

# Controlled Environments

Insulated Panels for Temperature & Hygiene Safe Building Applications



Assessed to ISO 9001: 2000  
Certificate No. 279c  
Certificate No. 562a



APPROVED



**FOOD & HYGIENE***safe*

Insurer Approved **FIRE***safe* Systems

# Controlled Environments

Insulated Panels for Temperature & Hygiene Safe Building Applications

Kingspan Controlled Environments manufacturers of fire-safe, hygienic and fibre-free PIR insulated panel solutions for internal and external walls, roofs and ceilings.



Kingspan Internal Insulated Wall and Ceiling Panel System



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## Applications

**The panel systems are suitable within temperature controlled and hygiene safe environments including:**

- **Food Processing**
- **Deep Freeze, Cold and Chill Store**
- **Clean Rooms for Bio-technology and Pharmaceutical Industries**

### **Internal Panel System:**

Kingspan Internal Insulated Wall and Ceiling System, box within a box.

### **External Panel System:**

Kingspan External Insulated Roof and Wall System.

The combination of the panel properties along with Kingspan's experience and expertise guarantees total satisfaction.

## Case Studies

### Thurrock Co-op

**Project :** The design, supply and installation of composite insulated panels to form chilled ambient and freezer areas of the new regional distribution centre for perishable foods.

**Size :** 24,000m<sup>2</sup>

**Architect :** Michael Sparks Associates, London

**Client :** Co-operative Group, New Century House



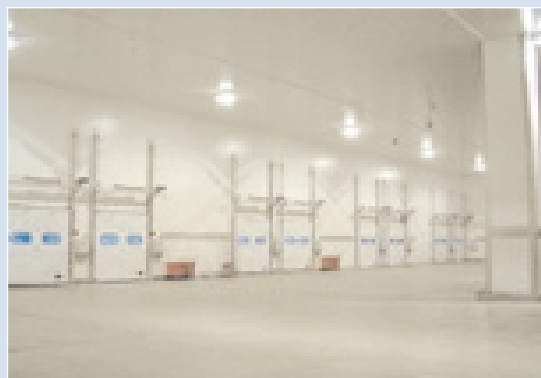
### Gist

**Project :** When Gist required two of their existing ambient warehouses to be fully refurbished into temperature controlled chill distribution stores in time for the christmas period, Kingspan's KS1150CS insulated panel systems were the obvious choice. Partnering superior structural, thermal & fire performance properties along with excellent service incorporating speed of manufacture, the project was completed ahead of schedule.

**Size :** 13,000m<sup>2</sup>

**Consultants :** MBA Consulting Engineers Ltd

**Client :** Gist, Thornbury



# Fire and Insurance

## Non-Combustible Building\*

### Tested & Approved

The use of insurer approved products is increasingly being insisted on by the insurance industry in all aspects of building construction. Kingspan have been working closely with the insurance industry to ensure that our building systems comply with their requirements.

By placing LPCB approved external panels within the 'non-combustible building' category, the ABI endorses the view that LPCB approved PIR panels will react as a non-combustible system in a real fire scenario. The classification also means that Insurers' capacity to insure buildings clad in LPCB approved panels is identical to those clad in other non-combustible systems.

\* *External claddings that are LPCB approved to LPS1181 can be classed as 'non-combustible building', Association of British Insurers (ABI) May 2003.*



Propane test on PIR insulation core, after 3 hours



Approved to LPS 1181 Certificate No. 279c  
Approved to LPS 1208 Certificate No. 562a



APPROVED

## Insurer Approved LPCB Certified Fire Performance

- **FIREsafe** Factory Mutual (FM) approved systems to unlimited height
- **FIREsafe** LPCB approved systems
- Integrity of the structure maintained
- No spread of fire within core
- No flaming drops
- Low smoke emissions
- Fire insulation criteria satisfied
  
- **FOOD & HYGIENEsafe**  
Insulation core resists moisture ingress and any risk of toxic mould and bacterial growth
- **THERMALsafe**  
High thermal performance, maintaining temperature of internal environment
- **FIBREfree**  
No release of fugitive fibres into internal environment



# Applications

## Kingspan Controlled Environments - Covering All Areas

### Food Processing

Controlling food processing areas has been made easier with Kingspan Controlled Environments insulated panel systems. Temperatures within the building can be better managed and most importantly the surfaces have food and hygiene safe coatings, therefore resisting moisture ingress, and any risk of toxic mould or bacterial growth.



### Cold & Chill Store

Kingspan insulated panel systems offer temperature controlled environments from -40°C to +40°C. The panels are available in different thicknesses which allow for a range of temperatures to be reached.



### Clean Room

The panels are fibre free therefore provide a controlled sterile environment where preventing airborne particles and micro-organisms is achievable.



### Covering All Areas


Kingspan have considerable and proven know-how in these sectors, which is supported by successfully completed projects for some of the largest brand names who operate in the retail, food supply chain, confectionery, distribution and logistic sectors.

# Product Range

## KS1150 CS Product Range - LPS1208 and FM Approved

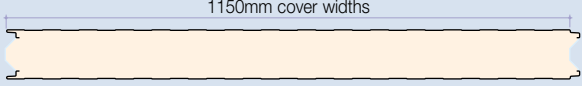


Approved to LPS 1208 Certificate No. 562a



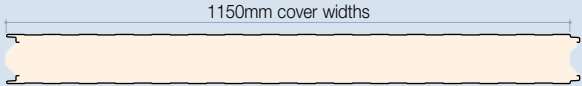
**KS1150 CS-Equi-Bead**  
Internal Application - Internal Ceiling or Wall

1150mm cover widths



**KS1150 CS-Equi-Bead**  
External Application - Vertically or Horizontally Installed


1150mm cover widths



## KS1100 CS Product Range - LPS1181 and FM Approved

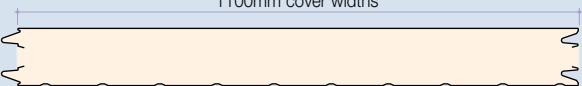


Approved to LPS 1181 Certificate No. 279c



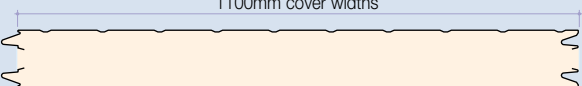
**KS1100 CS-FL**  
Internal Application - Internal Ceiling or Wall

1100mm cover widths



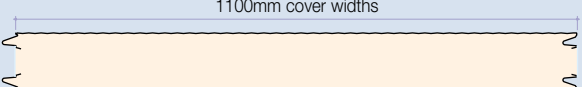
**KS1100 CS-Rib**  
Internal Application - Internal Ceiling or Wall

1100mm cover widths



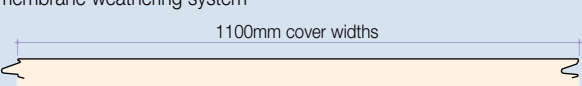
**KS1100 CS-MR**  
External Application - Vertically or Horizontally Installed

1100mm cover widths



**KS1100 CS-FL**  
External Application - Rafter to Rafter with site applied single ply membrane weathering system

1100mm cover widths



# Application & Selection Data

## KS1150 CS - LPS 1208 & FM Approved

### Application

The KS1150 CS panel range is an insulated panel system which can be used for temperature controlled and food & hygiene safe applications within an internal temperature range of +40°C to -40°C. Applications include food processing, chill/cold store and deep freeze, and clean room environments.

### KS1150 CS Wall & Partition Panel System

Product Reference	Application Description	
	Temp Range	Max Wall Height*
KS1150 CS 50mm	22°C	5.16m
KS1150 CS 80mm	35°C	6.40m
KS1150 CS 100mm	45°C	9.10m
KS1150 CS 125mm	60°C	10.00m
KS1150 CS 150mm	70°C	12.15m
KS1150 CS 175mm	80°C	12.90m
KS1150 CS 200mm	80°C	14.05m

\* Heights stated are for single span internal walls and partitions with a max load of 0.3kN/m<sup>2</sup>, deflection limit of  $\frac{1}{150}$

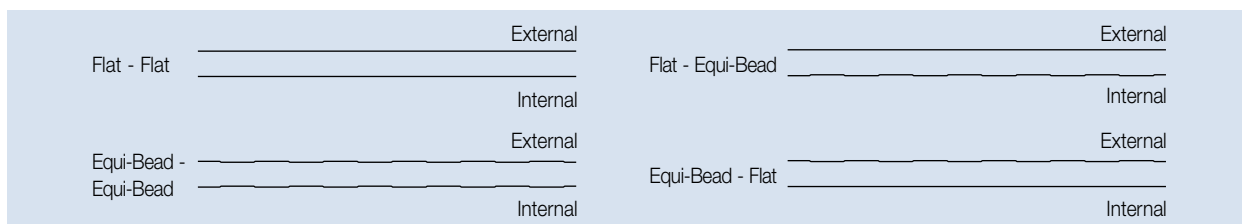
### KS1150 CS Ceiling Panel System

Product Reference	Application Description	
	Temp Range	Max Span
KS1150 CS 50mm	22°C	3.66m
KS1150 CS 80mm	35°C	4.50m
KS1150 CS 100mm	45°C	6.00m
KS1150 CS 125mm	60°C	7.50m
KS1150 CS 150mm	70°C	9.12m
KS1150 CS 175mm	80°C	9.98m
KS1150 CS 200mm	80°C	11.01m

Max span to BS 6399 Part 1 and maximum deflection of  $\frac{1}{200}$



### External & Internal Facing Combinations



### Product Specification Data

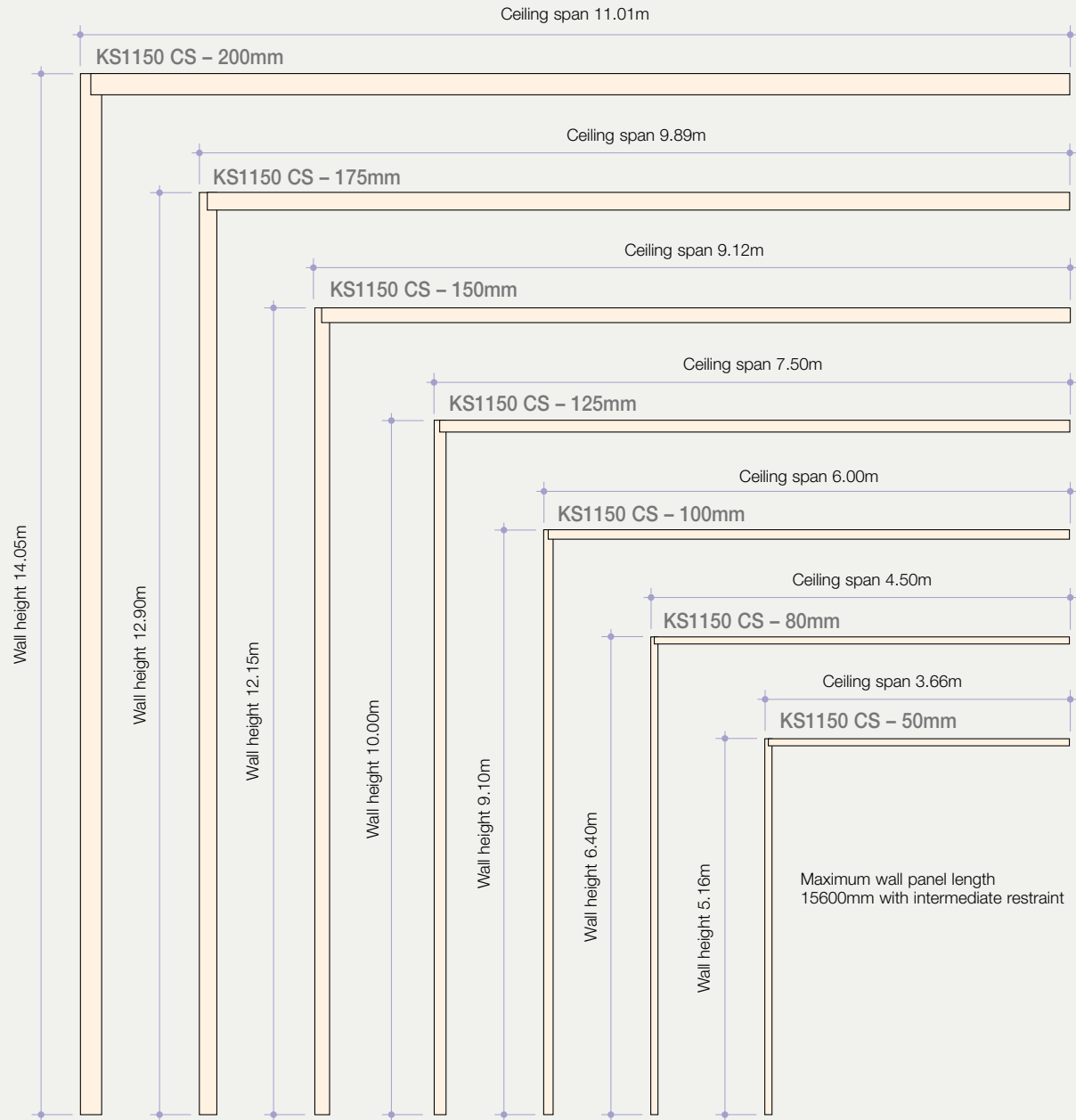
Product	Core Thickness (mm)	U Value (W/m <sup>2</sup> K)	0.5/0.5 Steel Weight (Kg/m <sup>2</sup> )	Temp. Range (°C)	Wall Max. Height (m)	Ceiling Span (m)
KS1150 CS	50	0.44	11.2	22	5.16	3.66
KS1150 CS	80	0.28	11.8	35	6.40	4.50
KS1150 CS	100	0.22	13.2	45	9.10	6.00
KS1150 CS	125	0.18	14.1	60	10.00	7.50
KS1150 CS	150	0.15	15.1	70	12.15	9.12
KS1150 CS	175	0.13	16.0	80	12.90	9.98
KS1150 CS	200	0.11	17.0	80	14.05	11.01

U – Thermal transmittance W/m<sup>2</sup>K

# Application & Selection Data

## KS1150 CS - LPS 1208 & FM Approved

Recommended Maximum Unsupported Wall & Ceiling Spans



## KS1150 CS Application & Selection Data

Operating Temperatures & KS1150 CS Panel Thicknesses

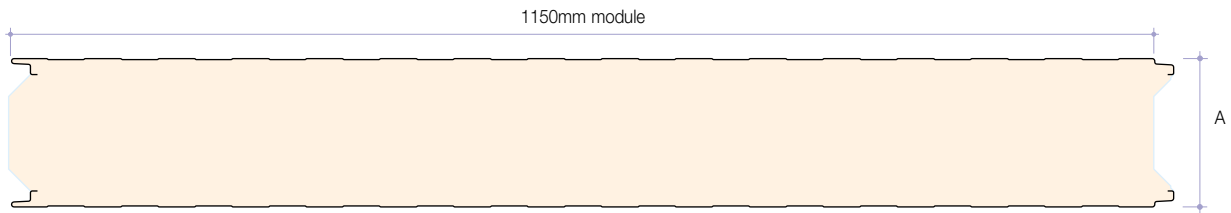
External Ambient Temperature 20°C	Operating Temperature (°C)																	
	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	
KS1150 CS - 50mm																		
KS1150 CS - 80mm																		
KS1150 CS - 100mm																		
KS1150 CS - 125mm																		
KS1150 CS - 150mm																		
KS1150 CS - 175mm																		
KS1150 CS - 200mm																		

Panel(s) should be selected to achieve a maximum thermal transmittance of 10W/m²

# Application & Selection Data

## KS1150 CS - LPS 1208 & FM Approved

### Dimensions & Weight



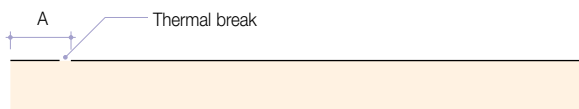
A = Core Thickness (mm)	50	80	100	125	150	175	200
Weight Kg/m <sup>2</sup> 0.5/0.5 steel	11.2	11.8	13.2	14.1	15.1	16.0	17.0

### Product Tolerance

Cut to Length	± 3.0mm	
Cover Width	± 1.0mm	
Thickness	+ 0.0	- 3.0%

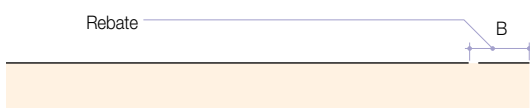
### Cold Store Thermal Break

Panels can be manufactured with a thermal break cut to one side at base to provide insulation continuity at floor slab level.



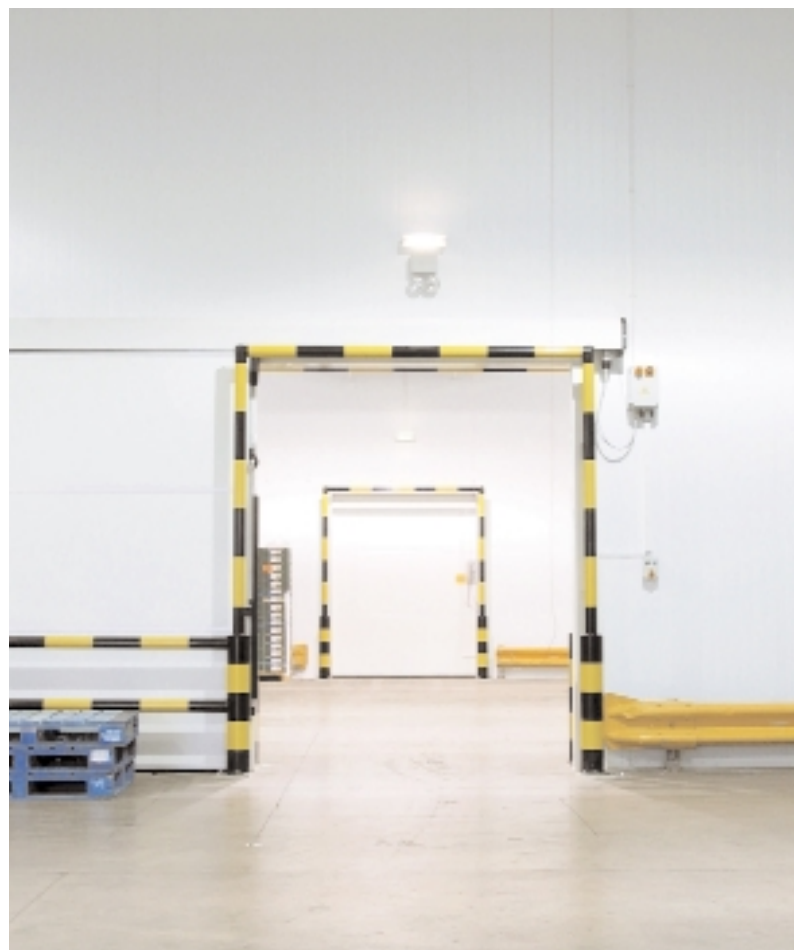
### Wall Panel Rebates

Panels can be produced with a rebate cut to one side at head.



NB. Rebates and Thermal Breaks are subject to Kingspan manufacturing tolerances, details available on request.

KS1150 CS panels are available with either thermal breaks or rebates. A combination of both will be available in 2006, details available on request.



### Available Lengths

Standard lengths 2 to 12 metres. 12 to 18 metres can be supplied but are subject to an additional transport surcharge.

# Application & Selection Data

## KS1100 CS - LPS 1181 & FM Approved



### Application

The KS1100 CS panel range is an insulated panel system which can be used for temperature controlled and food & hygiene safe applications within an internal temperature range of +40°C to -40°C. Applications include food processing, chill/cold store and deep freeze, and clean room environments.

### KS1100 CS Wall & Partition Panel System

Product Reference	Application Description	
	Temp Range	Max Wall Height*
KS1100 CS 80mm	40°C	6.4m
KS1100 CS 100mm	50°C	8.0m
KS1100 CS 125mm	60°C	10.0m
KS1100 CS 150mm	75°C	12.0m
KS1100 CS 180mm	80°C	14.4m

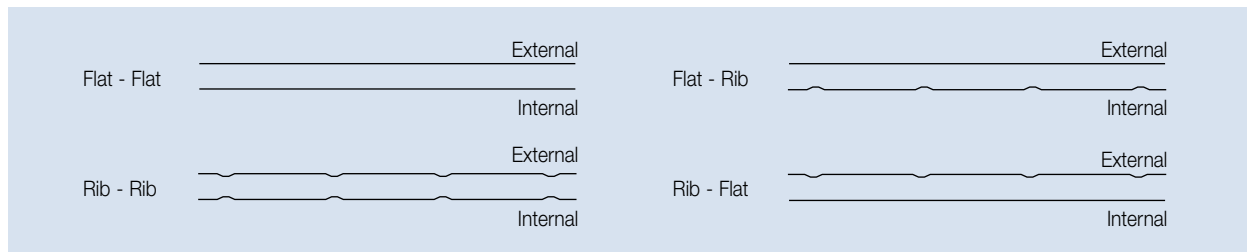
\* Heights stated are for single span internal walls and partitions with a max load of 0.3kN/m<sup>2</sup>, deflection limit of  $l/150$

### KS1100 CS Ceiling Panel System

Product Reference	Application Description	
	Temp Range	Max Span
KS1100 CS 80mm	40°C	4.1m
KS1100 CS 100mm	50°C	5.1m
KS1100 CS 125mm	60°C	6.1m
KS1100 CS 150mm	75°C	7.1m
KS1100 CS 180mm	80°C	8.1m

Max span to BS 6399 Part 1 and maximum deflection of  $l/200$

### External & Internal Facing Combinations



### Product Specification Data

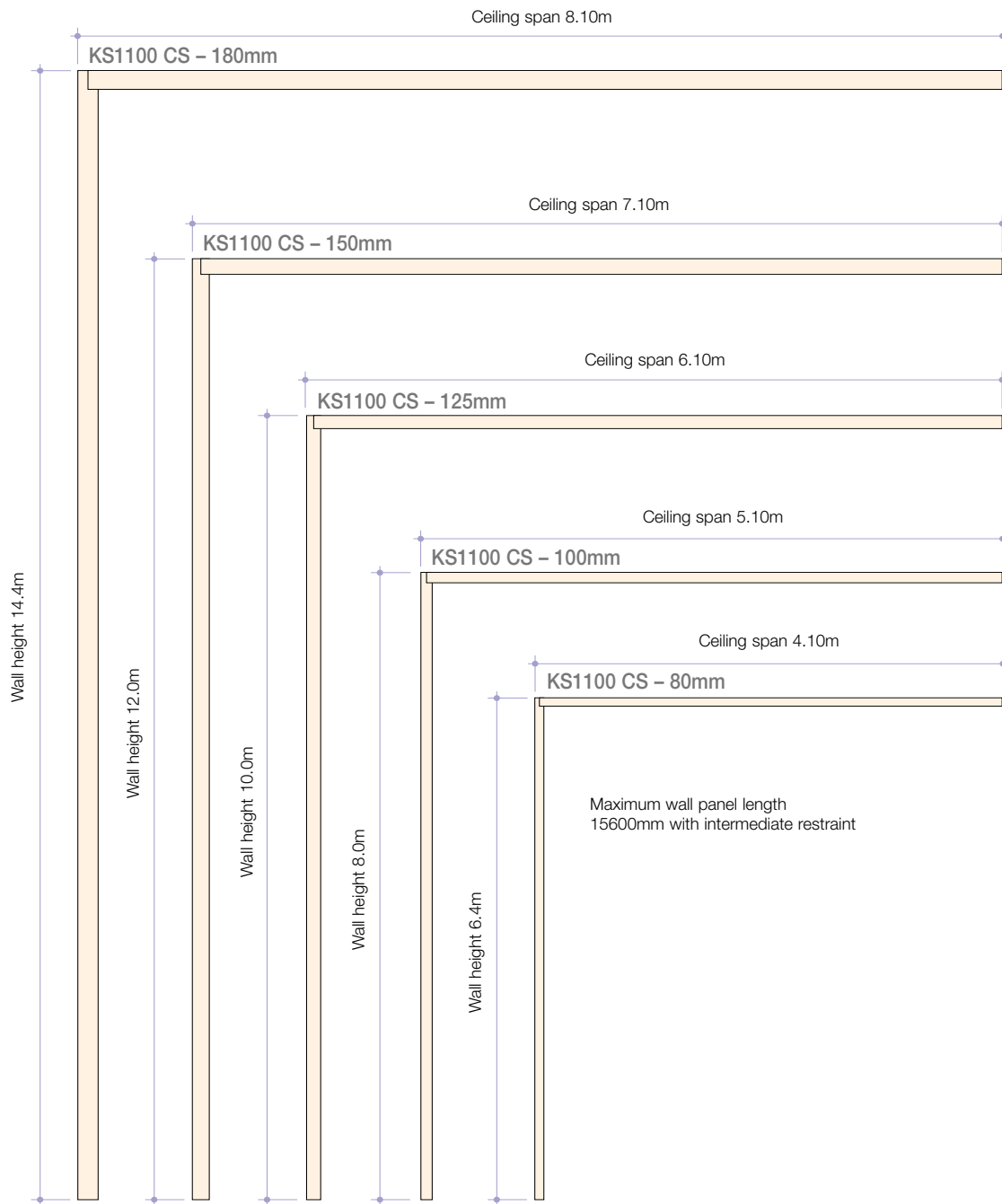
Product	Core Thickness (mm)	U Value (W/m <sup>2</sup> K)	0.5/0.5 Steel Weight (Kg/m <sup>2</sup> )	Temp. Range (°C)	Wall Max. Height (m)	Ceiling Span (m)
KS1100 CS	80	0.25	11.8	40	6.4	4.1
KS1100 CS	100	0.20	12.6	50	8.0	5.1
KS1100 CS	125	0.16	13.6	60	10.0	6.1
KS1100 CS	150	0.13	14.6	70	12.0	7.1
KS1100 CS	180	0.11	15.8	80	14.4	8.1

U – Thermal transmittance W/m<sup>2</sup>K

# Application & Selection Data

## KS1100 CS - LPS 1181 & FM Approved

Recommended Maximum Unsupported Wall & Ceiling Spans



### Operating Temperatures & KS1100 CS Panel Thicknesses

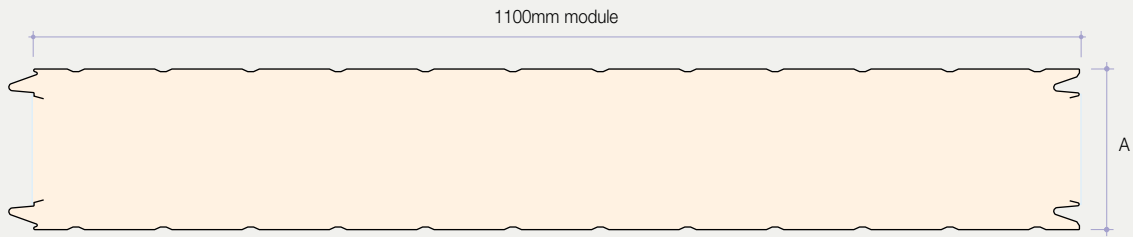
External Ambient Temperature 20°C	Operating Temperature (°C)																	
	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	
KS1100 CS - 80mm																		
KS1100 CS - 100mm																		
KS1100 CS - 125mm																		
KS1100 CS - 150mm																		
KS1100 CS - 180mm																		

Panel(s) should be selected to achieve a maximum thermal transmittance of 10W/m<sup>2</sup>

# Application & Selection Data

## KS1100 CS - LPS 1181 & FM Approved

### Dimensions & Weight



A = Core Thickness (mm)	80	100	125	150	180
Weight Kg/m <sup>2</sup> 0.5/0.5 steel	11.8	12.6	13.6	14.6	15.8

### Product Tolerance

Cut to Length	± 3.0mm	
Cover Width	- 0.0mm	+ 1.0mm
Thickness	+ 0.0mm	- 5.0mm
End Square	± 2.0mm	

### Cold Store Thermal Break

Panels can be manufactured with a thermal break cut to one side at base to provide insulation continuity at floor slab level.



### Wall Panel Rebates

Panels can be produced with a rebate cut to one side at head.



NB. Rebates and Thermal Breaks are subject to Kingspan manufacturing tolerances, details available on request.

### Available Lengths

Standard lengths 1.8 to 12 metres. 12 to 15.6 metres can be supplied but are subject to a transport surcharge. Panels less than 1.8m long can be provided but will be charged at 1.8m price plus additional cut down cost.



# Application & Selection Data

## KS1150 CS Panel System

### Material Specification: Material - Steel

#### Substrate

Galvalite, hot-dipped zinc coated steel to BS EN 10147 : 1992. Grade Z275 zinc coating. Standard internal sheet thickness 0.5mm, standard external sheet thickness 0.5mm. Other thicknesses can be supplied for specific orders.

### Coating Systems

#### Internal Construction Applications

##### Food & Hygiene Safe Liners

**Myriadecor:** Safe for continuous contact with food.

120 micron thick chemically inert polymer film bonded to steel suitable for cladding the interior of coldstores, food processing and other hygienic applications. Myriadecor is not suitable for external roof or wall cladding applications.

**Myrialac:** Fully foodsafe coating although not recommended for prolonged contact with moist or wet food. 25 micron standard white organic coating. Myrialac is not suitable for external roof or wall cladding applications.

##### Standard Liner - Non-Food & Hygiene Safe

Grey polyester lining enamel 12 microns thick.

##### External Weather Coatings

Durable external weather coatings of HPS200, 200 microns plastisol or PVDF 27 microns coil coated steel are available on request.

## KS1100 CS Panel System

### Material Specification: Material - Steel

#### Substrate

Galvalite, hot-dipped zinc coated steel to BS EN 10147 : 1992. Grade Z275 zinc coating. Standard internal sheet thickness 0.5mm, standard external sheet thickness 0.5mm. Other thicknesses can be supplied for specific orders.

### Coating Systems

#### Internal Construction Applications

##### Food & Hygiene Safe Liners

**Stelvetite Foodsafe:** Safe for continuous contact with food.

120 micron thick chemically inert polymer film bonded to steel suitable for cladding the interior of coldstores, food processing and other hygienic applications. Stelvetite is not suitable for external roof or wall cladding applications.

**Textured or Smooth Polyester:** Fully foodsafe coating although not recommended for prolonged contact with moist or wet food. 25 micron standard white organic coating. Textured polyester is not suitable for external roof or wall cladding applications.

##### Standard Liner - Non-Food & Hygiene Safe

White polyester lining enamel 15 microns thick.

##### External Weather Coatings

Durable external weather coatings of HPS200, 200 microns plastisol or PVDF 27 microns coil coated steel are available on request.

## KS1150 CS Panel System - Heat Transmission

Thermal Conductivity ( $\lambda$ ) 0.02 W/mK

Panel Thickness (mm)	Heat Transmission : W/m <sup>2</sup>					
	50	100	125	150	175	200
Thermal Transmittance W/m <sup>2</sup> K	0.43	0.22	0.18	0.15	0.13	0.11
Temp. Difference 10°C	4.60	2.30	1.84	1.53	1.31	1.15
15°C	6.90	3.45	2.76	2.30	1.97	1.73
20°C	9.20	4.60	3.68	3.07	2.63	2.30
25°C	11.50	5.75	4.60	3.83	3.29	2.88
30°C	13.80	6.90	5.52	4.60	3.94	3.45
35°C	16.10	8.05	6.44	5.37	4.60	4.03
40°C	18.40	9.20	7.36	6.13	5.26	4.60
45°C	20.70	10.35	8.28	6.90	5.91	5.18
50°C	23.00	11.50	9.20	7.67	6.57	5.75
55°C	25.30	12.65	10.12	8.43	7.23	6.33
60°C	27.60	13.80	11.04	9.20	7.89	6.90
65°C	29.90	14.95	11.96	9.97	8.54	7.48
70°C	32.20	16.10	12.88	10.73	9.20	8.05
75°C	34.50	17.25	13.80	11.50	9.86	8.63
80°C	36.80	18.40	14.72	12.27	10.51	9.20

## KS1100 CS Panel System - Heat Transmission

Thermal Conductivity ( $\lambda$ ) 0.02 W/mK

Panel Thickness (mm)	Heat Transmission : W/m <sup>2</sup>				
	80	100	125	150	180
Thermal Transmittance W/m <sup>2</sup> K	0.25	0.20	0.16	0.13	0.11
Temp. Difference 10°C	2.50	2.00	1.60	1.30	1.10
15°C	3.75	3.00	2.40	1.95	1.65
20°C	5.00	4.00	3.20	2.60	2.20
25°C	6.25	5.00	4.00	3.25	2.75
30°C	7.50	6.00	4.80	3.90	3.30
35°C	8.75	7.00	5.60	4.55	3.85
40°C	10.00	8.00	6.40	5.20	4.40
45°C	11.25	9.00	7.20	5.85	4.95
50°C	12.50	10.00	8.00	6.50	5.50
55°C	13.75	11.00	8.80	7.15	6.05
60°C	15.00	12.00	9.60	7.80	6.60
65°C	-	13.00	10.40	8.45	7.15
70°C	-	14.00	11.20	9.10	7.70
75°C	-	15.00	12.00	9.75	8.25
80°C	-	-	12.80	10.40	8.80

The recommended minimum insulation value for coldstores is 10W/m<sup>2</sup> heat gain. (See Code of Practice for the Design of Cold Store Envelopes).

$$\text{To calculate the above use : } D = \frac{\lambda \times \Delta t}{Q}$$

Where :

D = thickness of insulation (mm)

$\lambda$  = lambda value of insulation (W/mK)

$\Delta t$  = temperature difference between internal and external face

Q = heat flow = 10 (W/m<sup>2</sup>)

# Product Data

## Insulation Core

KS1100/1150 CS panels have a rigid closed cell PIR insulation core and are LPCB and FM Certified performance systems.

## Panel Joint Seals

The panel side joint can accommodate up to four vapour or hygiene safe seals. The core, tongue and groove joint interfit achieves excellent thermal performance.

### Airtightness

KS1100/1150 CS panels can achieve airtightness below  $0.5\text{m}^3/\text{hr}/\text{m}^2$  @ 50 Pa when installed to Kingspan's recommendations.



## FOOD & HYGIENE *safe*

KS1100/1150 CS panels are immune to attack from mould, fungi, mildew and vermin, no urea formaldehyde is used in the construction, and the panels are not considered deleterious. They also incorporate project specific food & hygiene safe, wash and clean down facings.

## LPCB & FM Certified **FIRE** *safe* Products

KS1100/1150 CS panels have a range of LPCB certification. Factory Mutual (FM) approved to FMRC 4880 Class 1 Fire Classification (no height restriction - ie - unlimited height). Steel inner and outer facings have Class 1 surface spread of flame to BS 476: Part 7: 1987, and are Class 0 as defined by building regulations.

## Quality & Durability

KS1100/1150 CS insulated panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO 9001: 2000 standard, ensuring long term reliability and service life.

## Guarantees & Warranties

Kingspan will provide coating and product warranties and guarantees on an individual project basis.

## Packing

### Standard Packing

KS1100/1150 CS panels are stacked horizontally (with facing sheets upwards). The pack is wrapped in polythene. The number of panels in each pack depends on panel thickness.

Typical pack height of the KS1100CS is 1000mm.

Panel Thickness (mm)	80	100	125	150	180
No. panels/pack (max)	11	9	7	6	5

Typical pack height of the KS1150CS is 1200mm.

Panel Thickness (mm)	50	80	100	125	150	175	200
No. panels/pack (max)	20	15	10	9	8	7	6

### Sea Freight

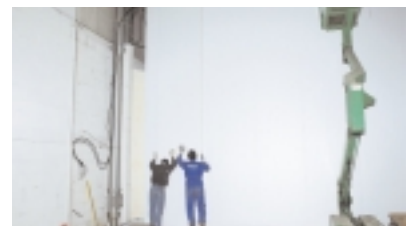
Timber crate packs are available on projects requiring delivery by sea freight shipping, at additional cost. Alternatively, steel containers can be utilised. Project specific charges apply for all sea freight contracts.

## Delivery

All deliveries (unless indicated otherwise) are road transport to project site. Off loading is the responsibility of the client.

## Site Installation Procedure

Site assembly instructions are available from Kingspan Technical Services.



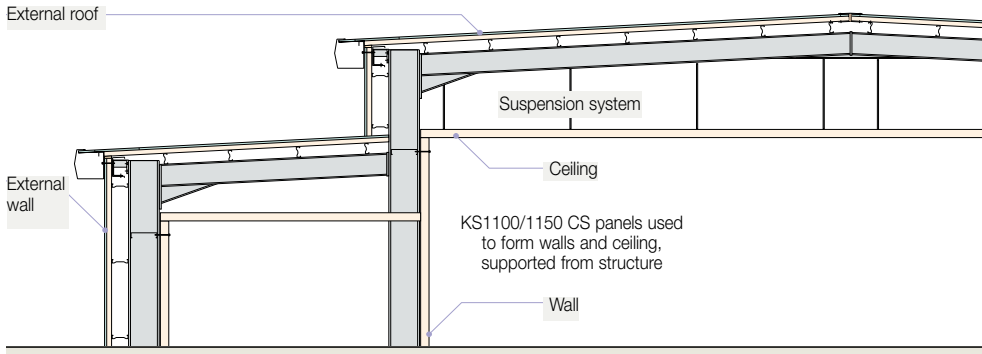
# Typical Construction Details

- Structural and thermal guarantee
- Permits safer and faster installation
- Provides a thermal, vapour and airtight barrier
- Low energy operating costs
- Lightweight construction
- Walk-on ceilings

## Internal Insulated System 'box within a box' with External Wall & Roof Cladding

Application: Coldstore/Chillstore/Food Processing or Preparation

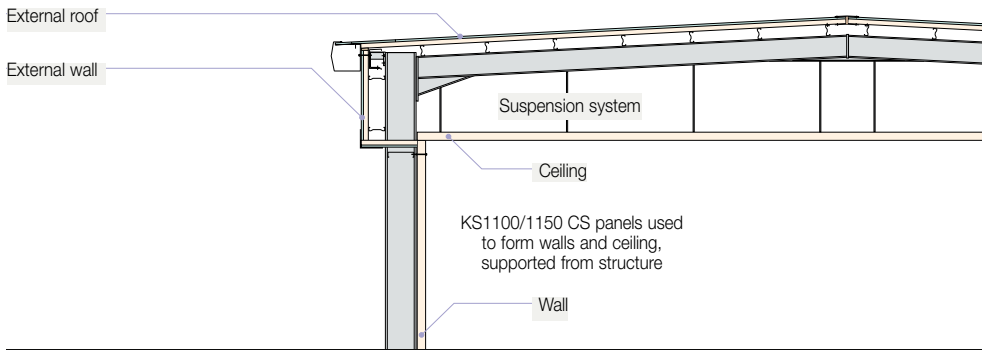
Main Structure: Portal or Truss Construction



## Internal Insulated System with Partial External Wall Cladding

Application: Coldstore/Chillstore/Food Processing or Preparation

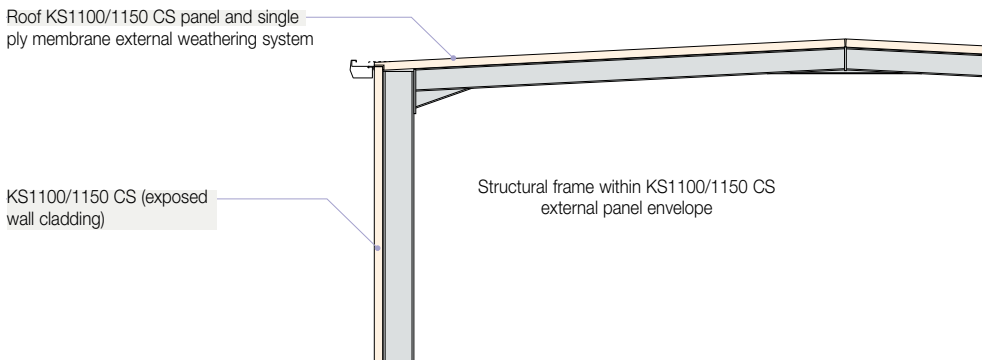
Main Structure: Portal or Truss Construction



## External Insulated System

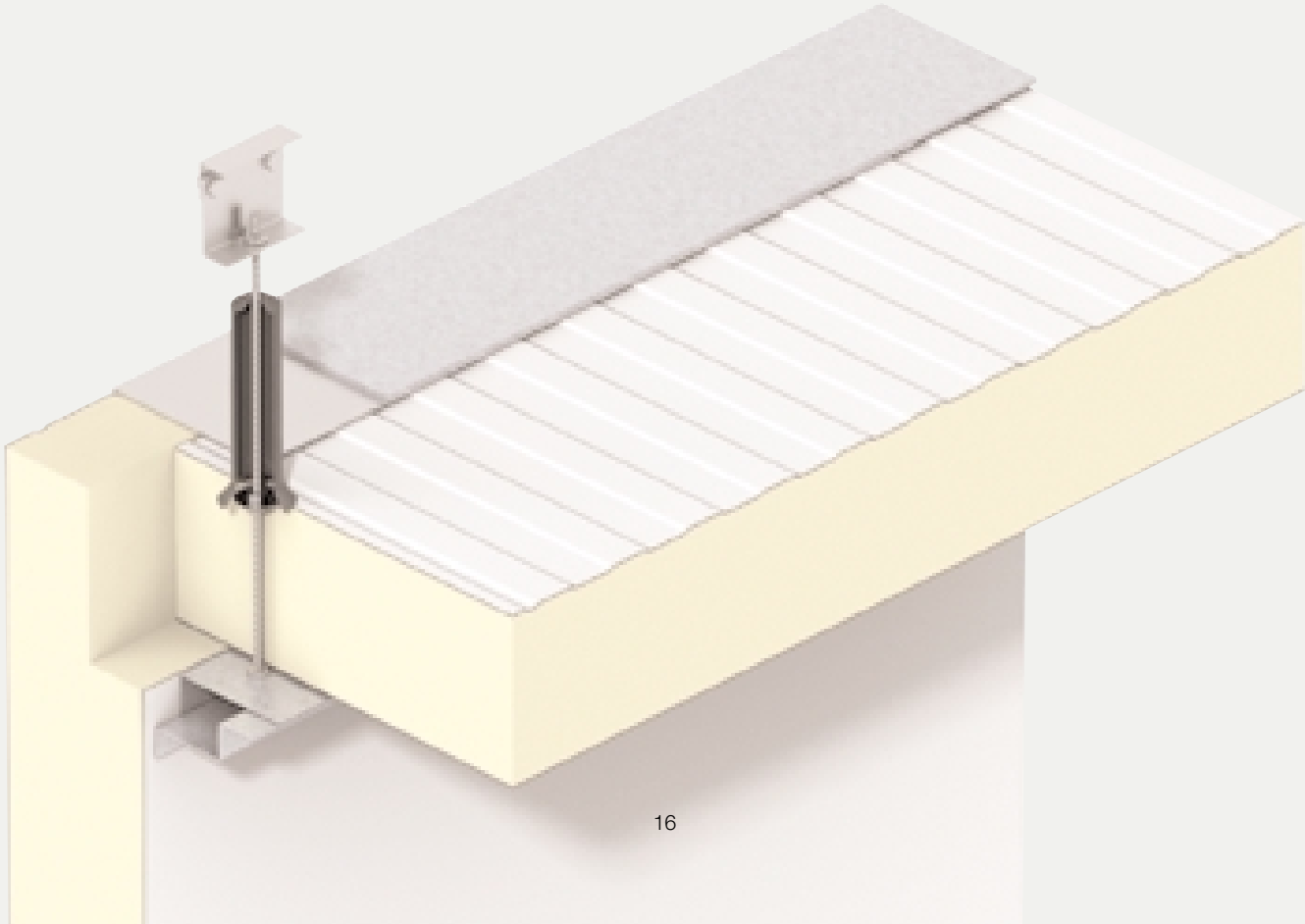
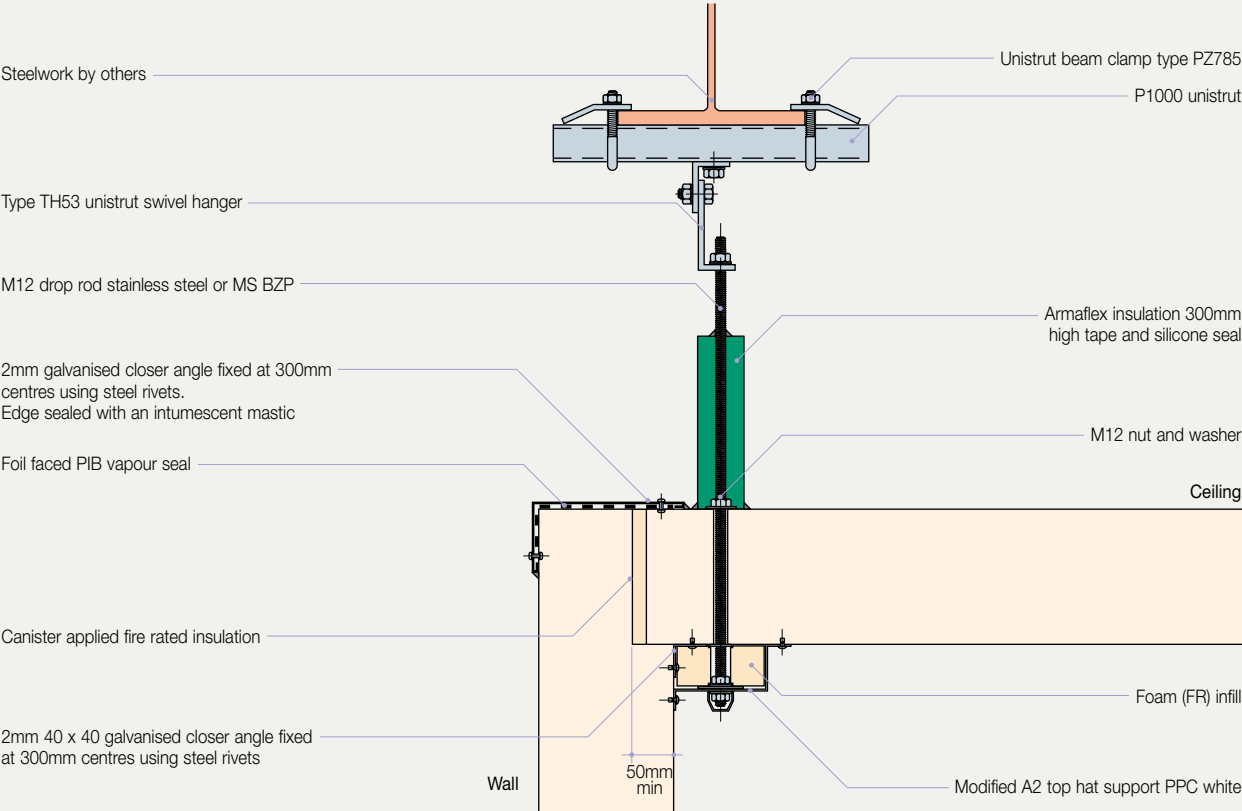
Application: Coldstore/Chillstore/Food Processing or Preparation

Main Structure: Portal or Truss Construction



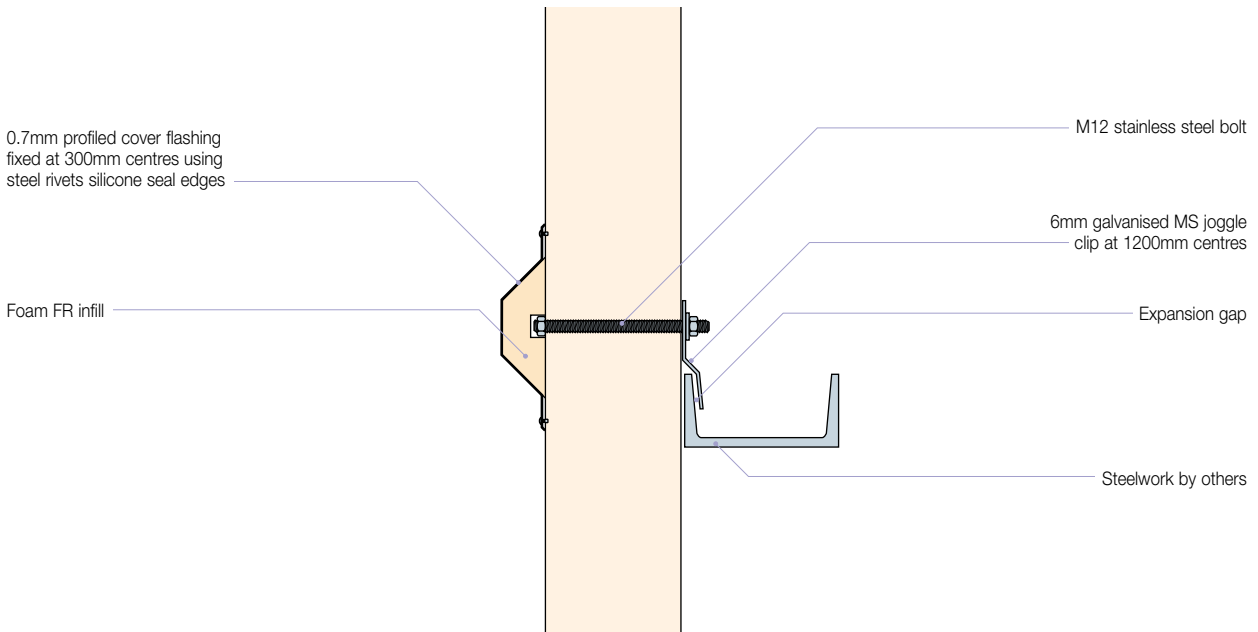
# Typical Construction Details

## Fire Safe Ceiling Edge Support

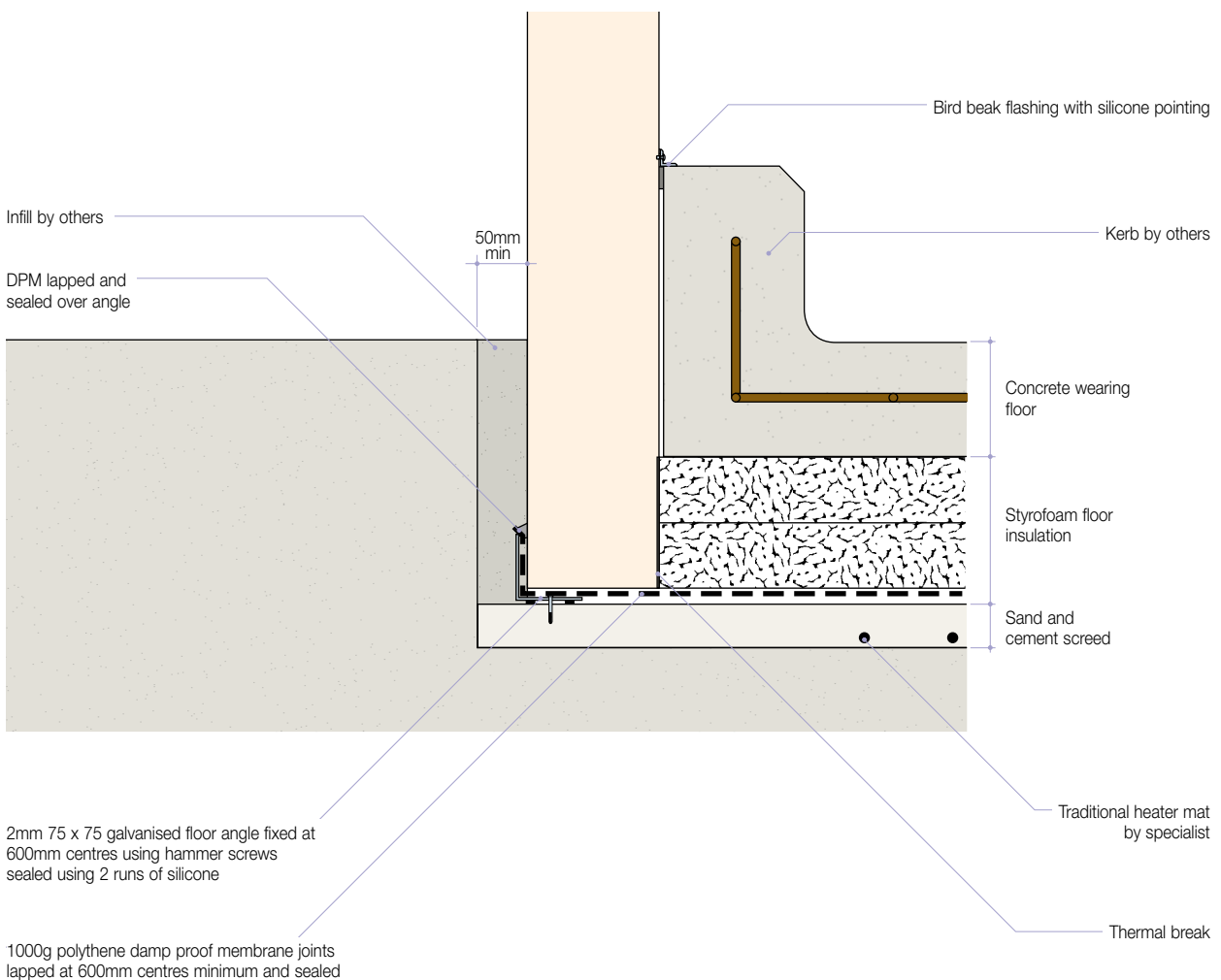


# Typical Construction Details

Vertically Laid Panel - Intermediate Detail

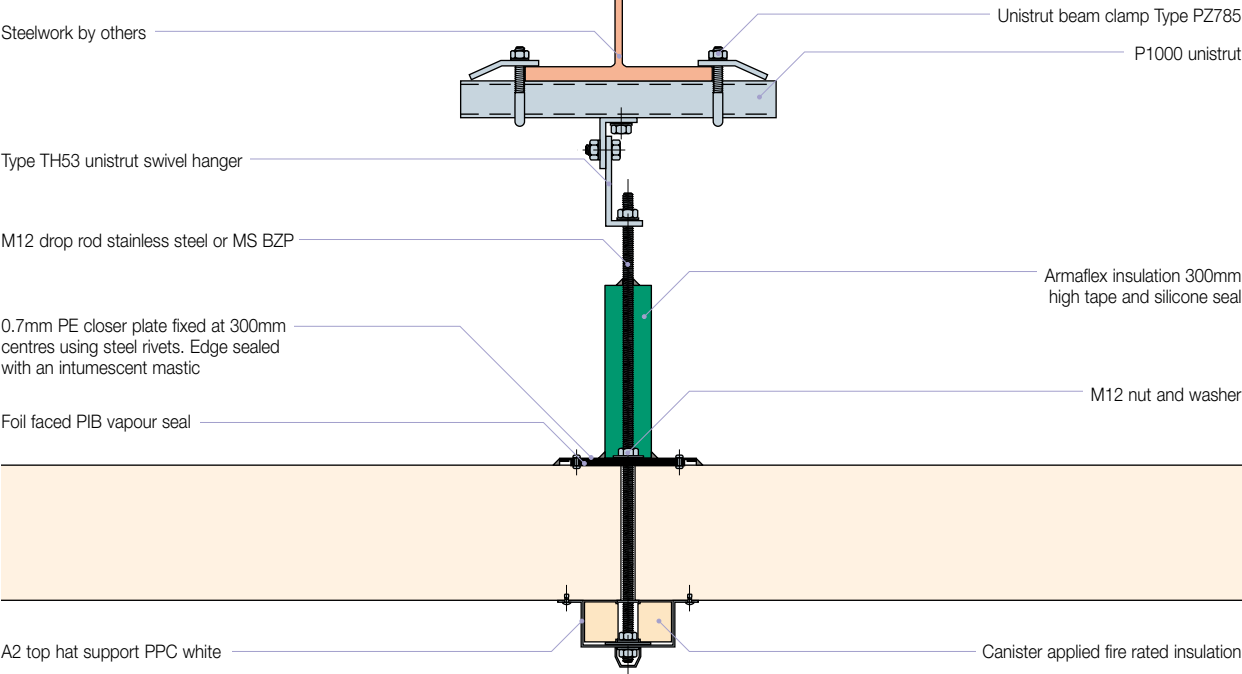


Base and Floor Detail

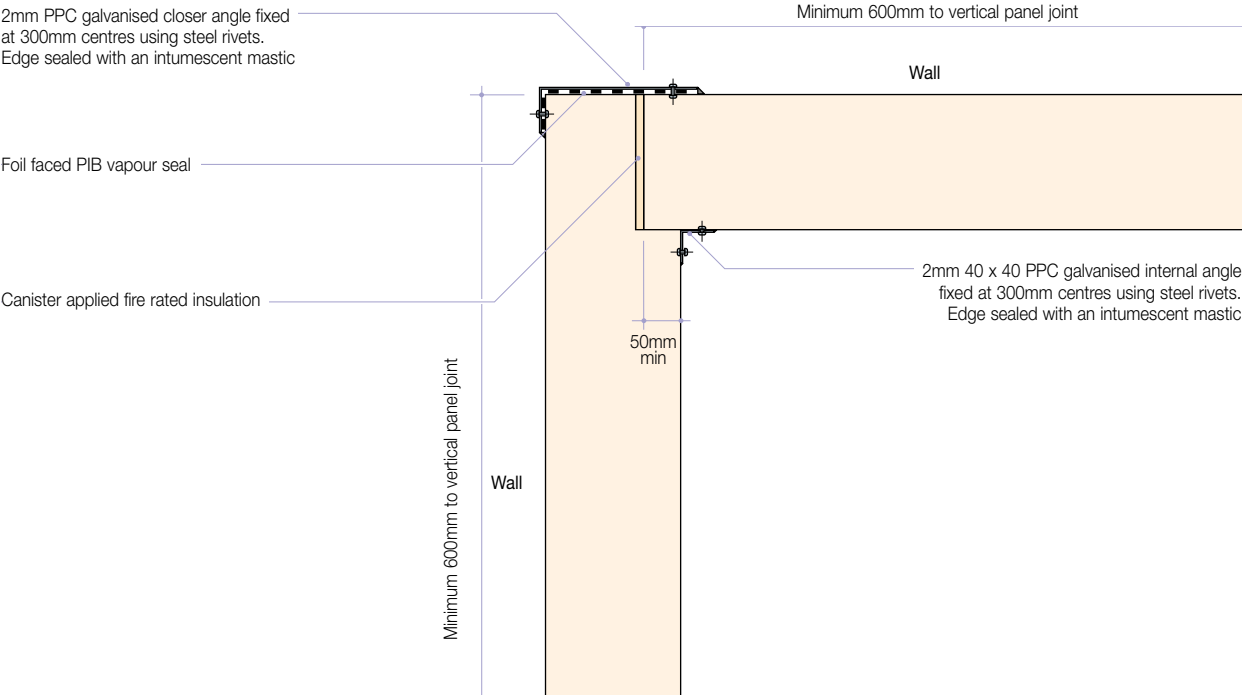


# Typical Construction Details

## Fire Safe Ceiling Support

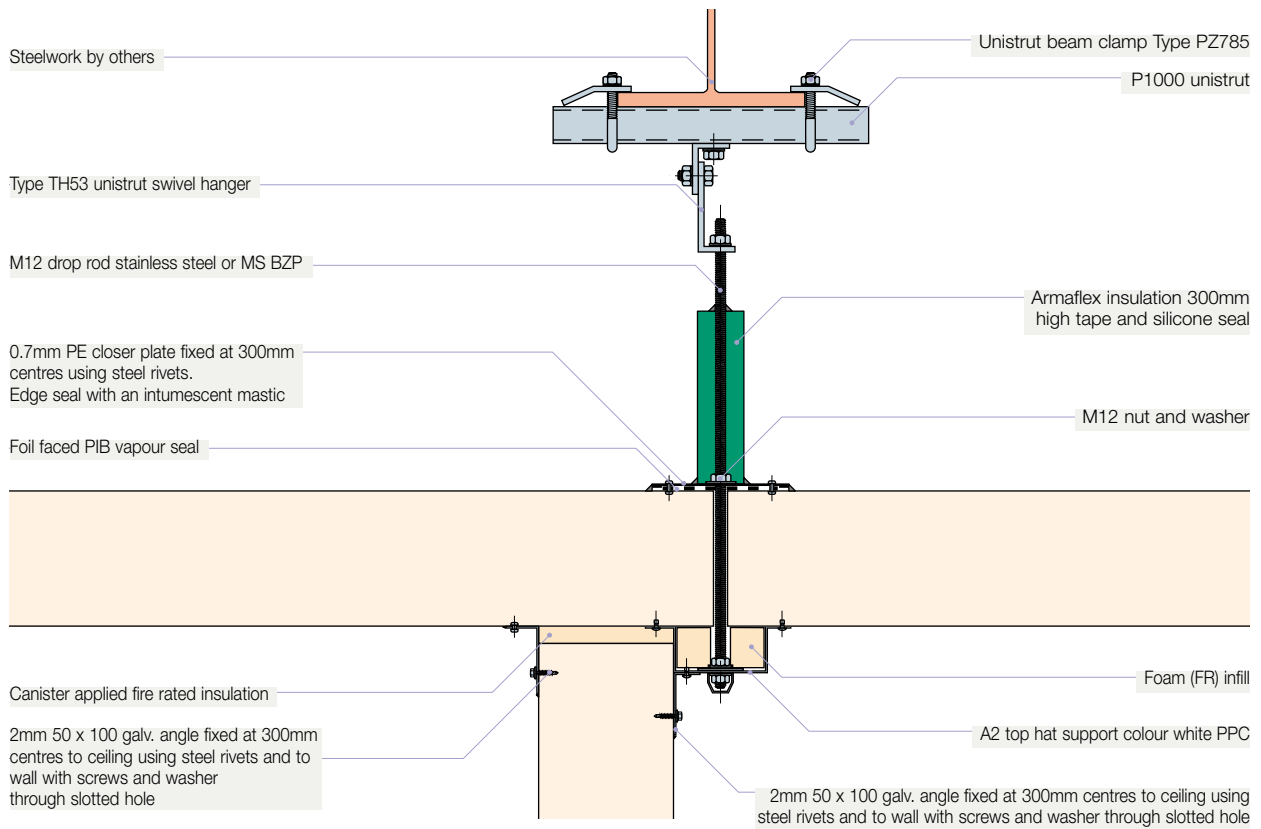


## Corner - Wall to Wall

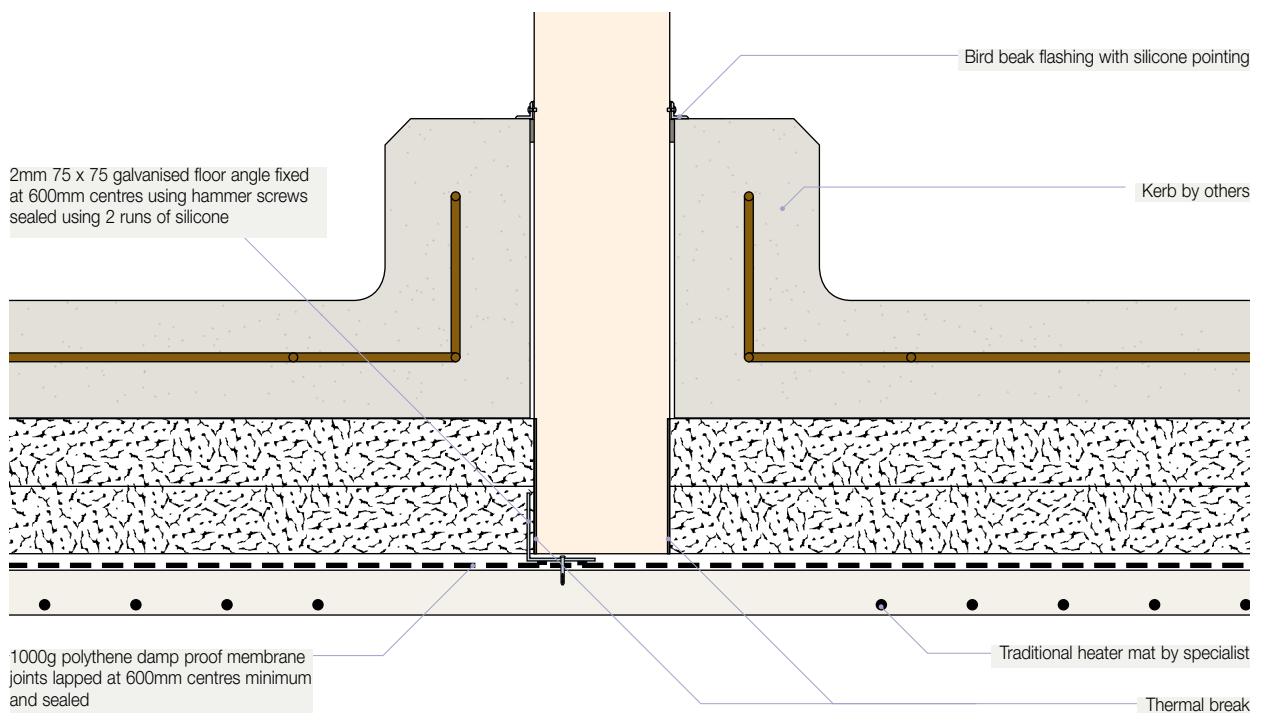


# Typical Construction Details

## Fire Safe Ceiling Partition Support



## Base Detail Partition Wall



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