

TIFUS

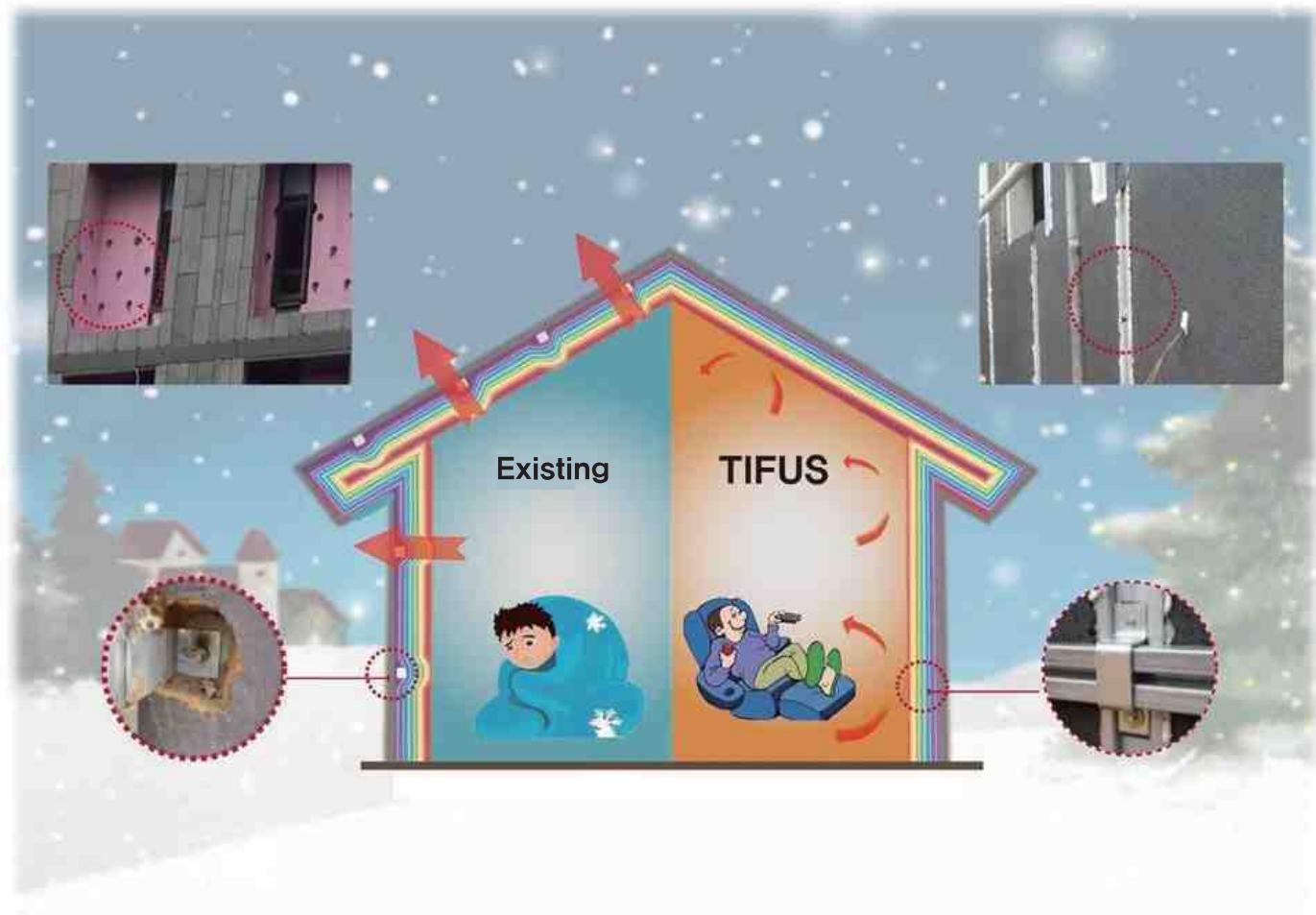
Truss Insulation Frame Unit System

Using a Truss Insulation Frame Unit Outside Insulation System

Outside Insulation,
Eco-friendly Low Energy
Building Construction
Tech. , R&D Company

Energy-Saving Structure
Thermal Bridge ZERO
Eco-friendly, Low Energy Green Tech.
Safety-Oriented Combined Tech.

Petent NO. 10-1141158
Green Cert. GT-14-00185
KIRA Recommended Materials



■ What is TIFUS Insulation Frame?

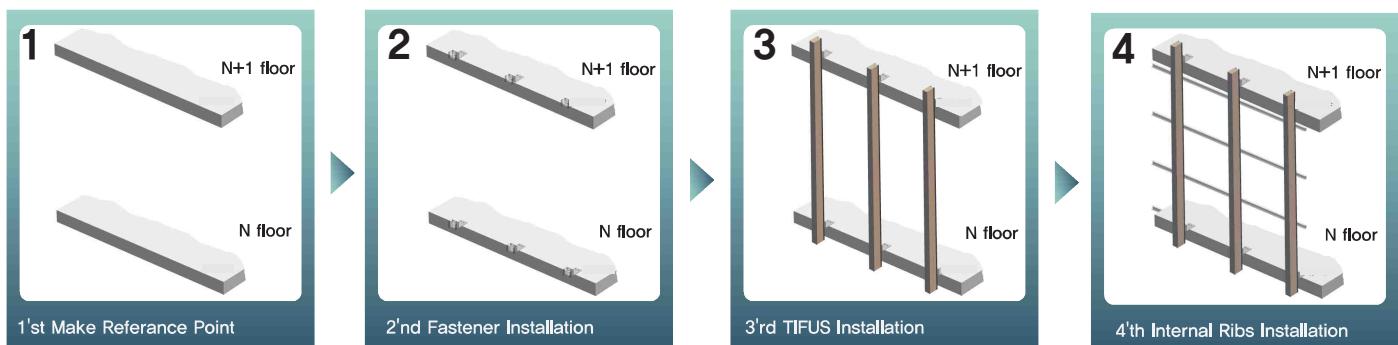
TIFUS(Truss Insulation Frame Unit System) We have independently developed external insulation system replace steel square pipe in order to install the constriction of building exterior finishing materials with insulation frame.

Using the existing steel truss insulation construction loses the energy required for heating and cooling by more than 60% due to square pipe thermal bridge. Then it is the cause of internal condensation and mildew. Eventually result in deteriorating living conditions.

TIFUS is an exterior insulation system which ensures at the same time the heat insulating performance and structural stability against an external force as a frame shape to create the structure of the truss shape by processing a stainlessss wire and steel plate and filled with insulation performance therein.

In particular, The system was developed to enable the bolts without welding construction on site. And than, This improved workability, such as a fire or electric shock, which can prevent disasters that friendly safety method.

■ TIFUS Construction Order



■ TIFUS Technology Introduction

Energy losses in the steel framework

Introduction to Business



Installation of steel framework

Metal exterior finish

Introduction to Products

Truss Frame

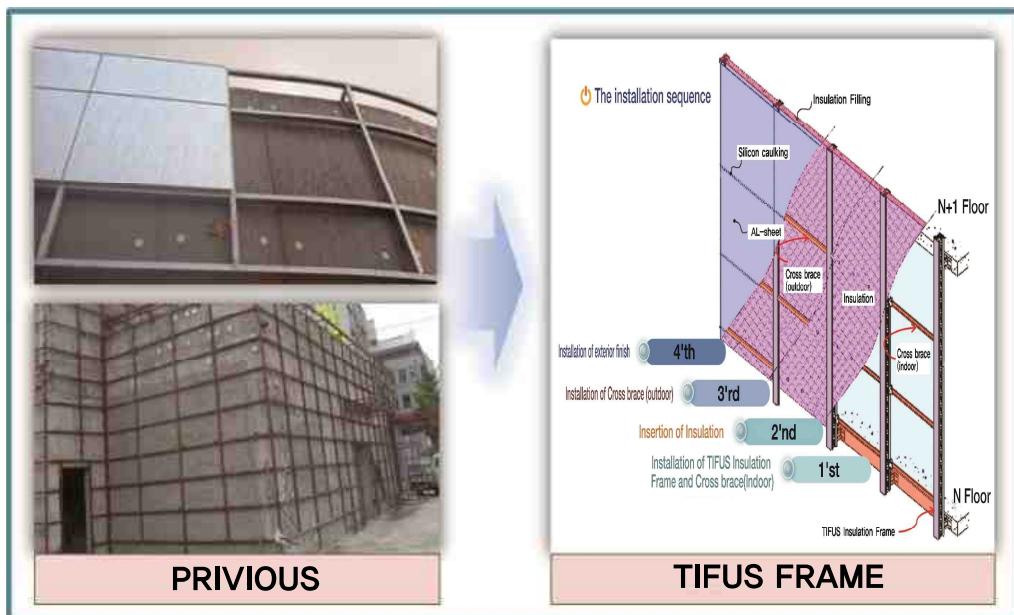


High Performance Insulation

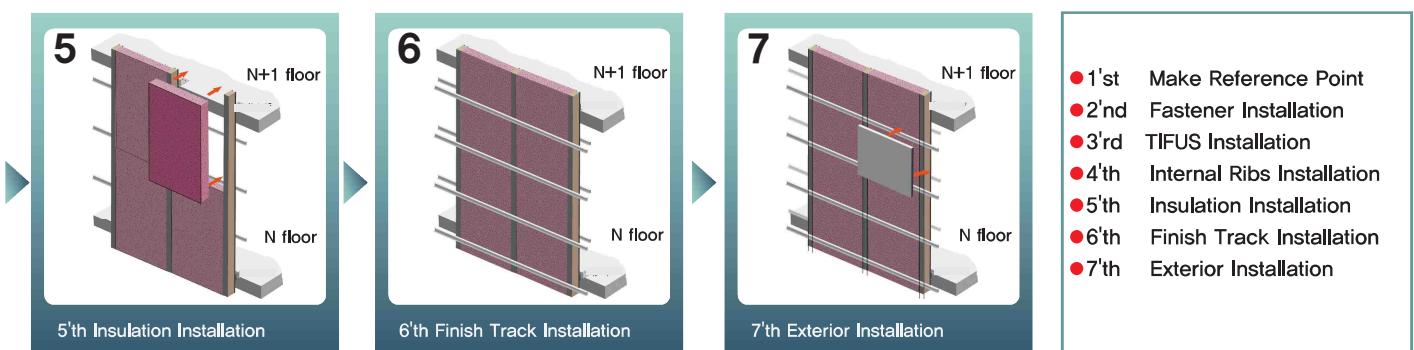


The company products
patent 10-1141158

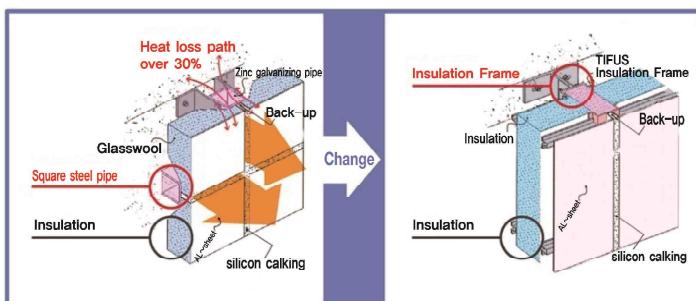
- Structural stability
- Improved insulation performance
- Improved workability
- Reduction of the period of construction



※ Depending on the type of exterior finish, The standard of TIFUS is variously applied.



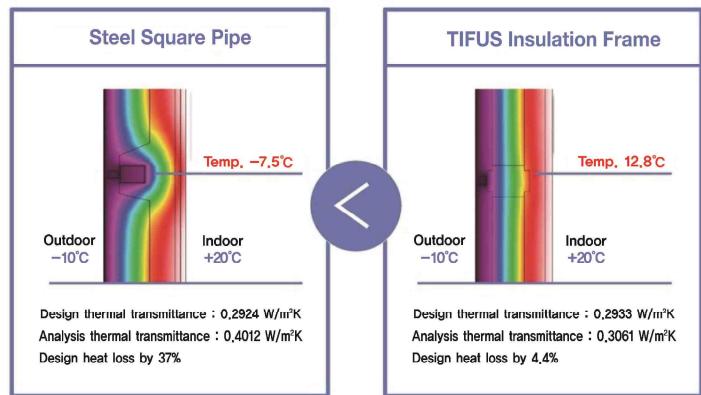
Introduction to Technology



Heat loss in steel square pipe

Prevent heat loss in TIFUS

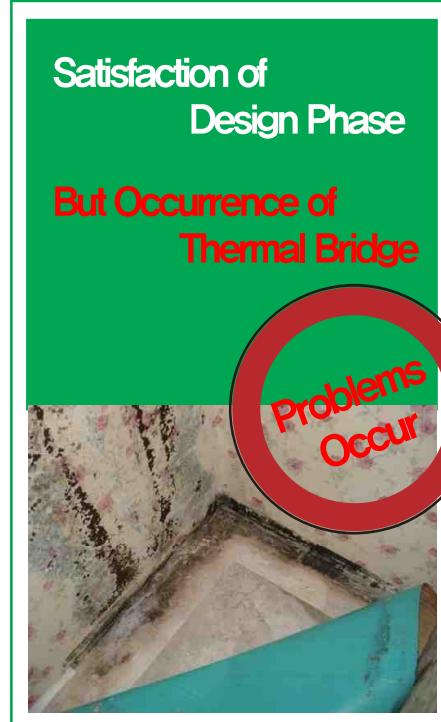
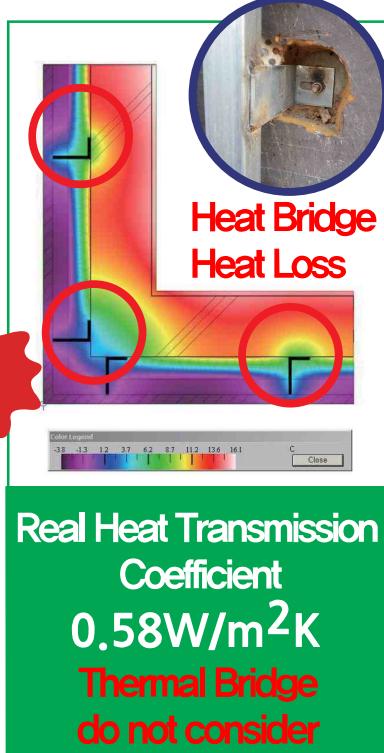
Sectional analysis of Heat loss by Therm6.3



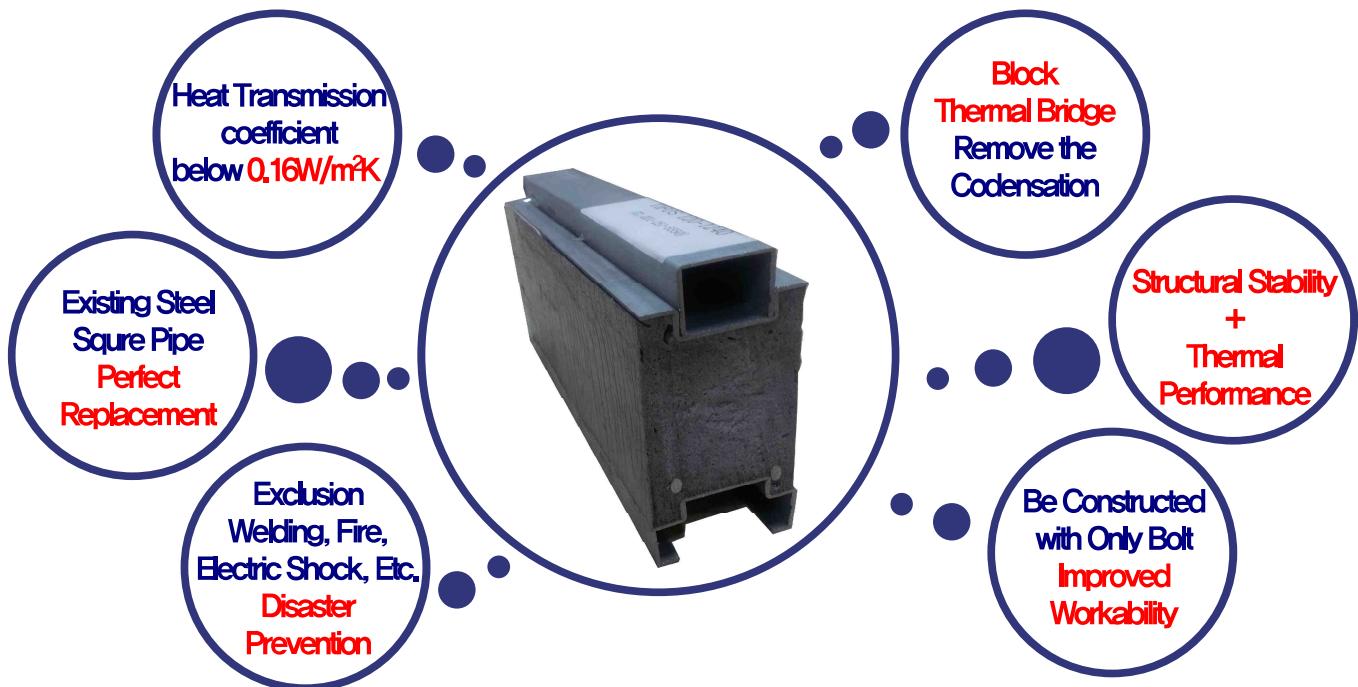
In the same conditions, about 30% reduction in heat loss

Necessity Of Blocking Heat Bridge

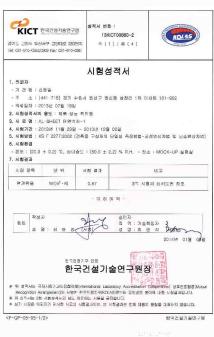
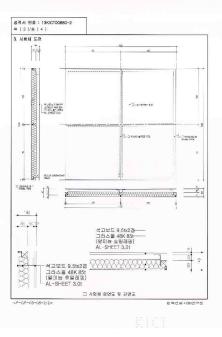
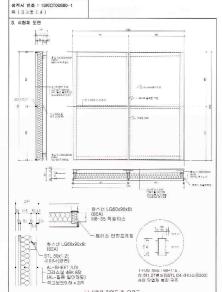
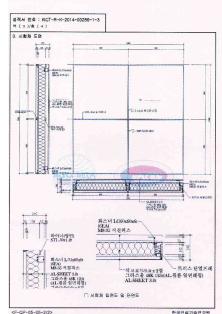
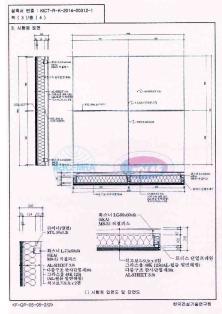
Datum : Korea Passive Association



The Product Features of TIFUS



TIFUS Performance Verification

Product Configuration	Design Performance (W/m ² K)	Test Performance (W/m ² K)	Performance Verification
AL-Sheet 3t Grasswool 48K x 85t Gyosum Board 2P x 19t Frame: Steel Squire Pipe 50x50x2.3t	0.32	0.57 (78%Loss)	 
AL-Sheet 3t Grasswool 48K x 85t Gyosum Board 2P x 19t Frame: TIFUS100 -1240	0.32	0.25 (22%Save)	 
AL-Sheet 3t Grasswool 48K x 125t Gyosum Board 2P x 19t Frame: TIFUS120 -1240	0.22	0.17 (23%Save)	 
AL-Sheet 3t Reflective Insul. 30t Grasswool 48K x 125t Gyosum Board 2P x 19t Frame: TIFUS120 -1240	0.16	0.16	 

TIFUS Economic Analysis

Exterior Type	Granite Stone 30T				AL-SHEET 3T			
U-Value	Design 0,27W/m ² K				Design 0,27W/m ² K			
Insulation Type	EPS 120mm Installation				EPS 120mm Installation			
Method	Angle	Truss	Truss	TIFUS-SYSTEM	Truss	Truss	Truss	TIFUS-SYSTEM
Insulation Method	Placement	Grid	Bond	Grid	Placement	Grid	Bond	Grid
Cost(m ² , Won)	135,355	174,220	180,398	188,683	147,110	145,770	152,050	163,460
100m ² Cost(Won)	13,535,500	17,422,000	18,039,800	18,868,300	14,711,000	14,577,000	15,205,000	16,346,000
TIFUS Replacement Additional Costs(Won)	5,332,800	1,446,300	828,500	—	1,635,000	1,769,000	1,141,000	—
¹⁾ (Ue=W/m ² k)	0,746	0,915	0,365	0,293	0,463	0,914	0,365	0,293
²⁾ Annual Energy Losses (kWh)	5,371	6,588	2,628	2,110	3,333	6,580	2,628	2,110
³⁾ The annual consumption of kerosene (Won)	751,800	822,600	365,400	295,400	466,620	921,200	367,920	295,400
Payback Period (years)	11.67	2.25	11.35	—	10.75	2.83	21.75	—

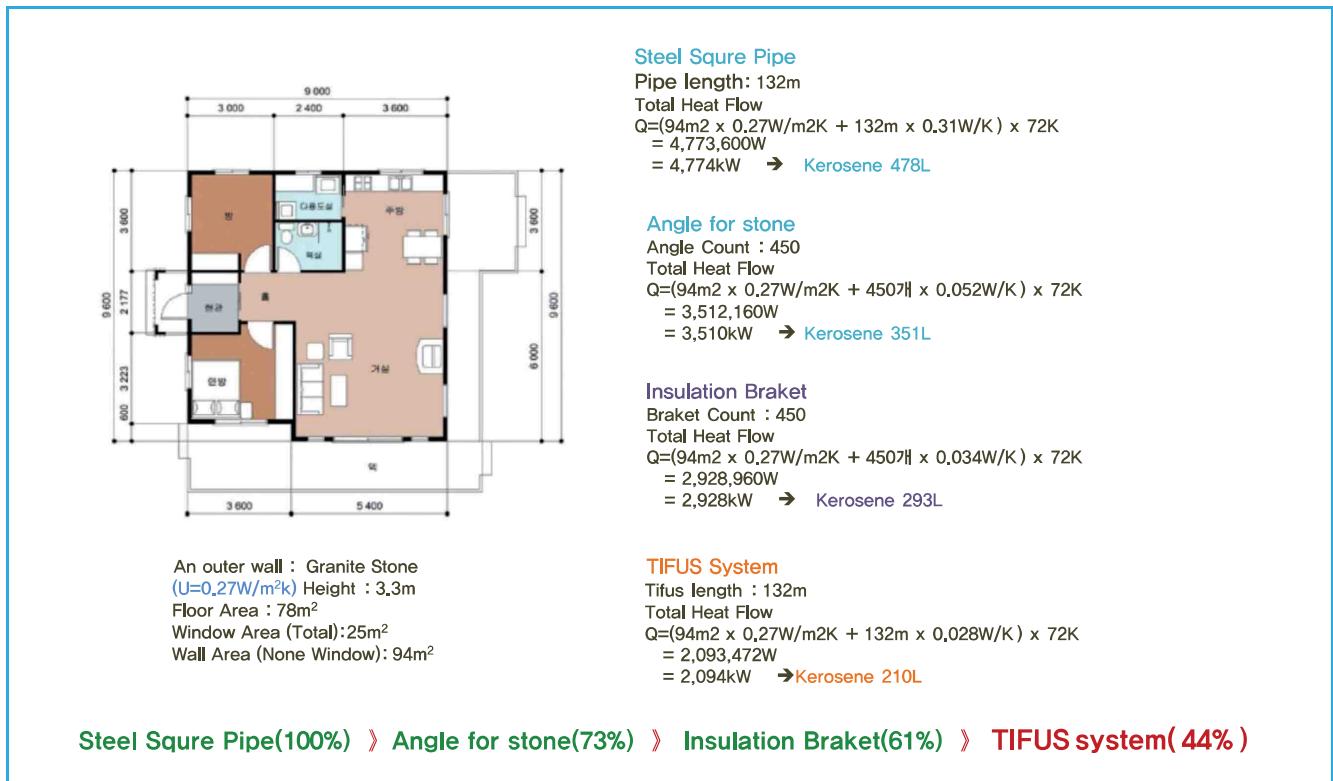
1)Equivalent U-value (Ue) = Real U-value including the thermal bridge being lost through the flat tie, fastener, steel pipe, ect.

2)Annual Energy Losses(kWh/yr) = Equivalent U-value(W/m²K) x Area(m²) x (Seoul:72kWh/yr)

3) The annual consumption of kerosene (\$) = Energy Losses through outer wall / Kerosene Cal.(About 10kW/L) x Kerosene Cost (\$/L)

4) Calculated by the standard of Korea

Energy Cost Compare



Method Feature Compare

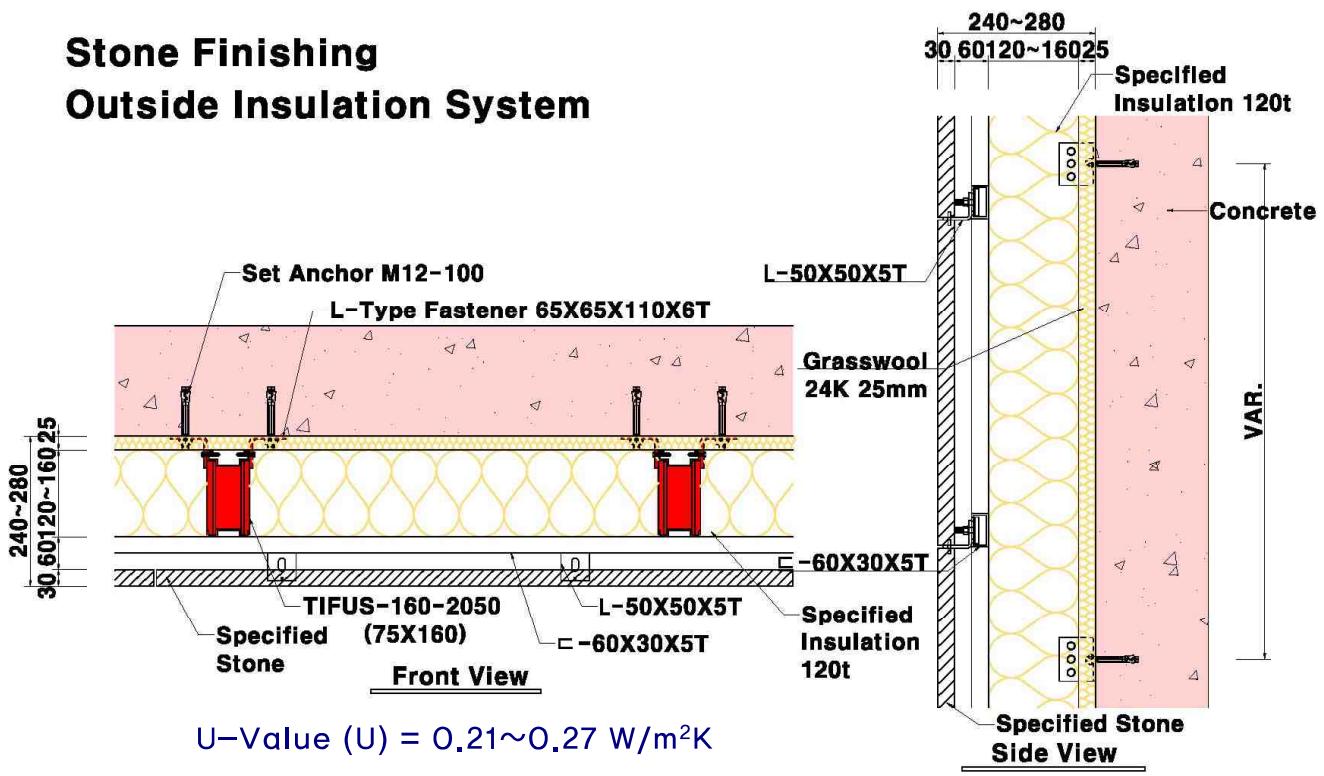
	Steel Truss Method	Stone Dedicated truss	STS Angle Method	Insulation Brakert	TIFUS SYSTEM
Cost (Sum Insulation)	100%	105%			110%
Construction Period	Welding Method : Disadvantage	△ Bolting combination : Shortening	◎ Old Method : Disadvantage	△ Multiple anchoring : Some Disadvantage	○ Bolting combination : Shortening
Workability	Follow bet/Welding /Filling : Disadvantage	△ Follow bet/Filling : Good workability	○ Follow bet/Filling : bad workability	△ Compare with Existing STS Method : Good workability	○ Disadvantage supplement of Truss Method : Best workability
Point, Line Heat Bridge(W/mK)	- Frame : More than 0,3 - Fastener : More than 0,5	△ - Fastener : More than 0,5	○ - Fastener : $0,05 \times 4 = 0,2$ More than 0,2/m ²	△ - Fastener : $0,034 \times 4 = 0,13$ More than 0,2/m ²	○ - Frame : Below 0,02~0,03 - Fastener : 0 (Zero)
Insulation Effect	Seriously Heat Bride More than 110% Heat Losses	△ Good U-vale but Anchring Area Seriously Heat Bride	○ Follow bet Area, Angle Area More than 70% Heat Losses	△ Anchring Area More than 50% Heat Losses	○ No Point Heat Losses About 11%~14 Heat Losses
Total Thickness	260~300mm	△ 270~300mm	△ 200~210mm	○ 200~210mm	○ 260~300mm
Insulation Applicability	- Organic board - Minerals - Fiber : Disadvantage	○ - All kinds of Application : advantage	○ - Organic board - Minerals - Fiber : Disadvantage	○ - Organic board - Minerals - Fiber : Disadvantage	○ - All kinds of Application : advantage
Structural Adaptability	- No Structural Wall - Curtain Wall (Additional Insulation, reinforcement)	○ - No Structural Wall - Curtain Wall (Additional Insulation, reinforcement)	○ - Required Structural Wall - Curtain Wall Required Truss	△ - Required Structural Wall - Curtain Wall Required Truss	○ - No Structural Wall - Curtain Wall (Systematic structure, Insulation applied)
Work Safety	Heavy /Electric shock /Fire rate : Very High	△ Heavy	○ Multiple Processes : Accident Probability High	△ Simple Processes : Accident Probability Low	○ Simple Processes : Accident Probability Low
Fire Safety	Welding : Disadvantage	△ No Fire	○ When Follow bet : Significant Fire	○ No Fire	○ No Fire
Waste	Insulation Waste	△ Partial Insulation Waste	○ Insulation Waste	△ None	○ None
Possibility of Condensation	Very High	△ Anchring Area Concentration	△ Very High (Required inside insulation Reinforcement)	△ High (Required inside insulation Reinforcement)	△ Very Low
Ect. Feature	Only Stone	△ Only Stone	△ -Only Stone -Insulation Pouring attachment : Heat Losses	△ -Different standards depending on the finish -Insulation Pouring attachment : Heat Losses	○ - Using a variety of finishes

Thermal Bridge Performance Compare

System Type	Insulation Performance (W/m ² K) (A)	Heat Bridge (Point · Line) (W/mK) (B)	Count (EA or M) (C)	Total Heat Bridge (W/mK) (D)=(BxC)	Equivalent U-value (W/m ² K) (E)=(A)+(D)	Loss (%) (E)/(A)
Steel Square Pipe (50x50)	(EPS 120T) 0.27	0.31	1 m/m ²	0.31	0.58	More than 115
	(Rigid urethane110T) 0.21	0.32	1 m/m ²	0.32	0.53	More than 152
Angle for Stone (50x50x5t)	(EPS 120T) 0.27	0.052	4EA/m ²	0.208	0.48	More than 77
	(Rigid urethane110T) 0.21	0.052	4EA/m ²	0.208	0.42	More than 100
Insulation Braket	(EPS 120T) 0.27	0.034	4EA/m ²	0.136	0.40	More than 50
	(Rigid urethane110T) 0.21	0.034	4EA/m ²	0.136	0.34	More than 65
TIFUS Frame (75x120)	(EPS 120T) 0.27	0.028	1 m/m ²	0.028	0.30	Below 11
	(Rigid urethane110T) 0.21	0.033	1 m/m ²	0.033	0.24	Below 14

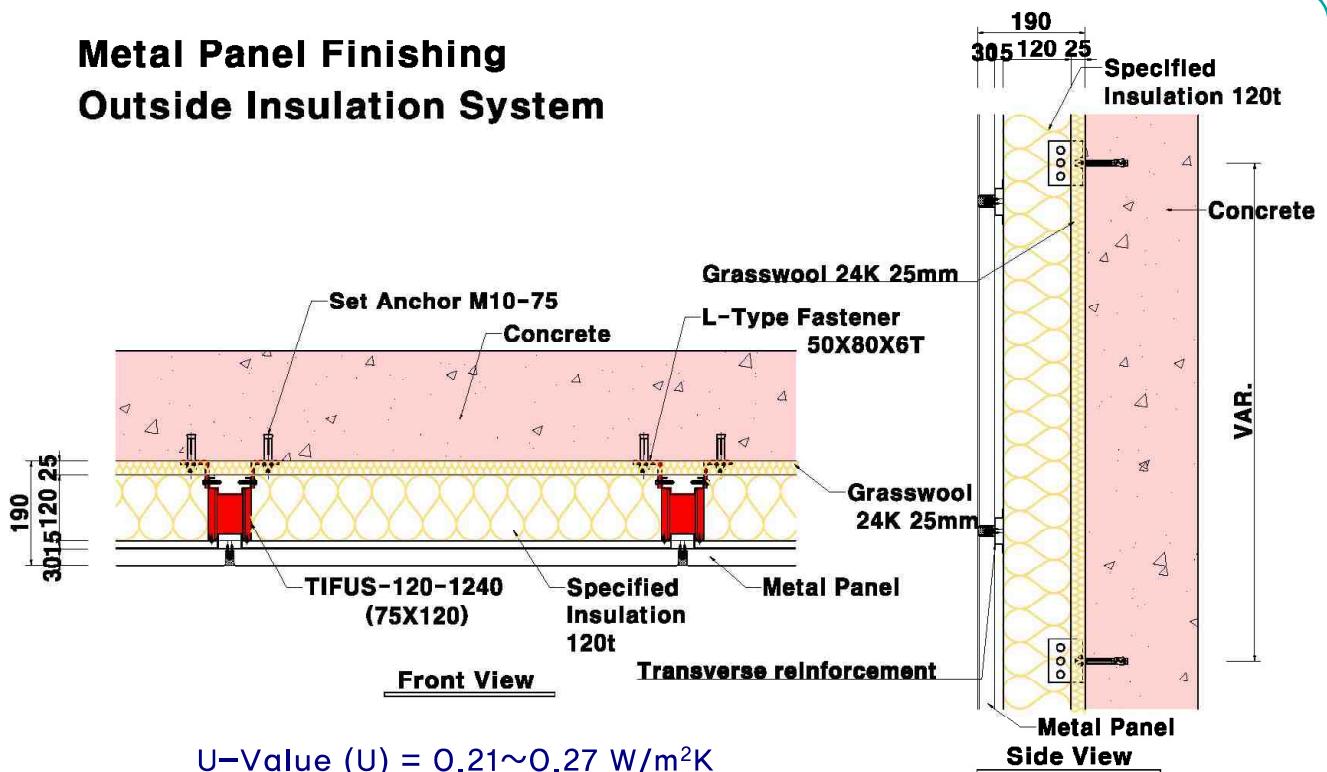
Construction detail

Stone Finishing Outside Insulation System

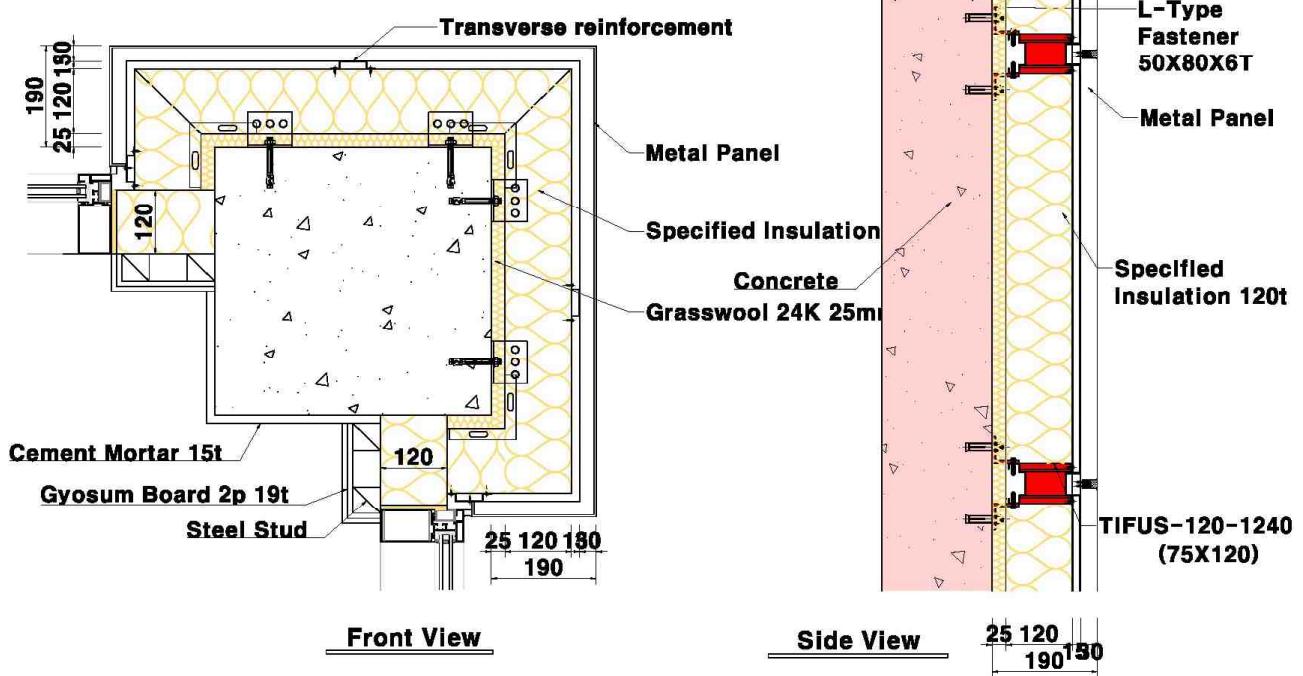


■ Construction Detail

Metal Panel Finishing Outside Insulation System

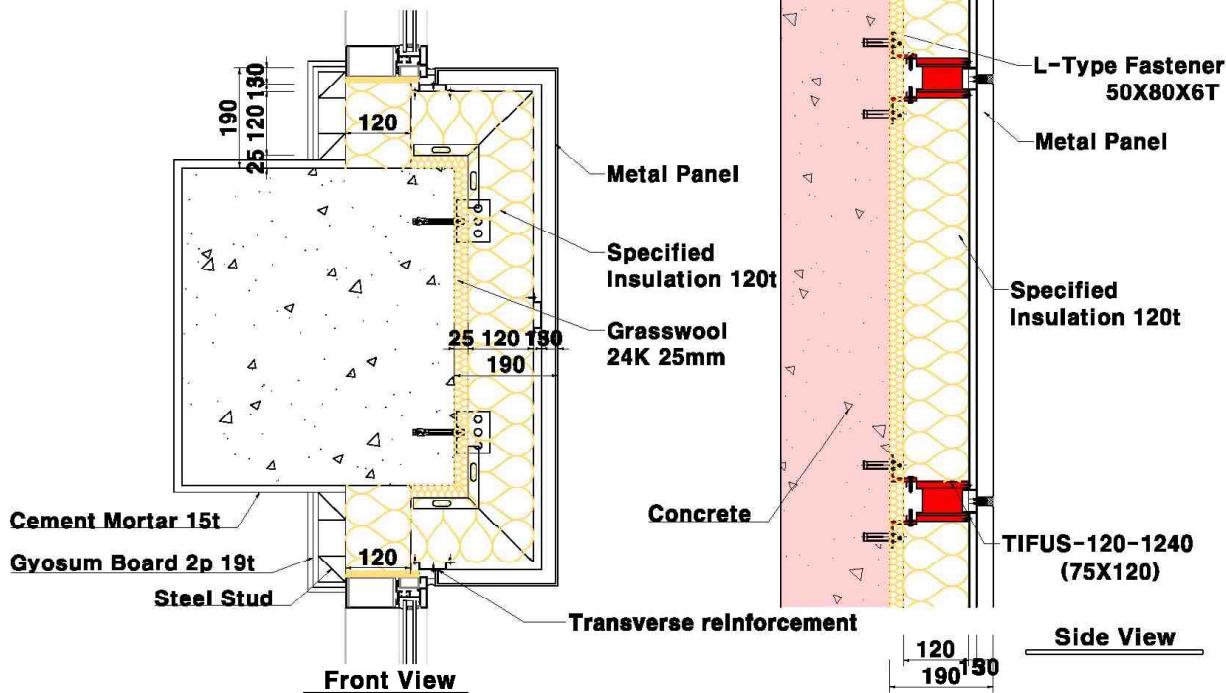


Construction Detail 1

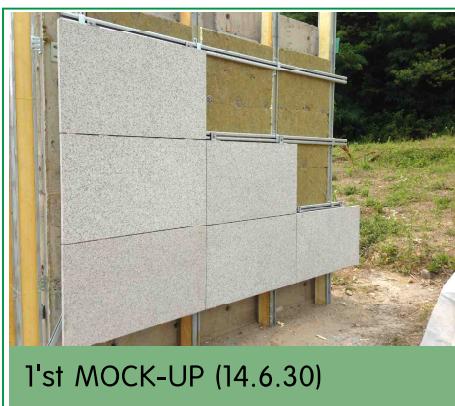


■ Construction detail

Construction Detail 2



■ Construction Reference



1'st MOCK-UP (14.6.30)



2'nd MOCK-UP (14.10.28)



2014.12 Yangji-myeon Yongin-si,
Gyeonggi-do, Korea



2015.04 Asan-si,
Chungcheongnam-do, Korea

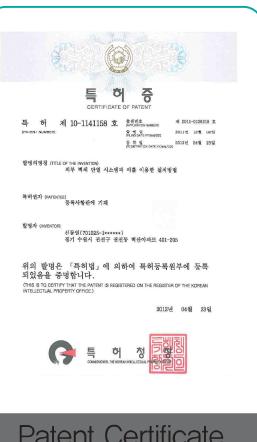
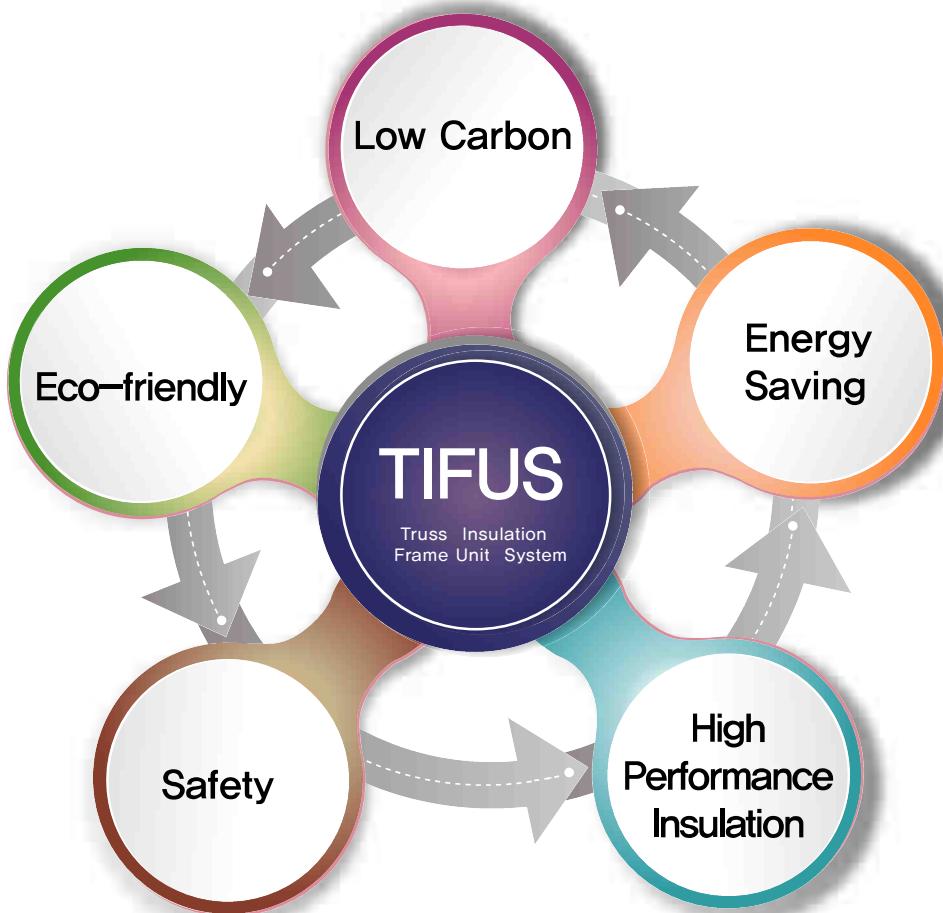
Using a Truss Insulation Frame Unit

Outside Insulation System

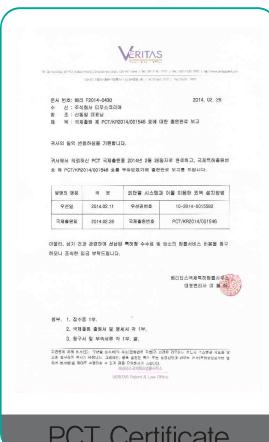
TIFUS Korea

Eco-friendly Low Energy

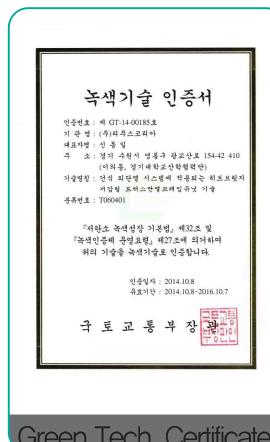
Building Construction
Tech. R&D Company



Patent Certificate



PCT Certificate



Green Tech. Certificate



KIRA Recommend Materials



Win Green Award