

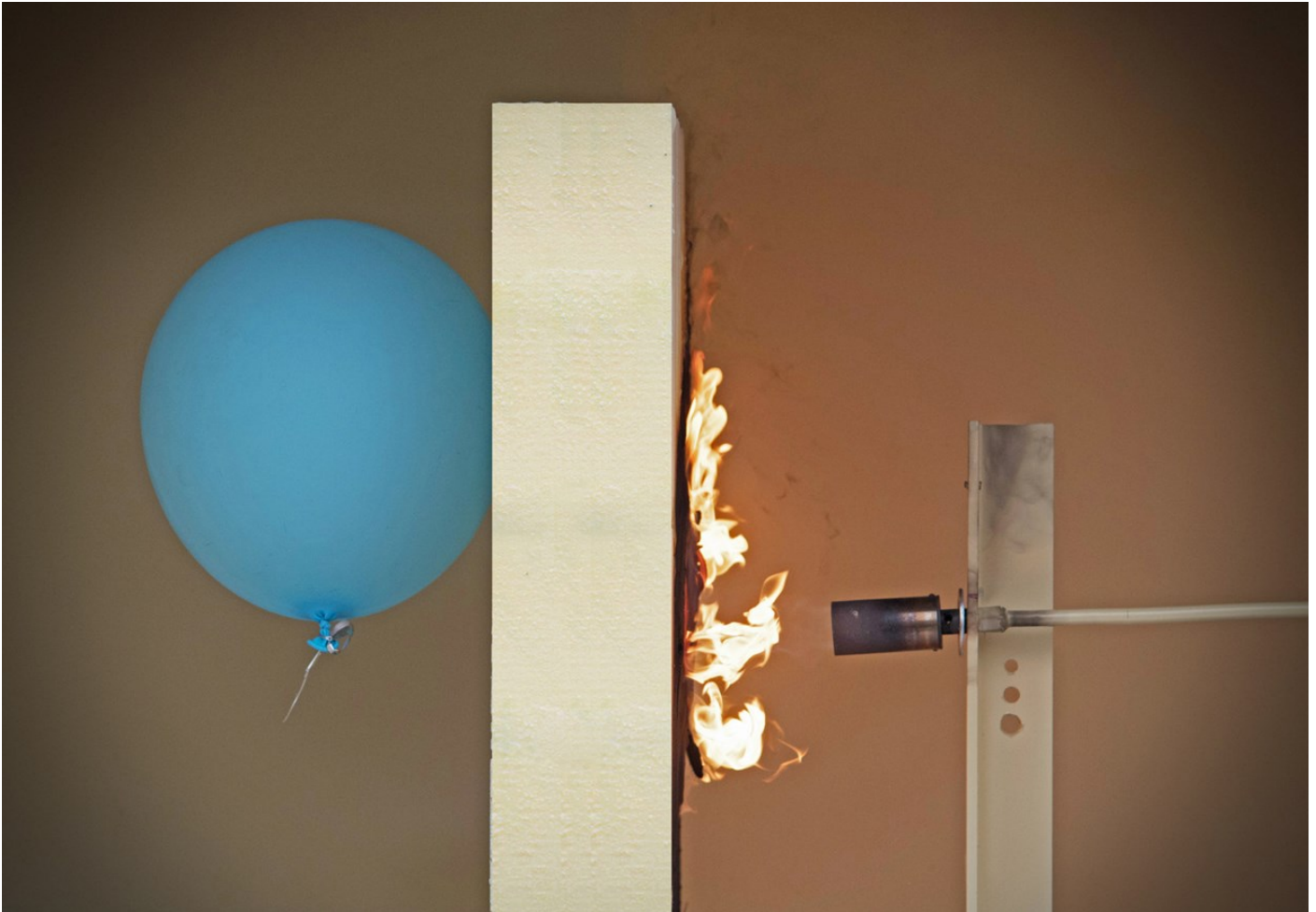


Insulated Panel

Wall Technology



Data Sheet



Distributed on
September 2019

Professional
Engineer Team





Product Overview

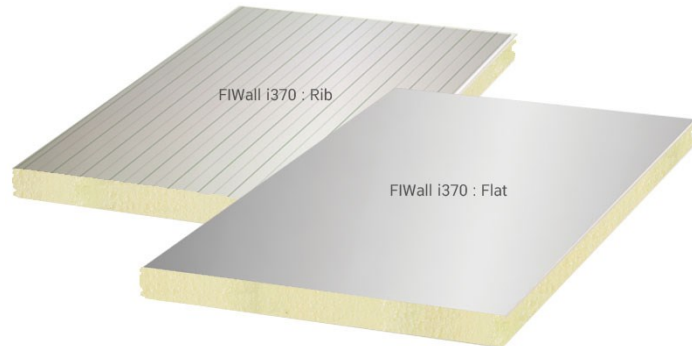
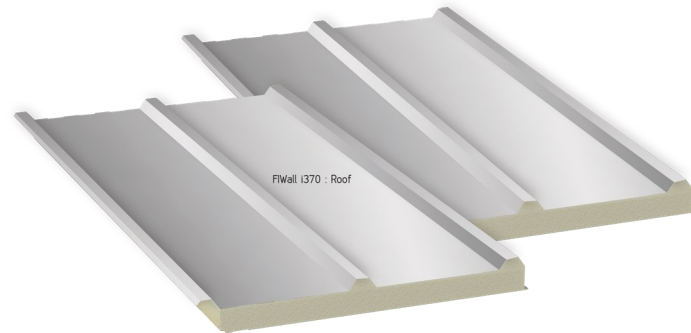
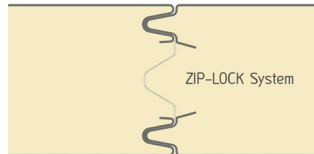
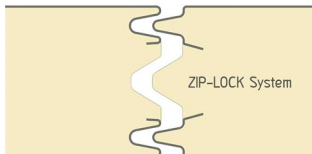
Wall Tech FIWall i370 panels are designed for use as an external or internal wall of temperature controlled and hygienic safe buildings as well as standard rooms such as food processing, freezers, cold/chill store, and clean rooms for bio-technology and pharmaceutical industries.

Additionally, this panel can be used as ceiling of the rooms as well as roof of the building. Moreover, it fits well for box within a box applications.

Manufacture

Wall Tech FIWall i370 panels are assembled by Wall Technology Co.,Ltd. in Nakornpathom, Thailand with the improved locking system called ZIP-LOCK system (Z-Improvement Lock System). The profiles of the panels have been designed for sturdiness as well as flexibility which can take into account future expandability and modifications.

The technologically-advanced and unique Z-Improvement Lock System (ZIP-LOCK system) interlocks the panels together ensuring trouble-free operations.



Panel Performance

Panel Properties and Thermal Performance

Insulation core: **Rigid Polyisocyanurate Foam (PIR Foam) | Index > 350 (5-components system)**

Thermal conductivity of insulation is 0.021 W/mK *based on guideline formulation and density of 40 kg/m^3

Insulation thickness (mm)	50	75	100	125	150	200
R value ($\text{m}^2\text{K/W}$)	2.38	3.57	4.76	5.95	7.14	9.52
U value ($\text{W/m}^2\text{K}$)	0.42	0.28	0.21	0.17	0.14	0.11


Dimension



Length: up to required specification

*Standard lengths are from 2.5 m to 15.0 m.

FIWall i370 Panel : System Features

- | | |
|--|---|
| <ul style="list-style-type: none"> • The outstanding feature of FIWall i370 Panels is that they are of the sandwich type which offers high durability. • A ZIP-LOCK system is embedded in all FIWall i370 Panels. • Facing of FIWall i370 Panels is available in stainless and steel. • FIWall i370 Panels are manufactured from zero ozone depletion potential (ODP) foam, polyisocyanurate foam, which is environmental-friendly without depleting the ozone layer. • The zero ODP foam are covered with polyester coated steel which in turn is treated with a zinc. Therefore, FIWall i370 Panels are non-corrosive and ideally suited to climates in Asia region. • Quality approved to ISO 9001 by TUV Nord (Thailand) Co., Ltd. | Product Tolerances |
| | Thickness Tolerance |
| | 50 mm |
| | 75 mm |
| | 100 mm |
| | 125 mm |
| | 150 mm |
| | 200 mm |
| |  |

Thickness Tolerances

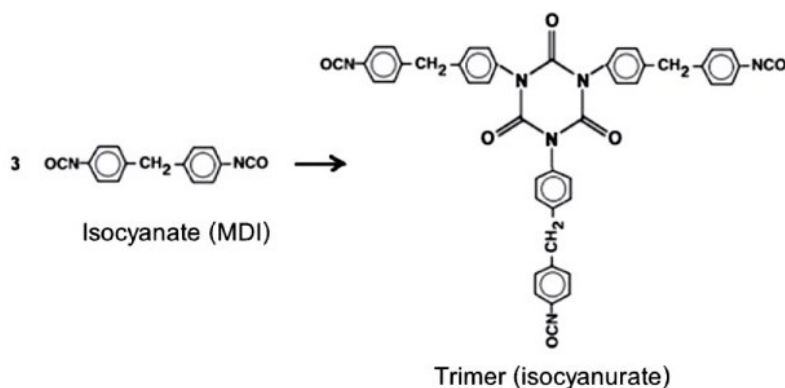
50 mm	+2 mm	-2 mm
75 mm	+2 mm	-2 mm
100 mm	+2%	-2%
125 mm	+2%	-2%
150 mm	+2%	-2%
200 mm	+2%	-2%



FIWall i370 Panel | Science Fact about FIWall i370 Panels

POLYISOCYANURATE (PIR)

Polyisocyanurate (PIR) is a polymer material that contains many polyisocyanurate rings (trimer) synthesized by using a simple reaction between three molecules of methylene diphenyl diisocyanate (MDI, isocyanate).





Technical Data : FIWall i370 Panel (Polyisocyanurate, PIR Foam)

Properties	Unit	Value	Standard
Density	kg/m ³	40	ISO 845
Thermal Conductivity	W/mK	0.0213	ASTM C 518
Compressive Strength	kPa (ton/m ²)	142-426 (14-43)	ASTM D 695 *depends on thickness
Fire Behaviors	FM 4880 Class 1	On Progress	FM Approval
	Class	B-s2, d0	BS EN 13501-1
	Class	B2	DIN 4012
	hr:min	2:08	BS 476
Water Absorption (Full Immersion)	% changed, 24 hours	3.14	ASTM D 570
	% changed, 4 days	4.20	
Dimensional Stability -40 °C for 48 hours			ASTM D 2126-09
• Width	%	0	
• Length	%	0	
• Thickness	%	-1.1	
• Change in mass	%	-0.6	
+90 °C for 48 hours			
• Width	%	-0.8	
• Length	%	0	
• Thickness	%	-0.8	
• Change in mass	%	-2.0	
FDA Certification	-	Yes	Certification
Non-CFC Certification	-	Non CFC	Certification

FIWall i370 Panel : Weight

Density	Weight of Panels (kg/m)						
kg/m ³	Foam Thickness, mm	50	75	100	125	150	200
40	04/04 Panel (Rib & Flat)	9.90	11.00	12.10	-	-	-
	05/05 Panel (Rib & Flat)	11.68	12.78	13.88	14.98	16.08	18.28
	06/06 Panel (Rib & Flat)	13.84	14.94	16.04	17.14	18.24	20.44

*Width 1.10 m with ZIP Lock **Original Weight Tolerance ±10%

Reaction to Fire

- Classification of Reaction to fire in Accordance with BS EN 13501-1:2017

Classification Report No. 7191170002-MEC17/3-LGJ
dated 21 Sep 2017



PSB Singapore

4.2. Classification

The product, 'FI WALL – ZIP LOCK Panel' PIR insulated panel with coated steel facing (200mm thick, 18.5 kg/m²), in relation to its reaction to fire behaviour meets the requirements to be classified as **B**.

The additional classification in relation to smoke production is: **s2**

The additional classification in relation to flaming droplets / particles is: **d0**

Fire behaviour		Smoke production			Flaming droplets	
B	-	s	2	,	d	0

Therefore, the classification of 'FI WALL – ZIP LOCK Panel' PIR insulated panel with coated steel facing (200mm thick, 18.5 kg/m²), in accordance with BS EN 13501-1: 2007 +A1:2009 is:

Reaction to fire classification: B-s2,d0




Expanded Polystyrene
(EPS)

PUR or Fake PIR
Index < 350

Real PIR by Wall Tech
Index > 350



Resistance to fire

Resistance to fire is an ability of materials to resist fire and ideally prevent the passage of heat. Fire resistance is quantified by either insulation or integrity performance. Fire protection elements (PIR Sandwich Panels) are tested according to BS 476 Part 20 & 22 and officially approved. The furnace temperature aligns with a standard curve given the maximum temperature on exposed side up to more than 1,000 degree Celsius. In the fire test, the maximum temperature of unexposed side of the panels exceeded 180 degree Celsius above the initial mean value of 31 degree Celsius marked as an insulation failure. Two hours after the test, sustained flaming is found on the unexposed side of the panels marked as an integrity failure. From the experiment we ensure that our panels can resist to the fire up to two hours.



PUR or Fake PIR
Index < 350



Real PIR by Wall Tech
Index > 350

- Fire Behavior of Insulation “ EPS , PUR , Fake PIR and Real PIR ”



Fire Resistance Test

Reference No. FSRC-039/62

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**FACULTY OF ENGINEERING
CHULALONGKORN UNIVERSITY
FIRE SAFETY RESEARCH CENTER**

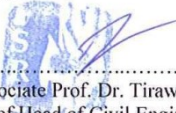


- TYPE OF TEST** : DETERMINATION OF THE FIRE RESISTANCE OF NON-LOADBEARING ELEMENTS OF CONSTRUCTION
- TEST SPECIMEN** : **Sandwich Panel with Polyisocyanurate Core (Thickness 200 mm)**
The specimen is a 3 m x 3 m vertical construction consisting of three 200-mm (8 in.) thick sandwich panels (FIWall i370). Each sandwich panel comprises polyisocyanurate (PIR) foam with a density of 40 kg/m³ as the core material and a single layer of 0.6-mm thick metal sheets on both sides. The specimen was installed in a perimeter frame comprising Z-sections of 200 x 218 x 100 x 6 mm together with T-sections of 103 x 53 x 3 mm on the unexposed side. Fire-resistant silicone was used to seal the gaps around the edge of the panels and the perimeter frame on the exposed side. The perimeter frame was installed in a 200-mm thick concrete frame, which was fixed to the 3.5 m x 3.5 m testing frame. The details of the specimen are shown in Appendix C. The specimen was provided and installed by the client.
- CLIENT** : **WALL TECHNOLOGY CO., LTD.**
70 Moo 13, Phutthamonthon Sai 5 Road, Raikhing
Sampran, Nakhonpathom 73210, Thailand
- DATE OF TEST** : May 17, 2019
- TEST MACHINE** : Large-scale vertical furnace at the Fire Safety Research Center (FSRC), Department of Civil Engineering, Chulalongkorn University in Saraburi province, Thailand. The furnace is capable of producing a standard temperature-time relationship according to BS 476 Part 20: 1987.
- TEST METHOD** : The testing procedures follow the British Standard BS 476: Fire tests on building materials and structures
BS 476 Part 20: 1987: Method for determination of the fire resistance of elements of construction (general principles)
BS 476 Part 22: 1987: Methods for determination of the fire resistance of non-loadbearing elements of construction Section 5: Determination of the fire resistance of partitions.
- TEST RESULTS** : The non-loadbearing element of construction described above has the fire resistance of each criterion for the period stated:
(The test results are good only for the specimen tested.)

Criteria	Fire Resistance (hr:min)	Remarks
Insulation	1:05	The maximum temperature of the unexposed face of the specimen exceeded 180°C above the initial mean value of 31°C.
Integrity	2:08	Sustained flaming on the unexposed face of the specimen.

Date: May 31, 2019

Tested by: 
(Professor Dr. Thanyawat Pothisiri)


(Associate Prof. Dr. Tirawat Boonyatee)
On Behalf of Head of Civil Engineering Department



Heat Transmission

$$D \geq (\lambda \times DT)/Q$$

D = Insulation thickness, m

λ = Thermal conductivity, W/mK

DT = Difference between external and internal temperature

Q = Heat flow, W/m²

Thermal Conductivity of PIR is 0.021* W/mK *base on guideline formulation and core density of 40 kg/m³

Heat Flow (Q) , W/m ²						
Insulation Thickness	50 mm	75 mm	100 mm	125 mm	150 mm	200 mm
Temperature Difference*						
10 °C	4.20	2.80	2.10	1.68	1.40	1.05
15 °C	6.30	4.20	3.15	2.52	2.10	1.58
20 °C	8.40	5.60	4.20	3.36	2.80	2.10
25 °C	10.50	7.00	5.25	4.20	3.50	2.63
30 °C	12.60	8.40	6.30	5.04	4.20	3.15
35 °C	14.70	9.80	7.35	5.88	4.90	3.68
40 °C	16.80	11.20	8.40	6.72	5.60	4.20
45 °C	18.90	12.60	9.45	7.56	6.30	4.73
50 °C	21.00	14.00	10.50	8.40	7.00	5.25
55 °C	23.10	15.40	11.55	9.24	7.70	5.78
60 °C	25.20	16.80	12.60	10.08	8.40	6.30
65 °C	27.30	18.20	13.65	10.92	9.10	6.83
70 °C	29.40	19.60	14.70	11.76	9.80	7.35
75 °C	31.50	21.00	15.75	12.60	10.50	7.88
80 °C	33.60	22.40	16.80	13.44	11.20	8.40
85 °C	35.70	23.80	17.85	14.28	11.90	8.93
90 °C	37.80	25.20	18.90	15.12	12.60	9.45
* 1 °C = 1 K						

Recommended Thickness										
Internal Temperature (°C)	40	30	20	10	0	-10	-20	-30	-40	-50
FIWall i370 50 mm				+18						
FIWall i370 75 mm				0						
FIWall i370 100 mm					-5					
FIWall i370 125 mm						-15				
FIWall i370 150 mm							-25			
FIWall i370 200 mm								-45		

*Recommended without height of building concerning. **We must consider height of building before selection.

Thickness Selection

FIWall i370 Panels-High Index Polyisocyanurate Foam: k-value is reported at 0.021 W/mK

Product	Insulation Thickness		Facing		Maximum Single Span (m)			Temperature Limit (°C)	R-value (m ² K/W)	Weight* (kg/m)
					External	Internal	Ceiling			
FIWall i370	50	mm	04/04	Steel	3.25	5.30	3.00	18	2.38	9.90
FIWall i370	75	mm	04/04	Steel	4.35	7.00	3.85	0	3.57	11.00
FIWall i370	100	mm	04/04	Steel	5.40	8.50	4.55	-5	4.76	12.10
FIWall i370	125	mm	04/04	Steel	-	-	-	-	-	-
FIWall i370	150	mm	04/04	Steel	-	-	-	-	-	-
FIWall i370	200	mm	04/04	Steel	-	-	-	-	-	-

*Width 1.10 m with ZIP LOCK **Thickness tolerance ± 2 mm for 50&75 mm thk. panel and $\pm 2\%$ for others. ***Original Weight Tolerance $\pm 10\%$

FIWall i370 Panels-High Index Polyisocyanurate Foam: k-value is reported at 0.021 W/mK

Product	Insulation Thickness		Facing		Maximum Single Span (m)			Temperature Limit (°C)	R-value (m ² K/W)	Weight* (kg/m)
					External	Internal	Ceiling			
FIWall i370	50	mm	05/05	Steel	3.65	6.05	3.30	18	2.38	11.68
FIWall i370	75	mm	05/05	Steel	4.95	8.00	4.20	0	3.57	12.78
FIWall i370	100	mm	05/05	Steel	6.10	9.75	5.00	-5	4.76	13.88
FIWall i370	125	mm	05/05	Steel	7.15	11.35	5.65	-15	5.95	14.98
FIWall i370	150	mm	05/05	Steel	8.15	12.85	6.20	-25	7.14	16.08
FIWall i370	200	mm	05/05	Steel	10.00	15.00	7.20	-45	9.52	18.28

*Width 1.10 m with ZIP LOCK **Thickness tolerance ± 2 mm for 50&75 mm thk. panel and $\pm 2\%$ for others. ***Original Weight Tolerance $\pm 10\%$

FIWall i370 Panels-High Index Polyisocyanurate Foam: k-value is reported at 0.021 W/mK

Product	Insulation Thickness		Facing		Maximum Single Span (m)			Temperature Limit (°C)	R-value (m ² K/W)	Weight* (kg/m)
					External	Internal	Ceiling			
FIWall i370	50	mm	06/06	Steel	4.00	6.70	3.50	18	2.38	13.84
FIWall i370	75	mm	06/06	Steel	5.40	8.85	4.45	0	3.57	14.94
FIWall i370	100	mm	06/06	Steel	6.65	10.75	5.25	-5	4.76	16.04
FIWall i370	125	mm	06/06	Steel	7.80	12.55	5.95	-15	5.95	17.14
FIWall i370	150	mm	06/06	Steel	8.90	14.20	6.55	-25	7.14	18.24
FIWall i370	200	mm	06/06	Steel	10.95	15.00	7.55	-45	9.52	20.44

*Width 1.10 m with ZIP LOCK **Thickness tolerance ± 2 mm for 50&75 mm thk. panel and $\pm 2\%$ for others. ***Original Weight Tolerance $\pm 10\%$



FIWall i370 Panel : Single Span Tables

Outer sheet 0.40 mm (Steel), Inner sheet 0.40 mm (Steel)

Thickness	External Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	0.73	0.12											
75 mm	1.95	0.75	0.23										
100 mm	3.39	1.55	0.70	0.27	0.03								
Note1: Designed according to Thailand code Zone 3: V0,3 second gust, 50 years =29 m/s													
Note2: Temperature difference across the panel is 15 °C													
Note3: Serviceability Limit State, (Require ≥50 kg/m ²)													

Thickness	Internal Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.31	0.64	0.35	0.21									
75 mm	2.58	1.31	0.74	0.45	0.30	0.20							
100 mm	4.05	2.15	1.24	0.78	0.51	0.35	0.25						
Note1: Pressure or Suction Load of 0.3 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥30 kg/m ²													

Thickness	Internal Ceiling: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.02	0.25	0										
75 mm	2.25	0.88	0.20										
100 mm	3.70	1.67	0.64	0.06									
Note1: Pressure or Suction Load of 0.25 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥100 kg/m ²													

*Recommended without temperature concerning. **We must consider room temperature before selection.

*1 kN = 101.97 kg

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FIWall i370 Panel : Single Span Tables

Outer sheet 0.50 mm (Steel), Inner sheet 0.50 mm (Steel)

Thickness	External Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.10	0.33	0										
75 mm	2.58	1.16	0.48	0.13	0								
100 mm	4.27	2.15	1.11	0.54	0.22								
125 mm	6.00	3.28	1.84	1.04	0.56	0.27	0.07						
150 mm	7.98	4.52	2.66	1.60	0.95	0.55	0.29	0.11	0				
200 mm	11.90	7.10	4.48	2.88	1.88	1.23	0.80	0.50	0.29	0.14	0.03		
Note1: Designed according to Thailand code Zone 3: V0,3 second gust, 50 years=29 m/s													
Note2: Temperature difference across the panel is 15 °C													
Note3: Serviceability Limit State, (Require ≥50 kg/m ²)													

Thickness	Internal Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.73	0.89	0.50	0.31	0.20	0.14							
75 mm	3.20	1.77	1.03	0.65	0.43	0.30	0.21	0.16					
100 mm	5.01	2.82	1.70	1.09	0.74	0.51	0.37	0.28	0.21	0.16			
125 mm	6.85	3.98	2.47	1.61	1.10	0.78	0.57	0.43	0.33	0.25	0.20	0.16	
150 mm	8.75	5.23	3.31	2.19	1.51	1.08	0.79	0.60	0.46	0.36	0.29	0.23	0.19
200 mm	12.78	7.91	5.17	3.52	2.48	1.80	1.34	1.02	0.79	0.62	0.50	0.41	0.33
Note1: Pressure or Suction Load of 0.3 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥30 kg/m ²													

Thickness	Internal Ceiling: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.39	0.42	0										
75 mm	2.90	1.26	0.40	0									
100 mm	4.59	2.25	1.01	0.25	0								
125 mm	6.41	3.38	1.72	0.71	0.05								
150 mm	8.30	4.58	2.50	1.23	0.39	0							
200 mm	12.20	7.18	4.25	2.42	1.20	0.33	0						
Note1: Pressure or Suction Load of 0.25 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥100 kg/m ²													

*Recommended without temperature concerning. **We must consider room temperature before selection.

*1 kN = 101.97 kg

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FIWall i370 Panel : Single Span Tables

Outer sheet 0.60 mm (Steel), Inner sheet 0.60 mm (Steel)

Thickness	External Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.39	0.50	0.09										
75 mm	3.04	1.47	0.70	0.28	0.04								
100 mm	4.87	2.62	1.44	0.78	0.39	0.14							
125 mm	6.80	3.88	2.29	1.37	0.81	0.45	0.21	0.05					
150 mm	8.80	5.22	3.22	2.03	1.28	0.80	0.48	0.26	0.10				
200 mm	12.92	8.06	5.24	3.50	2.38	1.63	1.11	0.75	0.49	0.30	0.16		
Note1: Designed according to Thailand code Zone 3: V0,3 second gust, 50 years=29 m/s													
Note2: Temperature difference across the panel is 15 °C													
Note3: Serviceability Limit State, (Require ≥50 kg/m ²)													

Thickness	Internal Wall: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	2.07	1.10	0.64	0.40	0.26	0.18							
75 mm	3.78	2.13	1.29	0.383	0.56	0.39	0.28	0.21	0.16				
100 mm	5.64	3.32	2.08	1.37	0.94	0.67	0.49	0.37	0.28	0.22	0.17		
125 mm	7.62	4.62	2.96	1.98	1.38	0.99	0.73	0.55	0.43	0.34	0.27	0.22	0.18
150 mm	9.64	5.98	3.92	2.67	1.88	1.37	1.02	0.78	0.60	0.48	0.38	0.31	0.25
200 mm	13.79	8.86	5.98	4.19	3.02	2.23	1.69	1.30	1.02	0.81	0.66	0.54	0.44
Note1: Pressure or Suction Load of 0.3 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥30 kg/m ²													

Thickness	Internal Ceiling: Maximum Allowable Load (kN/m ²)												
	Span (m), Deflection Limit L/100												
	3	4	5	6	7	8	9	10	11	12	13	14	15
50 mm	1.66	0.56	0										
75 mm	3.34	1.54	0.56	0									
100 mm	5.18	2.69	1.29	0.42	0								
125 mm	7.11	3.94	2.12	0.97	0.20	0							
150 mm	9.10	5.26	3.02	1.59	0.62	0							
200 mm	13.18	8.05	4.97	2.98	1.60	0.61	0						
Note1: Pressure or Suction Load of 0.25 kN/m ²													
Note2: Temperature difference across the panel is 0 °C													
Note3: Require ≥100 kg/m ²													

*Recommended without temperature concerning. **We must consider room temperature before selection.

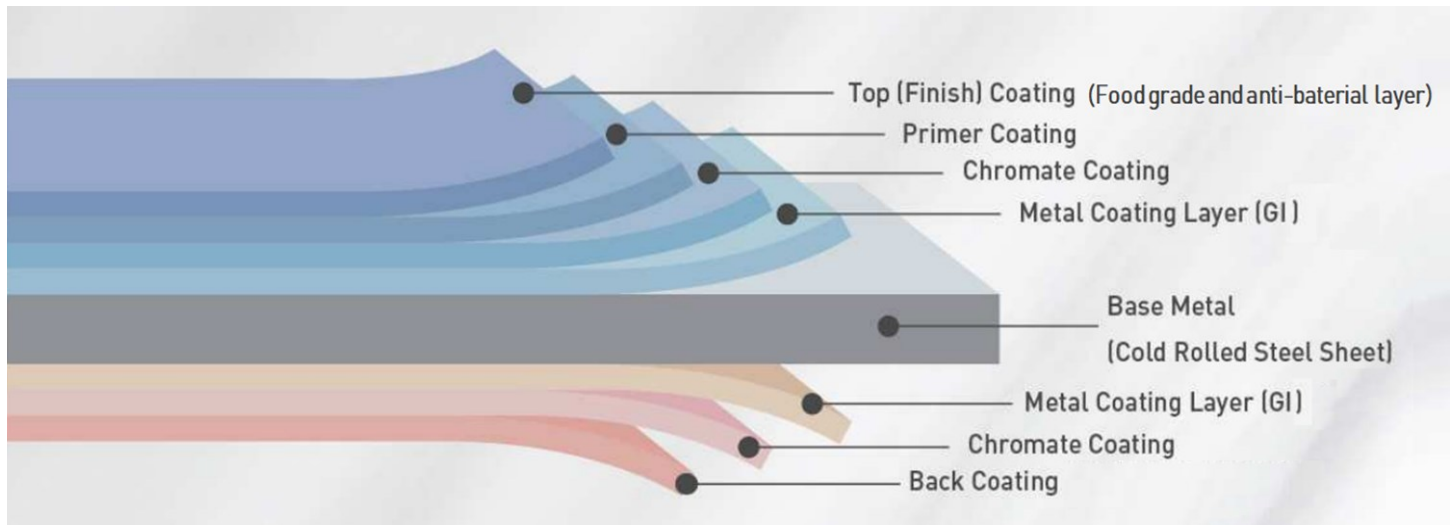
*1 kN = 101.97 kg

IN-BC-019 Rev.04 : 23/09/62

Facing

: Pre-Painted Galvanized Steel

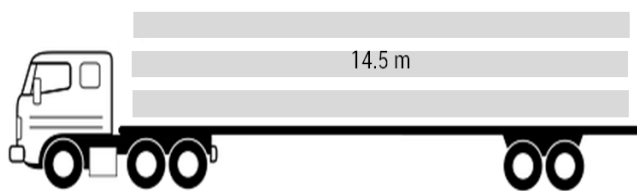
- Cold rolled steel sheet with a hot dip metallic coated steel substrate to increase the corrosion resistance.
- Finishing surface is food grade color layer combined with anti-bacterial technology.
- Covered with protective film PE (UV Protection) thickness 50 μm .



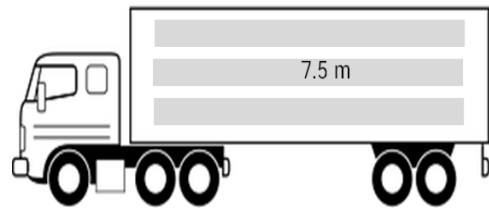


Delivery and Transportation : Domestic

FIWall i370 Panels covered with protective films are delivered to the project site by road transportation.



1. Trailer



2. 6 or 10 Wheeled Truck

Transportation			Quantity	
FIWall i370	50	mm	22	pcs /Pack
FIWall i370	75	mm	15	pcs /Pack
FIWall i370	100	mm	11	pcs /Pack
FIWall i370	125	mm	9	pcs /Pack
FIWall i370	150	mm	7	pcs /Pack
FIWall i370	200	mm	6	pcs /Pack

*For 6-wheeled truck, maximum length of panel is 7.5 meter and maximum weight is 5 tons.

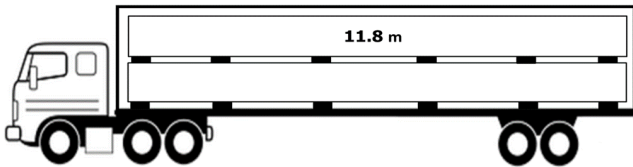
*For 10-wheeled truck, maximum length of panel is 7.5 meter and maximum weight is 15 tons.

*For Hiab truck, maximum length of panel is 6.5 meter and maximum weight is 10 tons.

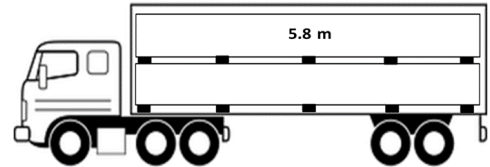
*For Trailer, maximum length of panel is 14.5 meter and maximum weight is 20 tons.

*Aluminium and accessories are separately transferred.

Delivery and Transportation : International

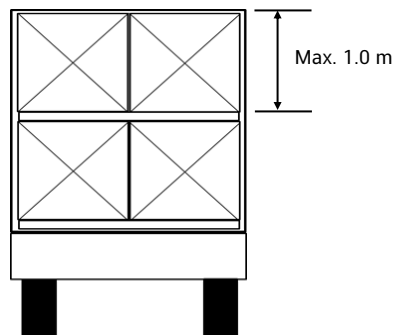


1. 40 ft Container



2. 20 ft Container

Transportation			Quantity	
FIWall i370	50	mm	20	pcs /Pack
FIWall i370	75	mm	13	pcs /Pack
FIWall i370	100	mm	10	pcs /Pack
FIWall i370	125	mm	8	pcs /Pack
FIWall i370	150	mm	6	pcs /Pack
FIWall i370	200	mm	5	pcs /Pack



- * 40 ft Container deliver maximum panel length at 11.8 meter.
- * 20 ft Container deliver maximum panel length at 7.5 meter.
- * Maximum height of each pack is 1.0 meter.



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