

Dry-type Floor Heating System

TECH VISION INC.

Lee Gyu-dong

General Manager

02-3677-6334

kudeng@kolon.com

II. System

Strengths (1)

i) Excellent Materials

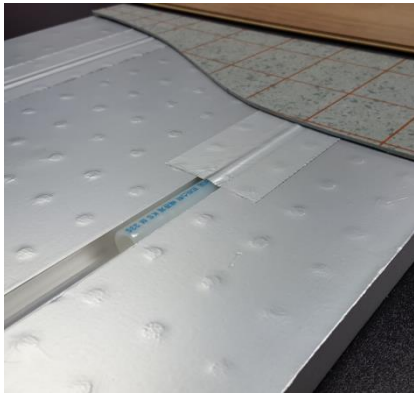
► Insulation material (EPS)

Low VOCs (volatile organic compounds: lowest in Korea)

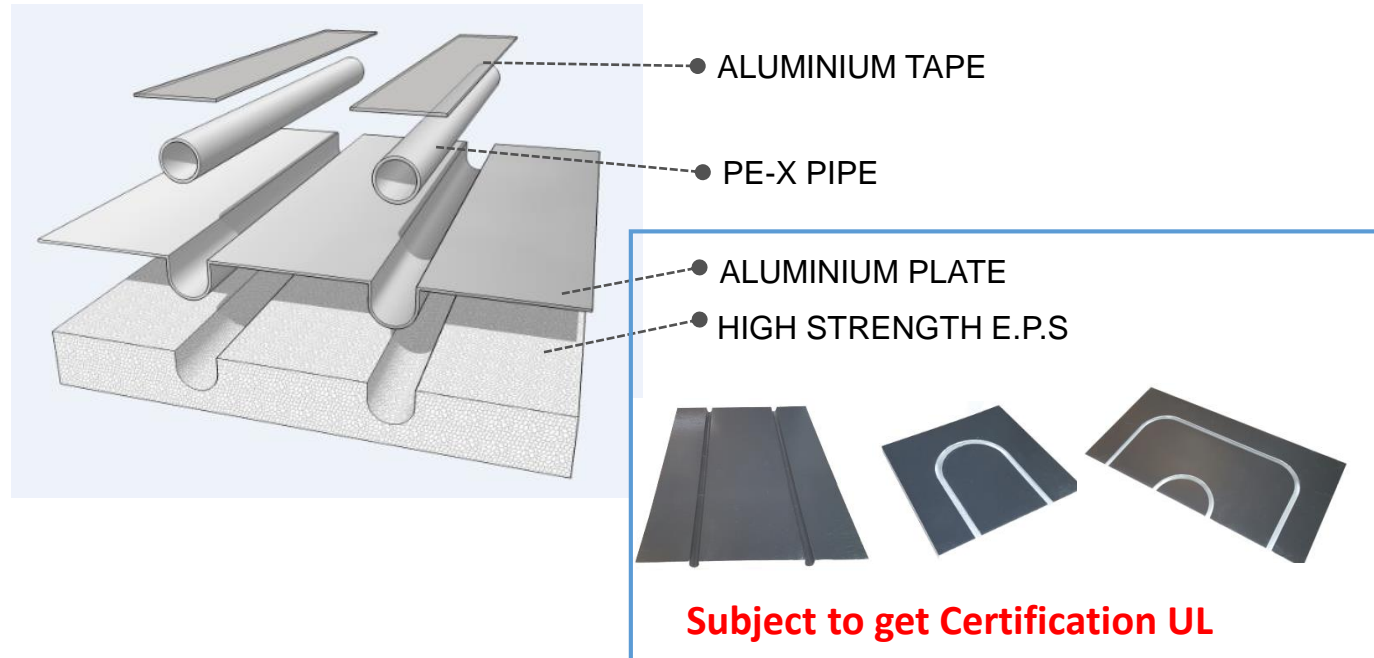
High density (55kg/m³: highest in Korea)

High insulation (0.033 W/mK)

ii) Heat Transfer in the Top Section, Insulation in the Bottom Section



Module type

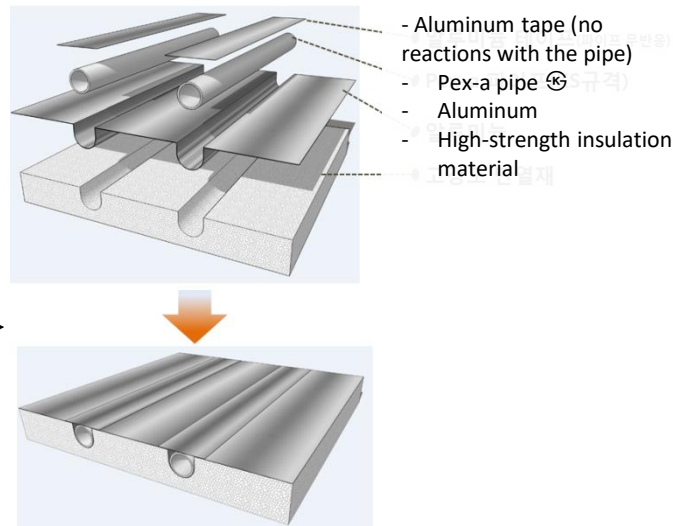


II. System

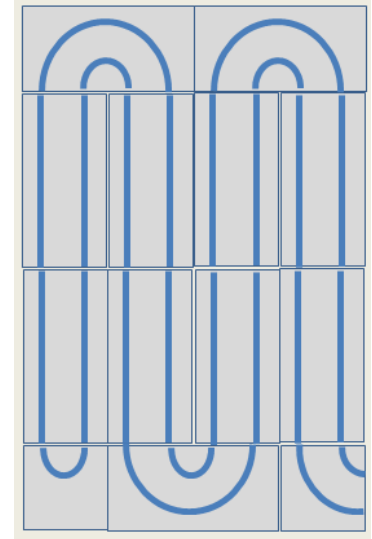
Characteristics of Modular Dry-type Heating Panels

➤ A dry-type heating system that has a total thickness of 20mm incl. hot water pipes that meets the KS specifications. After installing the heating panels (4 types: straight, curved, U-turn, etc.) containing the aluminum heat transfer plates, the pipes are inserted and the exclusive aluminum tape is used for finishing.

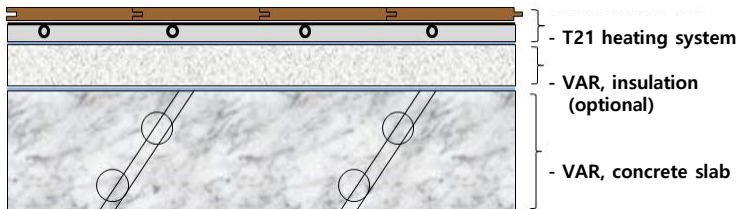
- Panel thickness: 20mm
- Excellent indoor temperature regulation
- Increased heat source efficiency
→ Increased energy efficiency
- Possible to install in winter time and rainy seasons with shortened installation time
- Easy installation and facilitates remodeling work
- Solution to the problems of conventional technology → no connecting parts necessary for the underfloor piping
- Highly durable and eco-friendly materials:
Low VOC emissions, high-strength EPS, high-durability pipes (PE-Xb)



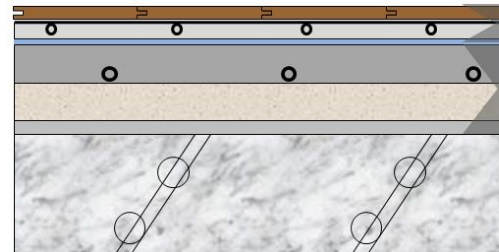
[Mosaic-type installation]



▼ For new buildings (hotels, small housing, hospitals, etc.)



▼ For repairs and renovations (remodeling)



New heating layer – 22mm (dry-type heating system + laminate flooring)

Existing heating layer

✓ No need to remove the existing wet-type heating system

II. System

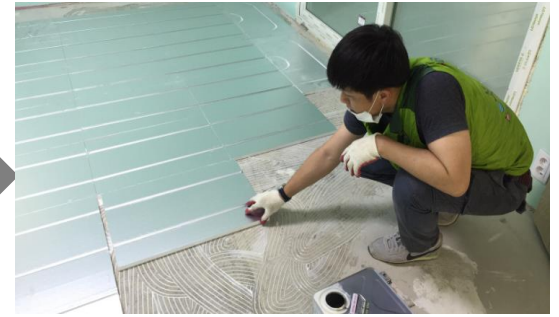
Modular Dry-type Heating Panels : Installation Method



Floor surface cleaning



Panel installation following bond application (1)



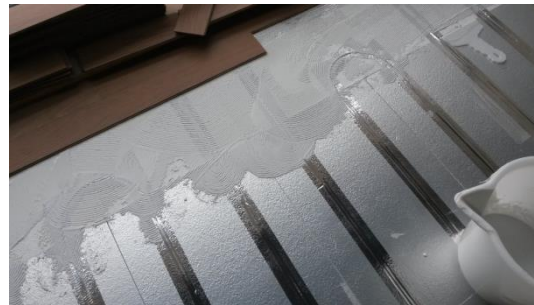
Panel installation following bond application (2)



Application of aluminum tape



Pipe installation

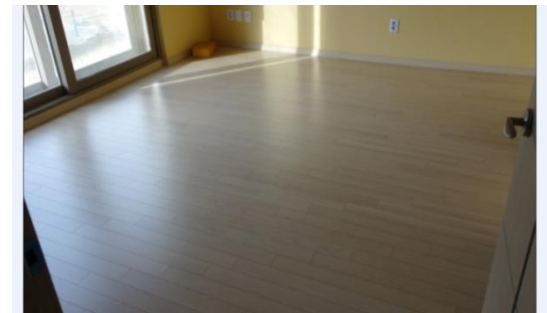


Installation of Ondol flooring

OR



Installation of laminate flooring



Completed look

II. System

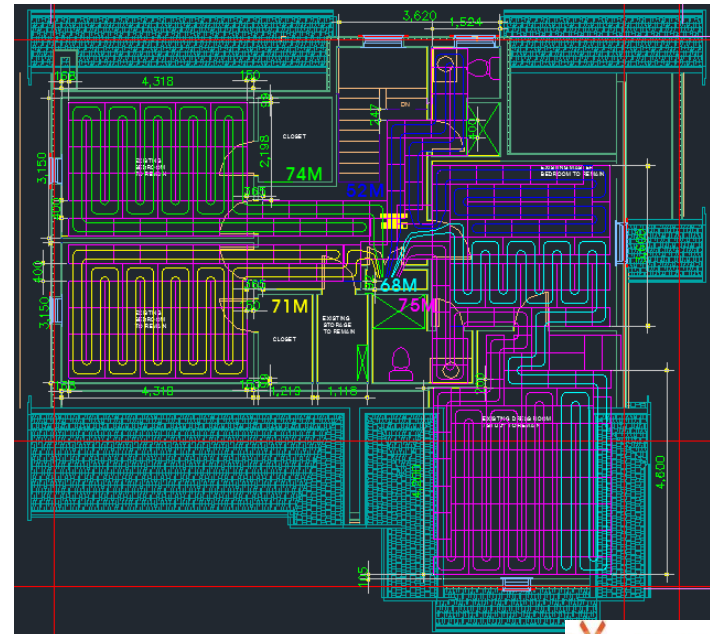
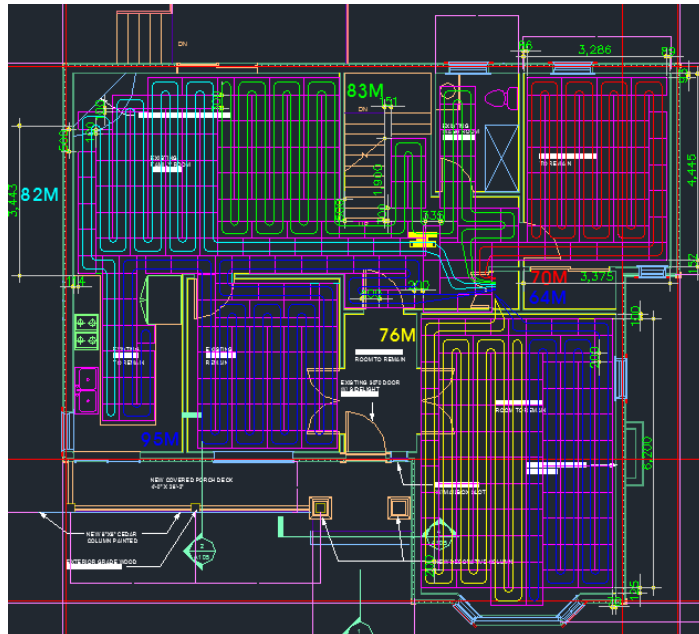
KS(Korean Standards) B 8025 Floor panels for hot water heating Evaluation results

✓ Rating agencies : Korea Energy Appliances Industry Association(KEAA)

Test items	Test Method	Performance Requirements	Module-type
			Result(KEAA)
Test of head loss	Pressure difference between inlet and outlet by (3±0.3) L/min Flow Rate	Be within displayed value(kPa) by manufacturers	27
Test of raising temperature, after the operation	The time which takes to rise 4.0°C indoor temperature from 18±2°C of the initial indoor laboratory temperature after supplying 60 ± 2°C hot water.	Be within displayed value(min) by manufacturers	33
Test of surface temperature distribution	Distribution of surface temperature of panel after supplying 60 ± 2°C hot water in 18±2°C of the initial indoor laboratory temperature.	Be within 5K difference between hot and low temperature point on surface.	1
Test of thermal output	Thermal output per Unit Area (m ²)	Ger over displayed value (J/m ² · s) by manufacturers	116.8
Test of transformation due to repeated heating	Repeat water supply 20 times by alternating cold water (<25 ° C) with hot water (80 ± 5°C) for 3 hours each.	Non-crack, non-expansion, non-contraction, non- condensation, etc..	test OK
Flatness Test	Check the maximum deflection by measuring 2m lines length of vertical and horizontal at center of laboratory.	Deflection of less than 5 mm	2
Live load test	Check product quality after putting 500 kg water tank(1.5m × 0.6m × 0.6m (H)) on panel for 24-hour.	less than 1 mm a difference of Floor-Level	test OK
Pressure Test	Check the deformation and leakage after putting 1.0 MPa hydrostatic pressure on blocked heading pipe for 10 min.	Non-deformation and non-leakage	test OK
Impact resistance test	Check the defects such as a dent after falling a 30 kg sand bag from 1 m height .	Non-deformation, non-cracks, non-damage, non-leaks.	test OK

Application of housing

- Vancouver, Canada





Subject to get Certification UL







THANK YOU

TECH VISION INC.



Lee Gyu-dong
General Manager



02 3677 6334
02 3677 6359(FAX)



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