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TIMBER SYSTEMS PRODUCT RANGE

PRECISION ENGINEERING • UNRIVALLED EXPERTISE • INNOVATION • HIGHEST QUALITY



STEWART
Milne
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PRODUCTS

We offer a wide range of wall, floor and roof combinations with insulation systems that can be tailored to your specific needs and preferred performance standards.

This allows each project to be value engineered, in a balanced approach, considering performance, speed, deliverability and cost.

A conventional 89mm or 140mm open panel framework with structural sheathing, site fitted insulation and vapour control layer can easily meet, current and future building regulations, related to fabric energy efficiency performance, in a reliable and cost effective way.

Our Sigma® OP external wall solutions offer performance options that assist designers achieve Level 3-5 of the Code for Sustainable Homes, current and

projected energy and carbon compliance legislation, within Building Regulations for Scotland, England and Wales, Fabric Energy Efficiency Standards and Building Regulation Section 7 Sustainability Labelling within Scotland.

Our Sigma® OP external wall solutions present a range of performance solutions in a matrix format. This helps designers to select the most appropriate wall build up for the project and proposed SAP compliance. We can provide further commercial and technical information to refine the most cost effective and practical option for your project.

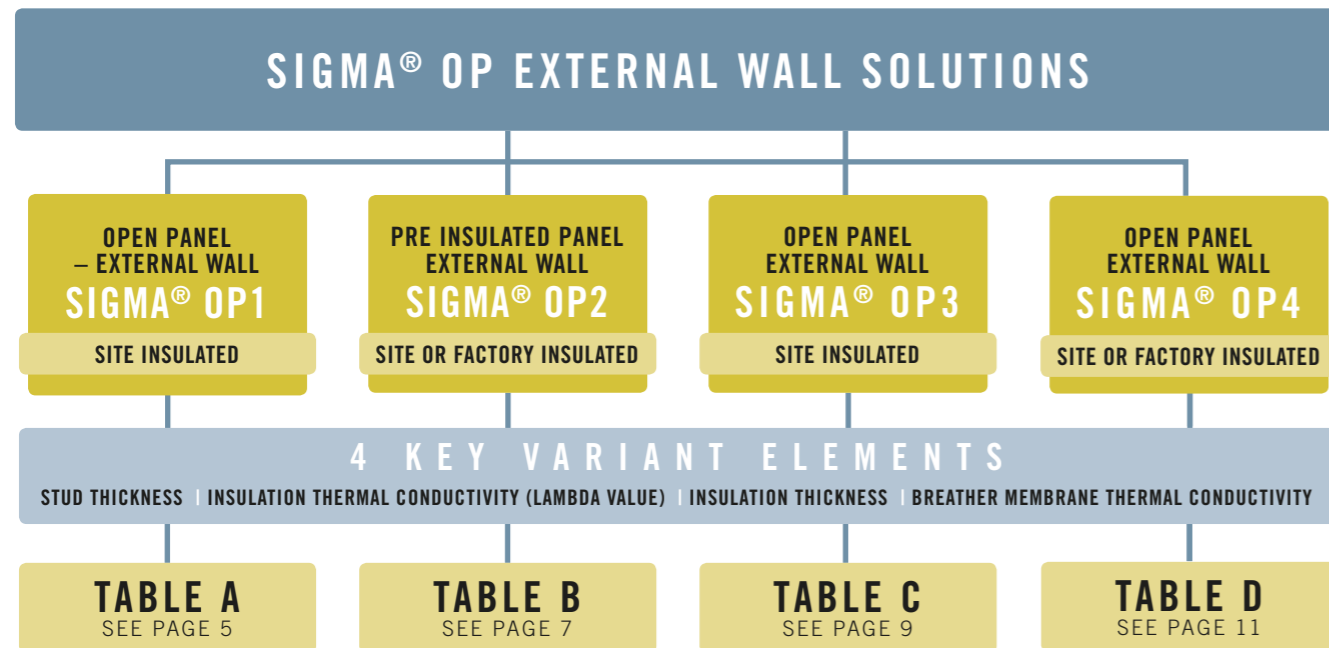
EXTERNAL WALL BUILD UPS

We have several builds ups that offer varying levels of performance and practical application to suit customer requirements.

QUALITY ASSURED

All our products comply with latest Building Regulations, BS and EN standards and NHBC technical requirements. Our range of Sigma® OP open panel wall systems have been through robust due diligence and can be supported with technical back up. All products are designed for a minimum 60 year design life.

The chart below shows the various wall types and performance that we offer, with all the insulation options and variables you may require. Once you've selected the wall type that most suits your project, turn to the following pages for detailed information on the performance levels available.



SIGMA® II BUILD SYSTEM – CLOSED PANEL SOLUTIONS

Our newest product is the award winning and BBA approved Sigma® II Build System.



Our Sigma® II Build System provides a robust and effective solution to achieving high levels of fabric performance which is affordable, reliable and simple to install – a fit and forget approach. With excellent air tightness, thermal bridging and thermal transmittance performance, the Sigma® II Build System offers reduced material and labour costs by using conventional materials in a more innovative manner.

The extent of site labour time has been reduced through the simplicity of the build system and the integration of several trades/suppliers into one package, thus eliminating non value adding site processes, which attract hidden capital cost, downstream cost overruns and quality issues.

Sigma® II Build System takes whole life costing into account, as well as risk and home owner impact. Our approach has been to focus on a fabric solution - recognised as the first priority.

PERFORMANCE LEVELS

The Sigma® II Build System is designed to achieve superior levels of fabric performance, suitable for projects, which are seeking to achieve the very highest fabric efficiency standards. Performance criteria offered is:

- Thermal U-value of 0.26 – 0.10 W/m²/k
- Air tightness ranging from 5.0 to 1.5 m³/h/m² @ 50pa
- Thermal bridging of 0.04 to 0.02
- Range of wall width and external finishes
- Assured performance built-in

FIRE PROTECTION

Due to our closed panel design the sheathing can be upgraded to provide a layer of factory fitted fire protection.

Offsite construction features:

- Closed panel
- Fully insulated
- Service cavity pre-fitted
- Built-in air tightness detailing and pre-fitted seals
- Floor cassettes wrapped, air sealed and insulated
- Potential to air test, immediately after kit erection
- Factory fitting of windows and doors if required
- Option of pre-fitted fire protection
- Insulated ground floor cassette options
- Optional insulated ceiling or rafter cassettes
- Principle service penetrations preformed if required



buildoffsite

Our Sigma® II Build System Brochure and Technical Guide provides full details of the system. If you would like a copy of the guide, please get in touch.

OPEN PANEL – EXTERNAL WALL SIGMA® OP1

This wall type is ideal for designs where the air tightness is greater than 3 and more conventional U-values are desired.

This system utilises the existing 89mm or 140mm stud options and introduces thermal laminate plasterboard, in combination with mineral or glass fibre insulation between the studs. U-values ranging from 0.44 – 0.16 can be achieved.

Sigma® OP1 has the following benefits:

- Lower cost insulation between studs, with a range of Lambda values
- Retains 89 or 140mm studs, for manual or crane erection
- Utilises plasterboard layer for air tightness delivery
- Limits wall thickness and maintains existing foundation
- Reduces thermal bridging
- Services accommodated within studwork and insulation zone
- Utilises conventional skills and materials

The thermal laminate is a one product solution, where the insulation and plasterboard are pre-bonded. This replaces the current dry lining approach and reduces the build up of layers and installation time on site.

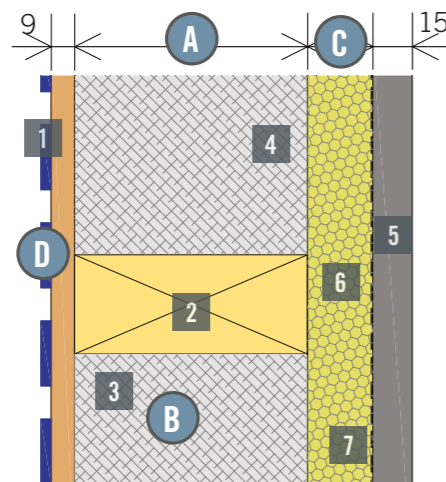
This can be provided as a supply only option, if preferred.



SIGMA® OP1 – OPEN PANEL

VARIANTS

- A** 38x89 or 38x140mm stud width
- B** 0.044, 0.040, 0.035 or 0.032 fibre insulation
- C** 20 – 45mm (5mm increments) PU insulation (0.022)
- D** Reflective or standard breather paper



- 1 Breather paper
- 2 Timber studs at max. 600mm
- 3 Full fill fibre insulation
- 4 Services within fibre insulation
- 5 15mm plain TE plasterboard
- 6 Rigid PU insulation
- 7 Integrated foil face of PU insulation to back of plasterboard acts as vapour control layer

Note: 5 and 6: insulation and plasterboard site fitted as composite thermal laminate board.

PERFORMANCE OPTIONS

The matrix below demonstrates the U-value options available with our systems. They enable you to select the right products to suit the U-values you require for your project. Ask us for cost details and we can enable you to flex U-values up or down, to suit your desired SAP compliance route, whilst understanding the commercial implications.

TABLE A – SIGMA® OP1

Breather Paper (Variant D)	Stud Width (Variant A)	Insulation Lambda (Variant B)	15mm Plasterboard + 0.022 Lambda PU Insulation (Variant C)						
			None	20mm	25mm	30mm	35mm	40mm	45mm
Standard	89mm	0.044	0.44	0.31	0.29	0.27	0.26	0.25	0.23
		0.040	0.42	0.30	0.28	0.26	0.25	0.23	0.22
		0.035	0.38	0.28	0.26	0.25	0.24	0.22	0.21
		0.032	0.36	0.27	0.25	0.24	0.23	0.22	0.21
	140mm	0.044	0.31	0.24	0.23	0.22	0.21	0.20	0.19
		0.040	0.29	0.23	0.22	0.21	0.20	0.19	0.18
		0.035	0.27	0.21	0.20	0.19	0.19	0.18	0.17
		0.032	0.26	0.20	0.20	0.19	0.18	0.17	0.17
Reflective	89mm	0.044	0.40	0.29	0.27	0.26	0.24	0.23	0.22
		0.040	0.38	0.28	0.26	0.25	0.23	0.22	0.21
		0.035	0.35	0.26	0.25	0.24	0.22	0.21	0.20
		0.032	0.33	0.25	0.24	0.23	0.22	0.21	0.20
	140mm	0.044	0.29	0.23	0.22	0.21	0.20	0.19	0.18
		0.040	0.27	0.22	0.21	0.20	0.19	0.18	0.17
		0.035	0.25	0.20	0.19	0.19	0.18	0.17	0.17
		0.032	0.24	0.20	0.19	0.18	0.17	0.16	0.16

Notes:

Dark grey shading indicates walls with U-value above the back-stop in Part L (England and Wales)

Light grey shading indicates walls with U-value above the back-stop in Section 6 (Scotland)

All U-values based on 50mm partially vented cavity, and 100mm masonry external leaf.

PRE INSULATED PANEL – EXTERNAL WALL SIGMA® OP2

This wall type is ideal for designs where air tightness greater than 3, minimum U-values and thinner wall build ups than Sigma® OP1, are desired.

This system utilises the existing 89mm or 140mm stud options and introduces thermal laminate plasterboard, in combination with a partial fill polyurethane rigid insulation between the studs. U-values ranging from 0.37 – 0.14 can be achieved.

Typically this wall solution suits projected 2013 regulations, CSH Level 4, FEES Compliance or Section 7 silver rated homes or walls requiring thinner build ups than Sigma® OP1.



Sigma® OP2 has the following benefits:

- **Improved thermal performance, with a range of insulation thicknesses**
- **Utilises plasterboard layer for air tightness delivery**
- **Retains 89 or 140mm studs, for manual erection**
- **Limits wall thickness and maintains existing foundation**
- **Reduces thermal bridging**
- **Services accommodated within studwork and space formed in front of the rigid Insulation**
- **Utilises conventional skills and materials**
- **Option of factory fitted insulation to achieve Structural Timber Association class B fire protection during construction**
- **Offers thinner wall build up than Sigma® OP1**

The thermal laminate is a one product solution, where the insulation and plasterboard are pre-bonded. This replaces the current dry lining approach and reduces the build up of site layers and insulation time on site.

As the fitting of rigid insulation requires greater attention to detail with no gaps between studs or boards, we factory fit the rigid insulation to reduce waste and offer an enhanced quality product. This is achieved by utilising fixings which retains insulation within the framework during transportation, lifting and erection.

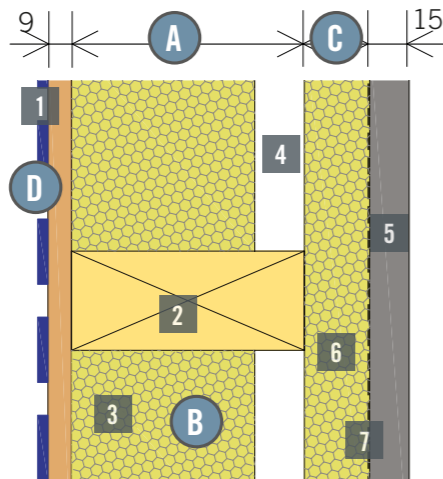
This system can be provided with the rigid insulation factory fitted. This provides a Structural Timber Association Class B timber frame solution, reducing separation distance between neighbouring buildings.

SIGMA® OP2 – OPEN PANEL OR PRE INSULATED PANEL

VARIANTS

- A** 38x89 or 38x140mm stud width
- B** 70 – 120mm (10mm increments) Rigid PU insulation
- C** 20 – 45mm (5mm increments) Rigid PU insulation
- D** Reflective or standard breather paper

(Optional extra for insulation between studs to be factory fitted)



- 1 Breather paper
- 2 Timber studs at max. 600mm
- 3 Partial fill rigid 0.022 PU insulation (site or factory fitted)
- 4 Min 20mm wide service zone air space
- 5 15mm plain TE plasterboard
- 6 Rigid 0.022 PU insulation
- 7 Integrated foil face of PU insulation against back of plasterboard as vapour control layer

Note: 5 and 6: insulation and plasterboard site fitted as composite thermal laminate board.

PERFORMANCE OPTIONS

The matrix below demonstrates the U-value options available with our systems. They enable you to select the right products to suit the U-values you require for your project. Ask us for cost details and we can enable you to flex U-values up or down, to suit your desired SAP compliance route, whilst understanding the commercial implications.

TABLE B – SIGMA® OP2

Breather Paper (Variant D)	Stud Width (Variant A)	Insulation Width (Variant B)	15mm Plasterboard + 0.022 Lambda PU Insulation (Variant C)						
			None	20mm	25mm	30mm	35mm	40mm	45mm
Standard	89mm	60mm	0.37	0.27	0.26	0.24	0.23	0.22	0.21
		70mm	0.33	0.25	0.24	0.22	0.21	0.20	0.19
	140mm	90mm	0.27	0.21	0.20	0.19	0.19	0.18	0.17
		100mm	0.25	0.20	0.19	0.18	0.18	0.17	0.16
		120mm	0.22	0.18	0.17	0.17	0.16	0.15	0.15
	Reflective	89mm	60mm	0.33	0.25	0.24	0.23	0.22	0.21
70mm			0.31	0.24	0.22	0.21	0.20	0.19	0.19
140mm		90mm	0.25	0.20	0.19	0.19	0.18	0.17	0.16
		100mm	0.24	0.19	0.18	0.18	0.17	0.16	0.16
		120mm	0.21	0.17	0.17	0.16	0.15	0.15	0.14

Notes:

Dark grey shading indicates walls with U-value above the back-stop in Part L (England and Wales)

Light grey shading indicates walls with U-value above the back-stop in Section 6 (Scotland)

All U-values based on 50mm partially vented cavity, and 100mm masonry external leaf.

OPEN PANEL – EXTERNAL WALL SIGMA® OP3

This wall type is ideal for very high performance designs, where air tightness less than 3, very low U-values, separate services cavity and air barrier are desired.

This system utilises the existing 89mm or 140mm stud options and introduces a separate rigid insulation overlay, dedicated service zone and conventional plasterboard, in combination with fibre insulation between the studs. U-values ranging from 0.26 – 0.15 can be achieved.

Typically this would be specified for CSH Level 5, Section 7 gold rated, advanced FEES compliance or Passive Haus Homes.

Sigma® OP3 has the following benefits:

- Separate air barrier membrane
- Retains 89 or 140mm studs, for manual or crane erection
- Limits wall thickness and maintains existing foundation
- Reduces thermal bridging
- Provides separate services zone, in front of air barrier

- Can be air tested before 1st fix, but after weather tight
- Utilises conventional skills and materials

The introduction of the batten between the plasterboard and overlay insulation creates a separate dedicated zone to run building services.

Sigma® OP3 uses the face of the overlay

insulation as the air barrier point. This should be taped and sealed, but allows an interim air test before 1st fix starts and the building is weather tight.

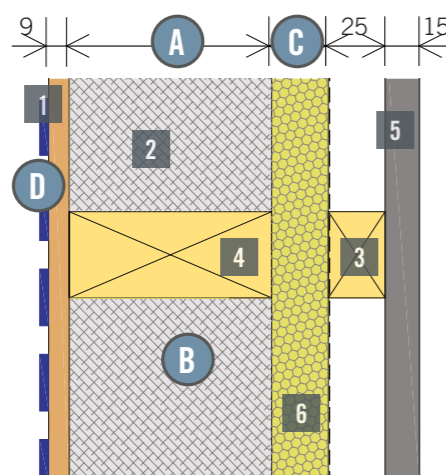
Thermal bridging is improved through the use of the overlay insulation. Cost is optimised through a balanced approach to more cost effective fibre and improved overlay insulation.



SIGMA® OP3 – OPEN PANEL

VARIANTS

- A** 38x89 or 38x140mm stud width
- B** 0.044, 0.040, 0.035 or 0.032 fibre insulation
- C** 20 – 45mm (5mm increments) rigid PU insulation (0.022)
- D** Reflective or standard breather paper



- 1 Breather paper
- 2 Full fill fibre insulation
- 3 25x38mm service zone battens at 600mm ctrs
- 4 Timber studs at max. 600mm vertical ctrs
- 5 15mm plain TE plasterboard
- 6 Rigid 0.022 PU insulation and air barrier / VCL point.

Note: All insulation and plasterboard site fitted

PERFORMANCE OPTIONS

The matrix below demonstrates the U-value options available with our systems. They enable you to select the right products to suit the U-values you require for your project. Ask us for cost details and we can enable you to flex U-values up or down, to suit your desired SAP compliance route, whilst understanding the commercial implications.

TABLE C – SIGMA® OP3

Breather Paper (Variant D)	Stud Width (Variant A)	Insulation Lambda (Variant B)	0.022 Lambda PU Insulation Width (Variant C)			
			20mm	25mm	30mm	40mm
Standard	89mm	0.044	0.26	0.24	0.23	0.21
		0.040	0.25	0.24	0.22	0.20
		0.035	0.24	0.22	0.21	0.19
		0.032	0.23	0.22	0.21	0.19
	140mm	0.044	0.21	0.20	0.19	0.17
		0.040	0.20	0.19	0.18	0.17
		0.035	0.18	0.18	0.17	0.16
		0.032	0.18	0.17	0.16	0.15
Reflective	89mm	0.044	0.24	0.23	0.22	0.20
		0.040	0.24	0.22	0.21	0.19
		0.035	0.22	0.21	0.20	0.19
		0.032	0.22	0.21	0.20	0.18
	140mm	0.044	0.20	0.19	0.18	0.17
		0.040	0.19	0.18	0.17	0.16
		0.035	0.18	0.17	0.16	0.15
		0.032	0.17	0.16	0.16	0.15

Notes:

Dark grey shading indicates walls with U-value above the back-stop in Part L (England and Wales)

Light grey shading indicates walls with U-value above the back-stop in Section 6 (Scotland)

All U-values based on 50mm partially vented cavity, and 100mm masonry external leaf.

OPEN PANEL – EXTERNAL WALL SIGMA® OP4

This wall type is ideal for very high performance designs, where air tightness less than 3, very low U-values, separate services cavity, air barrier and thinner wall build ups are desired.

This system utilises the existing 89mm or 140mm stud options and introduces separate rigid insulation overlay, dedicated service zone and conventional plasterboard, in combination with rigid polyurethane between the studs, as full or partial fill. U-values ranging from 0.22 – 0.12 can be achieved.

Typically this would be specified for CSH Level 5, Section 7 gold rated, advanced FEES compliance or Passive Haus Homes.

Sigma® OP4 has the following benefits:

- Separate air barrier membrane
- Retains 89 or 140mm studs, for manual or crane erection
- Limits wall thickness and maintains existing foundation
- Reduces thermal bridging
- Offers thinner wall to Sigma® OP3
- Option to factory fit insulation to achieve UKTFA Class B fire protection during construction

The introduction of the batten between the plasterboard and overlay insulation creates a separate dedicated zone to run building services.

As the fitting of rigid insulation requires greater attention to detail with no gaps between studs or boards, we factory fit the rigid insulation to reduce waste and offer an enhanced quality product. The complexity of wall panel design can complicate the site fitting of insulation, due to corner L-studs, junction

blocks, off grid studwork and aperture formations, requiring more cutting and notching, demanding higher levels of site workmanship and creating more material waste, than may be expected with Sigma® OP3.

The rigid insulation between the studs can be factory fitted to reduce waste. This is achieved by utilising fixings which retain the insulation within the framework during transportation, lifting and erecting.

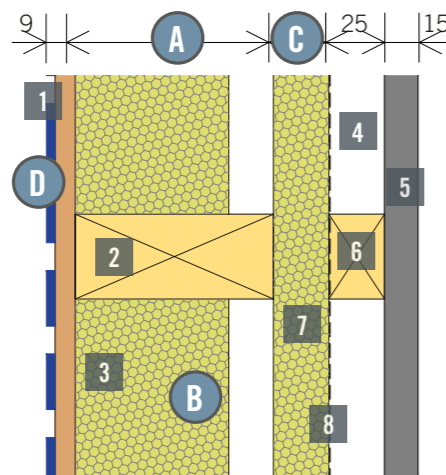


SIGMA® OP4 – PRE INSULATED OR OPEN PANEL

VARIANTS

- A** 38x89 or 38x140mm stud width
- B** 60 – 140mm (10mm increments) rigid PU insulation
- C** 20 – 40mm (5mm increments) insulation width
- D** Reflective or standard breather paper

(Optional extra for insulation between studs to be factory fitted)



- 1 Breather paper
- 2 Timber studs at max 600mm vertical ctrs.
- 3 Rigid 0.022 PU insulation. (Site or factory fitted)
- 4 25mm wide service zone air space
- 5 15mm plain TE plasterboard
- 6 25x38mm service zone battens at 600mm ctrs
- 7 Rigid 0.022 PU insulation
- 8 Integrated foil face of PU insulation as vapour control and air barrier layer

PERFORMANCE OPTIONS

The matrix below demonstrates the U-value options available with our systems. They enable you to select the right products to suit the U-values you require for your project. Ask us for cost details and we can enable you to flex U-values up or down, to suit your desired SAP compliance route, whilst understanding the commercial implications.

TABLE D – SIGMA® OP4

Breather Paper (Variant D)	Stud Width (Variant A)	Insulation Width (Variant B)	0.022 Lambda PU Insulation Width (Variant C)			
			20mm	25mm	30mm	40mm
Standard	89mm	60mm 0.022	0.22	0.21	0.20	0.18
		70mm 0.022	0.20	0.19	0.19	0.17
		80mm 0.022	0.20	0.19	0.18	0.17
	140mm	90mm 0.022	0.19	0.18	0.18	0.16
		90mm 0.022	0.18	0.17	0.16	0.15
		100mm 0.022	0.17	0.16	0.15	0.14
		120mm 0.022	0.16	0.15	0.14	0.13
Reflective	89mm	140mm 0.022	0.15	0.14	0.14	0.13
		60mm 0.022	0.20	0.20	0.19	0.17
		70mm 0.022	0.19	0.18	0.18	0.16
	140mm	80mm 0.022	0.19	0.18	0.17	0.16
		90mm 0.022	0.18	0.18	0.17	0.16
		90mm 0.022	0.17	0.16	0.16	0.15
		100mm 0.022	0.16	0.15	0.15	0.14
120mm 0.022	0.15	0.14	0.14	0.13		
140mm 0.022	0.14	0.14	0.13	0.12		

Notes:

Dark grey shading indicates walls with U-value above the back-stop in Part L (England and Wales)

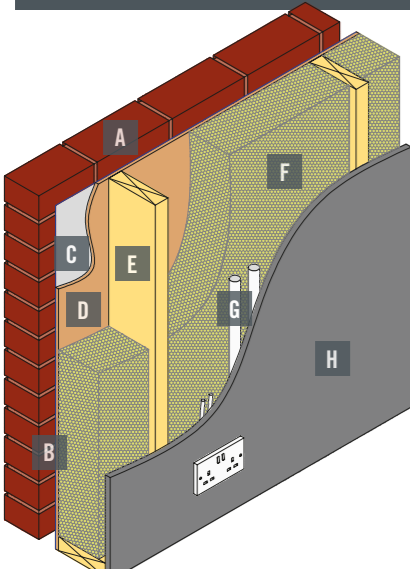
Light grey shading indicates walls with U-value above the back-stop in Section 6 (Scotland)

All U-values based on 50mm partially vented cavity, and 100mm masonry external leaf.

PRE INSULATED EXTERNAL WALLS

Pre insulating external walls in the factory offers savings in waste, time and site processes, whilst benefiting from factory fitted quality and higher levels of assured fabric performance.

**SIGMA® OP2 - 89MM, 140MM STUD
SUITABLE FOR AIR-TIGHTNESS OVER 3**



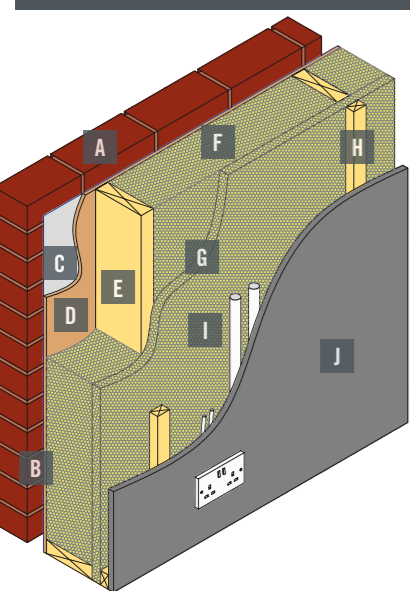
- A** 102.5mm brick outer leaf (options using lightweight cladding are available)
- B** 50mm partially vented cavity
- C** Reflective breather paper (factory fitted)
- D** 9mm OSB sheathing (factory fitted)
- E** Solid timber studs (factory fitted)
- F** Partial fill rigid 0.022 PU insulation with integrated vapour control layer (factory fitted)
- G** Min 20mm service zone, with services (site fitted)
- H** 15mm foil back plasterboard with integrated vapour control layer (site fitted)

This option is available for external wall type Sigma® OP2 and Sigma® OP4 which utilise rigid insulation fitted between the studs. This option supplies the external wall panels with the insulation fixed into position, between the studs in the factory. The rigid insulation and fixing system is robust and resilient to weather, during the transportation, lifting and erection stages.

Pre-insulated panels provide a range of benefits including:

- **Ease of fitting around complex external wall shapes**
- **No additional site supervision**
- **No site waste**
- **Higher levels of performance**
- **Improved quality assurance**

**SIGMA® OP4 - 89MM, 140MM STUD
SUITABLE FOR AIR-TIGHTNESS <3**



- A** 102.5mm brick outer leaf (options using lightweight cladding are available)
- B** 50mm partially vented cavity
- C** Reflective breather paper (factory fitted)
- D** 9mm OSB sheathing (factory fitted)
- E** Solid timber studs (factory fitted)
- F** Full or partial fill rigid 0.022 PU insulation (factory fitted)
- G** Rigid 0.022 PU insulation with integrated vapour control layer (various widths) to face of studs (fitted on site)
- H** 25mm service zone strapping (site fitted)
- I** Services (site fitted)
- J** 15mm plain plasterboard (site fitted)

THERMAL BRIDGING

Our Sigma® OP open panel timber frame solutions comply with Accredited Construction Detail's requirements and achieve Y-values ranging from 0.08 – 0.035.

Our Sigma® OP build systems can achieve improved performance, as low as Enhanced Construction Details (ECD) yielding Y-values of 0.04. Our construction details for all Sigma® OP wall solutions have been thermally modelled and psi values established. Each 0.01 improvement in Y-value can contribute up to 1% saving in SAP rating.

A key detail which has a big impact on the Y-value is the ground floor. It is recommended that the insulation is placed above the slab to the warm side of the building for best psi values.

Y-VALUE CALCULATIONS

(An example of overall thermal Bridging for a house)

The table below provides examples of Y-value calculations using Sigma® OP1 Panel Solution.

Our Sigma® OP1 Panel Solution can offer a 4.5% improvement in your SAP calculations, due to lower Y-values that can be achieved. This could mean a change in window glazing or an alternative non mechanical ventilation system, both of which saves significant cost.

**PSI VALUES - SIGMA® OP1
89MM STUD, 0.044 FIBRE AND 0.022 PU**

Construction Detail	Cert No.	ACD's	Psi value	% Improvement on ACD
External corner	687	0.090	0.042	53.3%
Internal corner	688	-0.090	-0.047	47.8%
Party wall to external wall, timber firestops	689	0.060	0.061	0.0%
G/floor, beam and block, with 150mm PU insulation above	702	0.160	0.020	88%
Party wall, G/floor, beam and block, with 150mm PU insulation above	21-1-012	0.160	0.027	83%
Intermediate floor, housing only	691	0.070	0.050	28.6%
Eaves detail, conventional trussed roof system	692	0.060	0.024	60%
Gable detail, conventional trussed roof system	693	0.240	0.049	79.6%
Party wall to top floor ceiling	694	0.240	0.038	84.2%
Window head, lintel above, insulated reveal and timber firestops	695	0.500	0.103	79.4%
Window jamb, insulated reveal and timber firestops	697	0.050	0.050	0.0%
Window cill, pvc extension, insulated reveal and timber firestops	696	0.040	0.041	0.0%

Note: Example Sigma® OP1 with U-value 0.29

**TYPICAL 3 BEDROOM END TERRACE
TWO STOREY HOME (APPROX 82M²)**

Junction description	Psi	Length	Heat Loss
Lintel below mid floor	0.103	5.3	0.55
Lintel below roof	0.103	4.35	0.45
Cill	0.041	9.65	0.40
Jamb	0.050	22.7	1.14
Ground floor (Parallel) beam and block, 150mm insulation above	0.027	9.7	0.26
Ground floor (Perpendicular) beam and block, 150mm insulation above	0.020	8.42	0.17
Intermediate floor/external wall	0.050	18.12	0.91
Eaves (Truss)	0.024	9.7	0.23
Gable (Truss)	0.049	8.42	0.41
External corner	0.042	10.12	0.43
Party wall/external wall	0.061	10.12	0.62
Party wall/ground floor	0.027	8.42	0.23
Party wall/ceiling (truss)	0.038	8.42	0.32
TOTAL LINEAR HEAT LOSS			6.12
TOTAL HEAT LOSS SURFACE AREA			175.50
Y-VALUE			0.035
STANDARD ACD DEFAULT			0.080

Notes: Example based on 0.29 U-value Sigma® OP1, using 89mm stud, 0.044 fibre insulation and 35mm thermal laminate.
Y Value is the summation of the total heat loss across all junctions in the building.

PRE FITTED WINDOWS AND DOORS

We have developed an innovative sliding bracket fixing system in conjunction with our preferred supply chain partners, that allows windows and doors to be installed horizontally within the timber frame aperture, in the factory, stacked as panels and moved to their final position, 50mm proud of the panel face.

FACTORY FITTED WINDOWS AND DOORS



This is a very safe operation and omits manual handling concerns and cost associated with damage, particularly relevant for heavy window and door components.

Windows are supplied with protected frames and “peel off” glazing protection, so that windows can still be used during construction for ventilation and to provide adequate daylight. In addition, windows can be factory fitted with air tightness tapes (generally for solutions requiring air tightness less than 3), for easy sealing to the panel aperture

reveals, once the windows are moved to their final position. Handles, extension sills and vents are supplied loose for the contractor to fit.

This system is available for u-PVC windows and external composite GRP doors ranging from 1.4 – 0.8 U-value, including triple glazed units. The maximum size of unit that can be installed is a French door up to 1.8m x 2.1m and triple glazed (max 150kg).

Windows and external doors are shipped in individual sequence to our factory to suit production runs. This

helps reduce cost and the amount of re-handling.

Timber windows can be fitted, by utilising timber pinch battens, but are supplied 50mm proud of the panel face, requiring more care and attention during handling, transportation and erection.

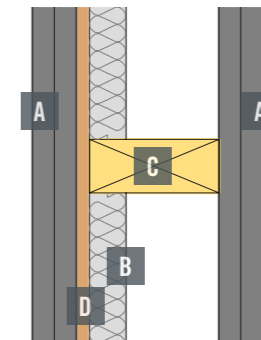
INTERNAL PARTITIONS

We provide a range of prefabricated internal timber walling systems, which comply with fire and acoustic regulations, offering a range of thicknesses and in-use service conditions.

LOAD BEARING WALL

Load bearing walls are supplied as part of the main superstructure and require fire compliance comparable with the external wall. Acoustic compliance is determined by the walls relationship to other rooms, within the building.

The table below shows the various performance levels available.



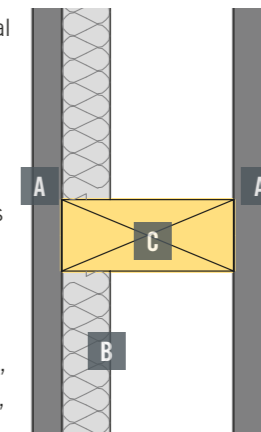
- A** Single or double layer plasterboard either side with various specifications and widths
- B** Min 25mm acoustic partition roll between studs where required
- C** 89mm stud width
- D** 9mm OSB sheathing as structurally required

INTERNAL NON LOAD BEARING WALL

Internal non load bearing walls do not form part of the structural carcass and are supplied and pre-loaded into the building, as the main superstructure is erected. Partitions do not require preservative treatment, as they are installed in a low risk classification for internal use.

We can install these as part of the erection service offered. This is common place in England and Wales where the dry lining sequence requires non load bearing partitions to be erected tight to the structural carcass.

In Scotland, the practise is to allow plasterboard to slip through, which reduces, timber content, plasterboard cutting and waste, in addition to speeding up the fit out process.



- A** Single layer plasterboard either side with various specifications and widths
- B** Min 25mm acoustic partition roll between studs where required
- C** 63mm or 89mm stud widths

INTERNAL PARTITIONS - PERFORMANCE TABLE

Use Classification	Stud width	Plasterboard width	Plasterboard spec	Insulation (25mm acoustic partition roll)	Fire rating (minutes)	Acoustic performance (Rw dB)	Overall partition width
NON-LOAD BEARING	63mm	12.5mm	Soundblock/ Soundshield	Yes	N/A	40	88mm
NON-LOAD BEARING	63mm	15mm	Plain	Yes	N/A	40	93mm
LOAD BEARING AND NON-LOAD BEARING	89mm	12.5mm	Soundblock/ Soundshield	Yes	30	43	114mm
LOAD BEARING AND NON-LOAD BEARING	89mm	15mm	Plain	Yes	30	43	119mm
LOAD BEARING	89mm	2 x 12.5mm	Plain	Yes	60	43	139mm
LOAD-BEARING	89mm	2 x 15mm	Plain	No	60	43	149mm

Notes: Compliance – Acoustic values shown are compliant with Section 5 of the Scottish Technical Standards 2010, and Approved Document L of the English Building regulations 2010. Fire ratings based on BS 476 fully loaded fire tests. Partitions based on 38mm wide, C16+ CLS softwood timber studs at max 600mm centres, with plasterboard to each face finished with tape & fill or skim coat. Insulation between studs to be min 25mm acoustic partition roll/batt. Source - Knauf Manual and British Gypsum White Book.

PARTY WALL SOLUTIONS

We offer a zero U-value party wall solution, fully filled cavity with insulation and effective edge sealing.

The system utilises RD Ltd. E-WT-1 and E-WT-2 solutions with fibre insulation between the party wall frames and floor zones in accordance with MIMA Design Guidance. The insulation between the frames can be fitted as part of the system erection. The sequence of erection allows for one leaf to be installed, with or without sheathing, insulation fitted and then the second leaf erected, to complete the process.

The use of insulated flexy fire barriers to both sides and between the timber frame party wall ends, is sufficient to achieve effective edge sealing. Where required the system provides sheathing for racking strength and secure by design compliance, ideally to one leaf only of the party wall.

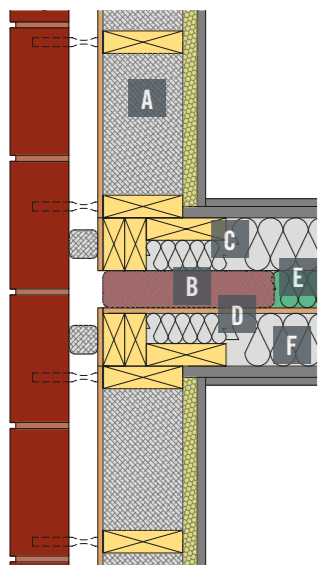
Where air tightness less than 3 is

specified, we recommend the fitting of an air tightness membrane to the face of the studwork, after acoustic insulation is fitted and before plaster boarding is installed. The membrane should be taped to the perimeter wall heads and sealed at laps, ends and junctions, penetrations should be limited, but where required, taped and sealed accordingly. It is recommended where heavily serviced walls occur i.e. kitchens, that an additional service batten and plasterboard layer is fitted to provide a service zone with the party wall intact behind. The fitting of the membrane should be sequenced after the building is weather tight and before first fix, to allow an interim air tightness test to be completed, before services installation. Air tightness membranes are normally supplied and fitted by the contractor.

Where air tightness is greater than 3, the plasterboard can act as the air barrier, with appropriate sealing at edges and joints. Fitting of plasterboard should be similar to the sequence required for the air membrane solution, to allow an interim test to be completed, if desired.

Where lower levels of air tightness are desired, typically less than 3, we can offer party wall solutions which have a dedicated air tightness barrier, behind the plasterboard layer. This provides greater confidence and aligns with the construction sequence on site, as well as providing a dedicated service void. For these solutions, the insulation, air tightness membrane and service batten are fitted after the building is watertight. This also allows an air tightness test to be carried out prior to 1st fixing, as good practise, if required.

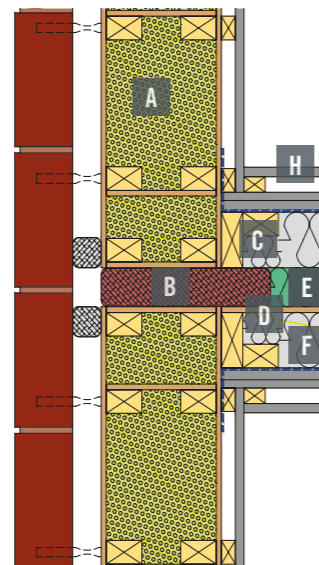
PARTY WALL TO EXTERNAL WALL DETAIL



- A** Sigma® OP1 external wall panel
- B** 50x300mm insulated cavity barrier to end of party wall cavity (fitted by Stewart Milne Timber Systems)
- C** 89mm twin leaf party wall, E-WT-1 or E-WT-2
- D** 9mm OSB pre-fitted to one leaf of party wall only as required structurally or for secure by design
- E** 50 – 70mm fibre batt insulation between frames (which can be fitted by Stewart Milne Timber Systems)
- F** 90mm fibre insulation between studs (fitted by contractor)

- This conforms to MIMA design guidance and provides full fill and effective edge sealing.
- Option for OSB sheathing for racking and secure by design can be accommodated.

PARTY WALL WITH SERVICE ZONE DETAIL

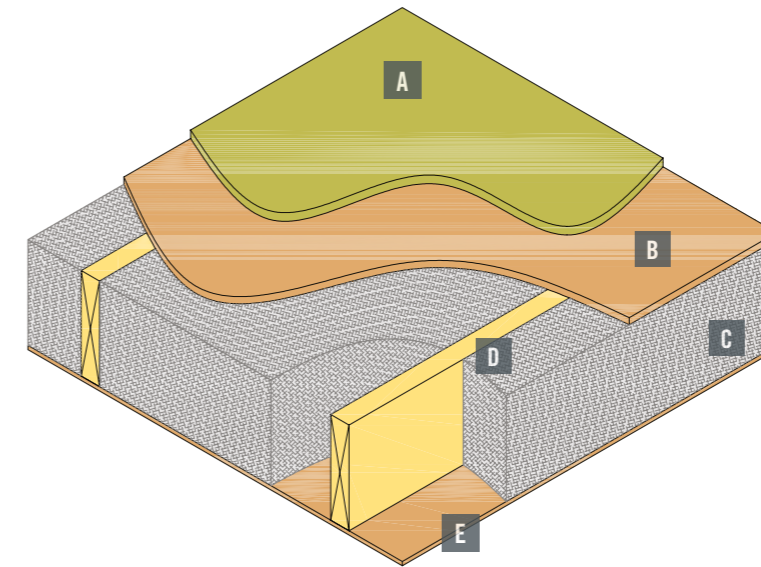


- A** Sigma® II C-stud external wall panel
- B** 50x300mm insulated cavity barrier to end of party wall cavity (fitted by Stewart Milne Timber Systems)
- C** 89mm twin leaf party wall, E-WT-1 or E-WT-2
- D** 9mm OSB pre-fitted to one leaf of party wall only as required structurally or for secure by design
- E** 50 – 70mm fibre batt insulation between frames
- F** 90mm fibre insulation between studs (fitted by contractor)
- G** Air-tight membrane to face of party wall panel studs (fitted by contractor)
- H** 25x38mm strapping and additional layer of plasterboard to form service zone (fitted by contractor)

FLOOR SOLUTIONS

In addition to loose joist floors, we also offer a range of floor cassette solutions, in open, closed and insulated formats. Solutions include pre-fitted insulation, edge wrapped cassettes and pre-formed service holes, which ensure the building fabric performs and is easy to build.

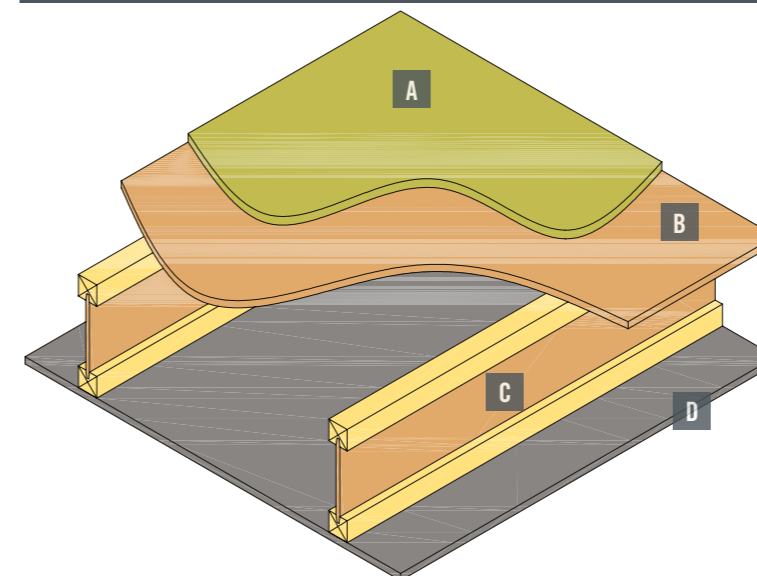
GROUND FLOOR TIMBER CASSETTES – CLOSED AND PRE-INSULATED



- A** 18mm chipboard
- B** 15mm OSB decking
- C** 220mm – 350mm glasswool or fire retardant bonded EPS insulation
- D** 220mm – 350mm deep solid timber or engineered I-Beam joists
- E** 9mm OSB boarding

Note: OSB decking is not required when using pre-finished chipboard clad cassettes.

INTERMEDIATE FLOOR CASSETTES – OPEN AND DECKED WITH WRAPPED AND INSULATED PERIMETERS



- A** 18mm chipboard
- B** 15mm OSB decking
- C** 220mm – 350mm deep solid timber or engineered I-Beam joists
- D** 15mm plain plasterboard

Note: OSB decking is not required when using pre-finished chipboard clad cassettes.

Note: Metal web joists can also be supplied, if desired.

SEPARATING FLOOR SOLUTIONS

We offer a range of pre-assembled floor cassette build ups with decking and a range of floating floor treatments.

These can be supplied and fitted as an optional extra. All solutions comply with RD Ltd Accreditation. These include:-

- Solid timber joists
- I-Beam joists
- Metal web joists
- Floating floor options
- Timber batten, insulation and flooring
- Cement particle board and acoustic matting

A hybrid solution (E-FT-4) provides different floor characteristics and dynamics, suitable for commercial or student accommodation buildings can also be provided.

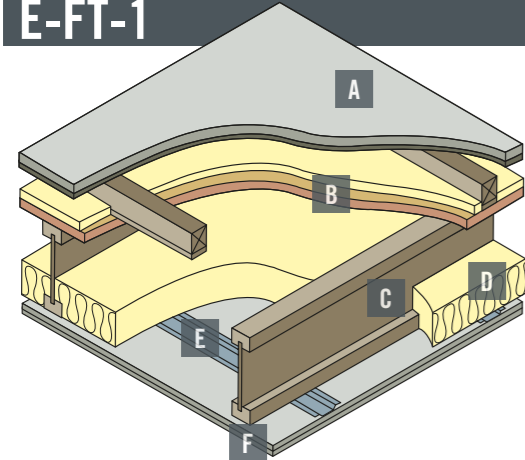
SERVICES INTEGRATION

Only vertical services should pass through the joist zone of a separating floor, with suitable fire collars installed at ceiling level to maintain the minimum fire performance of the floor. It is

recommended that heating, plumbing and electrical horizontal service runs are incorporated within a dropped ceiling below the plasterboard lining. Alternatively, these can be run within the floating floor above the structural decking where a batten system is utilised.

robustdetails

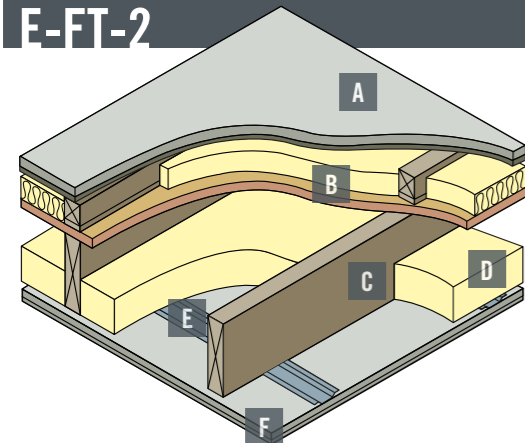
E-FT-1 Separating Floor – Timber I-Joists



- A Floating Floor - 116mm (supply and fit E/over)
- B Floor decking - 15mm thick (min) wood based board
- C Joists - 235mm (min) timber I-Joists
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard

Items D, E, F Supplied and fitted by others

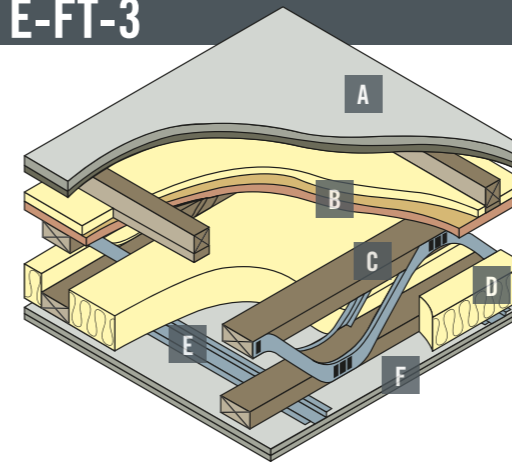
E-FT-2 Separating Floor – Timber Solid Joists



- A Floating Floor 116mm (supply and fit E/over)
- B Floor decking - 15mm thick (min) wood based board
- C Joists - 220mm (min) solid timber joists
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard

Items D, E, F Supplied and fitted by others

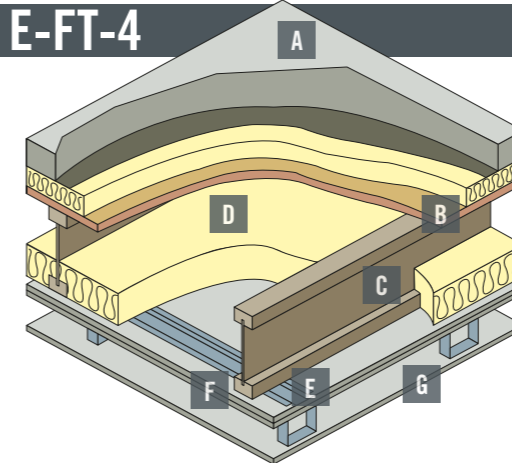
E-FT-3 Separating Floor – Metal Web Joists



- A Floating Floor - 116mm (supply and fit E/over)
- B Floor decking - 18mm thick (min) wood based board
- C Joists - 253mm (min) metal web joists
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard

Items D, E, F Supplied and fitted by others

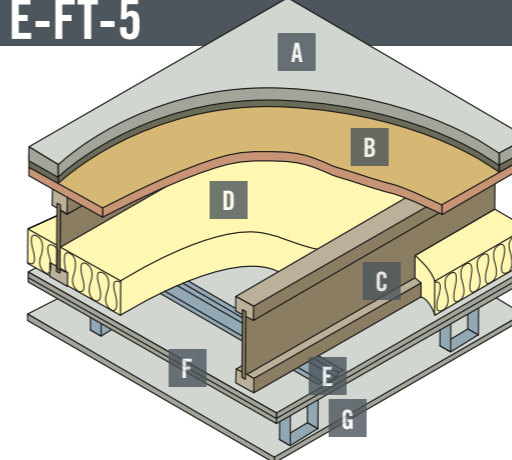
E-FT-4 Separating Floor – Timber I-Joists



- A Floating Floor - 40mm Gyvlon Soundbar screed on minimum 500 gauge polythene on 34mm Finnforest Soundbar Board
- B Floor decking - 15mm thick (min) wood based board
- C Joists - 220mm (min) I-Beam (Finnjoist)
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard
- G Suspended ceiling finish

Items A, D, E, F and G Supplied and fitted by others

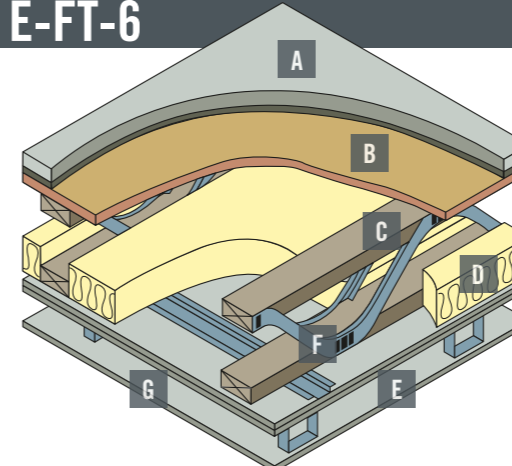
E-FT-5 Separating Floor – Timber I-Joists



- A Floating Floor - Collecta® Screedboard 28 (supply and fit E/over)
- B Floor decking - 18mm thick (min) wood based board
- C Joists - 240mm (min) timber I-joist
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard
- G Suspended ceiling finish (minimum 150mm)

Items D, E, F and G Supplied and fitted by others

E-FT-6 Separating Floor – Metal Web Joists



- A Floating Floor - Collecta® Screedboard 28 (supply and fit E/over)
- B Floor decking - 18mm thick (min) wood based board
- C Joists - 253mm (min) metal web joists
- D Absorbent Material - 100mm (min) mineral wool quilt insulation (10 - 36 kg/m³) between joists
- E Resilient bars
- F Plasterboard
- G Suspended ceiling finish (minimum 150mm)

Items D, E, F and G Supplied and fitted by others

ROOF SOLUTIONS

We offer a variety of roof solutions, to suit the varying needs of individual projects, roof shapes and performance requirements.

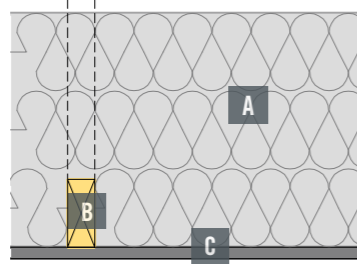
CONVENTIONAL TRUSSED ROOF SYSTEM

Our system utilises conventional roof trusses, gable panels and verge ladder frames. These come prefabricated, complete with all structural fixings and bracing requirements. Party wall spandrel panels can be pre-sheathed with limited combustibility boards easing installation of plasterboards within the roof spaces.

Where air tightness less than 3 is specified, we recommend the fitting of an air tightness membrane to the underside of the roof trusses, with a batten below to the underside to accommodate services.

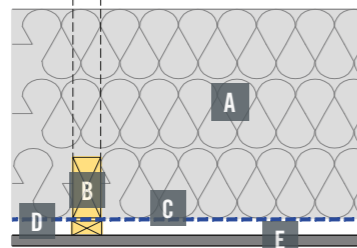
Where air tightness is greater than 3, the ceiling plasterboard can act as the air barrier, with appropriate sealing at edges and joints.

TRUSSED RAFTER ROOF – SUITABLE FOR AIR-TIGHTNESS OVER 3



- A** Multiple layers of fibre insulation to suit U-value, with each layer laid perpendicular to the one below (site fitted)
- B** Prefabricated roof trusses
- C** 15mm plain plasterboard (site fitted)

TRUSSED RAFTER ROOF – SUITABLE FOR AIR-TIGHTNESS 3 – 1.5



- A** Multiple layers of fibre insulation to suit U-value, with each layer laid perpendicular to the one below (site fitted)
- B** Prefabricated roof trusses
- C** Airtight membrane below trusses (site fitted)
- D** 25x38mm service zone strapping (site fitted)
- E** 15mm plain plasterboard (site fitted)

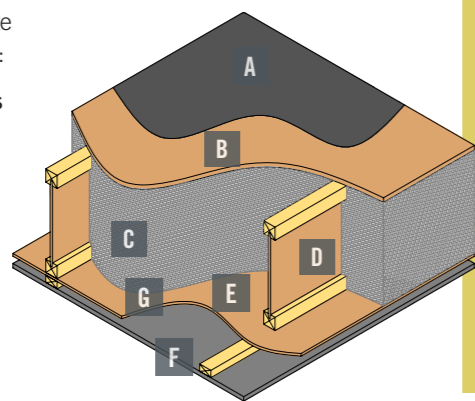
TRUSS RAFTER ROOF - U-VALUE TABLE

INSULATION DEPTH	FIBRE INSULATION LAMBDA VALUE			
	0.044	0.040	0.035	0.032
300	0.15	0.13	0.12	0.11
350	0.13	0.12	0.10	0.10
400	0.11	0.10	0.09	0.08
450	0.10	0.09	0.08	0.08

CEILING CASSETTE SYSTEM

We can offer a horizontal ceiling cassette system. This is particularly attractive for:

- **Fast completions – show complexes or build out sites**
- **Roof mounted equipment – ventilation systems**
- **Room in roof – future habitable conversions subject to structural design assessment**



- A** Pre fitted weather proof membrane
- B** 15mm OSB decking
- C** 220mm – 350mm glasswool or fire retardant bonded EPS insulation
- D** 220mm – 350mm deep solid timber or engineered I-Beam joists
- E** 9mm OSB boarding
- F** 25x38mm service zone battens
- G** 15mm plain plasterboard

ROOF, CEILING AND FLOOR CASSETTES

Our Sigma® OP open panel solutions offer the following range of floor, ceiling and roof cassette U-values.

ROOF CASSETTES

U-values – Sloping warm roof, insulation at rafter level, inclined cassettes and supported on purlins.

CONSTRUCTION	RAFTER TYPE	RAFTER DEPTH (MM)			
		220	235	300	350
Rafter type and depth	Solid timber	0.16	0.15	N/A	N/A
	I-Beam	0.15	0.14	0.11	0.09
	Metal web	0.18	0.17	0.14	0.12

Note: Rafters at 600mm centres with insulation thermal conductivity 0.032 W/mK.

CEILING CASSETTES

U-values – Horizontal cold roof, insulation at ceiling level and spanning wall head to wall head.

CONSTRUCTION	JOIST TYPE	JOIST DEPTH (MM)			
		220	235	300	350
Joist type and depth	Solid timber	0.17	0.16	N/A	N/A
	I-Beam	0.15	0.14	0.11	0.10
	Metal web	0.20	0.19	0.16	0.14

Note: Joists at 400mm centres with insulation thermal conductivity 0.032 W/mK.

GROUND FLOOR CASSETTES

U-values – Suspended cassettes with ventilated air space below and appropriate level access detailing.

CONSTRUCTION	JOIST TYPE	PERIMETER/ AREA RATIO	JOIST DEPTH (MM)			
			220	235	300	350
Joist type and depth, relevant to building footprint.	Solid timber	0.4	0.14	0.13	N/A	N/A
		0.7	0.15	0.14	N/A	N/A
		0.9	0.15	0.14	N/A	N/A
	I-Beam	0.4	0.12	0.12	0.10	0.09
		0.7	0.13	0.12	0.10	0.09
		0.9	0.13	0.13	0.10	0.09
	Metal web	0.4	0.17	0.17	0.15	0.13
		0.7	0.18	0.17	0.15	0.13
		0.9	0.18	0.18	0.15	0.13

Note: Joists at 400mm centres with Insulation thermal conductivity 0.032 W/mK. Soil conductivity at 1.5 W/mK. Ventilated air space below and 300mm thick perimeter masonry at 0.35 W/mK.

BUILDING SERVICES SIMPLY ACCOMMODATED

Our Sigma® OP open panel solutions are well established, proven and can easily accommodate building services, along with a range of floor solutions designed for increasing levels of ventilation and ductwork.



Our wall panels can accommodate services within the stud or via a site fitted batten (Sigma® OP3 and Sigma® OP4). This creates a route through which services can run.

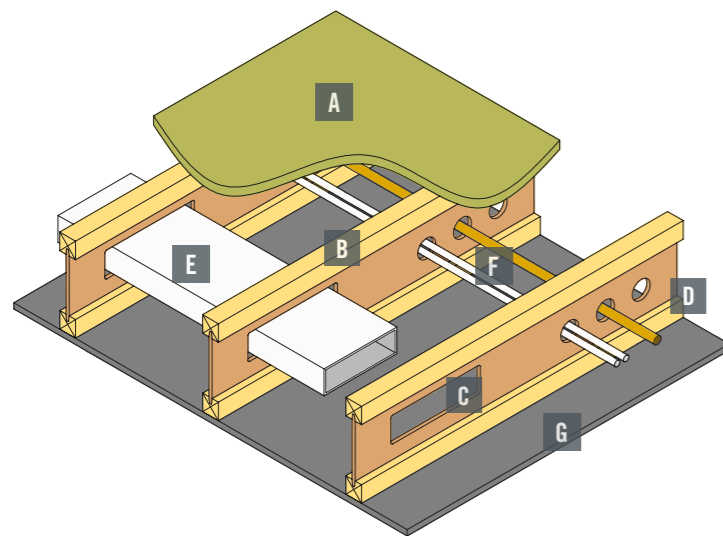
Principle ductwork for ventilation systems within the mid floors, can be

pre formed in solid joists, or factory drilled within I-Beams. This prevents the costly over specifying of joists.

Within the wall panels, penetrations can be easily formed on site for such things as incoming water or gas points, TV cables and boiler flues. These can

be simply sealed with expanding foam to maintain insulation integrity and air tightness.

We offer open web metal joists which provide greater levels of flexibility, where service designs have not yet been fully established.



- A** Chipboard flooring / OSB Decking
- B** 220mm – 350mm deep solid timber or engineered I-Beam joists
- C** 225x75mm slots pre-formed in I-Beam joists to suit ventilation duct route
- D** 50mm dia holes pre-drilled in solid timber or I-Beam joists within pre-determined zones
- E** Rectangular ducting for ventilation system (site fitted)
- F** Heating, hot and cold water pipes, and electrical cables through pre-drilled holes (site fitted)
- G** 15mm plain plasterboard (site fitted)

Note: open metal web floor joists can also be supplied.

DOORSETS AND STAIRS

Cost effective design solutions. We have now launched a new range of door sets and stairs, to complement our already award winning range of wall and floor systems.



STAIRS

Our range of stairs provides solutions for both residential and commercial use with a choice of designs, finishes and materials.

For all our products, we offer full technical guidance and advice combined with exacting design standards. Our range is manufactured to meet building regulations and can be delivered 'just in time' to suit your build programme.

Choosing the right staircases for your project is easy in just 4 steps:

- **Step 1 - Chose your staircase type and design**
- **Step 2 - Select your timber choice**
- **Step 3 - Choose your preferred handrails, newel posts and spindles**
- **Step 4 - Confirm your delivery dates and place your order**

Our range of standard staircases are offered in a variety of timbers and designs with a choice of handrails, newel posts and spindles to create the ideal stairs to complement your project design. We can provide stairs fully finished to your specification, ready for installation or part finished to suit your requirements.

Please ask for our Doors and Stairs brochure that includes full details of our products.



These cost-effective and flexible design solutions have been introduced to offer customers two distinct benefits – firstly a one stop shop that will ease procurement, meet tight timescales, exacting standards and improve on site health and safety, and secondly offers a range of products that combine master craftsmanship with the very latest CNC technology.

A one stop shop enables customers to order doorsets and stairs at the same time as wall panel and floor systems:

DOORS

A premium range of doorsets to suit all project types.

Our door sets have been selected to offer a wide range of options, suited to both residential and commercial projects. They offer high performance, exacting standards and meet all building regulations.

Easy to install and finish they come complete pre-hung in the frame with all door furniture and fixing brackets factory fitted and packed with architraves for easy of fitting on site. They don't require any undercoat and are available in a variety of lightweight, middleweight and heavyweight options. Fire doorsets are also available.

Ordering is easy, just follow these 5 easy steps:

- **Choose your door style and architrave type from our range**
- **Confirm the door size, structural opening size, lining thickness and lining width you require**
- **Confirm the handing you require**
- **Choose your door ironmongery from our range**
- **Confirm your delivery dates and place your order**