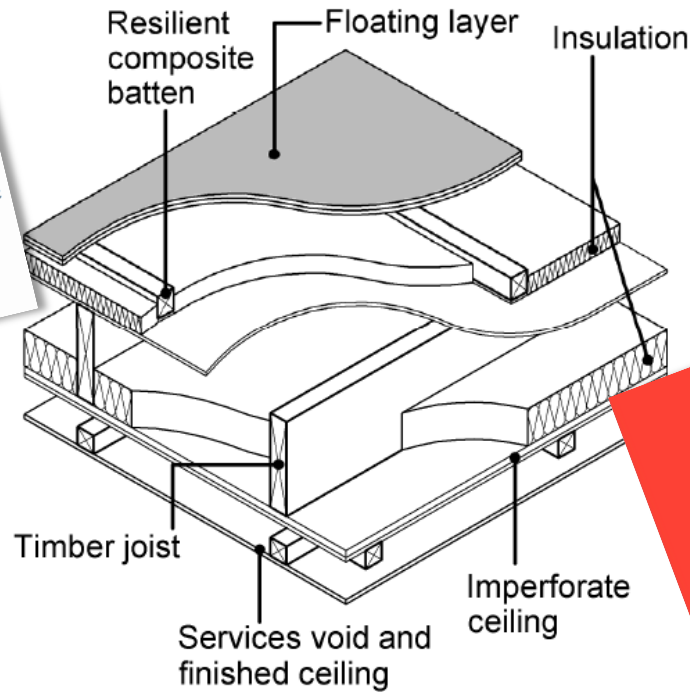


## Floating floor treatment

Floating floor, see par. 4.4.5.1



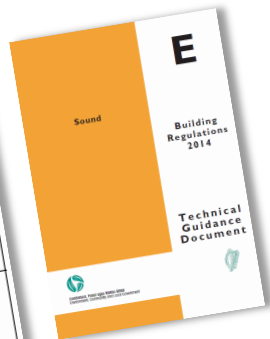
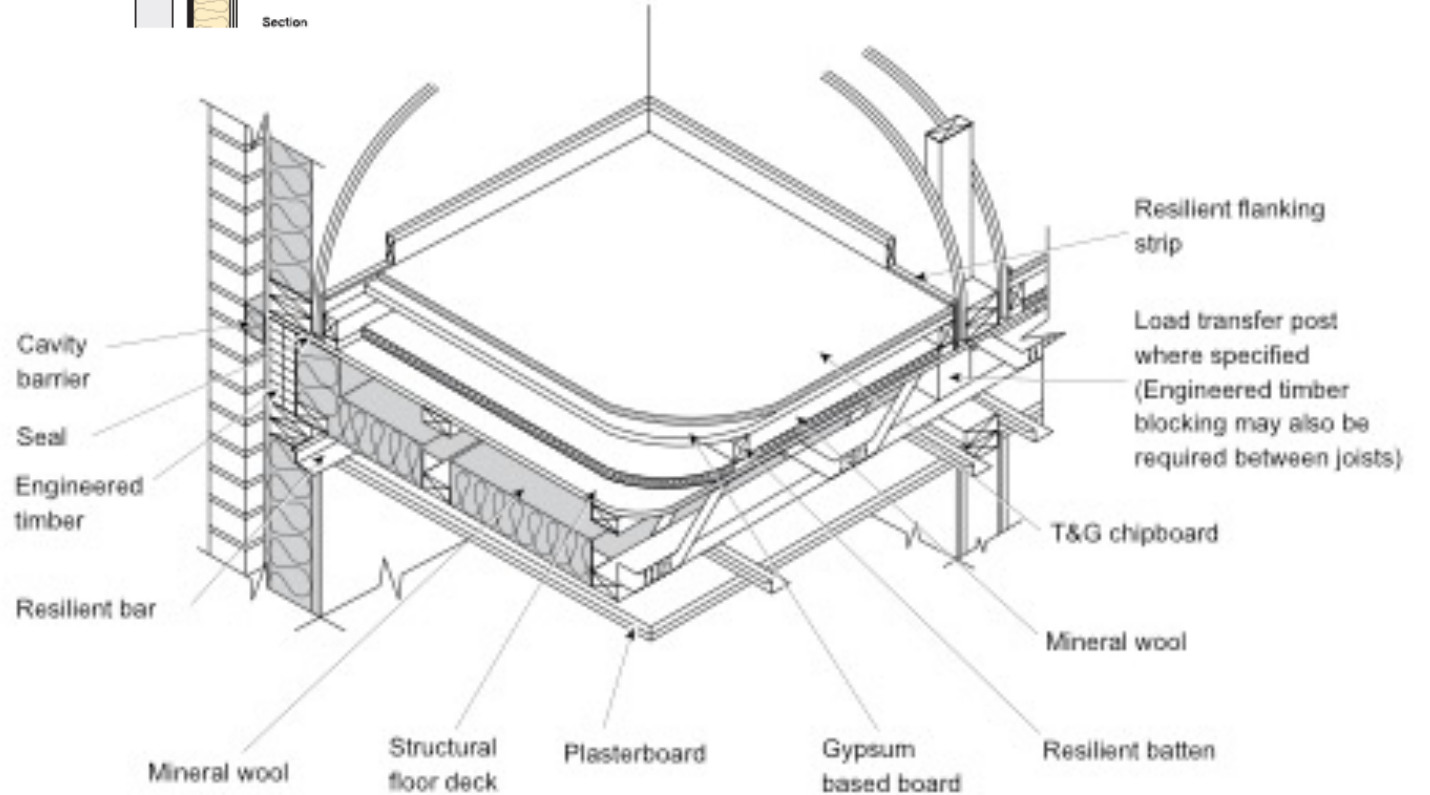
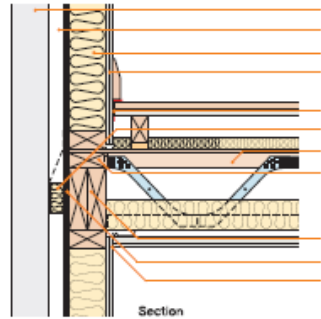
FT 3 (Timber floor)



# FIRE ASSEMBLIES

The specific provisions of test for fire resistance for new elements of structure, etc.

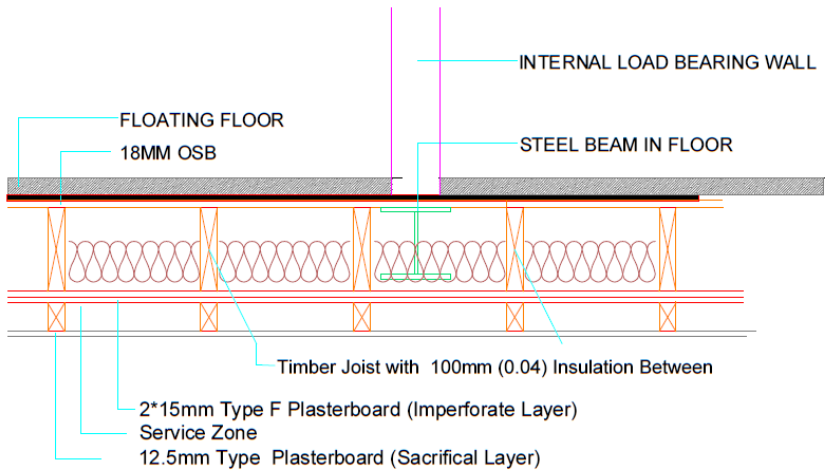
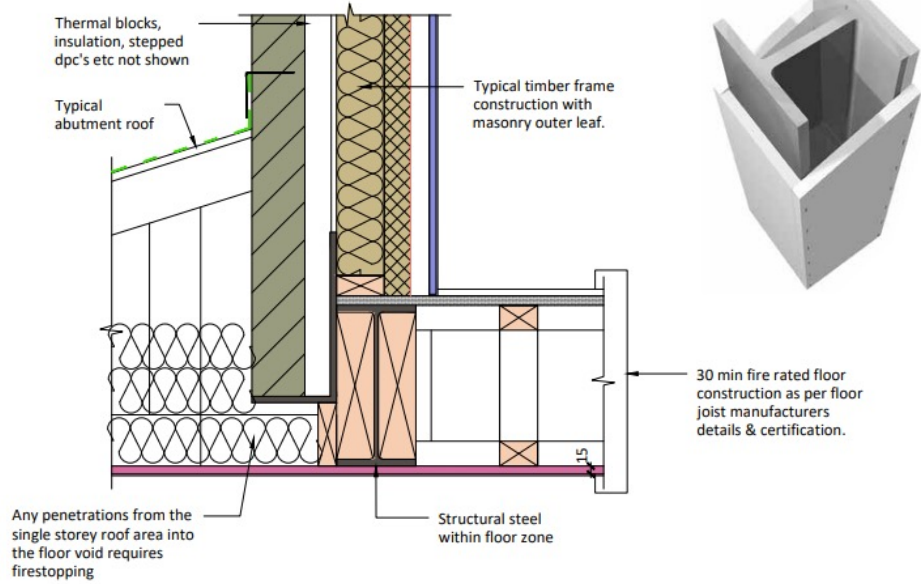
Part of Building	Minimum provisions when tested to relevant parts of BS 476 (minutes) <sup>1</sup>			Method of Exposure
	Load Bearing Capacity	Integrity	Insulation	
Any floor within duplexes / houses	30	15	15	From underside
Compartment Floors	60	60	60	From underside
External walls	30	30	15	From inside <sup>2</sup>
Separating walls	60	60	60	From each side



**Table 1 Sound performance levels (Par. 1.1.1)**

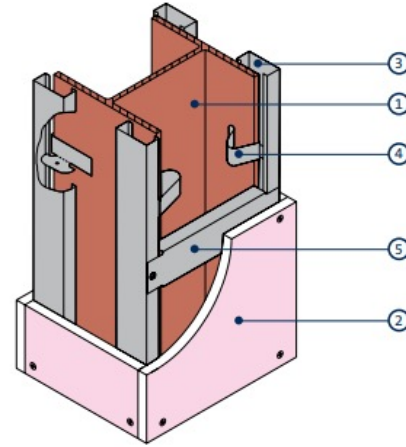
Separating construction	Airborne sound insulation $D_{nT,w}$ dB	Impact sound insulation $L'_{nT,w}$ dB
Walls	53 (min)	-
Floors (including stairs with a separating function)	53 (min)	58 (max)

# FIRE PROTECTION

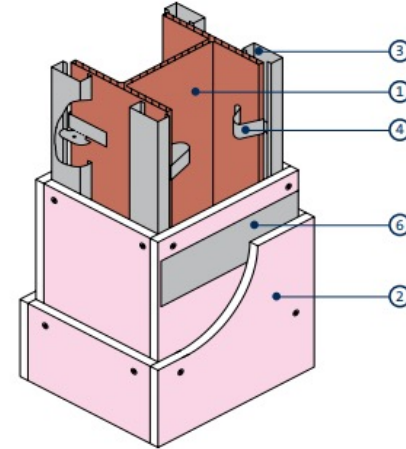


## Gyplyner ENCASE construction details

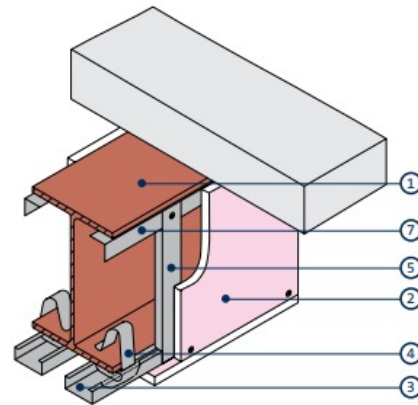
1



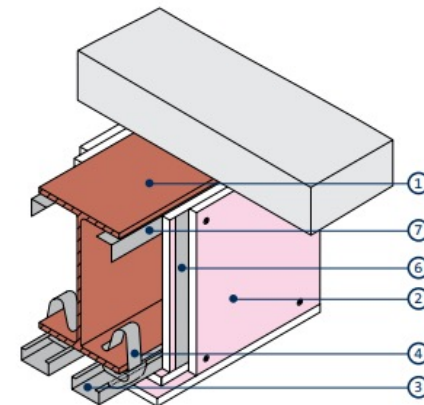
2



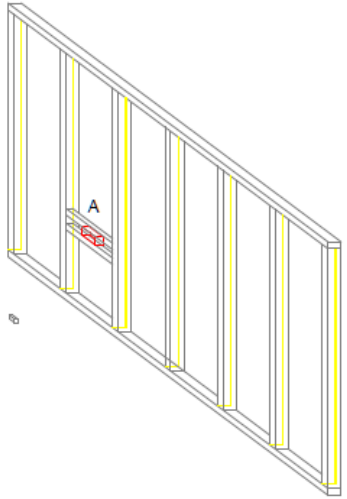
3



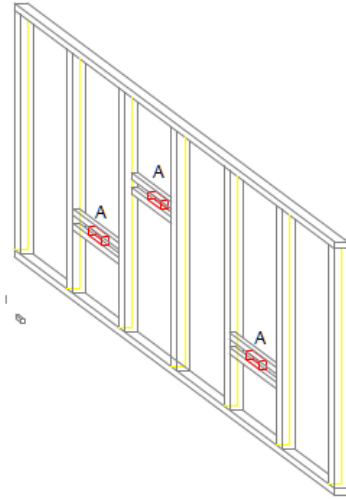
4



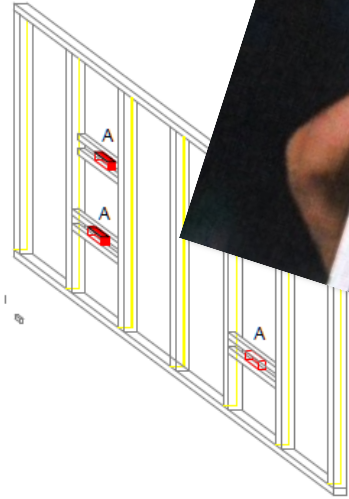
# FR60 Fire Resistant assembly Passive fire treatment



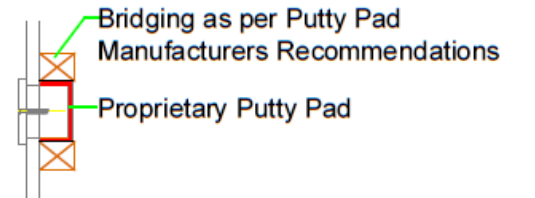
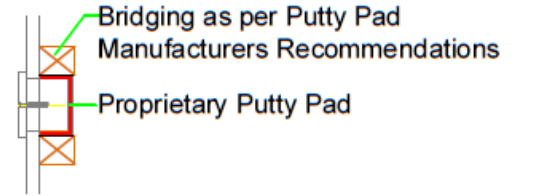
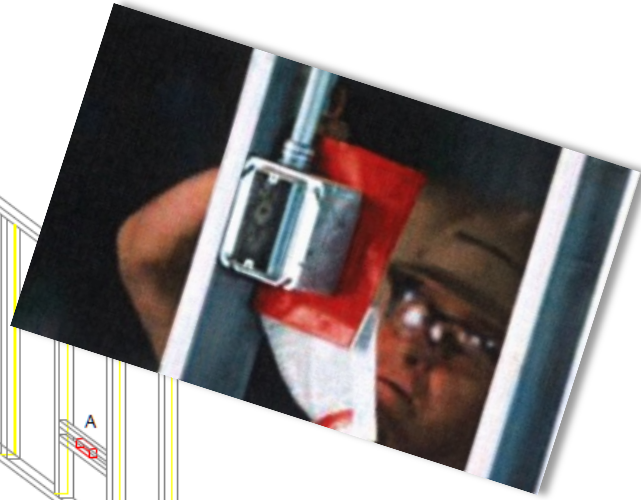
1) Socket/Switch to One Side of Wall Only



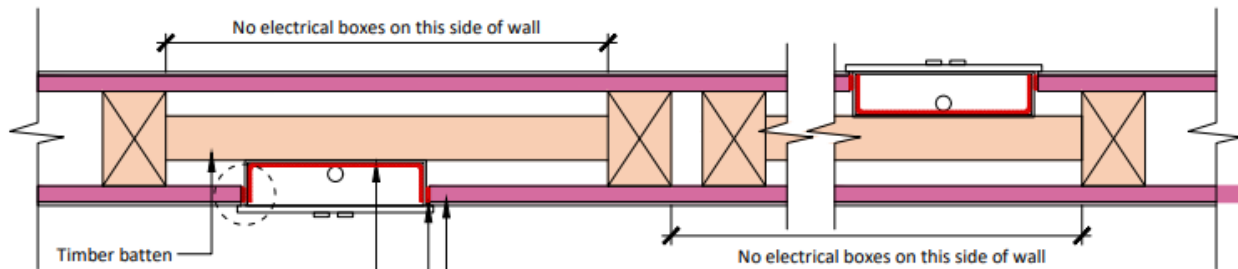
2) Socket/Switch to Both Sides of Wall (not in same bay)



3) Socket/Switch to Both Sides of Wall (same bay)



A - Metal Box in Stud

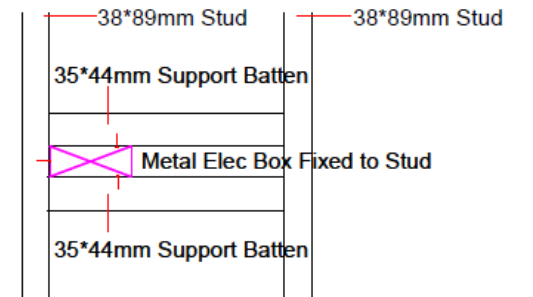
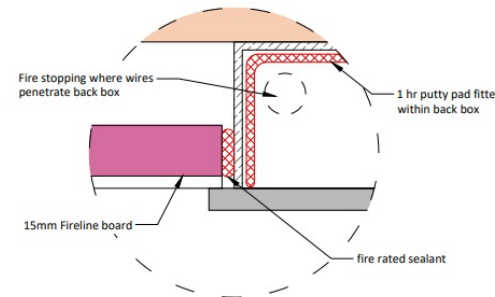


1 hr fire rated electrical back box or 1 hr putty pad fitted within back box PVC or metal

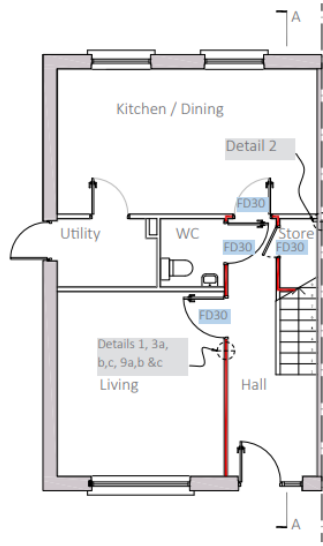
30min fire rated partition in accordance with European Test methods

Electrical socket box to be installed flush with the front edge of the plasterboard. Any gaps to be sealed with fire rated sealant

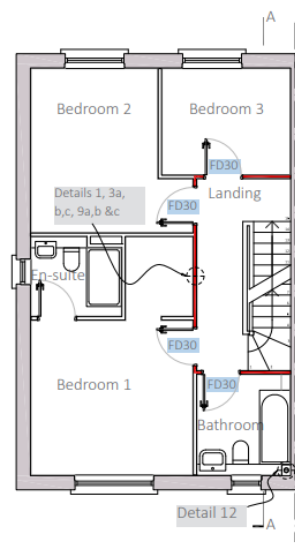
Details adapted from Gyproc Detail



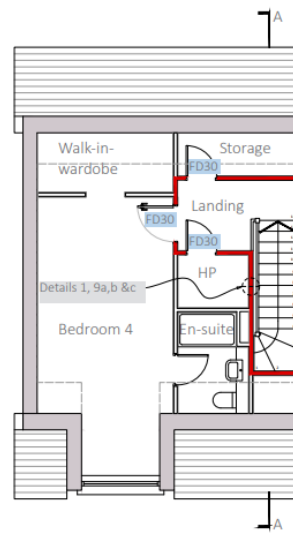
ALL JOINTS TO BE SUPPORTED ON SOLID TIMBER



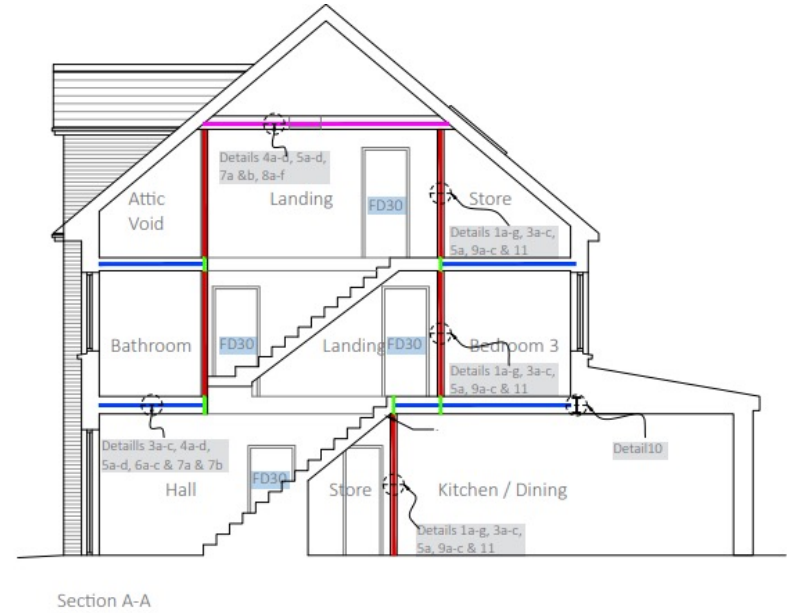
Ground Floor Plan



First Floor Plan



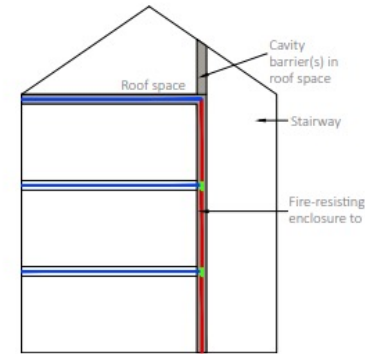
Second Floor Plan



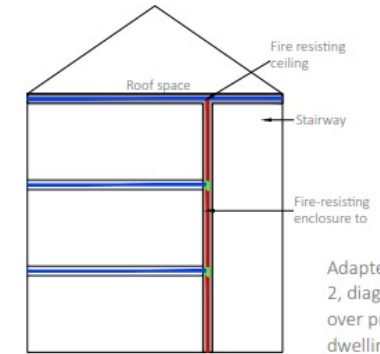
Section A-A

## Protected Corridor

- -Fire resisting enclosure- 30 mins
- -Fire resisting floor- 30 mins
- -Fire resisting ceilings- 30 mins
- -Fire resisting construction- 30 mins
- FD30 - 30 mins fire door.

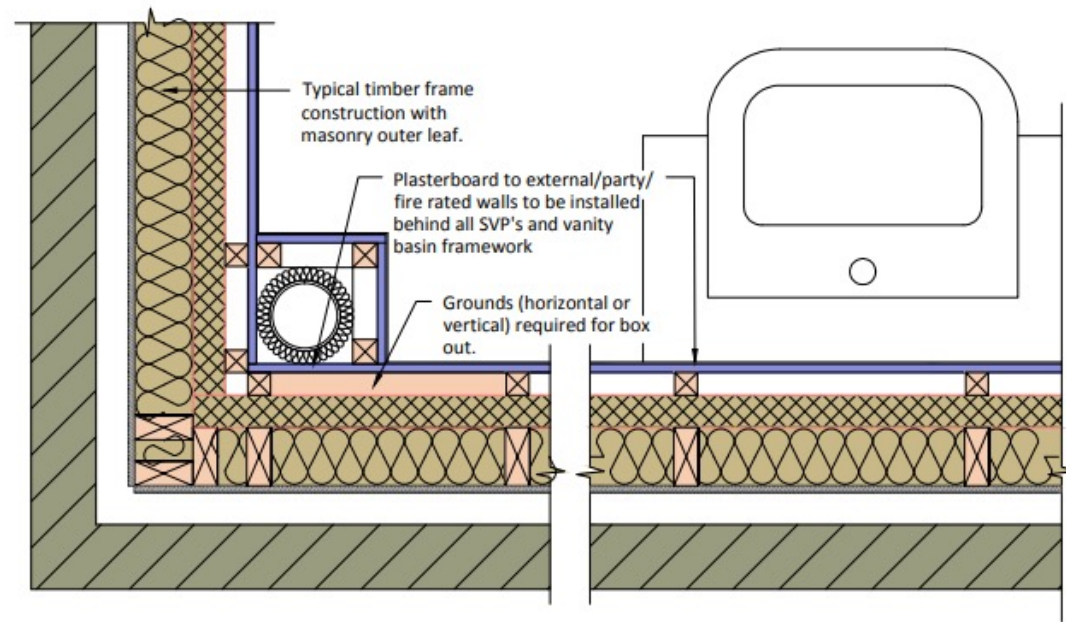
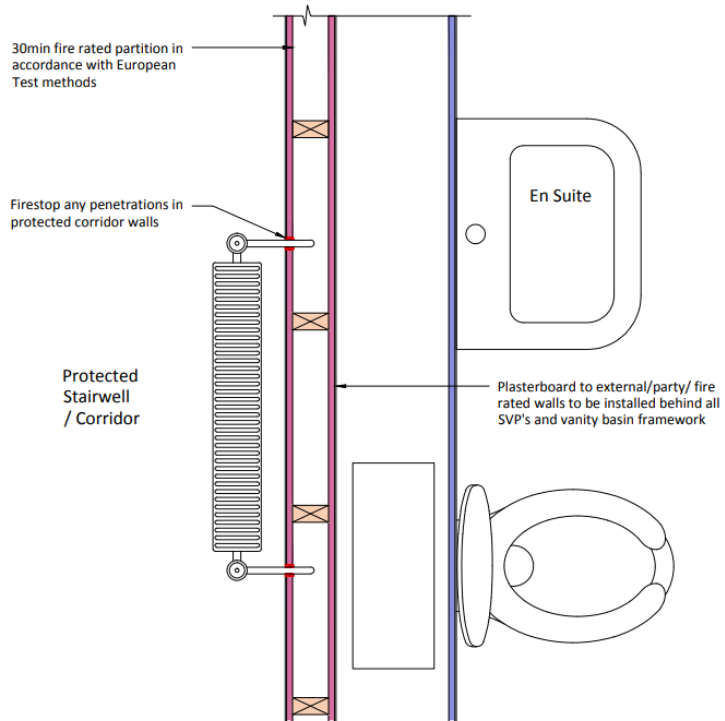


(a) with cavity barriers



(b) with fire resisting ceiling

Adapted from TGD b: Vol 2, diagram 11 roofspace over protected stairways in dwelling houses (alternative arrangements)



Box out details & Service Risers

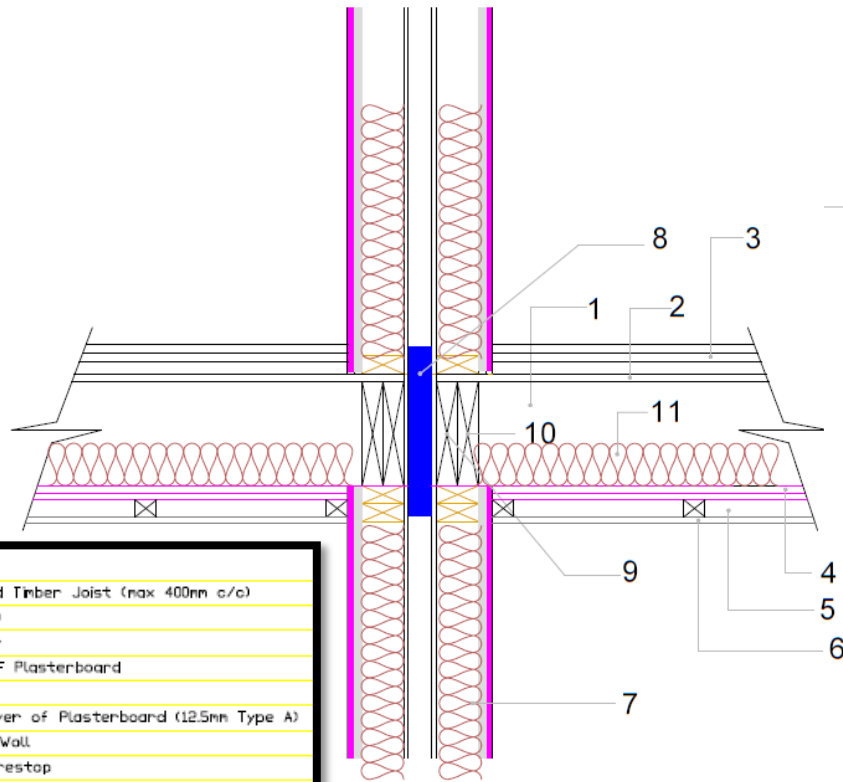


# FIRE STOPS

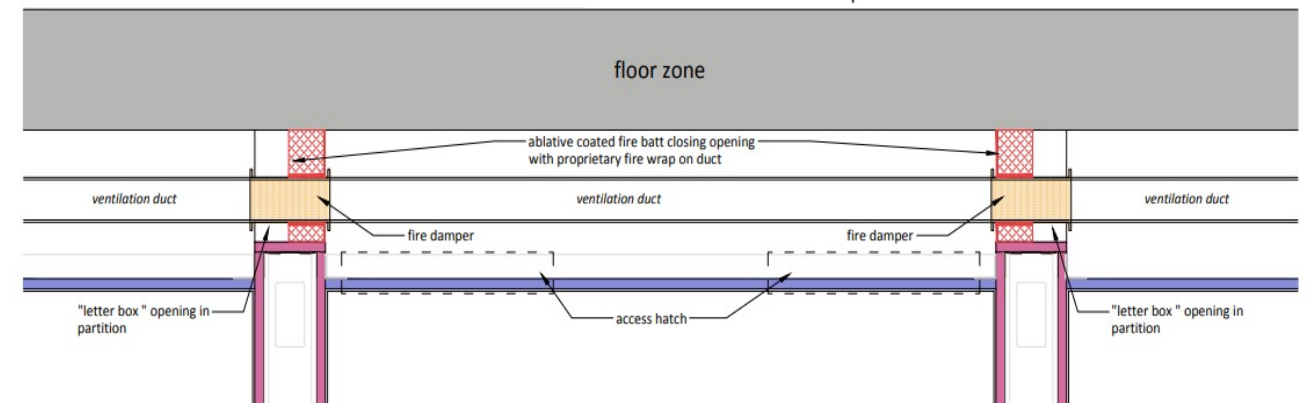
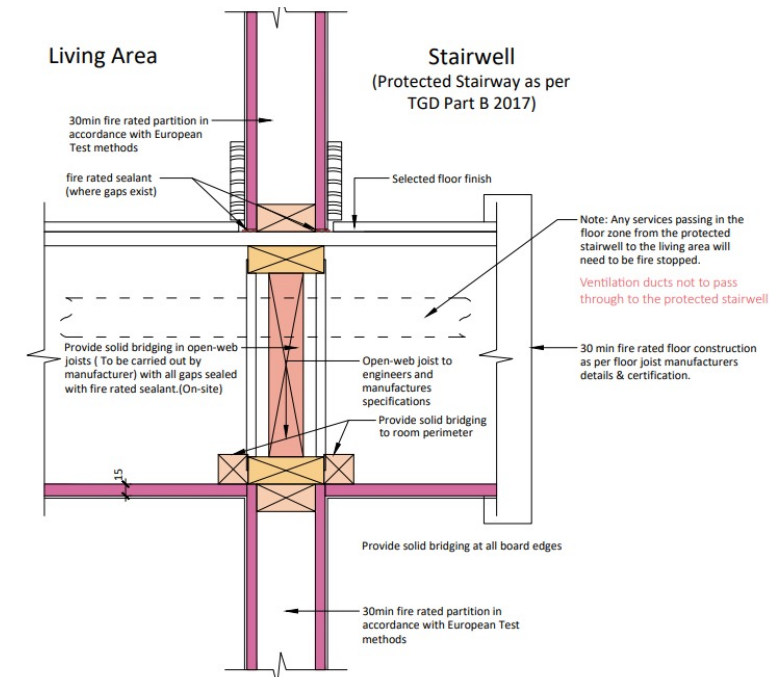
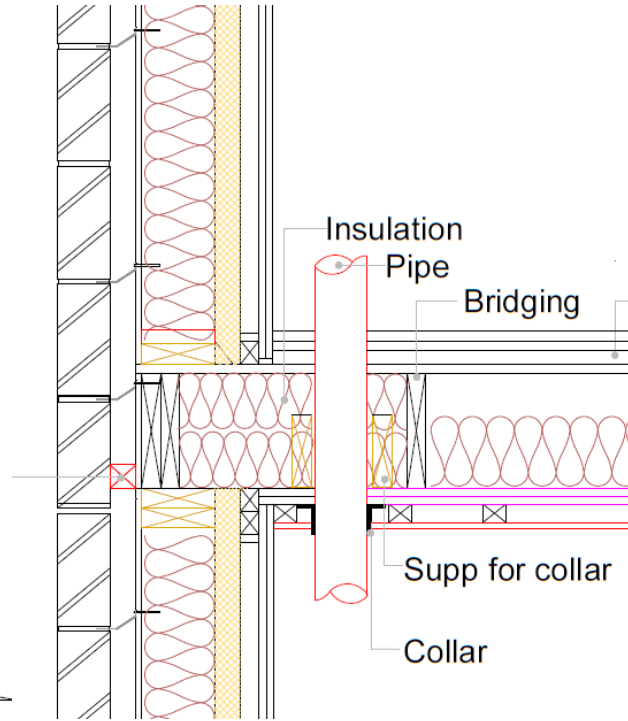
## Service penetration in Comp Floor

## Posi Floor Junction @ Load Bearing Wall

## Comp Floor – Comp Wall Junction

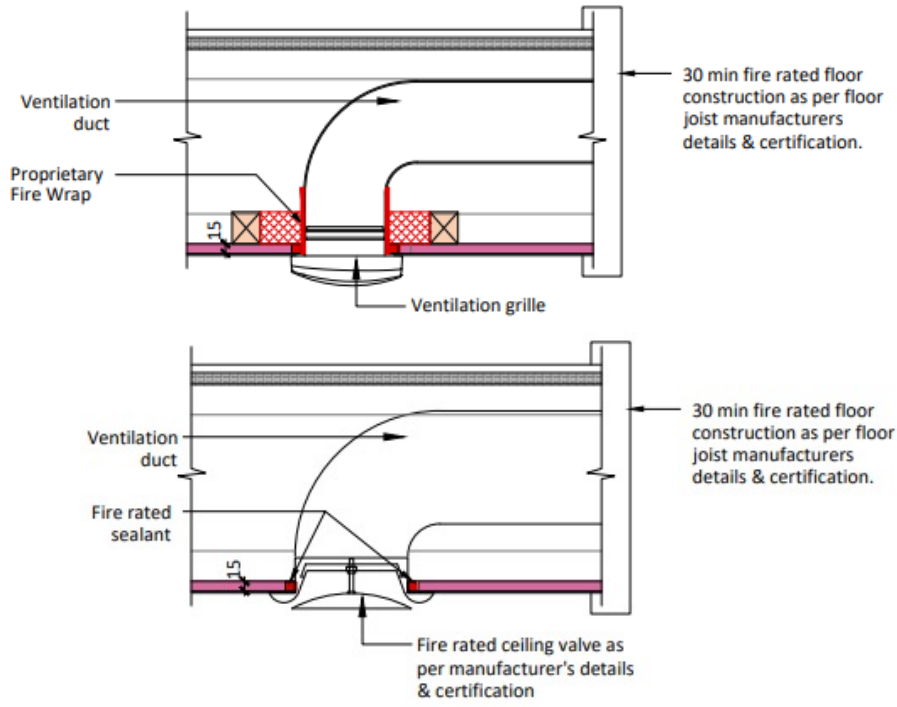


Description
1 44*219mm Solid Timber Joist (max 400mm c/c)
2 18mm OSB (min)
3 Floating Floor
4 2*15mm Type F Plasterboard
5 Service Zone
6 Sacrificial Layer of Plasterboard (12.5mm Type A)
7 Compartment Wall
8 Reinforced Firestop
9 Facing Joist (44*219mm)
10 Solid Bridging (min 44mm)
11 Insulation in Floor (Mineral Wool)



## Service penetration in FR60 Int Wall

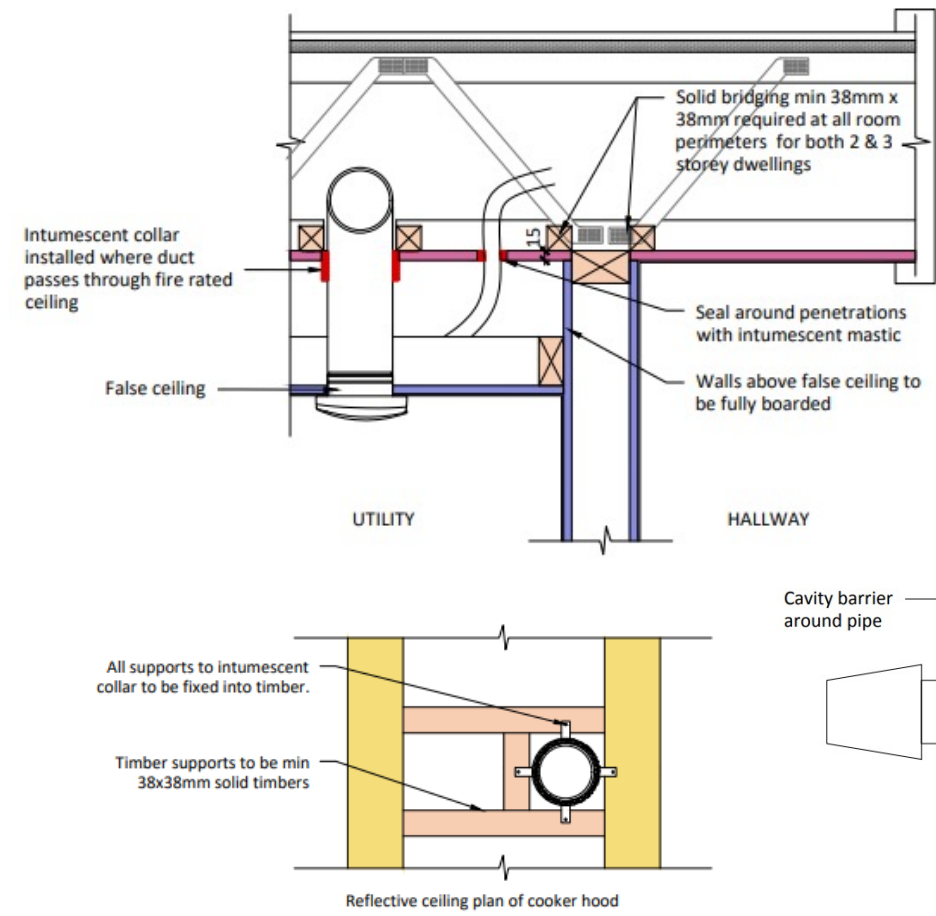
Fire rated ceiling valves for ventilation ducting



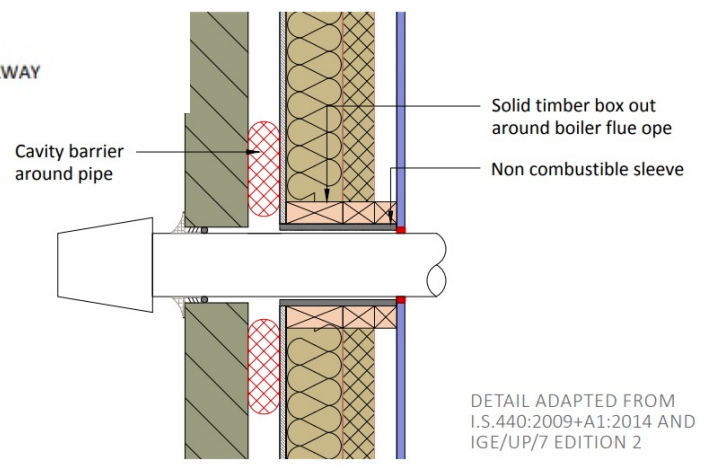
**Fire Rated Ceiling Valve installed before a fire.**



**Fire Rated Ceiling Valve sealed after a fire.**



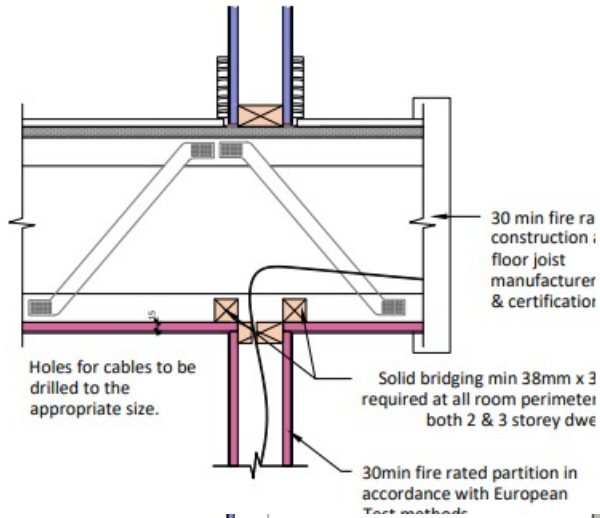
Service penetration in FR60 Floor



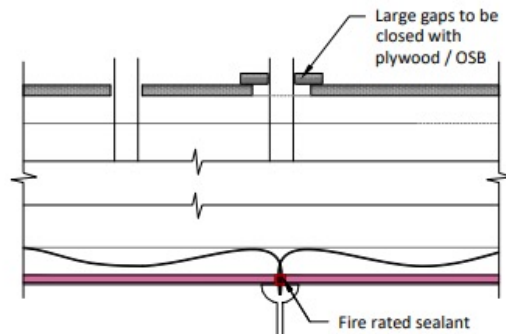
Boiler Flue Penetration

DETAIL ADAPTED FROM I.S.440:2009+A1:2014 AND IGE/UP/7 EDITION 2

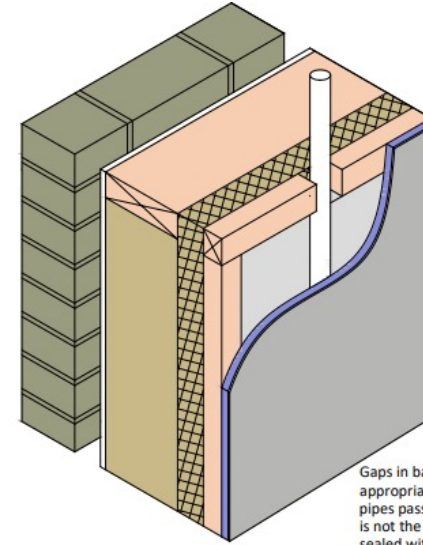
Penetration @ Stud Heads



Penetration through ceiling / floor

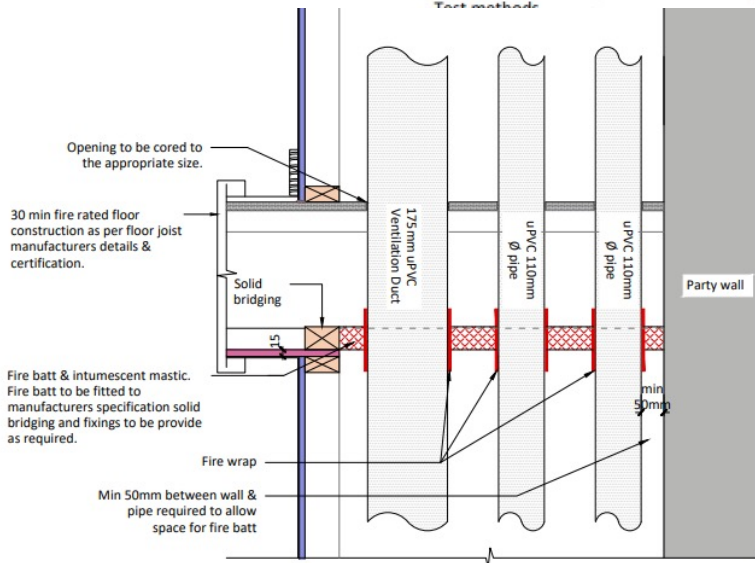


Gaps in flooring layer: Holes for services to be cored to the appropriate size. Where gaps greater than approx 10mm exist they should be closed with a piece of flooring as per drawing

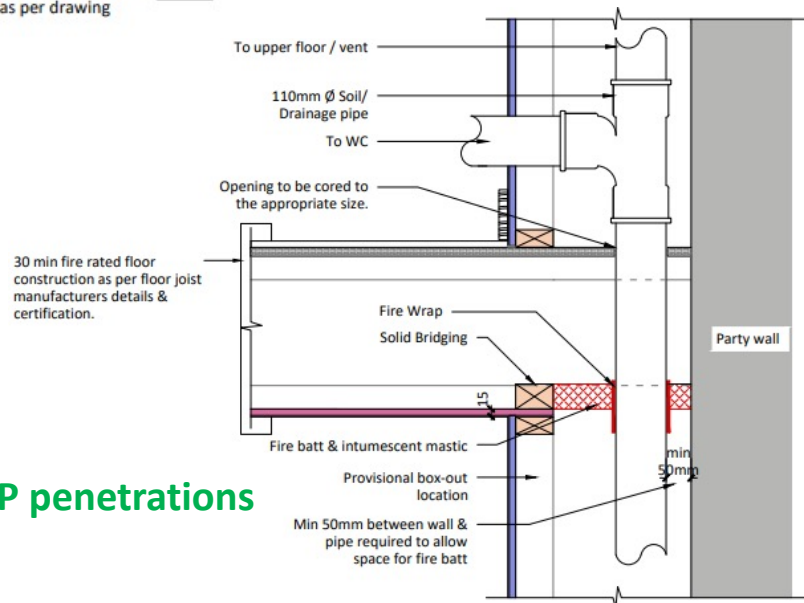


Service penetration at head of service cavity

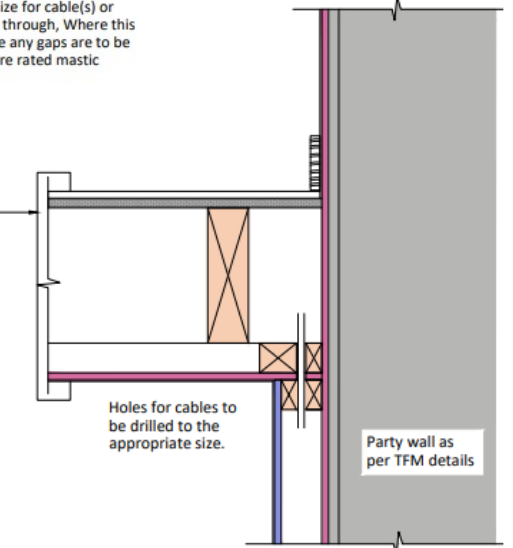
Gaps in battens to be sized to the appropriate size for cable(s) or pipes passing through. Where this is not the case any gaps are to be sealed with fire rated mastic



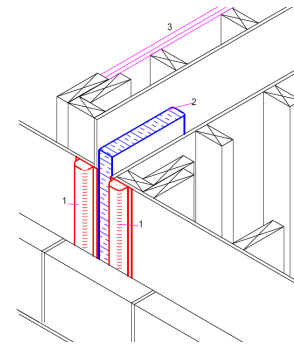
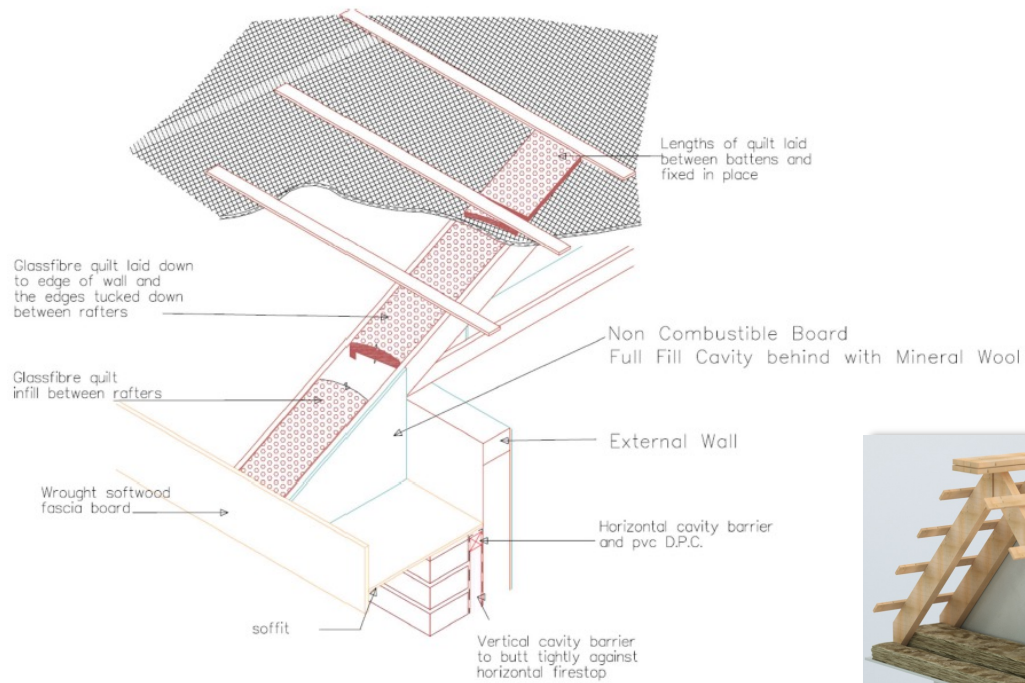
SVP penetrations



30 min fire rated floor construction as per floor joist manufacturers details & certification.



# Party Wall



**TYPICAL EXTERNAL WALL CONSTRUCTION**  
 12.5mm. PLASTERBOARD AND SKIM  
 140x38mm. TREATED TIMBER STUDS  
 VAPOUR BARRIER TO INTERIOR FACE OF STUD  
 150mm. FIBREGLASS QUILT INSULATION  
 50mm. CLEAR CAVITY  
 SELECTED EXTERNAL WALL / CALDDING

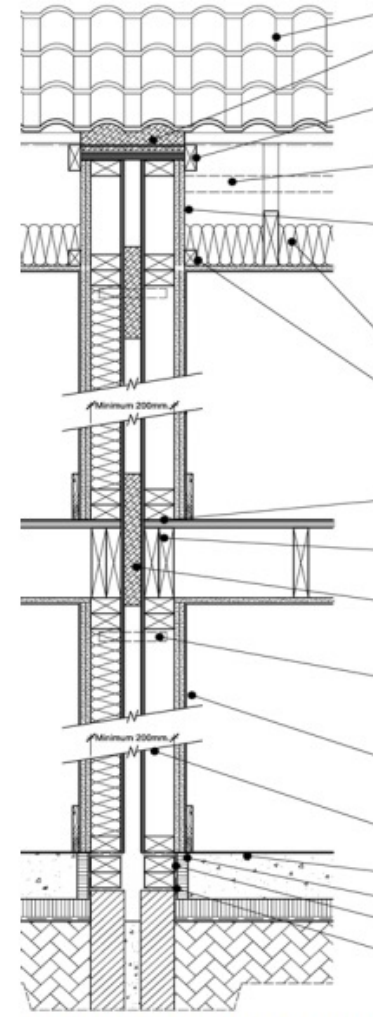
PROPRIETARY CAVITY BARRIER.  
 WIRE REINFORCED MINERAL WOOL CAVITY BARRIER FIXED TO ONE SIDE OF TIMBER FRAME.

**TYPICAL PARTY WALL CONSTRUCTION**  
 89mm. TIMBER STUDS WITH 9.5mm. OSB/PLYWOOD SHEATHING TO CAVITY SIDE  
 19mm. PLANK TYPE PLASTERBOARD INNER LAYER  
 12.5mm. SKIMMED PLASTERBOARD OUTER LAYER  
 ALL JOINTS TO BE STAGGERED, TAPED, FILLED MINERAL WOOL / FIBREGLASS QUILT INSULATION TO ONE SIDE OF PARTY WALL ONLY.

**TYPICAL INTERNAL PARTITION**  
 12.5mm PLASTERBOARD  
 FIXED TO 75mm. TIMBER STUDS

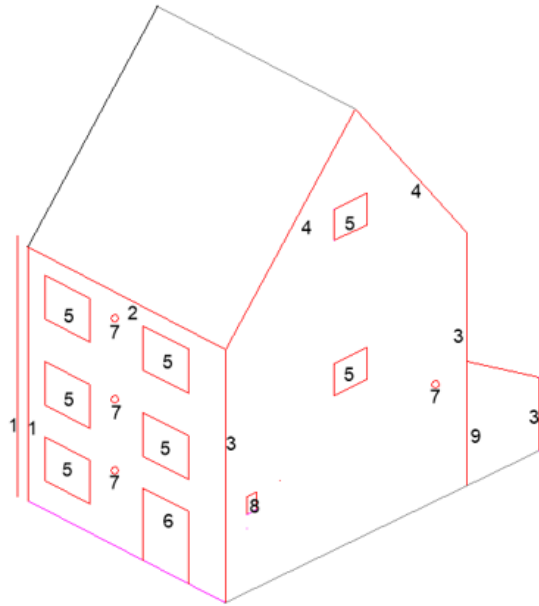
ADDITIONAL STUDS AT JUNCTION  
 ACOUSTIC INSULATION BETWEEN STUDS

PLAN DETAIL (not to scale)

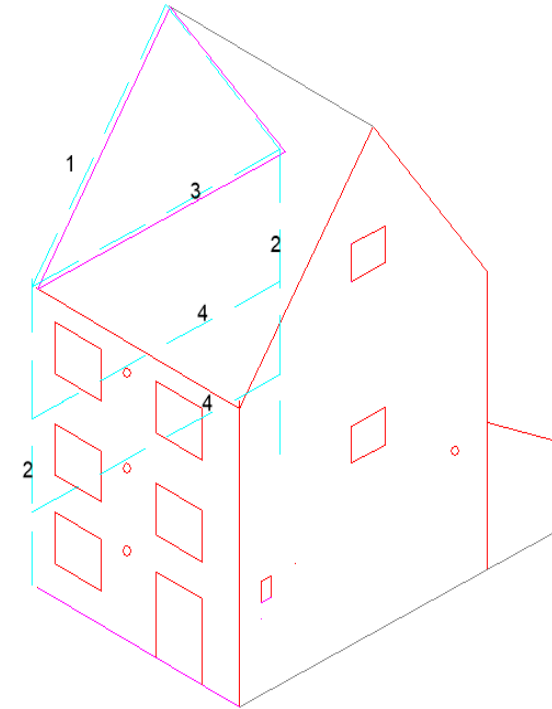


SECTION DETAIL (not to scale)

## Fire Stop Locations



<b>1</b>	<b>Vertically at either side of separating wall</b>
<b>2</b>	Horizontally at eaves level
<b>3</b>	Vertically at corners
<b>4</b>	Along roof pitch at gable
<b>5</b>	Around Windows (concrete cill forms cavity barrier under window)
<b>6</b>	At top and sides of ground floor doors
<b>7</b>	Around service penetrations
<b>8</b>	Around meter boxes and other penetrations in cavity
<b>9</b>	Vertically where cavities exceed 10m in length when measured horizontally

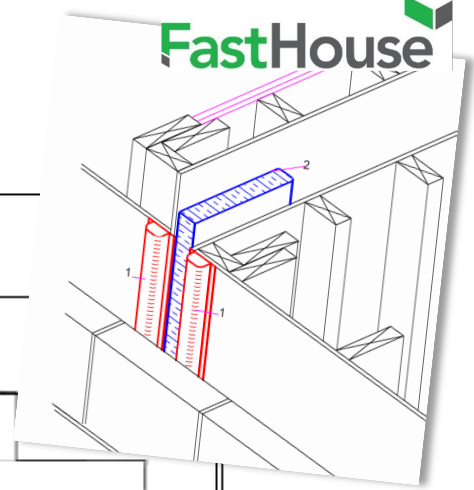


<b>1</b>	<b>At top of separating walls</b>
<b>2</b>	Vertically at the ends of separating walls at junctions with external walls
<b>3</b>	horizontally within the separating or compartment wall cavity at roof ceiling level covering the full depth of the ceiling and the rails of the adjacent wall panels (may be a cavity barrier in certain situations)
<b>4</b>	horizontally within the separating or compartment wall cavity at roof ceiling level covering the full depth of the ceiling and the rails of the adjacent wall panels.

# FIRE Cavity Barriers

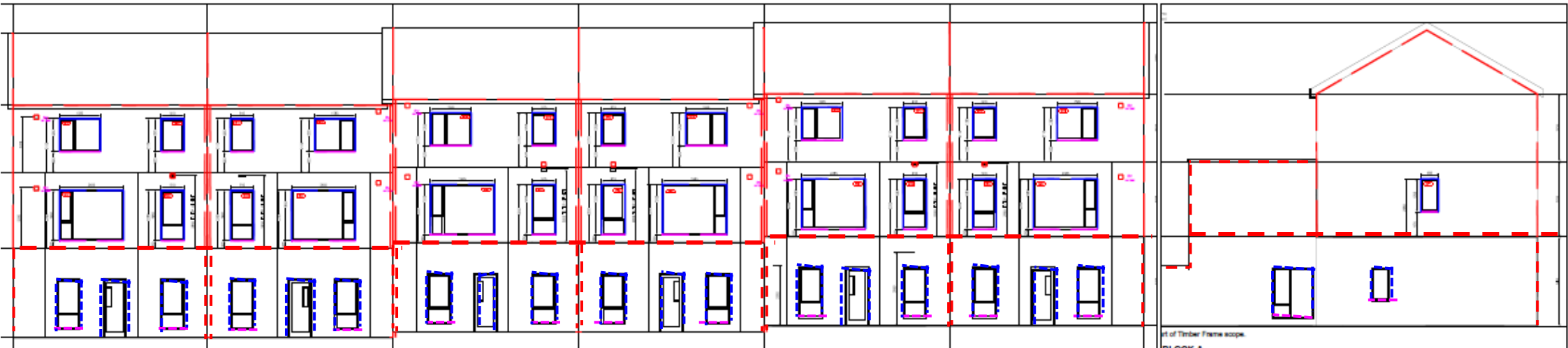
LEGEND:

- DENOTES CAVITY BARRIER (TO BE PLACED ON ONE FACE OF HOUSE AT CORNERS)
- DENOTES CAVITY BARRIER (BY OTHERS)
- DENOTES CLOSED CAVITY WITH A LOOPED FIRE BAG OR CONCRETE CILL TO CORRECT SPECIFICATION



FRONT ELEVATION

LEFT ELEVATION



FRONT ELEVATION

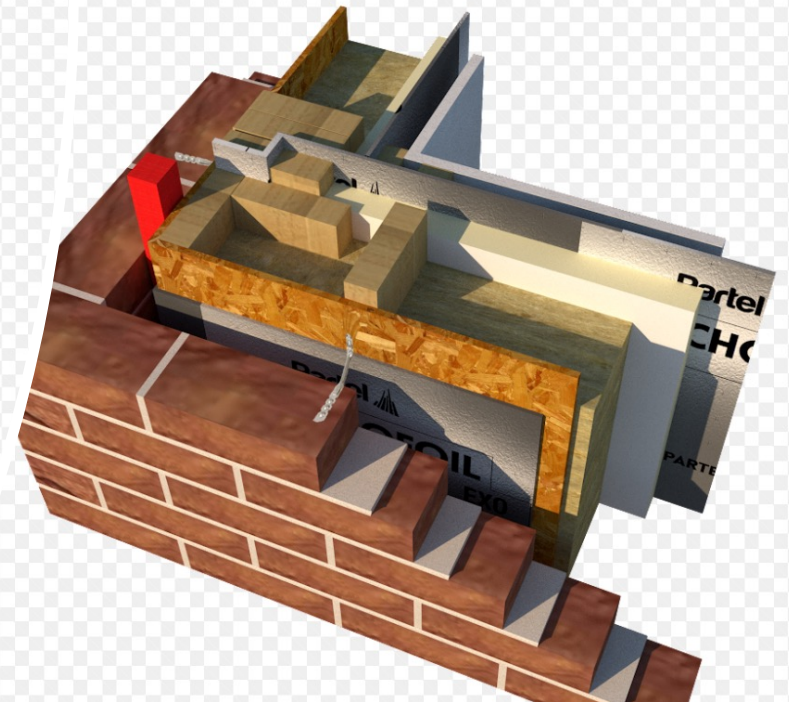
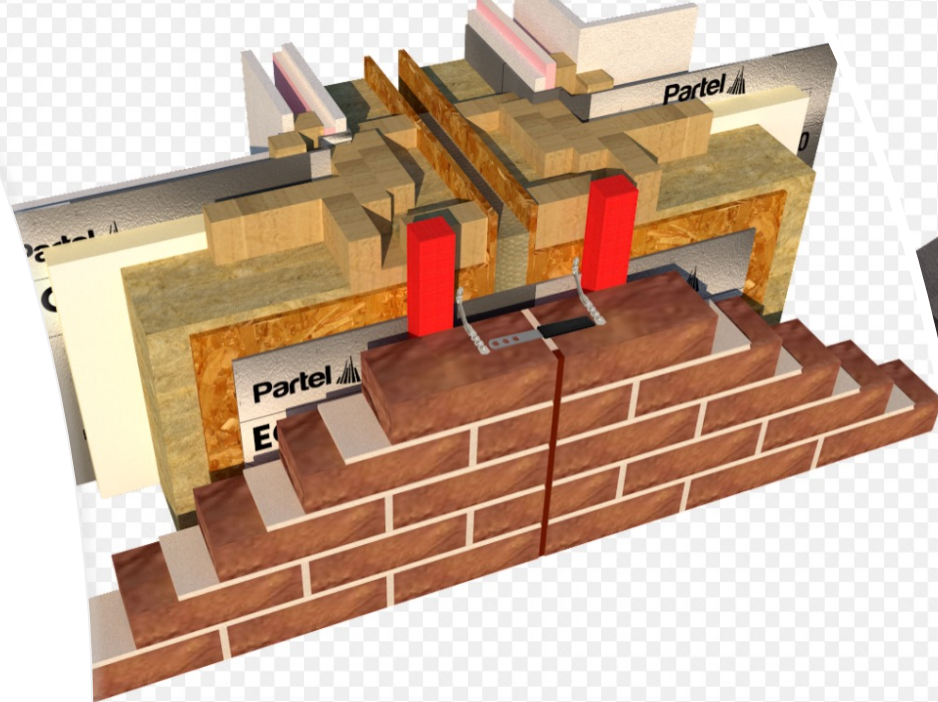
RIGHT ELEVATION

Not of Timber Frame scope.

BLOCK A

# Cavity Barriers

- Must be Tightly Fitted at Joints
- Must close Cavity
- Must be sized correctly



## Resistance to Moisture

### Damage to the fabric of the building:

Preventing moisture from reaching materials which would be damaged or by using materials which will not be damaged by moisture.

#### 3.2.1 External walls

Prevent moisture from the ground

Resist the penetration of rain or snow to the inside

#### 3.2.6 Cavity Walls

2 leaf external wall - outer leaf separated from the inner leaf by a drained air space to prevent moisture from the outside accumulating in the cavity or being carried to the inner leaf.





# Energy Performance – Energy Efficient Buildings

## Where to next??

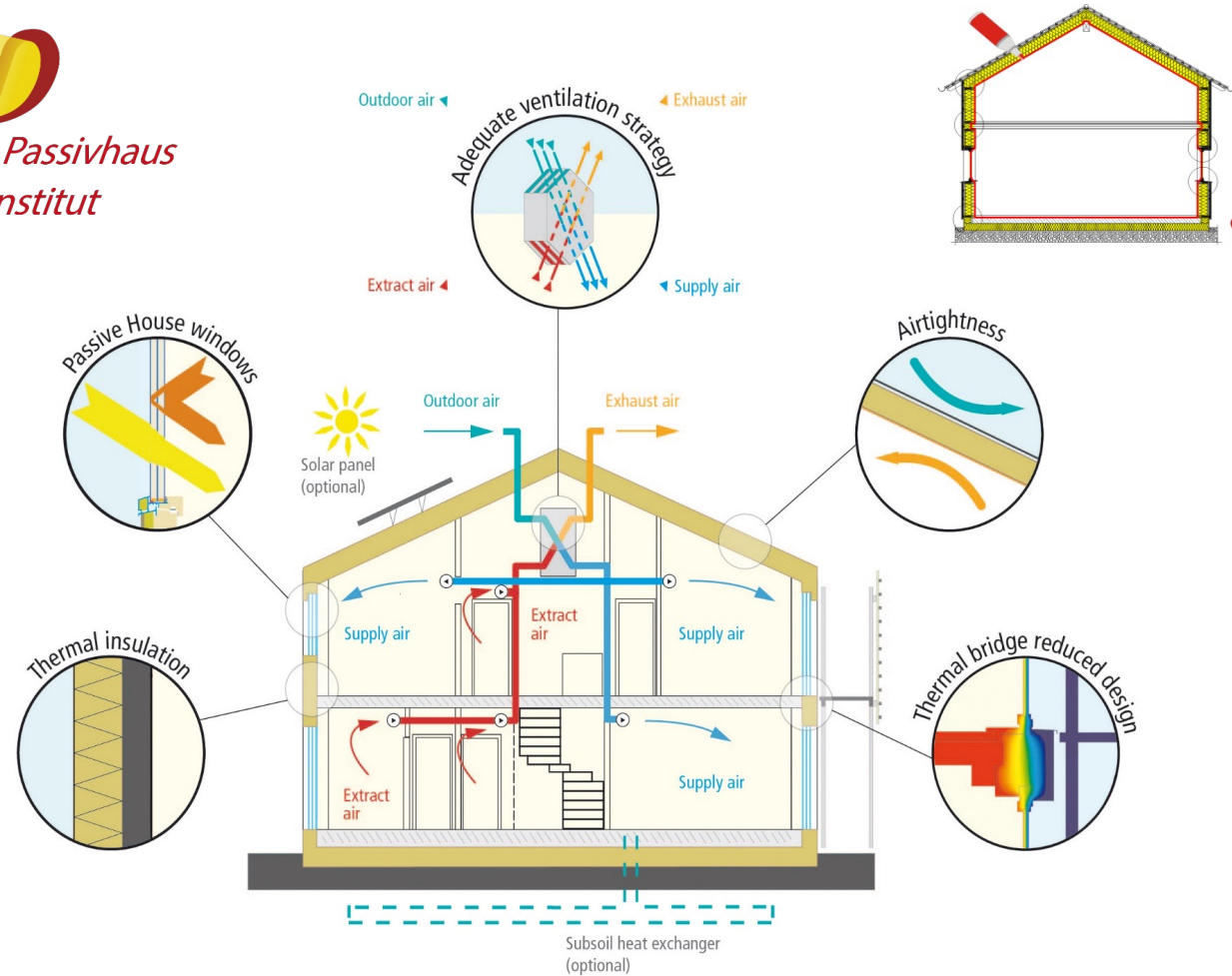
### nZEB compliant details & specifications

A2 BER Rating  
 Primary Energy consumption <45 kWh/m<sup>2</sup> pa  
 MPEPC 0.3  
 MPCPC 0.35



### Passive house criteria

Heating energy demand: < 15kWh per m<sup>2</sup> per year  
 Or Building heating load: < 10 W/m<sup>2</sup>  
 Primary energy demand: < 120 kWh per m<sup>2</sup> per year  
 Building air tightness: < 0.6 ACH @ 50pa  
 Excess temperature frequency (25oC): < 10%  
 Ventilation: with > 75% heat recovery  
 Electricity demand max. 0.45 Wh/m<sup>3</sup>

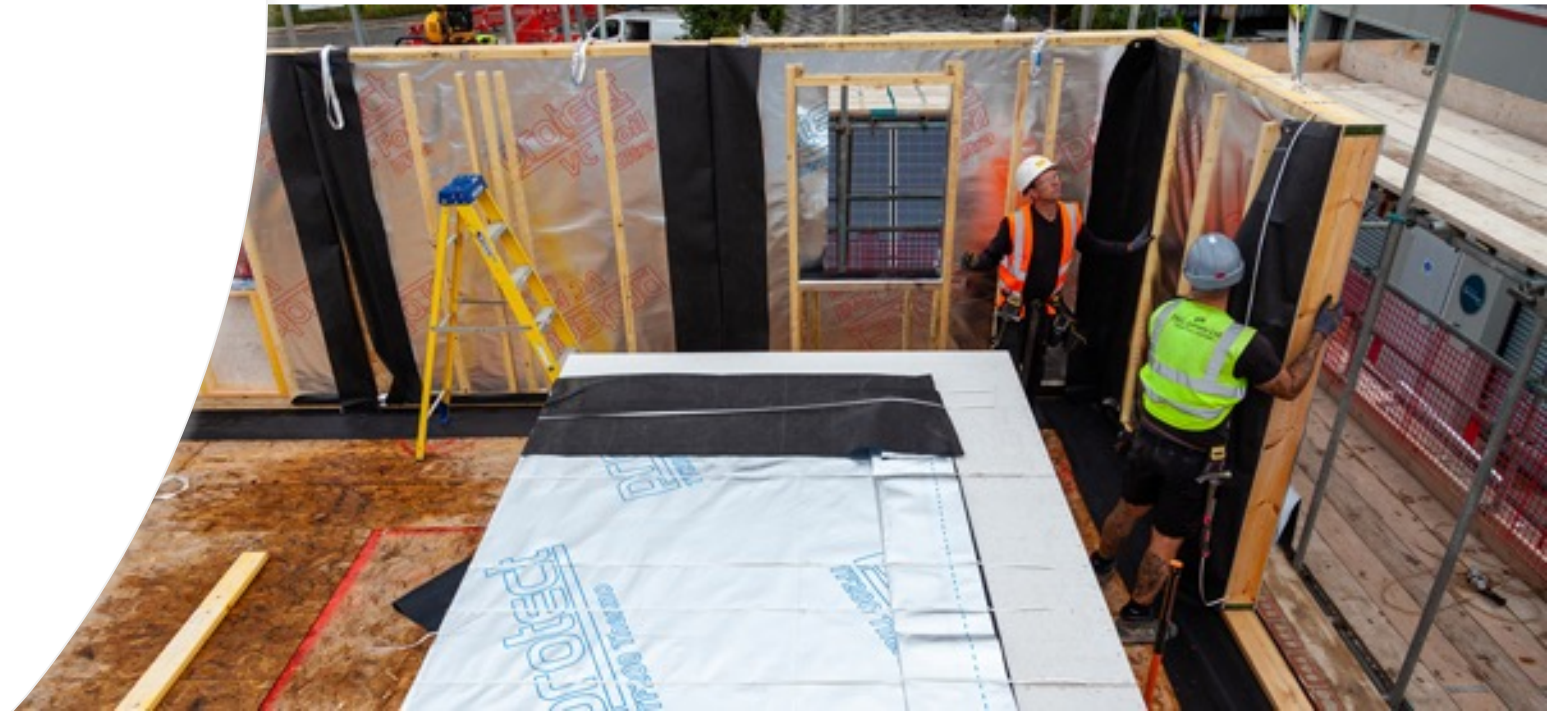
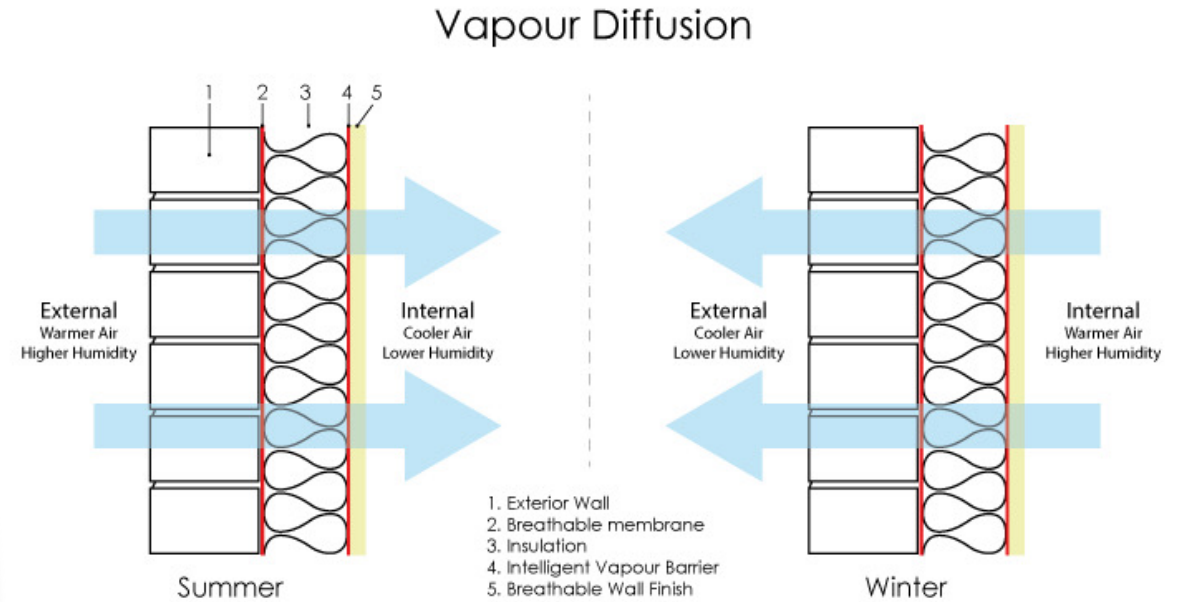


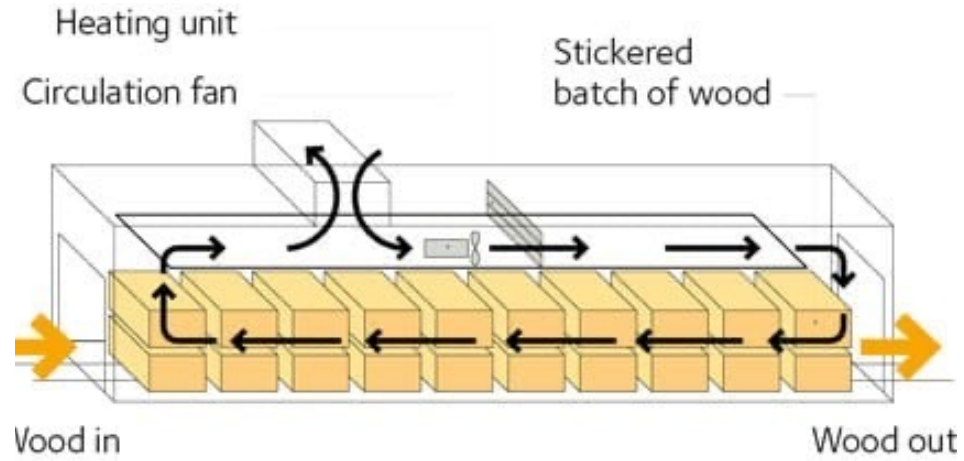
Green Sustainable Energy Efficient

# Resistance to Moisture and Vapour Management

## 3 main categories membranes

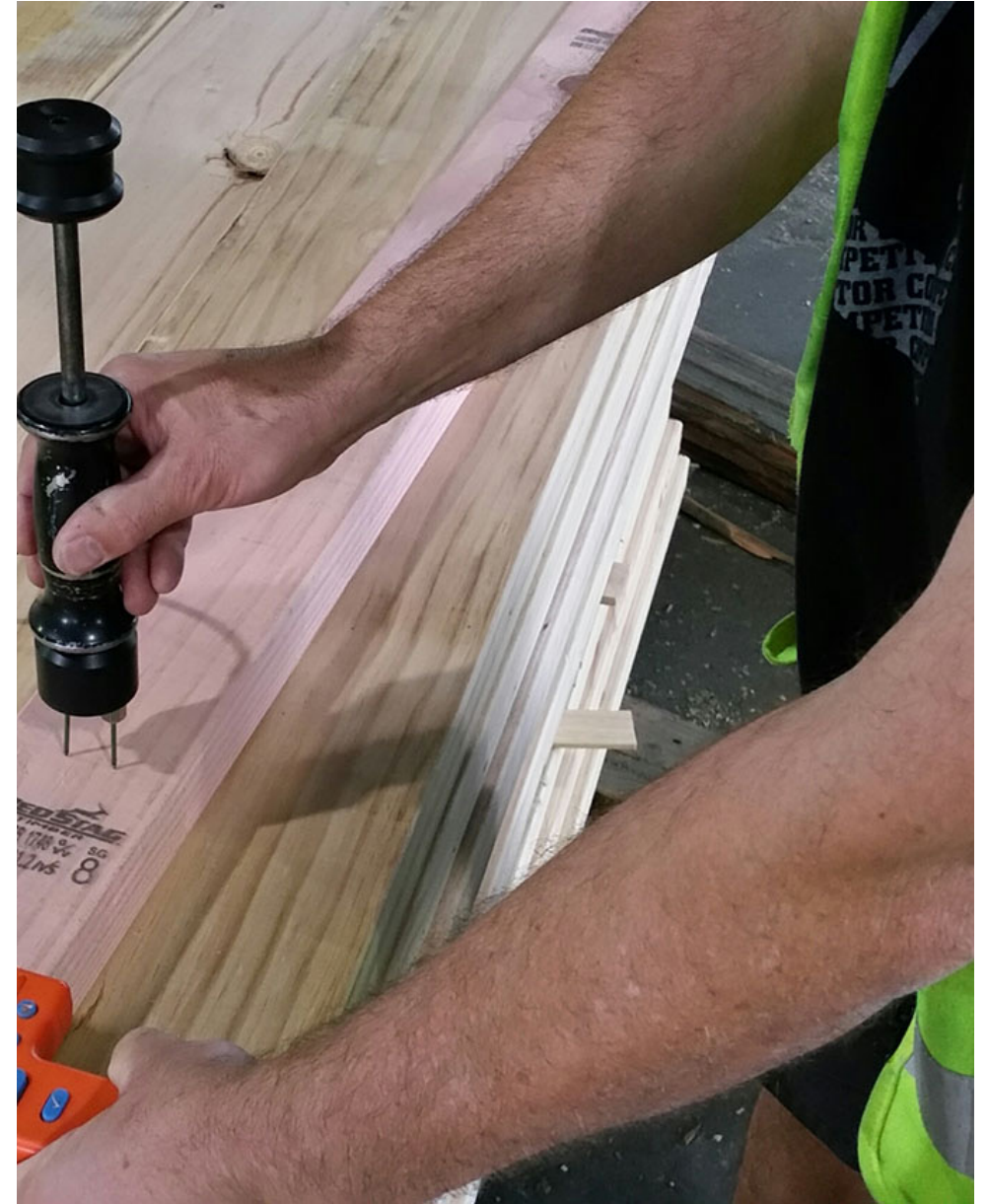
- Vapour Barriers
- Breathable Membranes
- Intelligent Membranes AVCL's





Moisture content:

In accordance with I.S. EN 13183-2 at the time of fabrication, shall not exceed 18 %.



## Preservative treatment:

Requirement for preservation treatment is determined in accordance with I.S. EN 335 (Parts 1, 2 and 3), I.S. EN 350-2, I.S. EN 351-1 and I.S. EN 460 as appropriate



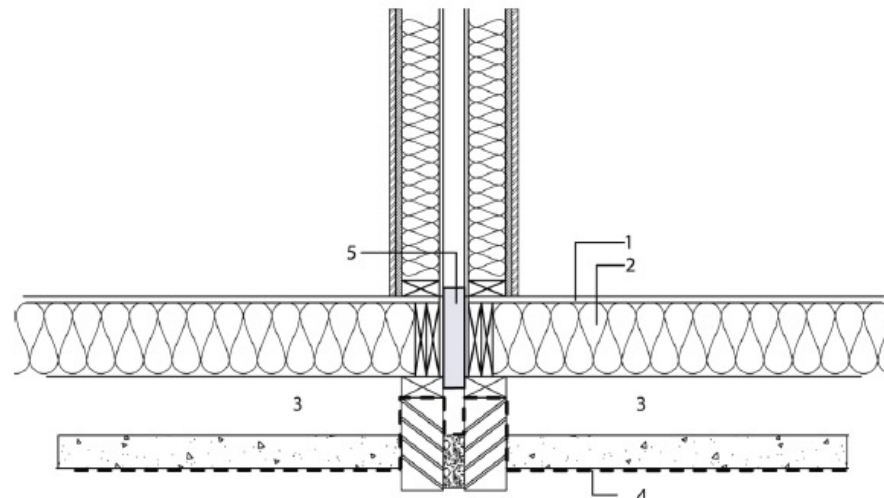
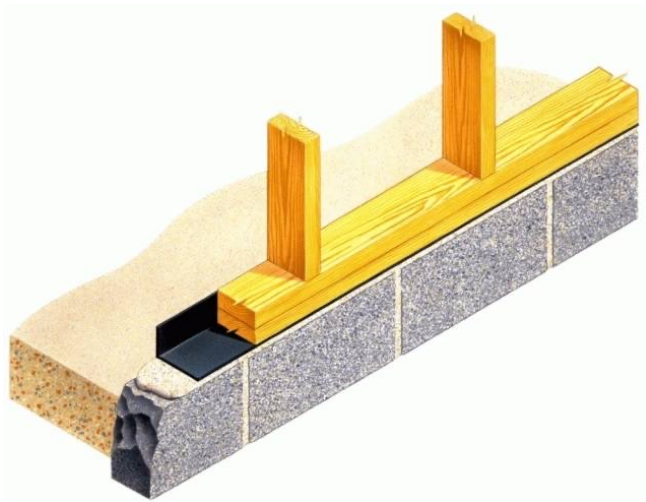
Service class 1, preservative treatment is not required.  
All other components require preservation treatment.

Construction element	Service class
Timber frame external walls	2
Timber frame internal walls	1
Timber frame compartment and separating walls	1
Timber ground floors	2
Timber upper floors	1
Cold roofs	2
Warm roofs	1
External timber, protected from direct wetting e.g. cavity barriers	2
External timber; fully exposed e.g. cladding	3

## Resistance to Moisture

DPCs and DPMs to conform to I.S. EN 14909

A drained and ventilated external wall cavity



# Resistance to Moisture



## Condensation Risk Analysis in accordance with BS EN ISO 13788

BuildDesk U 3.4
Hybrid Wall System London Climate

26. August 2022  
Page 5/19

Documentation of the component  
Calculation according BS EN ISO 13788  
Source: **own catalogue - FAST HOUSE**  
Component: **Hybrid Wall System**

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### Condensation risk analysis - summary of main results

Calculation according BS EN ISO 13788

- ✓ **Surface temperature to avoid critical surface moisture:**  
No danger of mould growth is expected.
- ✓ **Interstitial condensation:**  
No condensation is predicted at any interface in any month.

Interstitial condensation and evaporation per month gc [g/m<sup>2</sup>]

Component, condensation range

Condensation Risk Analysis calculations according to BS EN ISO 13788 are used as a guide in predicting interstitial condensation. This methodology uses some simplifications of the dynamic processes involved and subsequently does have some limitations. For further information the user is advised to follow the prescriptive guidance in BS 5250:2021 Management of moisture in buildings – Code of practice & BRE Information Paper:IP2/O5 (Feb. 2005)

**\*Modelling and controlling interstitial condensation**

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Documentation of the component  
Calculation according BS EN ISO 13788  
Source: **own catalogue - FAST HOUSE**  
Component: **Hybrid Wall System**

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### Vapour pressure distribution

Calculation according BS EN ISO 13788

1. Month of balance: January

T<sub>i</sub> [°C] 21.0    phi<sub>i</sub> [-] 0.600    T<sub>e</sub> [°C] -2.0    phi<sub>e</sub> [-] 0.900

Outside

Inside

Temperature [°C]

Vapour pressure [Pa]

Table of month January:

Name	T [°C]	d [m]	psat [Pa]	p [Pa]
External / Brick outer leaf & Mortar outer leaf (f = 0.000 / automatic disregard acc. BRE 443)	-1.9	0.355	524	465
Brick outer leaf & Mortar outer leaf (f = 0.000 / automatic disregard acc. BRE 443) / 50 mm cavity e = 0.03	-1.4	0.253	545	470
50 mm cavity e = 0.03 / Protect TF200 Thermo	1.5	0.203	680	470
Protect TF200 Thermo / Oriented strand board (OSB)	1.5	0.202	680	470
Oriented strand board (OSB) / Earthwool FrameTherm Roll 40	1.7	0.193	692	471
Earthwool FrameTherm Roll 40 / Generic PIR insulation	10.1	0.103	1232	471
Generic PIR insulation / Protect VC Foil Ultra	16.8	0.063	1910	473

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### Surface temperature to avoid critical surface humidity

Calculation according BS EN ISO 13788

Free input of all environmental conditions

Month	1	2	3	4	5	6	7	8	9	10	11	12
	T <sub>e</sub>	phi <sub>e</sub>	T <sub>i</sub>	phi <sub>i</sub>	pe	delta p	pi	ps(T <sub>si</sub> )	T <sub>si,min</sub>	fR <sub>si</sub>	T <sub>si</sub>	T <sub>se</sub>
	[°C]	---	[°C]	---	[Pa]	[Pa]	[Pa]	[Pa]	[°C]	---	[°C]	[°C]
January	-2.0	0.900	21.0	0.600	465	1026	1491	1864	16.4	0.800	20.1	-1.9
February	-2.0	0.880	21.0	0.600	455	1036	1491	1864	16.4	0.800	20.1	-1.9
March	2.9	0.830	21.0	0.600	624	867	1491	1864	16.4	0.746	20.3	3.0
April	4.8	0.770	21.0	0.600	662	829	1491	1864	16.4	0.716	20.3	4.9
May	8.6	0.750	21.0	0.600	838	654	1491	1864	16.4	0.629	20.5	8.7
June	11.7	0.750	21.0	0.600	1031	461	1491	1864	16.4	0.505	20.6	11.8
July	13.9	0.740	21.0	0.600	1175	317	1491	1864	16.4	0.352	20.7	13.9
August	13.6	0.760	21.0	0.600	1183	308	1491	1864	16.4	0.378	20.7	13.6
September	10.9	0.810	21.0	0.600	1056	436	1491	1864	16.4	0.545	20.6	11.0
October	7.2	0.870	21.0	0.600	883	608	1491	1864	16.4	0.667	20.4	7.3
November	3.6	0.900	21.0	0.600	711	780	1491	1864	16.4	0.736	20.3	3.7
December	-2.0	0.920	21.0	0.600	476	1016	1491	1864	16.4	0.800	20.1	-1.9

- The critical month is January with  $f_{Rsi,max} = 0.800$   
 $f_{Rsi} = 0.960$

**f<sub>Rsi</sub> > f<sub>Rsi,max</sub>, the component complies.**

**Nr Explanation**

- 1 External temperature
- 2 External rel. humidity
- 3 Internal temperature
- 4 Internal relative humidity
- 5 External partial pressure  $p_e = \phi_e \cdot p_{sat}(T_e)$ ;  $p_{sat}(T_e)$  according formula E.7 and E.8 of BS EN ISO 13788
- 6 Partial pressure difference. The security factor of 1.10 according to BS EN ISO 13788, ch.4.2.4 is already included.
- 7 Internal partial pressure  $p_i = \phi_i \cdot p_{sat}(T_i)$ ;  $p_{sat}(T_i)$  according formula E.7 and E.8 of BS EN ISO 13788
- 8 Minimum saturation pressure on the surface obtained by  $p_{sat}(T_{si}) = p_i / \phi_{si}$   
where  $\phi_{si} = 0.8$  (critical surface humidity)
- 9 Minimum surface temperature as function of  $p_{sat}(T_{si})$ , formula E.9 and E.10 of BS EN ISO 13788
- 10 Design temperature factor according 3.1.2 of BS EN ISO 13788
- 11 Internal surface temperature, obtained from  $T_{si} = T_i - R_{si} \cdot U \cdot (T_i - T_e)$
- 12 External surface temperature, obtained from  $T_{se} = T_e + R_{se} \cdot U \cdot (T_i - T_e)$

# Quality assurance onsite

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UNCONTROLLED IF PRINTED  
VERSION 1  
DATE 30/06/17  
PAGE 1 OF 3  
Site checklist for timber frame dwelling  
based on IS440:2009-A1:2014  
RHS FORM 54

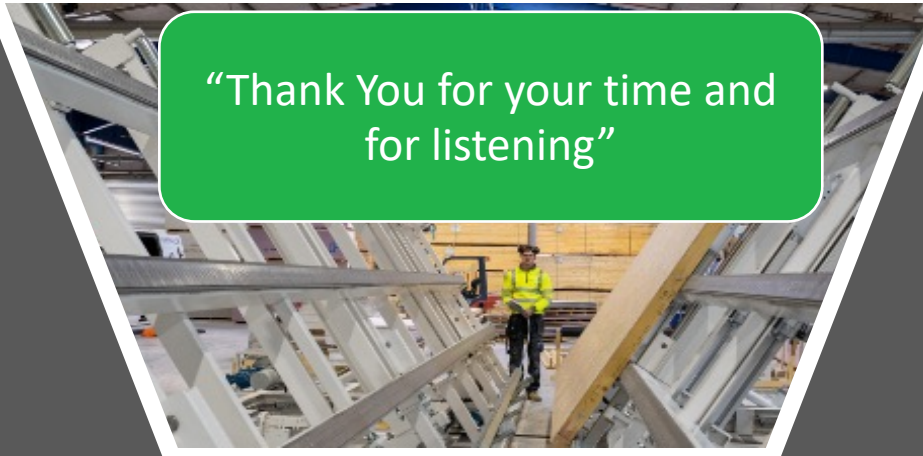
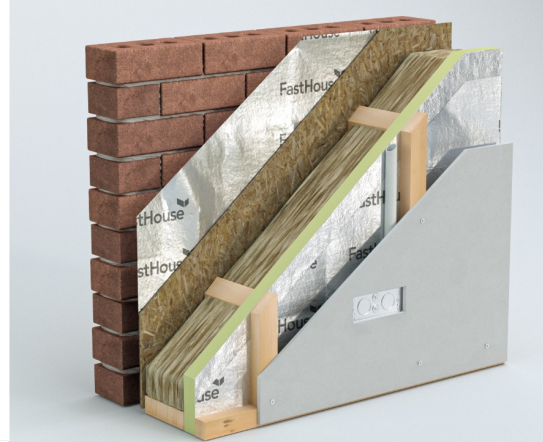
Item or Stage	Yes	No	N/A	Comment
Cavity barriers				
Control all openings in external walls				
At junction of separating wall to external walls (Vertical)				
At junction of separating wall to external walls (Horizontal)				
At junction of separating wall to external walls (Diagonal)				
Breather membranes				
Undamaged or correctly repaired				
Continuous				
Correctly lapped				
Correctly stapled				
Gaps/service holes sealed				
Shed positions clearly marked				
For apartment buildings				
Detailed check as above				
Roofing				
Healing as per schedule				
Insulation				
Windows				





# ITFMA FastHouse

## OFFSITE TIMBER FRAME SYSTEMS



“Thank You for your time and for listening”



FastDesign FastManufacture FastInstall