

MITAKE

THE THERMAL FLOOR MEMBRANE •
SPECIALLY DESIGNED FOR WOODEN FLOOR

REMOTE INFRARED FLOOR HEATING SYSTEM



特許「PTCヒータ用印刷インク」技術を用いた高性能PTCインク使用

Patented PTC Automatic Temperature Control

Authorised Distributor (Hong Kong)



日本製
MADE IN JAPAN



鈞泰工程
KWAN TAI ENGINEERING

乙種業務成員 Member of Twintek Group



MITAKE

ABOUT KWAN TAI

Established in 1988, Kwan Tai Engineering Co., Ltd has grown to become a leading building material contractor in the Hong Kong construction industry. Kwan Tai has successfully listed on the main board of HKEX in January 2018 (HKG: 6182).

Since its establishment in 1988, Kwan Tai has strived to attain and maintain a cutting edge technology with wide recognition in the building industry. It has continued to render technical support to architects and designers throughout all stages of project development for its committed projects including production, installation and maintenance. The project portfolio to date spans a wide ranging prestigious projects in the government, residential, commercial and institutional sectors.

Kwan Tai is fully committed to comply with the most stringent standards of safety, quality control and environmental protection. The company's management system has been certified to accord with the standard of ISO9001:2015 (quality management).

OUR DEVELOPMENT

1993
We began to supply "Terreal" and "Ludowici" roof tiles in several large-scale residential complexes including Discovery Bay and Gold Coast.

2003
Our Group developed our proprietary label of residential timber flooring products - "HUGO".

2003-2005
Our Group worked on major Government projects including the Hong Kong Science Park in Tai Po and Hong Kong Disneyland Park and Resort.

2014
Our Group was appointed by VG-Orth as the sole and exclusive distributor of "MultiGips" gypsum block for markets of Hong Kong, Macau, Malaysia and Singapore.

2016
Our proprietary label "HUGO" has extended into the timber door and furniture product lines.

2019
We expand our product and services into the Heated Flooring system.

1988

Kwan Tai Hong Kong was established.

1991-1994

Our Group was engaged by the Architectural Service Department of Hong Kong as a supplier for major reconstruction projects for community facilities including the Western Wholesale Market, Cheung Sha Wan Wholesale Food Market and Queen Elizabeth Hospital in Jordan, Kowloon.

1996

Our Group became listed amongst the Approved Proprietary Names of the Hong Kong Housing Authority and was engaged as a major supplier and installation service provider of the marble flooring system at the Hong Kong International Airport.

1999-2006

Our Group took on numerous timber flooring products supply and installation projects for primary and secondary schools in Hong Kong.

2010-2012

Our Group was engaged by the Hong Kong government for major community facilities including the Tseung Kwan O Community Hall and sports arena and town park.

2005

Our Group began to supply gypsum block products to the Hong Kong market, which were used large-scale projects including a major shopping arcade in West Kowloon.

2015

Kwan Tai Macau was incorporated.

2018

Our Group is listed on the main board of HKEX. We continue expanding our product and services into the Smart Air Purification system.

ABOUT MITAKE

Business overview and opportunities ahead

MITAKE Electronics Industries Co., Ltd was founded in 1969. Its semi-fixed resistor products are targeted for large electrical and mechanical plants and has since got a solid foundation in the business. Capitalizing on this unique resistor technology, it has extended its research on the development of special ink. In 1992, the PTC ink (self-regulating temperature control) was developed, and the PTC ink planar heating element was brought forward to commercial production. It is widely used in various applications due to its unique safety, ease of construction and energy saving (about 40% of power saving characteristics).

Company strengths

Based on MITAKE self-developed PTC printing ink technology (Japanese Patent No. 3351697). It is now widely applied in areas of residential, surface heating, home appliances and medical therapy, as well as in the fields of vehicles, agriculture, and food produce.

Milestone

YEAR	DEVELOPMENT
1969	MITAKE Electronics Industry Co., Ltd founded Production of semi-fixed resistors and semi-fixed resin resistors
1981	Development of automatic temperature control (PTC) ink / automatic temperature control (PTC) planar heating element
1984	Company was renamed as MITAKE ELECTRONIC CO., LTD Development of molded resin semi-fixed resistors, and expansion of the sales business
1992	Sales extended to cover automatically controlled temperature (PTC) planar heating elements
1998	The SME Creation Activity Promotion Law enactment: automatic ink temperature control (PTC ink) 40°C~120°C production
2000	Development joint venture with Kansai Electric Power Co., Ltd. (PTC surface heating element)
2001	Inclusion by institute of Electrical Safety and Environment (JET): PTC planar heating element
2002	Use of Ink for printing in automatic temperature control heating element patent (license No. 3351697) Patent in China: Printing ink for self-temperature regulating heating (license ZL 97 1 26330.2)
2003	Patent: Automatic control of temperature planar heating elements (license No. 3428857) Patent: Conductive particle-polymer sensor (licensed No. 3418851)
2005	Electrical Safety and Environment Research Institute Factory Certification Award (S-JET): 12JET No. 1159
2006	Recognition by Electric Bed Heater Industry Association on autonomous benchmark (S-JEF): 14Y-JET0061



PATENT CERTIFICATES

MITAKE COMPANY RELATED CERTIFICATES



Trademark registration certificate
(Login No. 4680145)



PTC self-regulating temperature printing
ink patent (Charge No. 3351697)



PTC self-regulating heating element patent
(Cal. No. 3428857)



Conductive particles polymer sensor patent
(Charge No. 3418561)



Product registration card (Registration No. 3038310)



Chinese Invention Patent Certificate (No. 90991)

MITAKE product's application and joint venture partners

Anchoring on Creation, Innovation, and Challenge, MITAKE utilises a combination of PTC technologies, and extends application to cover medical facilities such as therapeutic devices, development of health facilities such as far-infrared rock baths ice and snow, melting facilities for roads and roofs in areas subjected to extreme cold climatic conditions etc.

PTC Technology enriches the comfort of people's living and makes significant contributions to the global environment.

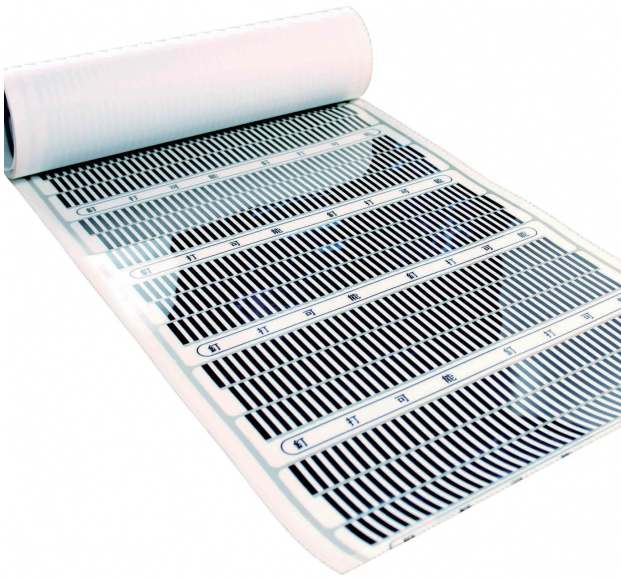
JOINT VENTURE PARTNERS	MITAKE'S PRODUCT APPLICATION
Atlas Co., Ltd	Technical Committee of The Japan Building Materials Association, PTC floor heating certification, Development of tatami and floor heating products
Misawa Homes Hokkaido Co Ltd	Ice and snow melting in pipelines
Fuji Nameplate Co Ltd	Car (exterior) reverse mirror, defogging and snow removal
Omron Corporation, Fujikura Ltd	Joint development of health facilities

UNIQUE MATERIAL WITH PATENT TECHNOLOGY

PTC HEATING MEMBRANE

0.43_{MM} 

THICKNESS ONLY



The MITAKE system from Japan is a planar heating element, following the concept of point-line-face, can raise the surface temperature of the floor planks in the shortest time possible, while the PTC automatic temperature control can allow extended carpeted coverage without undue abnormal temperature increase.

SAFE & SECURE

EXCEEDING 100,000 HOURS OF
PERFORMANCE TESTING

The PTC planar heating element has gone through durability test of 100,000 hours since the test began as early as 1997, the test is still been continued.

As of to date, the PTC planar heating element still maintains its original functional performance. 100,000 hours of continual operation amounts to a 12 years duration, if to be based on 8 hours a day, 5 months a year, it could be used for 83 years.

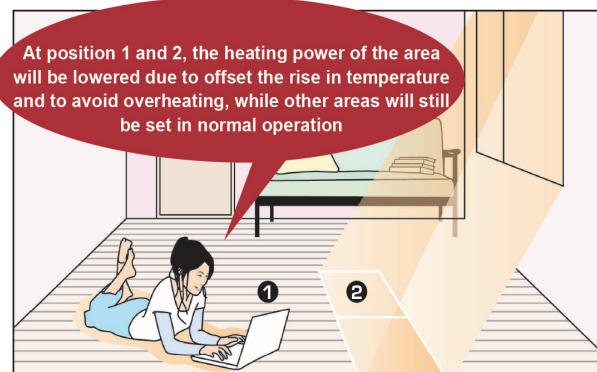
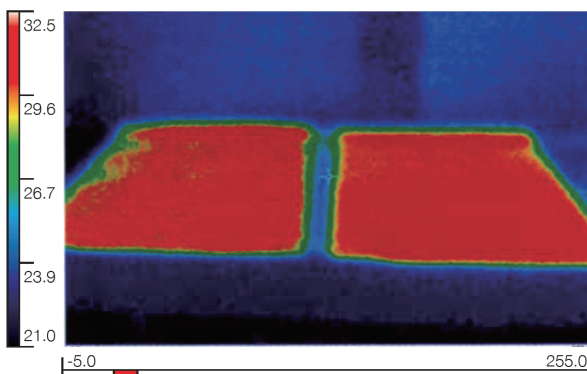


日本リビング保証が耐久性を認定

CERTIFIED 10 YEARS PRODUCT WARRANTY

PTC AUTOMATIC TEMPERATURE CONTROL
CAN REGULATE THE POWER CONSUMPTION

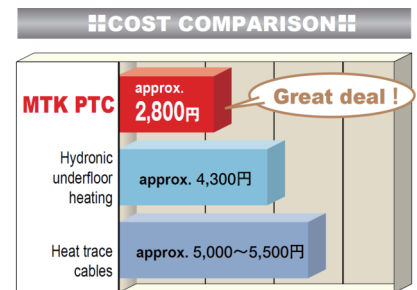
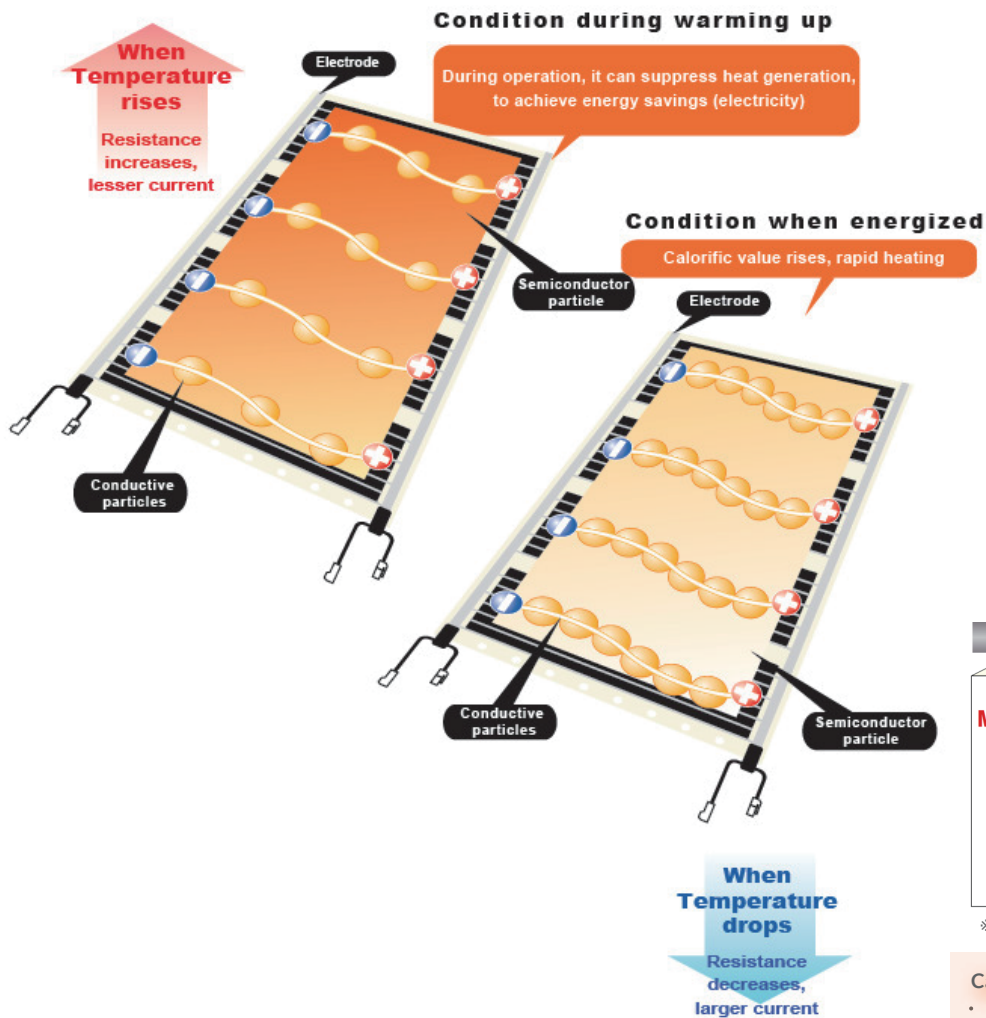
PTC (Positive Temperature Coefficient = 正温度係数) is a unique material and technology that we could be proud of. It can regulate heat according to the temperature of the local area. That is to say, when some areas that are obstructed by physical objects, furniture or due to presence of direct sunlight, the PTC automatic temperature control technology can automatically adjust to increase or decrease the impedance of the heating element. This special feature can truly make our floor heating system safe and energy efficient.



※Advantages of remote infrared floor heating system

EXCELLENT ENERGY SAVING

MITAKE PTC HEATING PRINCIPLE



※ Operates 8 hours per day, 30 days

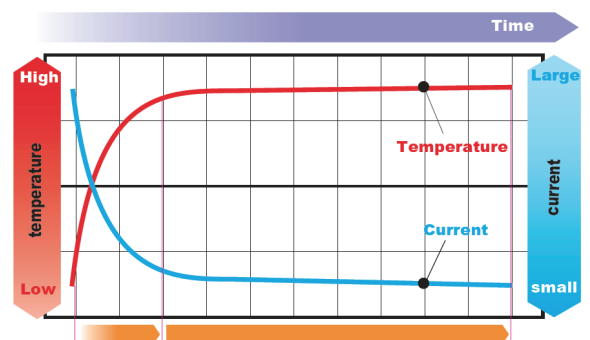
Costing performed by MITAKE JAPAN

Calculation condition

- Room Area (8 pieces) ----- 12.25m²
- Floor heating installation area ----- 6.48 m²
- Electric bill ----- 23 ¥/1kWh
- Gas bill ----- 93 ¥/1m³

※ Depends on actual environment & circumstances

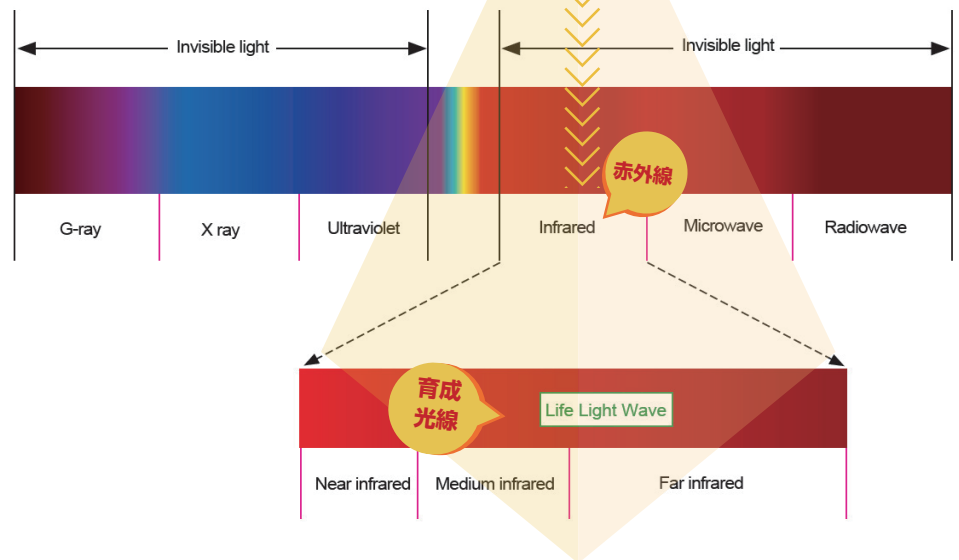
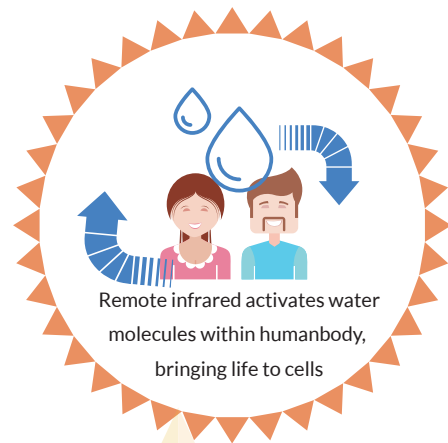
- At the initial stage of energization, heat generation performance will be relatively high, where temperature rises within a short duration, thereafter a constant temperature is maintained.
- Since the response to the temperature change is performed automatically, the power consumption is self-regulatory and the operation is stable at about 1/2 to 1/3 of the initial input power.
- In addition, the power control by the PTC temperature controller further helps reduction of electricity cost.



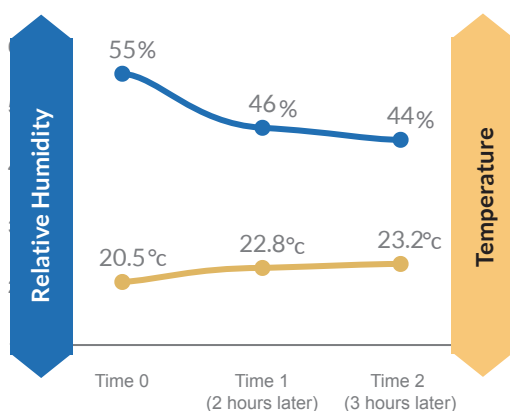
Heating temperature rises within a short duration, after which the resistance increases, current becomes smaller.

ADVANTAGES OF REMOTE INFRARED FLOOR HEATING

Far Infrared Floor Heating releases 4 to 20 micrometers of "cultivated far infrared lightwave", which is equivalent to the infrared wavelength band for use in physiotherapy, it can resonate with water molecules in human cells, improve somatosensory temperature and accelerate blood circulation. It can also promote metabolism, improve immunity, activate cells, enhance tissue regeneration, inhibit aging, keep head cool and feet warm and make you stay comfortable and healthy, especially suitable for both elderly and children.

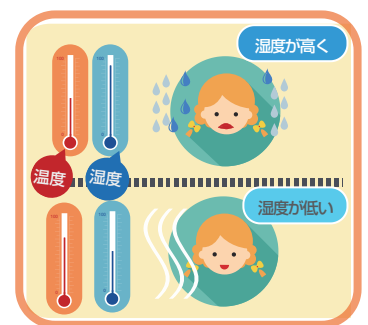


A SOLUTION TO REDUCE RELATIVE HUMIDITY LEVEL



※ Test conducted by Pentasun Greentek Co., Ltd

- The floor heating system is the solution to the high air humidity during rainy seasons around Spring and Summer. **When the room temperature increases by 1 °c, the relative humidity level drops by 4-5%.**
- This can also prevent the growth of mildew and mold and improves skin and respiratory allergies.
- Furthermore, moisture will be heated up through the floor to balance the overall space humidity. This avoid cold and humid air from sinking to the ground.

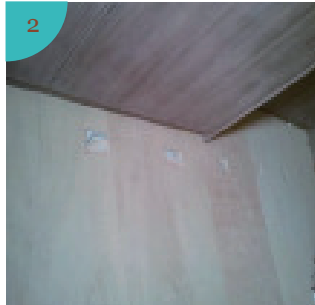


SCHEMATIC DIAGRAM OF "FLOATED INSTALLATION METHOD"

DRY HEATING FILM METHOD (FLOATED INSTALLATION METHOD)



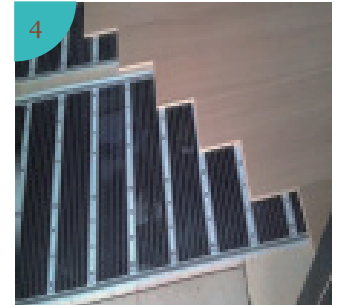
1. Laying of resilient and reflective moisture barrier on bare floor surface.
2. Laying of support according to the required fixed spacing.
3. Laying of cables and power connection.
4. Fixing of thermal insulation layer between support.
5. Installation of floor planks.



1. Carving out of cable grooves within plyboard sublayer.
2. Installation of thermo membrane.

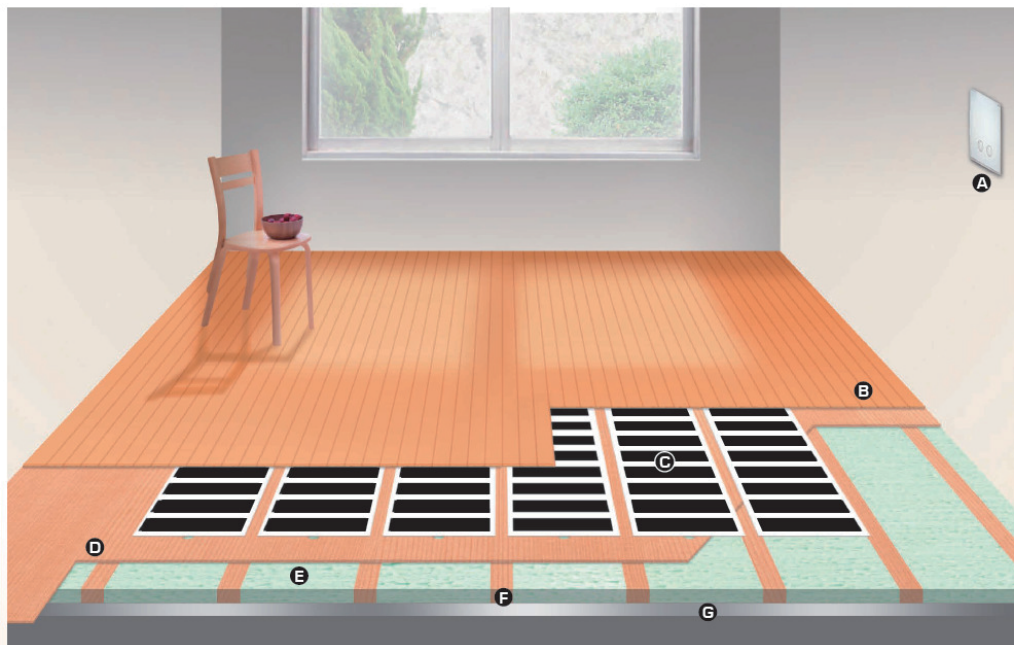


Roll up thermo membrane to safeguard damage if timber flooring is not to be done immediately.



Blind nails should be staple at normal to the timber planks without damaging the heating elements (staple at 150mm centers).

SCHEMATIC DIAGRAM OF FLOOR HEATING SYSTEM BUILT-UP (FLOATED INSTALLATION METHOD)

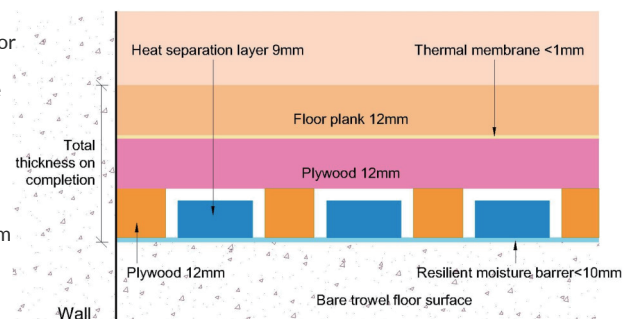


- A** THERMOSTAT
- B** FLOOR PLANKS / FLOORING
- C** FLOOR HEATING FILM
- D** 12mm PLYBOARD
- E** THERMAL INSULATION LAYER
- F** 12mm PLYBOARD SAWN TO STRIP
- G** RESILIENT REFLECTIVE MOISTURE BARRIER

TIMBER FLOORING INSTALLATION PROCEDURE (FLOATED FLOOR METHOD)

The floor heating system requires a thermal insulation layer to avoid undue dissipation of floor heating energy to the bare floor surface. Therefore, reflective heat insulation layer should be laid, and the overall thickness on site can be adjusted according to the designer's planning intention. The recommended overall thickness is 5.8cm, 3.7cm inclusion of floor planks etc.

Example: The plyboard to be used such as marine ply (12mm), and the overall thickness 37mm inclusive of the finishing floor planks.

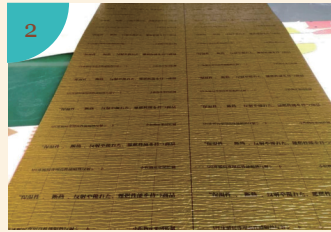


SCHEMATIC DIAGRAM OF "TILING INSTALLATION METHOD"

DRY HEATING FILM METHOD (TILING METHOD)



Leveling screed



Laying of Thermo Separation & Reflective layer



Install Plyboard



Forming of cable trenches



Complete cable trenches forming



Heating membrane installation

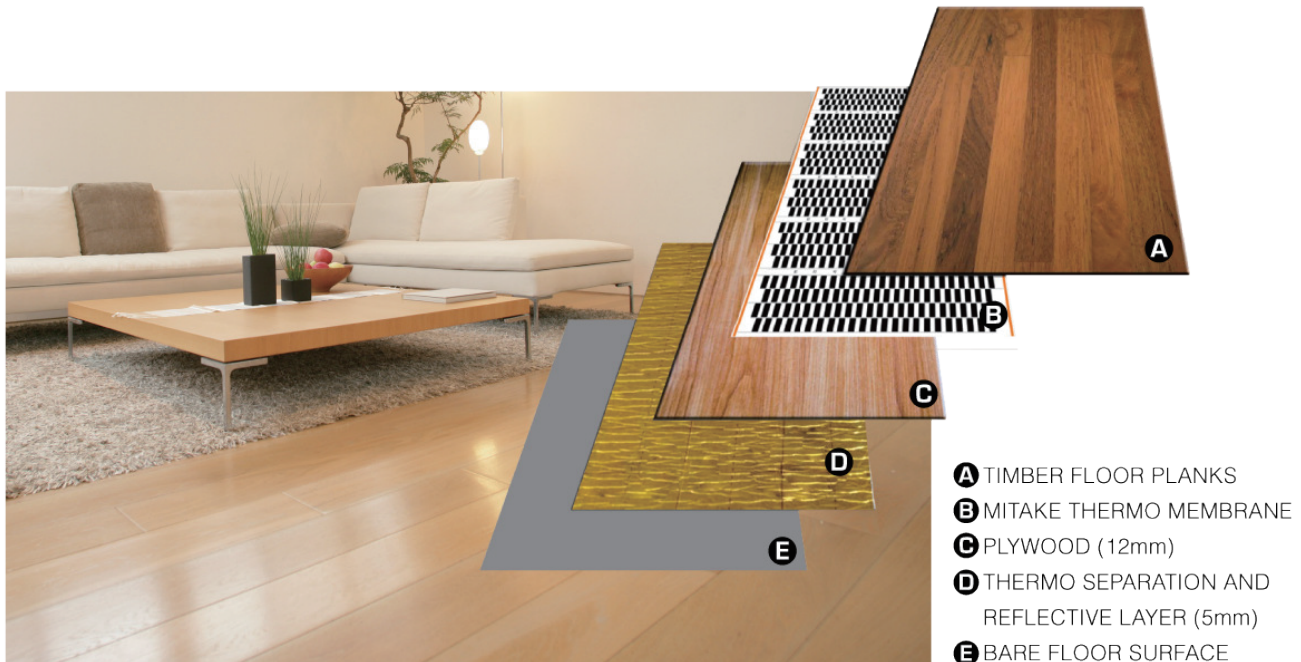


Complete installation of heating membrane



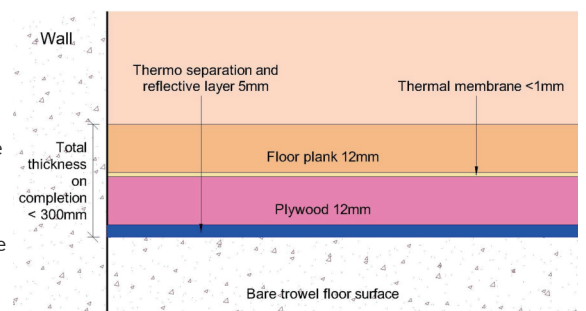
Laying of wooden floor with blind nails

SCHEMATIC DIAGRAM OF FLOOR HEATING SYSTEM BUILT-UP (TILING METHOD)



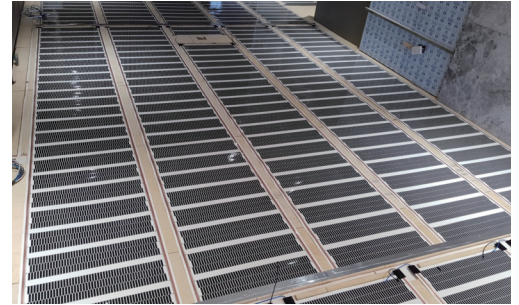
TIMBER FLOORING INSTALLATION PROCEDURE (TILING METHOD)

The floor heating system requires a thermal insulation layer to avoid the heat generated from the floor heating being dissipated to the bare slab. Therefore, it is necessary to install reflective layer and thermal insulation layer. The overall thickness on site can be adjusted according to the designer's planning intention. The recommended overall thickness could be 3.7cm, 2.7cm, etc. Example: Panels such as marine ply (12mm), with a total overall thickness of 27mm including the top finish layer.



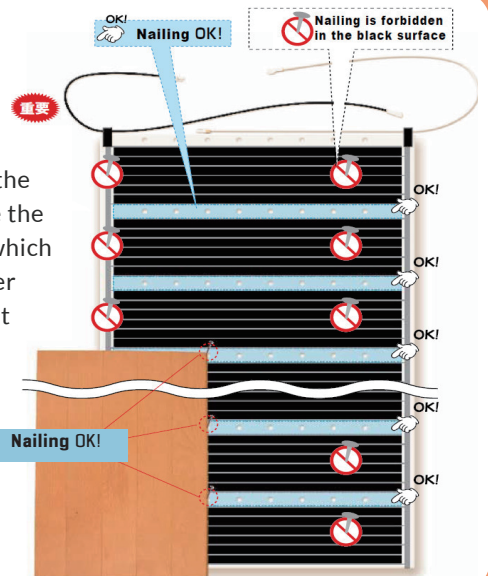
MITAKE INSTALLATION & PIPE FITTING SCHEMATIC

1. Actual covering area of heating sheet 45-60%.
2. Installation requires 100-200 mm clearance allowances from the 4 walls, and not required under large furniture and wardrobe, spacing of sheets to be within 50 mm.
3. The thermo membrane is cut to a maximum large of 3600 mm (24 minor groupings of small unit pieces).
4. Starting power of each piece is 0.14A and a constant power of 0.07A/ piece. The room electric power is calculated using the starting power. Up to 110 pieces per 16A thermostat.
5. Each thermostat on the main circuit control board needs to be configured with a 30mA leakage protector.
6. Design drawings must indicate the number of thermo-membrane (calculated according to the small unit pieces) stating the starting power, constant power and number of thermostats for each room.



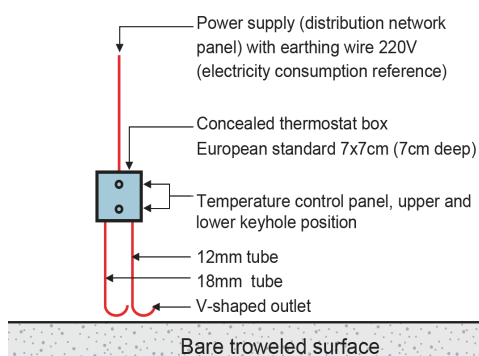
ATTENTION

Do NOT stable the blind nail on the the Black Surface, which is the PTC Planer Heating Element



POWER SUPPLY

(DISTRIBUTION NETWORK PANEL) WITH EARTHING WIRE



1. 220V power supply, 30A with one leakage circuit breaker loop (with earthing)
2. Use 3.5~5.5 wire
3. Concealed thermostat box (European standard 7 x 7 cm) with upper and lower key holes, depth minimum 7cm
4. Provide 2 No. 12mm, 18mm PVC pipes from the thermostat to floor level, V-shaped outlet
5. Thermostat size: 8.6*9.0cm or 8.6*8.6cm

ADVANTAGES OF MITAKE PTC HEATING MEMBRANE

(1) HEALTH



Far Infrared Rays

Release far infrared rays, warm from inside out, promote human health.

Compare to **Constant Power Floor Heating**
⇒ NO far infrared



(3) HUMIDITY



Solution to the spring humid climate

When room temperature increases by 1 °C, the relative humidity level drops by 4-5%. It can further prevent the growth of mold, bacteria, and improve skin and respiratory allergies.

(5) ENERGY SAVING



Lower energy consumption than constant power floor heating

Frequency conversion temperature control, the power consumption to constant temperature drops by about 50%, which amounts to 20% lower than constant power floor heating. Automatic control of power heating in each area.

Compare to **Constant Power Floor Heating**
⇒ Stable power output, no zonal adjustment for temperature and power.



(2) SAFETY



No Overheating

Furnitures can be freely placed anytime and anywhere, no need to worry about covering up by objects or carpet. No need to worry about overheating.

Compare to **Constant Power Floor Heating**



⇒ Cannot be cover up (need 100 mm distance from furniture) If power floor heating is turned on under direct coverage by object or carpet for a long time, overheating may occur and risk burning of the floor.

(4) WAITING TIME



15-30 Mins

Short waiting time - Floor heating is about 15-30 minutes, ready to use immediately.

Compare to other floor heating technologies



Time to pre-heat:

- Heating cable (with aluminum plate): 1 hour
- Heating cable (within cement): 2-3 hours

(6) ADVANTAGES OF TIMBER FLOOR CONSTRUCTION



No Change in Installation Framework

1. Maintain original installation framework, will only increase 3mm in overall thickness
2. Can be fixed by blind nails and floated interlock.

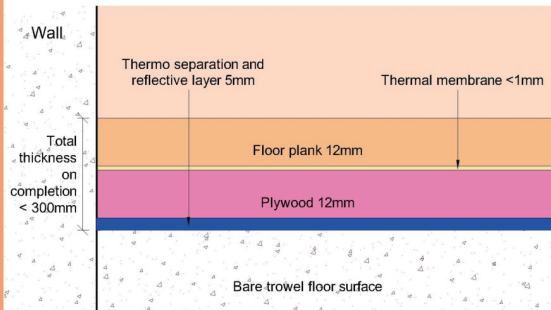
Compare to **Constant Power Floor Heating**



1. Original installation method altered, will increase overall thickness by 30mm plus.
2. Installation method of individual brand limits application by nail.

COMPARISON AGAINST KOREAN THERMO FLOOR MEMBRANE

MITAKE



Nailing :

Heating Principle :

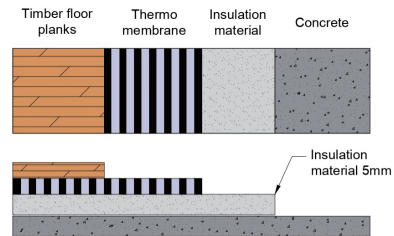
Damp Proofing :

Can be installed with blind nails or using floated floor method

Far infrared reflection

Yes

Other Korean Brands



Can only use floated floor method

Nil

Nil

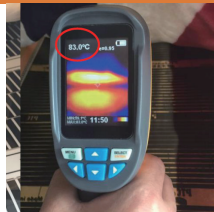
OVERHEATING PROBLEM OF KOREAN THERMO FLOOR MEMBRANE



MITAKE PTC

Thermo membrane

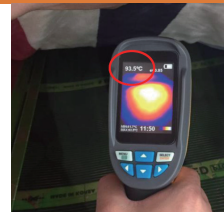
39.8°C



Korean-Brand 1

Thermo membrane

83°C



Korean-Brand 2

Thermo membrane

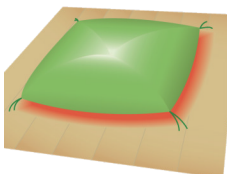
93.5°C



**DANGER OF
OVERHEATING
過熱する問題**

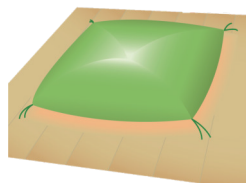
FREE FROM WORRIES ABOUT OVERHEATING/ LOW TEMPERATURE BURNS

CONVENTIONAL FLOOR HEATING



- When physical object are placed on top, heat is built up in that obstructed area, leading to abnormal increase in temperature and results in overheating and low temperature burnt

MITAKE PTC HEATING



- With PTC floor heating, the heater itself acts as the temperature sensor, thus limiting heat generation and power consumption only where requires
- This PTC function prevents overheating due to heat buildup by obstructed object

WHAT IS LOW TEMPERATURE BURNS?

低温熱傷!

- Occurs when the human skin is exposed to heat, at a low surface temperature of 40-50°C for a prolonged period of time.
- Happens when an individual lies on top of a heated surface, unconsciously got burns at the contact area that penetrate underneath the dermis and even to the muscles beyond.
- As no pain is observed at the time of injury, most patients are not aware of their skin injuries and missed the critical window for proper initial burn care.



SPECIFICATIONS- HEATING MEMBRANE

TECHNICAL ITEM	MITAKE
Rated voltage	220v (+/- 5%)
Electric current	50Hz
Starting power	0.14A/pc
Constant power	0.7A/ pc
Surface heating time	2-3 minutes
Heating material	High molecular PTC carbon nano conductive particles
Heating material surface temperature (winter)	37-40°C
Floor surface temperature (winter)	≥29°C
Insulation resistance	≥500MΩ
Electrothermal radiation conversion rate	>97%
Formaldehyde, Benzene, TVOC	nil
Remote infrared	Release 5-15μm light wave
Dimensions	40m ² / roll
Manufacturer	ミタケ電子工業株式会社
Country of manufacture	Japan

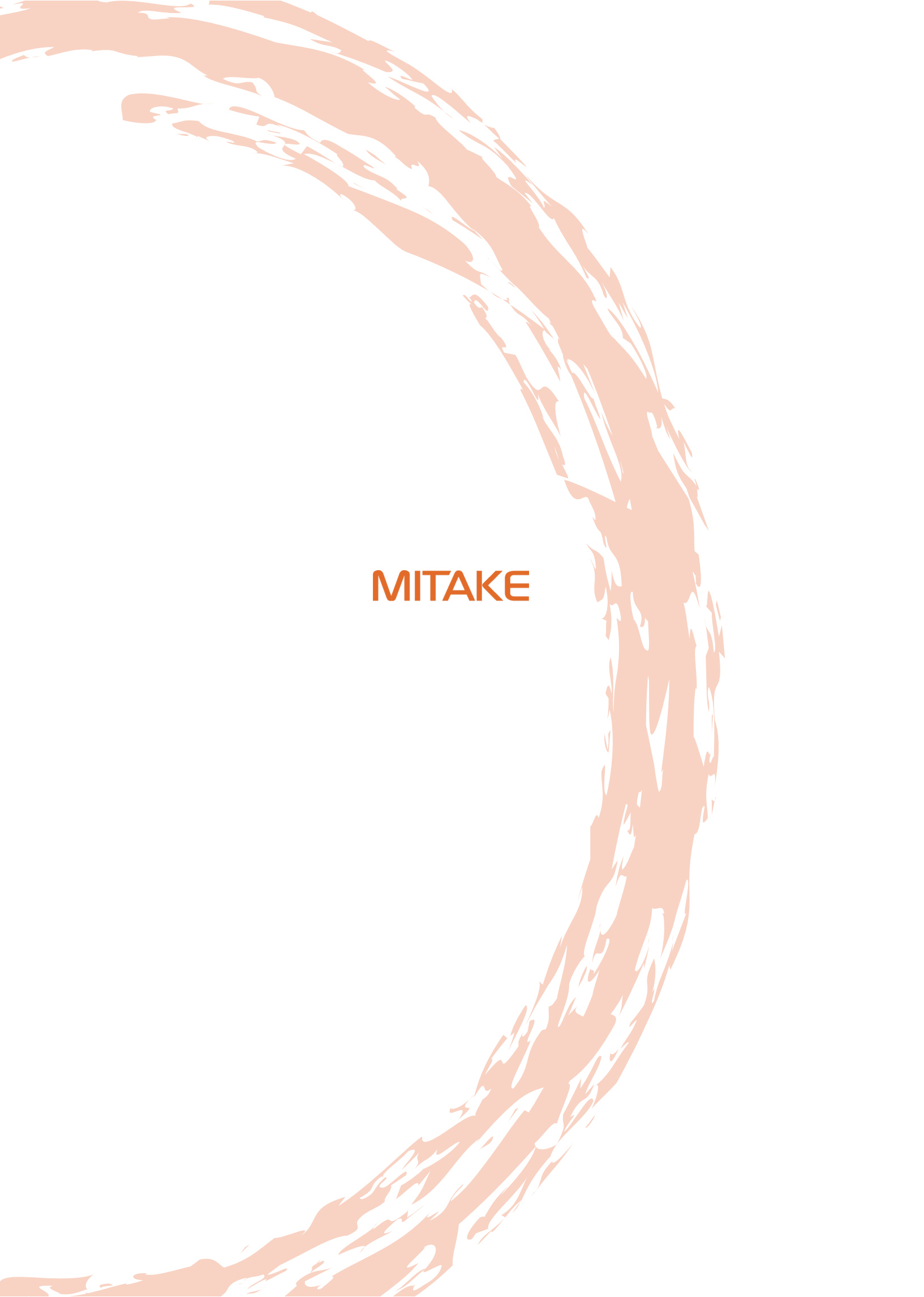
COMPLIMENTARY REMOTE CONTROLLER



HALMBURGER (HT8516)
 Programmable Monitor Thermostat
 Dimension: 86 x 90 x 13 mm
 Voltage: AC230 16A (Load Current)
 Temperature range: 5-50°C
 Double temperature with dual controller: IP20



HAILIN (緑動WIFI)
 Smart LCD Touch Monitor Thermostat
 Dimension: 86 x 86 x 15.8 mm
 Voltage: AC 85-250v, 50/60 HZ 16A (Load Current)
 Set temperature range: 5-35°C
 Double temperature with single controller: IP30



MITAKE



PRESENTED BY:



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