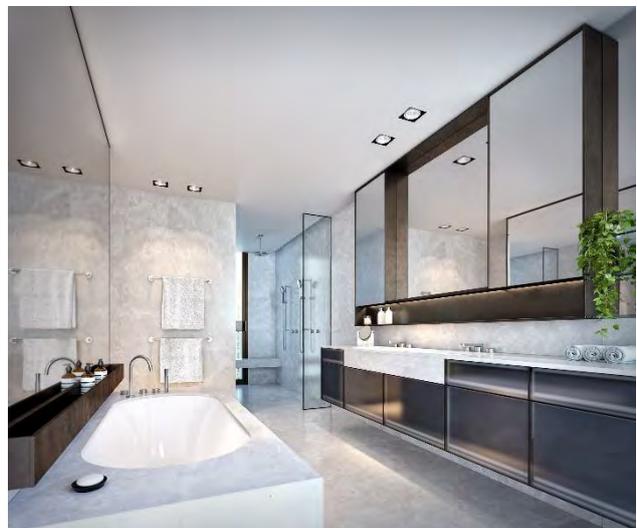


## PRODUCT DESCRIPTION

Intelligent Heating Floor – (Timber & Tiles)



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# CONTENTS



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1. Purpose
2. Criteria for References
3. Pattern
4. Requirements
5. Inspection Method
6. Inspection Rule
7. Logo, Package, Transportation and Storage
8. Comparison charts IHF Vs Traditional Heating Methods
9. Consumer Guarantees

# 01

## PURPOSE



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PURPOSE of this document -

The purpose of this document is to stipulate the primary uses of the HYDRO ECO-Floors Intelligent Heated Flooring (IHF) in brief and to provide basic information on the following;

- Test methods
- Inspection rules
- Packaging
- Transportation
- Storage
- Applications

# 02

## CRITERIA FOR REFERENCES



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### CRITERIA FOR REFERENCES -

The following documents are essential to the application of this document. For references which are dated, they can only be applied to this document. For references that are not dated, their latest version (including all modification list) can be applied to this document.

GB/T 191 Packaging-pictorial Marking for Handling of Goods GB/T 2828.1-2012 Counting Sample Inspection Procedure Part 1: The Plan which Inspects

Samples batch by batch according to Acceptable Quality Level (AQL).

GB/T 2829-2002 Procedures and tables that are checked and counted periodically.

GB 4706.1 Safety of Household and similar electrical appliances Part 1: General requirements.

GB 4706.23 Safety of Household and similar electrical appliances Part 2: Special requirements for household heater.

GB/T 7287-87 Testing method for infrared radiation.

GB/T 15036.2-2009 solid wood flooring Part 2: Testing method.

# 03

## PATTERN



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### 3.1 Category

IHF can be classified according to the differences of Patterns:

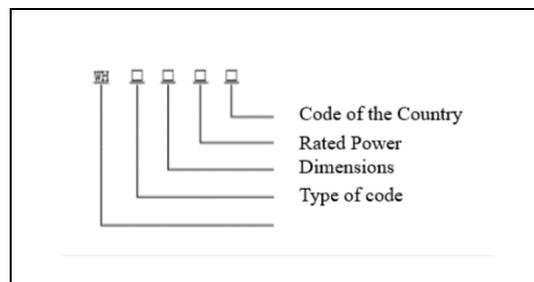
Solid wood substrate type (A)

Solid wood composite substrate type (B)

Intensive flooring substrate type (C)

### 3.2 Code

**Figure 1. IHF Codes**



IHF codes are as follow:

**WHA9012170C: VNT heating substrate plate is applicable in Australia, rated power 120W=m<sup>2</sup> and the Shape and dimension are suitable for the floor.**

# 04

## REQUIREMENTS



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### 3.3 Specification

**Table 1. The specification of IFH**

| Parameter                                   | Index         |
|---|---------------|
| Rated Voltage                               | 240V          |
| Rated Power                                 | 150W – 300W   |
| Surface temperature (indoor temperature 20) | 30°C - 55°C   |
| The use of ambient temperature              | -40°C - +50°C |
| Highest surface temperature                 | 35°C - 60°C   |

### 3.4 Operational environment

- IHF is to be used only in the following conditions:
- Ambient relative humidity: not higher than 80%
- There should not be any air and dust which can corrode metal and break insulation property.
- Allowed operating voltage range: +10%.

# 04

## REQUIREMENTS - CONTINUED

### 4.1 Size Deviation

The tolerance of length and width of IHF are 1:5mm, the tolerance of thickness is 1:5mm.

### 4.2 Appearance

4.2.1 IHF should be clean and smooth without any obvious mechanical damage, crack, craze, and burr.

4.2.2 The leading-out terminal (electrode hole) is not supposed to be Loose and falling o, and it should be connected well with external connection.

### 4.3 Heating time

The time of working temperature which based temperature goes up 5 degrees does not exceed 720 seconds.

### 4.4 Surface temperature

4.4.1 The surface temperature of IHF should be in accordance with the below Table 2 regulations (The Room which temperature is 20°C 2°C without the influence of air flow).

**Table 2. Surface Temperature**

| Program                        |   | Thermal power per unit area (W/M <sup>2</sup> ) |     |     |     |
|--------------------------------|---|---|-----|-----|-----|
|                                |   | 150   | 175 | 200 | 250 |
| Highest Surface temperature °C | ≥ | 25  | 35  | 45  | 55  |
| Average Surface temperature °C | ≥ | 20  | 30  | 40  | 50  |

### 4.5 Input power deviation

The deviation between input power and rated power should not be over the values shown as Table 3 when IHF is operating under rated voltage and normal working ambient temperature.

**Table 3. Input Power Deviation**

| Rated input power | deviation                                      |
|-------------------|--|
| ≤ 100             | ±10%   |
| > 100             | ±5% or -10% or 10W (refer to the larger value) |

# 04

## REQUIREMENTS - CONTINUED

### 4.6 Safety

#### 4.6.1 Electricity safety

The requirements of electricity safety conform to the regulations of GB4706.1 and GB4706.23.

#### 4.6.2 Current leakage

The current leakage of IHF should obey the regulations on Table 4.

#### 4.6.3 Dielectric strength

IHF should withstand the voltage test with 1 min, 50Hz(60Hz) Sine wave, no as hover or break-down shall occur during the test.

### 4.7 Life

IHF should stand for 5000h aging test and keep working normally.

**Table 4. Current Leakage**

| Product  | Leakage Current/mA |
|--|--------------------|
| Category 0 (Nano-carbon based ceiling board)   | <<0.5              |
| Category I (Screen with metal frame and vertical IHF)  | <<0.75             |
| Category II (IHF floor dado board, IHF flooring)   | <<0.08             |
| PS1: The leakage current is measured when the input power is equal to 1.15 times the maximum rated input power under working temperature |                    |
| PS2: The leakage current is measured at 1.06 times the rated tested voltage under cold state   |                    |

### 4.8 Electrothermal radiation conversion efficiency

Electrothermal radiation conversion efficiency of IHF is supposed to be higher than 60. %

### 4.9 Normal thermal emittance $E_n$

Normal thermal emittance should not less than 0.85.

### 4.10 Wavelength of radiation spectrum

Wavelength of radiation spectrum of IHF should be (5-18) m.

# 05

## INSPECTION METHOD



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### 5.1 Inspection condition

**5.1.1** The test shall be carried out in a room where ambient temperature is  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and there is no influence of external airflow

**5.1.2** The frequency and voltage fluctuation of the power supply used in the test shall not exceed the +1% of rated value

#### 5.1.3 Testing and Measuring Equipment:

For electrical measuring instrument for the type test, its accuracy grade shall not be less than 0.5 grade (1.0 grade could be used at factory test).

The accuracy is not less than the 1% of the measured range for instrument which is measuring temperature.

The accuracy is not less than the 1% of the measured range for instrument which is measuring time.

The accuracy is not less than the 1% of the measured length for instrument which is measuring length.

The accuracy is not less than the 1% of the measured length for spectrometer for radiation wave length which is measuring length.

The accuracy is not less than the 1% of the measured length for spectrometer for electric radiation which is measuring length.

The accuracy is not less than the 1% of the measured length for Full normal emission spectrometer length.

# 05

## INSPECTION METHOD - CONTINUED



VNT GROUP



### 5.2 Size deviation

It executes the regulation GB/T 15036.2-2009 3.1.

### 5.3 Appearance

It executes the regulation GB/T 15036.2-2009 3.2.

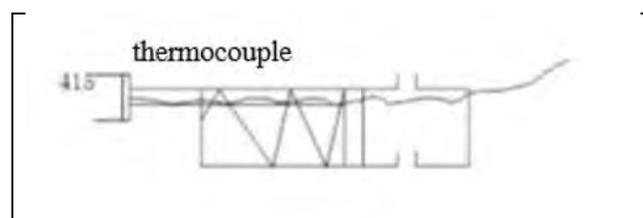
### 5.4 Heating time

It measured during surface temperature test (5.5) period, and it measured the time required to reach the specified surface temperature.

### 5.5 Surface temperature

The equipment which is used to test surface temperature is on Figure 2. The heating part between one end of electrode of the heat dissipation surface (plane) and the other end of the electrode is divided into nine equal parts, and the highest temperature is measured at the centre of the plane and at the centre of each bisection. Then calculate the average temperature and temperature difference.

**Figure 2. Measurement of Service Temperature**



### 5.6 Deviation of power

Apply rated working voltage to the sample for temperature rise, measure the sample current and working voltage when the specified temperature is reached, and calculate the measured power. Calculate the power deviation according to the Equation (1).

**Figure 3. Measurement Circuit of Leakage Current**

$$J = \frac{P - P_n}{P_n} \times 100\% \quad (1)$$

where,  
 $J$  -Power deviation  
 $P$  -Measured electrical power(W)  
 $P_n$  -Rated electrical power (W)

# 05

## INSPECTION METHOD - CONTINUED



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### 5.7 Safety

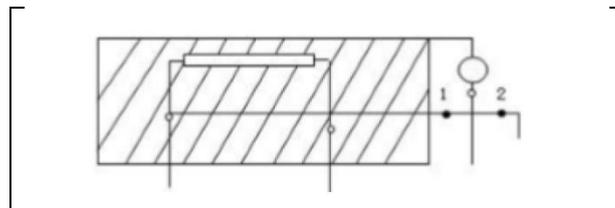
#### 5.7.1 Electrical Safety

It executes the regulation GB 4706.1, GB 4706.23, AS/NZS 60335.1:2011+A1:2012+A2:2014+A3:2015+A4:2017+A5:2019 AS/NZS 60335.2.96: 2020

#### 5.7.2 Leakage current

Input the tested voltage at 1.15 times the rated power at at operating temperature; Test voltage at rated voltage 1.06 times in cold condition. Leakage current testing device is shown in figure 4. The measurement is made between either pole of the current and the accessible metal parts connected to the foil and the plate surface (the area of the foil should be the same as the plate), in contact with the easy-to-contact surface of the insulating material, apply a certain gravity (5Kg) on the foil surface, and turn the switch to each position of 1.2m for measurement.

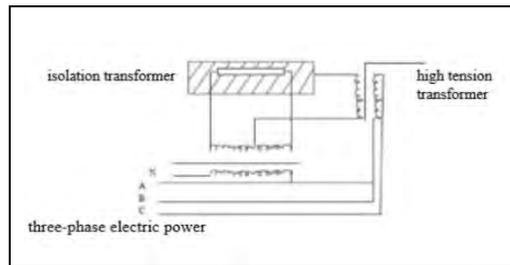
**Figure 4. Measurement circuit of leakage current**



### 5.7.3 Dielectric strength

The measurement of dielectric strength is on Figure 5. Connecting the sine wave with voltages of 50Hz and 60Hz, and the tested voltage is following: a) Under operating temperature: 1) Category 0 (Nano-carbon based ceiling board):1000V; 2) Category i(Screen with metal frame and vertical IHF): 2500V; 3) Category ii(IHF floor dado board, IHF flooring) :3750V; b) Under cold state: 1) Basic insulation: 1250V; 2) Intensive insulation: 2000V:

**Figure 5. The Measurement of Dielectric Strength**



# 05

## INSPECTION METHOD - CONTINUED



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PS1: The foil is placed so that the edges of the insulation do not.

PS2: It is negligible for glow discharge without voltage drop.

PS3: The high-voltage power supply used for this test shall be able to provide an overload release of short-circuit current  $I_s$  circuit between the output terminals after its output voltage is adjusted to the corresponding test voltage  $U$ , and it shall not operate on any current lower than the tripping current  $I_s$  to measure the effective value of the test voltage (R.M.S) voltmeter, and it should be at least 2.5 according to IEC51-2,  $I_s$  is  $I_r$  table 5 for various high voltage currents. The initial voltage applied to the test should not exceed half of the voltage value, and then the voltage is gradually increased to the full value.

**Table 5: Characteristic Leakage of High Voltage Power**

| Testing Voltage U/V | Minimum Current /mA |       |
|---------------------|---------------------|-------|
|                     | $I_s$               | $I_r$ |
| $U < 4000$          | 200                 | 100   |

PS1: This current is calculated on the basis of the above zero voltage range, short circuit and release energy, respectively 800VA and 400VA.  
 PS2: When leakage current is larger than 50% of  $I_r$ , the uncertainty of high voltage measurement should not exceed 3% of the measured voltage.

### 5.8 Life

Power on at rated voltage and rated frequency for 2h and power o for 1h, and the cumulative power on time shall not be less than 5000h.

**5.9 Electrothermal** radiation conversion efficiency, full normal emissivity radiation, spectrum wavelength executes according to the regulation GB/T 7287

# 06

## INSPECTION RULE



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### 6.1 Inspection category

The inspection of IHF can be divided into factory inspection and type inspection, and the inspection item with nonconformity classification is on Table 6.

**Table 6: Inspection Category**

| No. | Category                                 | Requirements | Mothed | Nonconforming category |   |   |
|-----|--|--------------|--------|------------------------|---|---|
| 1   | Size deviation                           | 4.1          | 5.2    |                        |   | C |
| 2   | Appearance and logo                      | 4.2 7.1      | 5.3    |                        |   | C |
| 3   | Heating time                             | 4.3          | 5.4    |                        |   | C |
| 4   | Package                                  | 7.2          | Eye    |                        | B |   |
| 5   | Surface temperature                      | 4.4          | 5.5    |                        | B |   |
| 6   | Power deviation                          | 4.5          | 5.6    |                        | B |   |
| 7   | Safety                                   | 4.6          | 5.7    | A                      |   |   |
| 8   | Life                                     | 4.7          | 5.8    |                        | B |   |
| 9   | Normal thermal emittance                 | 4.10         | 5.11   |                        | B |   |
| 10  | Electrothermal radiation conversion rate | 4.9          | 5.10   |                        | B |   |
| 11  | Energy spectrum wavelength               | 4.11         | 5.12   |                        | B |   |

# 06

## INSPECTION RULE - CONTINUED

### **Factory inspection**

#### **6.2.1 Set of rules**

The products shall be checked and accepted in batches. The products produced in the same batch with the same raw materials, the same technology, the same specifications and the same shift shall be in one inspection batch.

#### **6.2.2 Sampling scheme**

Samples are randomly selected from the tested products, and applied one sampling plan according to the regulation GB/T 2828.1-2003, IL=I. Category A disqualification: AQL=0.65 Category B disqualification: AQL=2.5

#### **6.2.3 Qualification evaluation**

If the inspection lot does not meet the standard, it can be submitted for acceptance again after removing the unacceptable products, and strict inspection can be used further. If the resubmitted inspection batch still fails to meet the requirements, the products shall not be resubmitted for acceptance. At this time, the reasons should be analysed and the resolutions should be come up. The products can leave the factory only after it has passed the inspection and attached the qualification certificate and the instruction manual.

# 06

## INSPECTION RULE - CONTINUED



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### 6.3 Type Inspection

#### 6.3.1 Inspection period

Type inspection shall be conducted under any of the following circumstances: Identification of new product or trial production; Structural material technology has a big change may affect the performance of products after mass production. The products which are regular or accumulated to certain amount should be periodically inspected in normal production, not less than once a year. When production resumes after half a year's suspension of production; When the ex-factory inspection result is greatly different from the last type inspection; When the state quality supervision agency proposes the requirements for type inspection.

**6.3.2 Inspection category** Type inspection items shall be inspected according to all items checked in Table 5.

#### 6.3.3 Sampling scheme

Samples should be randomly sampled from the products which are produced in this cycle that have passed the factory inspection, and take secondary sampling program according to regulation GB/T 2829-2002. The level of inspection is: Category A: must be all qualified; Category B unqualified: RQL=30; Category C unqualified: RQL=50. Detailed sampling scenario, the determination method according to Table 7.

#### 6.3.4 Qualification evaluation

The inspection should be in full compliance with the provisions of this standard. When the safe and oxygen index do not meet the requirements of this standard, no re-inspection will be conducted, and products which are represented by the type inspection shall be judged to be unqualified. If only one of the other inspection items does not conform to the provisions of this standard, after removing the unqualified products, take the double number of samples from the same type of inspection for the re-inspection of the unqualified items. The re-inspection results should conform to the provisions of this standard, otherwise the products represented by the type inspection are unqualified.

# 07

## LOGO, PACKAGE, TRANSPORTATION & STORAGE



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### 7.1 Logo

#### 7.1.1 Each IHF is supposed to be marked or labelled axed with a label to indicate the following contents clearly

Product name; specification and model; Rated power W; Rated voltage V; Type and symbol of power supply; Rated frequency: Hz; Name and address of the manufacturer; Date of manufacture or factory number Executive Standard.

#### 7.1.2 Package mark

Product name, model and specification; The trademark; Product quantity and colour; Product packaging gross weight Kg; Package dimensions (cm)L b h (stacking height); Attention signal, “put carefully against rain and moisture” mark should be consistent to the mark of storage and transportation according to the regulation GB/T 191.

### 7.2 Package

#### 7.2.1 Products can be packed in cartons or wooden cases, and should be at moisture- proof and shockproof packaging to ensure that the products will not be damaged in the process of transportation

Products should be accompanied by the product qualification certificate packing list and the accessories which are on the list the operation manual includes the following contents: product overview; Product characteristics; Application; Product model and specification; Main technical parameters

# 07

## LOGO, PACKAGE, TRANSPORTATION & STORAGE – CONTINUED



VNT GROUP



### 7.3 Transportation

During transportation, collision, rain and dampness should be avoided for IHF, and IHF must not be approached resources, and no throwing is allowed.

### 7.4 Storage

**7.4.1** Warehouse should be well ventilated, no corrosive gas, the relative humidity is not more than 90%, no less than 200mm above the ground and wall, and prevent heavy weight and do not pile up in the open air

**7.4.2** IHF should be laid at, not inclined or vertical when in storage, and maximum limit of horizontal stacking is 10 layers

# 08

## ENERGY SAVING COMPARED WITH TRADITIONAL HEATING METHODS



VNT GROUP



*Intelligent Heated floor is made by mixing carbon microcrystalline particles with pure wood pulp referred to as IHF (Intelligent Heated Flooring)*

**Table 7. Comparison of Energy**

Comparison of energy cost in 12m<sup>2</sup> room

| Room size                        | Heater types                  | Energy star rating | Annual energy cost | Cost Saving (%) |
|----------------------------------|-------------------------------|--------------------|--------------------|-----------------|
| Small room 12m <sup>2</sup>      | Gas heater                    | 3                  | \$170              | -55.68823529    |
|                                  |                               | 5                  | \$140              | -46.19285714    |
|                                  | Portable electric heater      |                    | \$385              | -80.43376623    |
|                                  | Reverse-cycle air conditioner | 2                  | \$140              | -46.1928571     |
|                                  |                               | 5                  | \$85               | -11.37647059    |
| <b>Intelligent Heating Floor</b> |                               | \$75.33            | 0                  |                 |

Comparison of energy cost in 60 m<sup>2</sup> room

| Room size                        | Heater types                               | Energy star rating | Annual energy cost | Cost Saving (%) |
|----------------------------------|--|--------------------|--------------------|-----------------|
| Large area 60m <sup>2</sup>      | Gas heater                                 | 3                  | \$730              | -46.87534247    |
|                                  |  | 5                  | \$625              | -37.9504        |
|                                  | Electric panel, convection or fan heater   |                    | \$1860             | -79.15          |
|                                  | Reverse-cycle split system air conditioner | 1.5                | \$640              | -39.4046875     |
|                                  |  | 4                  | \$440              | -11.86136364    |
| <b>Intelligent Heating Floor</b> |  | \$387.81           | 0                  |                 |

# 08

## ENERGY SAVING COMPARED WITH TRADITIONAL HEATING METHODS - CONTINUED

Comparison of energy cost in 100m<sup>2</sup> room

| Room size                    | Heater types                         | Energy star rating | Annual energy cost | Cost Saving (%) |
|------------------------------|--------------------------------------|--------------------|--------------------|-----------------|
| Small room 100m <sup>2</sup> | Gas ducted heating                   | 3                  | \$1130             | -46.75132743    |
|                              |                                      | 6                  | \$860              | -30.03372093    |
|                              | Gas hydronic                         | Standard           | \$1035             | -41.86376812    |
|                              |                                      | High               | \$865              | -30.43815029    |
|                              | Ducted Reverse-cycle air conditioner | 2                  | \$975              | -38.28615385    |
|                              |                                      | 4                  | \$680              | -11.51323529    |
|                              | Intelligent Heating Floor            |                    | \$601.71           | 0               |

# 09

## CONSUMER GUARANTEES



VNT GROUP



### 9.1 Consumer Guarantees

Under the Australian Consumer Law, when you buy IHF products and services they come with automatic guarantees that they will work according to what has been explained. If you buy IHF products that are faulty, you have consumer rights to protect you.

#### 9.1.2 Repair, replace, refund

If IHF or service you buy fails to meet a consumer guarantee, you have the right to ask for a repair, replacement or refund under the Australian Consumer Law. The remedy you're entitled to will depend on whether the issue is major or minor.

#### 9.1.3 Cancelling a service

Under the Australian Consumer Law, you have certain rights to cancel a service.

#### 9.1.4 Compensation for damages & loss

You can seek compensation for damages and losses you suffer due to a problem with the IHF or service if the supplier could have reasonably foreseen the problem. This is in addition to your repair, replacement or refund rights.

#### 9.1.5 Warranties

Under the Australian Consumer Law, automatic consumer guarantees apply to IHF products and services you buy regardless of any other warranties' suppliers sell or give to you.