HALLMARK FLOORS®

Radiant Heat Guide

Pre-Finished Engineered Hardwood, Luxury & Premium Vinyl Flooring



Introduction:
Welcome to the new Hallmark Floors Radiant Heat Guide. This updated guide now includes applications for Electric In-Floor Radiant Heat. For efficiencies sake it is referred to as Electric Floor Heating throughout the guide. It also has rele-vant information regarding the control of relative humidity.

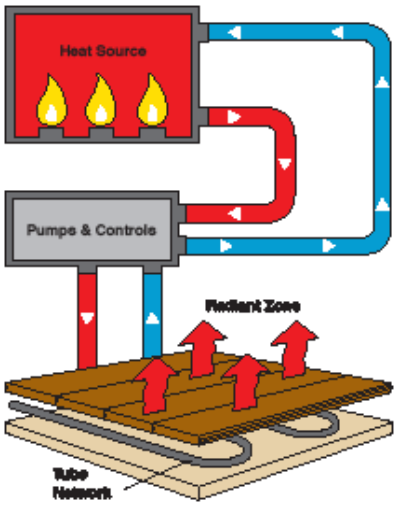
Radiant Heat Guide
Hallmark Floors has been manufacturing hardwood floors for over 20 years - since 1997 and vinyl planks and tiles for Since 2013. Our commitment to quality is unsurpassed. Hallmark Floors collection of hardwood flooring is an exceptional choice for installation over multiple types of radiant heat systems.

In most cases both wood and vinyl flooring are suitable for use over radiant heat systems as specified by our installation instructions, with a few exceptions. Our high-quality engineered flooring systems are very dimensionally stable, and thus ideal in radiant heat applications. Our internal ply glue systems are world class and are TSCA Title VI (CARB II) compliant.

Even though some hydronic or electric in-floor heating systems may approve installation methods other than those described in these guidelines, the methods described and approved have been tested and found to produce the most consistent and successful results with Hallmark Floors.

Hydronic Heating Systems:

Water based systems, employing hot water, tubing and a hot water boiler. Review information in this guide re-garding specific accepted types.



Electric Heating Systems:

Due to performance, compatibility and safety considera-tions, only systems compliant with the NWFA Guideline classification of Fabric-Heating Underlayment or Mat with Thermal Cut Off are recommended for direct contact with Hallmark Flooring. All other system variants require installation of the heating components either between joists or embedded in a 1” thermal mass of cement.

In-floor systems powered by FiberThermics® such as WarmStep® and ThermoFloor® are classified as Fabric-Heating Underlayment or Mat with Thermal Cut Off and are approved for direct contact with the flooring when installed according to the installation instructions.



FLOORING TYPES - DESCRIPTION

Engineered Wood Floors:

Engineered Wood Products Suitable for Installation with In-Floor Radiant Heat both Hydronic and Electric

- True – All (excluding Hickory)
- Alta Vista – All
- Monterey - All (excluding Hickory)
- Organic Engineered only (excluding Hickory)
- Ventura – All (excluding Hickory)
- American Traditional Classics (excluding Hickory)
- Serenity - All
- Novella – All (excluding Hickory)
- Avenue – All (excluding Hickory)
- Grain & Saw - All (excluding Hickory)
- Regatta – All (Wood/Rigid SPC Core) – See Rigid Core SPC)

¾" Solid:

¾" Solid Products Suitable for Installation with In-Floor Radiant Heat Systems powered by FiberThermics® Only.

- Organic Solid: Excluding Hickory – Systems powered by FiberThermics® Only
- Crestline: Excluding Hickory - Systems powered by FiberThermics® Only

Luxury Vinyl (EZ Loc)– LVT & Rigid/SPC:

Vinyl Products Suitable for Installation with In-Floor Radiant Heat both Hydronic and Electric.

- Luxury Vinyl: 3Twenty, 2Twelve & Times Square – Specified hydronic systems only (excluding fiber thermic open surface channel hydronic). Not suitable for use over electric mat system. Must use system incased in concrete/gypcrete
- Rigid Vinyl Plank + IXPE: Courtier, Polaris – All (excluding open channel hydronic).

ENGINEERED WOOD FLOORS: INSTALLATION METHODS

The following is a basic guideline to installation applications for types of in-floor radiant heating systems.

Hydronic:

• Glue-Down: Method can be used on specified hydronic systems.

• Floating: Method can be used on specified hydronic systems, utilizing a high quality 2mm underlayment pad.

• Nail-Down: Is not recommended due to high risk of nails penetrating in-floor tubbing.

• Nail-Down Glue-Assist: Is not recommended due to high risk of nails penetrating in-floor tubing.

NOTE: nail-down produces risk of puncturing the in-floor tubing. Nails can also work a heat-sink when in contact with aluminum transfer sheets, potentially causing discol-oration of the floor at the fastener head. Hallmark Floors does not warrant against nail penetration of tubing or against discoloration at fastener heads.

CAUTION: Carefully follow all hydronic radiant manufacture's guidelines and Hallmark Floors installation instructions.

Electric:

• Glue-Down: Method can be used on specified electric systems.

• Floating: Method can be used on specified electric systems, utilizing a high-quality underlayment pad, as specified by the type of system being used. Over con-crete a 2mm pad is used under the heating mats powered by FiberThermics® heating elements. If the heating system contains an integrated underlayment the 2mm pad may not be required.

• Nail-Down: Is permitted when using heating mats powered by FiberThermics® heating elements.

• Glue-Assist: Nail-Down: Is permitted when using heating mats powered by FiberThermics® heating element.

NOTE: Nail-down installation run the risk of damaging the electric heating element. Nail-down and nail-down with glue assist should only be done in conjunction with systems powered by FiberThermics® heating elements. Use of installation alarm will notify installer of any damage to the system during install.

Other system types heating elements cannot be seen when installed between joists. Other surface film type units do not have enough space between the elements.

WARNING: SUBFLOORS FOR BOTH METHODS OF HEATING MUST BE DRY AND REMAIN DRY FOR LIFETIME OF THE FLOOR.

¾” SOLID HARDWOOD: ORGANIC SOLID & CRESTLINE INSTALLATION METHODS

Hydronic:	Electric:
• Glue-Down: Is not authorized.	• Glue-Down: Is not authorized.
• Floating: Is not authorized.	• Floating: Is not authorized.
• Nail-Down: is not authorized.	• Nail-Down: Is permitted when using mat powered by FiberThermics® heating elements.
• Glue-Assist: Nail-Down: is not authorized.	• Glue-Assist: Nail-Down: Is permitted when using mat powered by FiberThermics® heating element.
CAUTION: Carefully follow all fiber hydronic radiant manu-facture’s guidelines and Hallmark Floors installation in-structions.	CAUTION: Carefully follow all electric radiant manufacture’s guidelines and Hallmark Floors installation instructions.

WARNING: SUBFLOORS FOR BOTH METHODS OF HEATING MUST BE DRY AND REMAIN DRY FOR LIFETIME OF THE FLOOR.

****GENERAL NOTE: Engineered Wood & Vinyl Hydronic in Gypcrete/Lightweight Concrete**

• Glue Down Concrete Thermal Mass – Wood Subfloor, LVT&P, PVP: Adhesive must be approved by adhesive manufacturer for use with radiant heat.

• Concrete/Gypcrete thermal mass must have vapor control capabilities built in. Moisture needs to be controlled below thermal mass not with surface sealers. Thermal mass must be rated at a compressive strength of 2500 psi or greater.

• Some adhesive manufacturers warrant use over thermal mass of less than 2500 psi. See adhesive manufactures instructions.

• Thermal mass with less than 2500 psi compressive strength without adhesive acceptance of lower compressive strength must use floating installation method if allowed. Follow all adhesive manufacturer’s installation and Hallmark Floors installation instructions.

NOTE: See Hallmark Floors installation.
WARNING: Subfloors for both methods of heating must be dry and remain dry for lifetime of the floor.
Instillation instructions, hydronic and electric system manufacturers guidelines.

VINYL PLANK & TILE: INSTALLATION METHODS

Hydronic:

Luxury Vinyl - 3Twenty, 2Twelve & Times Square Collections:

- Glue Down**: Can be achieved with a hard-set ad-hesive, pressure sensitive/releasable adhesives cannot be used over radiant heat, see installation instructions for full details (not suitable for installation over aluminum channel board/exposed tubing.). Not suitable for glue down to OSB, plywood, particle board, or non-birch plywood.
- Floating: Is not authorized

Rigid Core Premium Vinyl with EZ Loc - IXPE Pad - Courtier

- Glue-Down-: Glue down is not authorized.
- Floating: Method can be used on specified.
- Hydronic Radiant Heat systems. (not suitable for installation over aluminum channel board/exposed tubing).

Engineered Wood/Rigid SPC Core – Regatta:

- Glue-Down-: Glue down is not authorized.
- Floating: Method can be used on specified.
- Hydronic Radiant Heat systems. (not suitable for installation over aluminum channel board/exposed tubing).

Electric:

Luxury Vinyl - 3Twenty, 2Twelve & Times Square Collections:

- Glue Down: Is not authorized.
- Floating: Is not authorized.

Rigid Core Premium Vinyl with EZ Loc - IXPE Pad - Courtier

- Glue-Down: Glue down is not authorized.
- Floating: Method can be used.

Engineered Wood/Rigid SPC Core – Regatta:

- Glue-Down: Glue down is not authorized.
- Floating: Method can be used.

CAUTION:
Carefully follow all electric radiant manufacture's guidelines and Hallmark Floors installation instructions.

NOTE: An alarm meter can be connected to individual mat lead wires to alert the installer to any breaks in the heaters that can occurs during installation.

****GENERAL NOTE: Engineered Wood & Vinyl Hydronic in Gypcrete/Lightweight Concrete**

- Glue Down Concrete Thermal Mass – Wood Subfloor, LVT&P, PVP: Adhesive must be approved by adhesive manu-facturer for use with radiant heat.
- Concrete/Gypcrete thermal mass must have vapor control capabilities built in. Moisture needs to be controlled below thermal mass not with surface sealers. Thermal mass must be rated at a compressive strength of 2500 psi or greater.
- Some adhesive manufacturers warrant use over thermal mass of less than 2500 psi. See adhesive manufactures instructions.
- Thermal mass with less than 2500 psi compressive strength without adhesive acceptance of lower compressive strength must use floating installation method if allowed. Follow all adhesive manufacturer's installation and Hallmark Floors installation instructions.

NOTE: See Hallmark Floors installation instructions, hydronic and electric system manufacturer guidelines.

WARNING: SUBFLOORS FOR BOTH METHODS OF HEATING MUST BE DRY AND REMAIN DRY FOR LIFETIME OF THE FLOOR.

FAQ FREQUENTLY ASKED QUESTIONS

Radiant Heat Systems:

In-floor heating systems must be Hallmark Floors® approved hydronic or electric systems. Placement of both radiant and flooring systems should be installed in a manner consistent with Hallmark Floors and radiant heat systems installa-tion instructions. Hydronic and electric systems should be designed with controls that have in-floor sensors to prevent the surface temper-ature of the hardwood floor from exceeding 80° F.

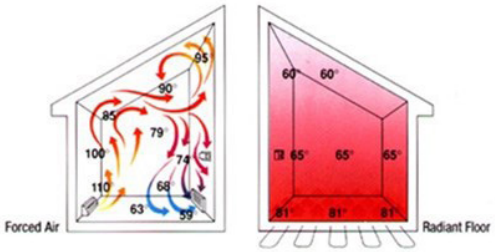
Q. What are the differences between hydronic and electric radiant heat systems powered by FiberThermics®?

A. 1. Hydronic is a water-based system, where the water is heated by a boiler and pumped through flexible tubing by a pump. The warm water is run through a concrete thermal mass, or through a wood subfloor assembly with alumi-num sheeting to assist in evenly radiating the heat through the floor.

2. Electric systems powered by FiberThermics® create heat by a converting electricity generated by either green or traditional methods. The structures' own electrical power is all that is necessary. Electric radiant heat is very efficient and almost 100% of the energy is used to heat the floor.

Q. What is the difference between heat generated by HVAC (forced air & heat) and radiant heat?

A. 1. HVAC heats the air from the top down. Radiant heat warms the room from the bottom up. Since radiant floor heat is attracted to people and objects, and warms the body from the floor, radiant heat feels 6-8 degrees (F) warmer than forced air. Utility providers publish potential energy cost savings of 3-5% for every degree the thermostat is turned down.



2. Not All Heat Rises; Warm air rises. Since radiant heat is heating the floor vs. the air, allow the occupants to absorb heat more efficiently and feel warmer at lower operating temperatures.

Q. How long before installation of the floor should the radiant heat system be powered on?

A. Hydronic:

1. Tubing in Concrete Thermal Mass:
Once Thermal- Mass is dry: Two to three weeks prior to installation of the hardwood or vinyl flooring with the thermostat set at 70° F and then at 85° F for 3 more days. If tubing is encased in concrete or gypcrete the home should be aired out briefly eve-ryday to allow excess humidity from the thermal-mass to exhaust moisture out of the structure.

2. Aluminum Channel Board/Aluminum Hangers/ aluminum Sheeting:
These systems are part of wood subfloor assem-blies. The subfloor should be dry and have an EMC within two percentage points of the wood flooring and No more than 12% EMC for the installation of vinyl.

A. Electric Fabric-Heating Underlayment or Mat with Thermal Cut Off:

HVAC or Temporary heat should be used during Installation to bring up temperature during severely cold weather. These systems are then turned on after installation of the flooring.

Once the system is connected to a power source the starting temperature of the floor should be observed on flooring thermostat. Temperature of the system should be increased no more than 2 ˚F per day until desired floor temperature is achieved (no more than 80˚ F) generally 72 to 74˚ F is most common for optimum level of comfort.

NOTE: See installation instructions for site conditions and acclimation information.

Q. At what point should a Hallmark Floors be installed?

A. Hydronic & Electric: Hardwood & Vinyl flooring should be the last item installed on the project. All windows and doors must be in place and the structure completely weather tight. If the tubing/heating element is encased in lightweight concrete, the concrete must be completely dry. Kitchen cabinets must be in place prior to installation of the floor. The relative humidity conditions must be between 35 and 55%, and the temperature between 60- and 80°F

FREQUENTLY ASKED QUESTIONS

Q. How do they compare?

A. Each System has its pros and cons. Hallmark Floors make not distinction regarding system types.

HYDRONIC VS. FIBERTHERMICS® ELECTRIC SYSTEMS

	Hydronic		FiberThermics®	
TOPIC	**Pro**	**Con**	**Pro**	**Con**
1. Usually is used as Sole Heat Source.	X			X
2. Cost effective installation.		X	X	
3. Risk of damage due to installation minimized. Repair is simple.		X	X	
4. Excessive heat build up near manifold, through doorways and in hallways due to heater spacing.		X	X	
5. Minimal structural disruption.		X	X	
6. May require pouring thermal mass of concrete. Long waiting time for drying before floor install.		X	X	
7. Geothermal option for renewable energy.	X			X
8. Solar, wind, hydro-electric option for renewable energy.	X		X	
9. Potential for water related damage to structure.		X	X	
10. Uniform Heat Distribution.		X	X	
11. Shortened production schedule. Can be installed at the same time as the floor.		X	X	
12. Can be added to any flooring project new and retrofit in less than a day.		X	X	
13. Heating power output limited to prevent damage to floor coverings.		X	X	

Q. Do floating floors have surface movement?

A. Hydronic & Electric: A floating floor will have a degree of resilience or give that a nail-or-glue-down floor does not have. However, even a nail-down or glue-down floor will experience some movement. Subfloor conditions will dictate the amount of movement.

NOTE: Floating vinyl floors are subject to minimal surface deflection. Subfloor level specifications must be met to keep deflection withing acceptable norms

FREQUENTLY ASKED QUESTIONS

Q. Should the floor be acclimated?

A. Hydronic and Electric:

1. Solid Wood: Should be acclimated in the anticipated climate in which it will be used. Acclimation should be undertaken for whatever length of time is required to reach the desired EMC (equalized moisture content in the sold wood floor.

2. Engineered Wood: Since the floor is engineered, as such it is pre-acclimated to a 35 to 55% environment. As such long acclimation times are not required. Place the material on fully climate controlled site 24 hours prior to installation.

3. LVT 48hrs, Rigid SPC 24 hrs.

Q. Should radiant heat be turned on before weather becomes cold?

A. Hydronic and Electric: In-Floor Radiant heat systems should be turned in the fall and the heat increased gradually. This is necessary to avoid shocking the wood or vinyl floor. The temperature needs to be increased slowly with less stress to the floor.

A. Hydronic: An exterior thermostat can be used to automatically begin those adjustments. Or the thermostat can be programed or manually managed to make those changes.	**Electric** In the fall (before it gets cold) the thermostat should be set to sense the floor temperature. The thermostat can be programed or manually set to increase the temperature 2˚F per 24 hours.

Q. Can the thermostat/radiant system be turned off overnight?

A. Hydronic and Electric: The heating system should not be turned off overnight. Wood and vinyl can be subjected to unnecessary stress. Once the system is at operating temperature at the beginning of the heating season the temperature can be changed up or down 5˚ F within a 12-hour time frame (up in the morning, down at night).

Q. Are there any design limitations you need to be aware of?

A. Hydronic and Electric FiberThermics® Electric Radiant Heat Mats: Radiant heat is very efficient but does have some limitations when ceilings exceed 10’ in height. The amount of cubic air volume to be heated can create problems when system is not properly designed with an in-floor temperature sensor. In-floor temperature sensors are placed in rooms/zones and tell the thermostats that the floor is getting too hot and can adjust the temperature down. Damage to both wood and vinyl can occur without sensors due to the high volume of space to be heated.

Rooms with high ceilings may require in floor radiant heat to be supplemented or air movement created to circulate the air and if necessary, introduce humidity in the room HVAC system and/or ceiling fans can be used to circulate the air.

NOTE: All systems should have a in-floor temperature sensors in the floor to ensure the surface temperature of the floor never exceeds the recommended maximum of 80° F. Hallmark Floors requires that ALL in-floor radiant heat systems MUST have in-floor temperature sensors and control.

FREQUENTLY ASKED QUESTIONS

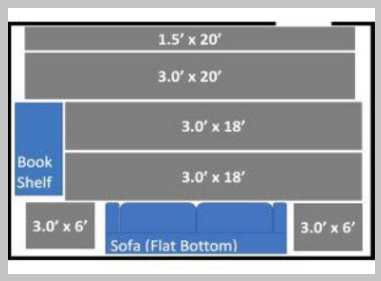
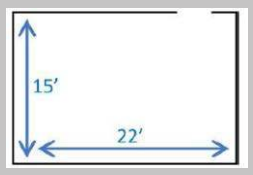
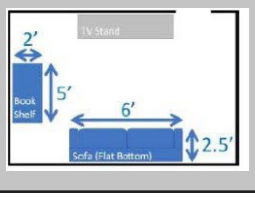
Q. Are all in-floor radiant heat systems OK for use with Hallmark Wood & Vinyl Floors?

A. Only the systems that ensure a very even distribution of heat over the heating system should be used.

Hydronic:	**Electric**
Systems that do not include thermal mass or alumi-num transfer sheets will not provide even distribution of heat. Properly configured systems will not have tem-perature variations exceeding 3° F within a 2' radius, 5˚F within 5' radius, and not exceed surface temperatures of 80° F.	Properly configured systems will not have temperature variations exceeding 3° F within a 2' radius, 5˚F within 5' radius, and not exceed surface temperatures of 80°F within the bounds of the heating system area. FiberThermics® Fabric-Heating Mats with Thermal Cut Off have the heating element spaced at 3". This spacing ensures a very even distribution of heat to the flooring.

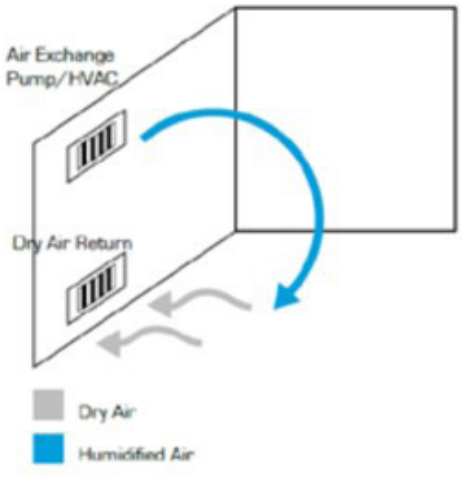
Q. Can area rugs, closed bottomed furniture such as bookcases and entertainment units, bean bags, pet beds and foam based couches/chairs increase thermal resistance and overheat a wood or vinyl floor?

A. Depending on the thickness of the area rug, a situation can develop where the floor could be overheated. Closed bottomed furniture, bean bags and furniture that does not allow airflow underneath can result in overheating the wood floor.

Hydronic:	**Electric**
A well-designed radiant system is usually operating well below the maximum of 80° F. However, the thicker the rug pad under the rug and the denser the material the rug is made from can create a hot spot under the rug. This does limit the maximum efficiency of a hydronic systems. Closed bottomed furniture can also make it necessary to operate the system at much lower temperatures than is desirable. Closed bottom furniture, bean bags, foam couches and pet beds trap heat and prevent sufficient air movement over the floor. NOTE: Wait 48 hours after floors are installed and radiant heat is up to operating temperatures. To installation of the floor. After rugs are in place the rugs should be turned back within 48 hours and checked with a laser surface thermometer to determine if the rug is making the floor too hot. Adjust the heat down as necessary.	Electric systems should be designed for the space in such a configuration so the individual heating sections can be disconnected or not installed under obstructions to airflow over the floor. Closed bottom furniture, bean bags, foam couches and pet beds trap heat and prevent sufficient air movement over the floor. Example: WarmStep® Fabric-Heating Mats can be configured as shown (Fig. 11-1, 11-2, 11-3) to avoid heat in areas where it is detrimental to the floor.   

FREQUENTLY ASKED QUESTIONS

Q. Can radiant heat damage a wood floor?



A. Hydronic and Electric:
Poorly designed, passive radiant systems can damage a wood or vinyl floor. Air movement and proper humidity are the real issue vs. the in-floor radiant heat system. Lack of air movement and humidity control are responsible for dry floors for which the in-floor radiant heat many times is incorrectly identified as the source of the damage.

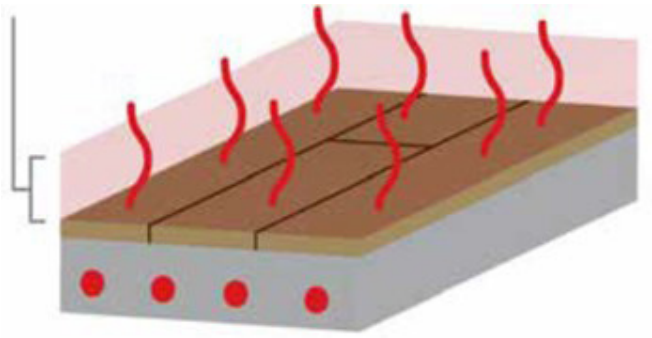
These issues affect forced air, wood stove heating, and baseboard heating equally. Overheated floors create a dry zone above the floor where lack of humidity and air movement add to a hostile environment for the floor. Dry and damaged floors are more generally related to the low relative humidity in the space and insufficient air movement to disperse the humidity properly. Adequate environmental control is crucial to proper performance of the floor. Surface temperature should not ex-ceed 80°F.

Q. What is passive in-floor radiant heat?

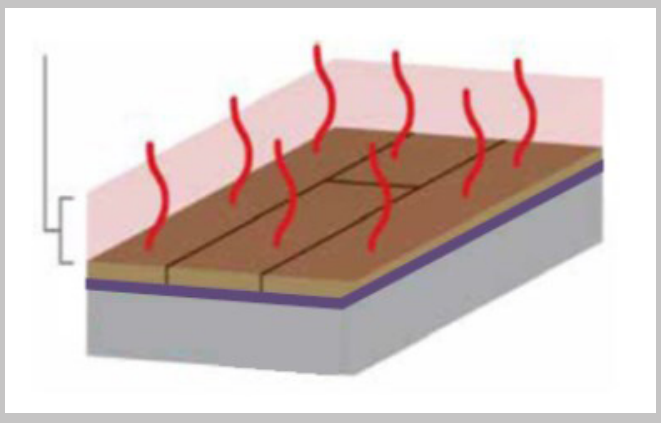
A. Hydronic and Electric: Passive in floor radiant heat is a situation where the structure cannot move air and control humidity. Standard oper-ating temperatures in practice are 72 to 74˚ F, and moderate air movement effectively breaks up that one allowing humidity in the air to sustain a healthy moisture content (EMC) in the wood floor.

Positive air movement also benefits vinyl flooring as well.

Hydronic:



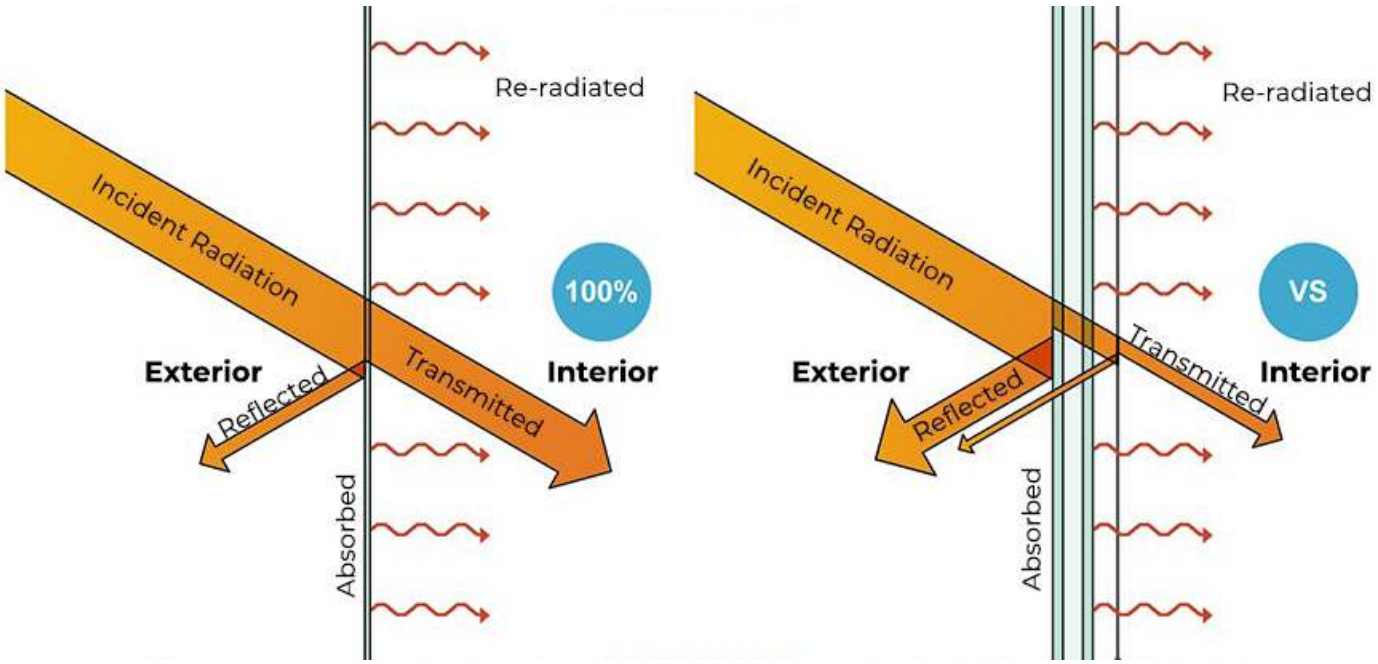
Electric



FREQUENTLY ASKED QUESTIONS

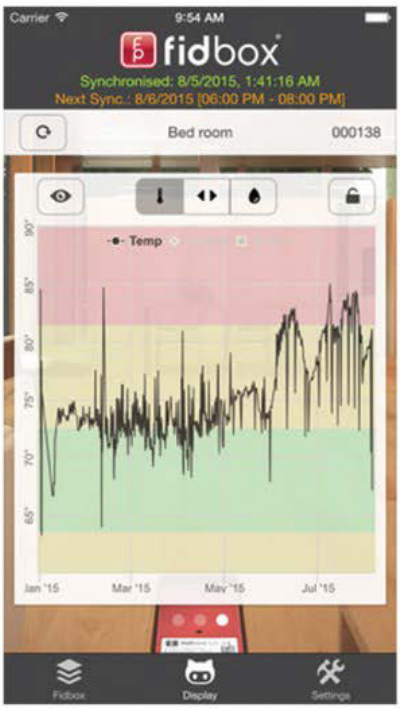
Q. Does sunlight coming through windows adversely affect flooring performance?

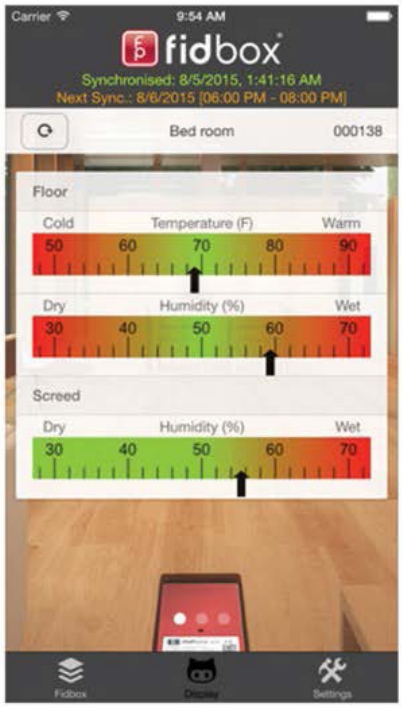
A. Yes. Regardless of the heating system, solar gain or loss can have a detrimental effect on floor. When planning your project all environmental factors including the solar impact need to be considered.

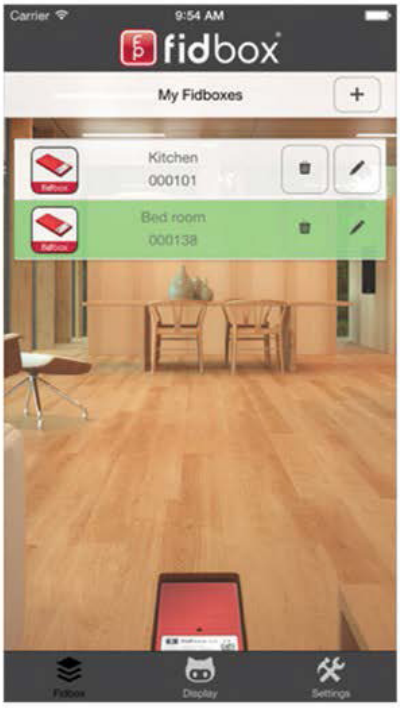


Q. Is there a way to avoid issues due to Low or High Moisture.

A. Yes. A Low Moisture / High Moisture Warning System can be installed at the same time as the radiant heat and the flooring. Fidbox, a data logging device that is Bluetooth connected and helps track the condition of the floor. Since proper climate and humidity control is required as a standard by Hallmark Floors and the entire wood floor industry, this device can make the difference between a successful installation and a site or environmental related failure of the wood floor. See Fid Box application instructions at fidbox.net for full instructions on installation and use.







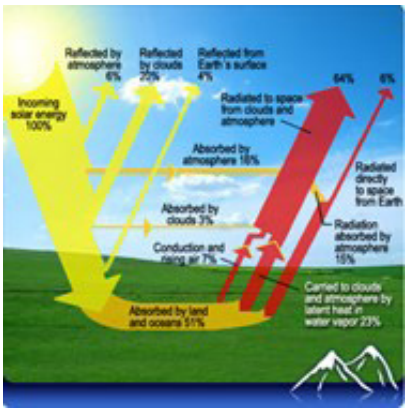
GEOTHERMAL HEATING

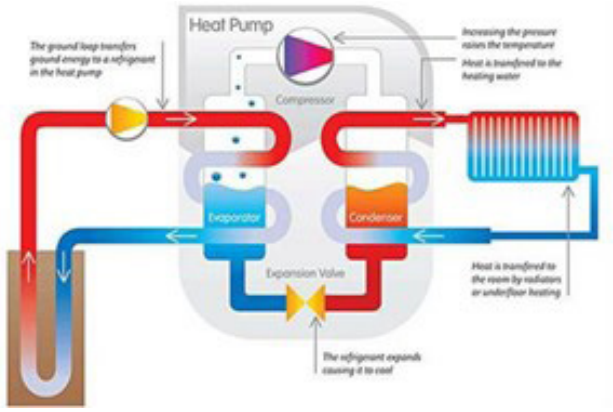
Q. Are geothermal heat pumps acceptable as part of a hydronic radiant heat system?

A. Yes, Geothermal heat pumps (GHPs), sometimes referred to as GeoExchange, earth-coupled, ground-source, or water-source heat pumps, have been in use since the late 1940s. They use the con-stant temperature of the earth as the exchange medium instead of the outside air temperature. The heat extracted from the ground is transferred to the boiler making it more energy efficient.

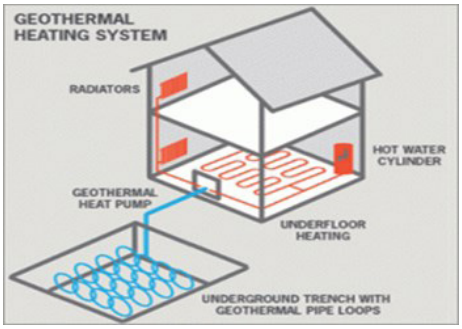
Although many parts of the country experience seasonal temperature extremes -- from scorching heat in the summer to sub-zero cold in the winter—a few feet below the earth's surface the ground remains at a relatively constant temperature. Depending on latitude, ground temperatures range from 45°F (7°C) to 75°F (21°C). Like a cave, this ground temperature is warmer than the air above it during the winter and cooler than the air in the summer.

The GHP takes advantage of this by exchanging heat with the earth through a ground heat exchanger. is warmer than the air above it during the winter and cooler than the air in the summer. The GHP takes advantage of this by exchanging heat with the earth through a ground heat exchanger.





All wall, baseboard, and wood stove heating should be combined with a whole house humidification system capable of moving the air. All three of these systems are passive in nature. Lack of supplemental air movement and humidity control can lead to inconsistent temperatures in the wood & vinyl flooring.



NOTE: Geothermal systems can also be incorporated into systems utilizing an HVAC or heat pump to heat the air vs. the floor. For the purposes of this guide we have focused on a Heat delivery system.

Q. Can geothermal be used with a heat pump and run through traditional duct work?

A. Yes, The geothermal energy is run through a heat pump (blower motor) to warm the air. Since geothermal is a very expensive system, geothermal is usually used in a radiant manner.

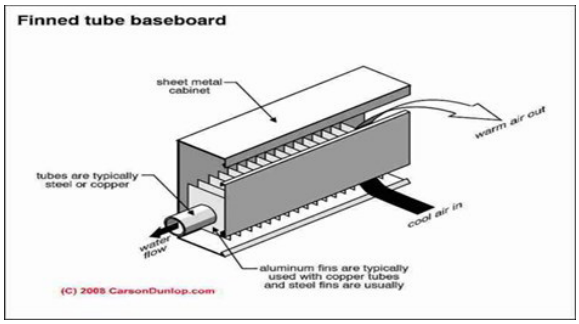
Q. Can geothermal be used to cool the floor in the summer?

A. The NWFA (national wood flooring association) prohibits the use of geothermal for cooling. Due to condensation from the system.

WALL, BASEBOARD & WOOD STOVE HEATING – PASSIVE SYSTEMS

Baseboard Heater Gas or Electric

Baseboard heating systems are passive systems. Without added air movement they can create wide variations in temperature within the floor. Additional humidity control may be necessary. Caution must be exercised with furniture and draperies as to not trap the heat emitted by the heating system.





Wood Burning Stoves

Like any other heating system a great deal of thought needs to go into the functionality of a wood stove. Stoves should be placed on a masonry hearth and set into a masonry fireplace. Free standing stoves should have a masonry or stone wall behind the stove to effectively radiant heat outwards into the room.

Air movement and humidity control must be facto red into the design.

In wall furnace

In wall furnaces are generally passive in nature. Air movement and humidity control are issues that need to be considered.

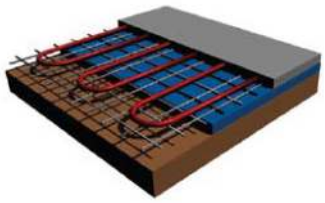


NOTE: See pages Environmental Controls – Support Systems for further information on air movement and humidity control.

HYDRONIC HEATING SYSTEMS - GUIDELINES

What types of hydronic systems are suitable for a Hallmark Floors wood floor floating installation?

1. Lightweight Concrete or Gypcrete Thermal Mass:



The heating tubes are installed and lightweight concrete or gypcrete poured over the tubing. Concrete/ gypcrete acts as a radiator (thermal mass) to provide even distribution of heat. (This is the method is described in previous section.) Although this is the most traditional type of radiant heat, other systems are available.

NOTE: Follow all specific instructions from Hallmark Floors based on product type. Follow all adhesive manufacturers instructions.

CAUTION: Ensure all sources of moisture are eliminated and preventative measures are in place to keep moisture out of structure.

INSTALLATION		
GLUE DOWN		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square	YES	
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
Regatta SPC Core – Engineered Wood	YES	
NAIL DOWN		
NOT APPLICABLE (ALL PRODUCTS)		
FLOATING		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE	YES	
Regatta SPC Core – Engineered Wood	YES	

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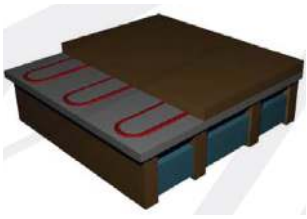
2. Aluminum Hangers:

INSTALLATION		
GLUE DOWN		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square W/ Birch Underlayment	YES	
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
NAIL DOWN		
NOT APPLICABLE (ALL PRODUCTS)		
FLOATING		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE	YES	



The tubing is suspended in aluminum hangers with channels to accommodate the tubing. An efficient conductor of heat, these aluminum hangers radiate heat evenly and effectively upwards. This system removes the need for a concrete thermal mass and eliminates the corresponding weight and elevation gain it produces.
NOTE: Follow all specific instructions from Hallmark Floors based on product type. Follow all adhesive manufacturers instructions.
CAUTION: Ensure all sources of moisture are eliminated and preventative measures are in place to keep moisture out of structure.

3. Open Surface Channeled Aluminum Board



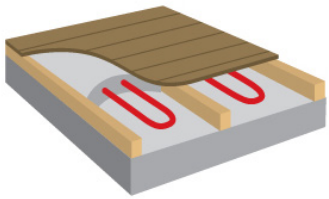
Wood subfloor panels are channeled and an aluminum transfer sheet is vacuum pressed to the surface at the channel board factory. The water tubes are then pressed into the channels, on the jobsite and hooked up to the boiler. The tubing in the channel's transfers heat to the aluminum and generates very even results. Since there is less loss of thermal energy, this system is more efficient than others.
NOTE: Follow all specific instructions from Hallmark Floors based on product type. Follow all adhesive manufacturers instructions.
CAUTION: Ensure all sources of moisture are eliminated and preventative measures are in place to keep moisture out of structure.

INSTALLATION		
GLUE DOWN		
Engineered Wood: (hickory excluded) NOTE #1		NO
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
Regatta SPC Core – Engineered Wood		NO
NAIL DOWN		
NOT APPLICABLE (ALL PRODUCTS) NOTE #2		
FLOATING		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
Regatta SPC Core – Engineered Wood		NO

NOTE 1: GLUE-DOWN OF ENGINEERED FLOOR (EXCLUDING HICKORY) IS PERMITTED BY WARM BOARD. HOWEVER, CHECK WITH ADHESIVE MANU-FACTURER FOR COMPATIBILITY WITH PEX TUBING.
NOTE 2: NAIL-DOWN IS PERMITTED BY WARM BOARD, HOWEVER NAILING THROUGH ALUMINUM LAYER CREATES A POTENTIAL FOR FASTENERS TO ACT AS A HEAT SINK AND CREATE DISCOLORATION AT THE SURFACE OF THE PLANK. NAIL DOWN IS NOT PERMITED OVER HYDRONIC RADIANT HEAT.
HALLMARK FLOORS DOES NOT WARRANT AGAINST LEAKING PEX TUBING CAUSED BY METAL TROWELS, OR BY FASTENER PUNCTURES.

4. Sleeper System with Deck:

INSTALLATION		
GLUE DOWN		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square W/ Birch Underlayment		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
Regatta SPC Core – Engineered Wood		NO
NAIL DOWN		
NOT APPLICABLE (ALL PRODUCTS)		
FLOATING		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO



Sleeper system is applied to subfloor. Heat tubing is then run between the sleeper system. A plywood deck/substrate with an aluminum sheet applied to the bottom side (towards tubing) is attached to the sleepers.

NOTE: Follow all specific instructions from Hallmark Floors based on product type. Follow all adhesive manufacturers instructions.

CAUTION: Ensure all sources of moisture are eliminated and preventative measures are in place to keep moisture out of structure.

ELECTRIC HEATING SYSTEMS – GUIDELINES
FABRIC-HEATING UNDERLAYMENT OR MAT WITH THERMAL CUT OFF - NEW FOR 2020

What types of electric systems are suitable for a Hallmark Floors® wood, floating, glue, glue assist nail, and nail-down? (Floating for Courtier and Regatta)

Concrete or Wood subfloor :

The NWFA has released an updated and comprehensive Hardwood Flooring Installation Guide, (Jan, 2020, 183 pgs.), with electric radiant heat systems covered on pages 92 – 97. The NEW Guidelines also expand on the Requirements, Operation, Wood Selection and Installation Methods of wood flooring over the variety of available heating systems on pages 97-101. To select the most versatile system, Hallmark Floors has opted to approve only one type of NWFA specification for this guide: Fabric-Heating Underlayment or Mat with Thermal Cut Off.

Heating Systems powered by FiberThermics® and designed for use with wood or vinyl floors, comply with this NWFA electric heating classification.



Electric heating systems powered by FiberThermics, paired with compatible flooring are usually installed at the same time. Because of this installation flexibility, electric systems are used to add floor heating during remodeling or new construction. The heating elements are evenly spaced inside of the underlayment or mat. These systems are usually placed directly on the subfloor in the case of glue or nail-down installations. In the event of floating installations it is placed on top of an approved underlayment pad if it is not already part of the heating system. These systems are also approved for use with floating flooring that has a pre-attached pad.

Fabric-Heating Underlayments or Mats with Thermal Cut Off are specified by the NWFA as being in direct contact with the bottom of the flooring.

NOTE: Follow all specific instructions from Hallmark Floors based on product type. Follow all adhesive manufacturer instructions.

CAUTION: Ensure all sources of moisture are eliminated and preventative measures are in place to keep moisture out of structure.



INSTALLATION		
GLUE DOWN		
Engineered Wood: (hickory excluded) Double Glue Down – mat to subfloor	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE		NO
Regatta SPC Core – Engineered Wood		NO
NAIL DOWN		
ENGINEERED WOOD: (HICKORY EXCLUDED)	YES	
SOLID WOOD FLOORING: (HICKORY EXCLUDED)	YES	
NAIL-DOWN / GLUE ASSIST		
Engineered Wood: (hickory excluded) Glue Down mat – Serpentine Bead of Glue / Bottom	YES	
Solid Wood Flooring: (hickory excluded) Glue Down mat – Serpentine Bead of Glue / Bottom	YES	
FLOATING		
Engineered Wood: (hickory excluded)	YES	
Luxury Vinyl 3Twenty, 2Twelve & Times Square		NO
Solid Wood Flooring: (all excluded)		NO
Courtier Premium Vinyl Rigid/SPC: IXPE	YES	
Regatta SPC Core – Engineered Wood IXPE	YES	

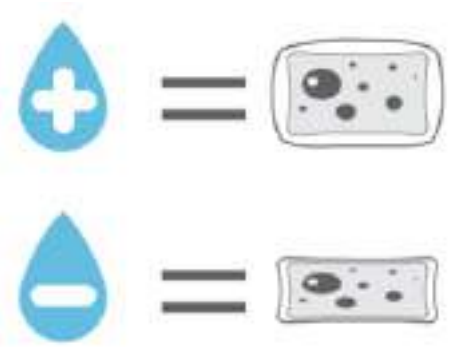
ENVIRONMENTAL CONDITIONING - SUPPORT SYSTEMS

Hallmark Healthy Home & Floors
Home is were the heart is. Interior design should be fashionable , functional, practical, and provide a healthy environ-ment for all. These things are important to Hallmark Floors.

In this section we will talk about indoor environmental controls, that not only promote human health, but also protect our homes and their contents. We will discuss the nature of wood and how it will react to its environment positively, or negatively. At Hallmark Floors we believe there is very little information available in the marketplace regarding these issues. This publication will explain why indoor climate and humidity control is so important for human health. Also we will take a look at environmentally responsible manufacturing in relation to indoor air quality.

Understanding Wood and Humidity

Wood is HYGROSCOPIC and will absorb and release water. Properties change depending on moisture content. As we continue to explore this amazing substance called wood, many will learn things they never realized before. Once understood wood is no longer a mystery, and its physical behaviors.

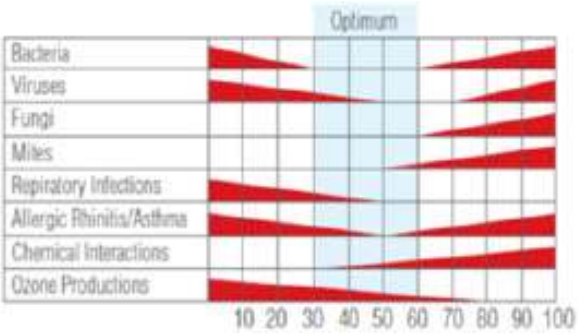


Wood becomes wider or narrower. In a dwelling expansion / swelling, occurs with a rise in humidity and contraction / shrinking occurs with a drop in humidity. Wood was once a living thing. At the microscopic level the cell linings are like the sponge described above, expanding and contracting with changes in moisture content. Once dry, wood will still expand and contract, in reaction to the humidity levels found in the room or to the intro-duction of moisture from other sources, such as structural leaks.

Climate Control & You:

Indoor climate and humidity control are the key to proper wood and vinyl performance, personal comfort and human health.

Control of humidity levels in the atmosphere is vital to optimum health. If humidity levels are not maintained within the 35 to 55% humidity range, it can have adverse effects on human health.



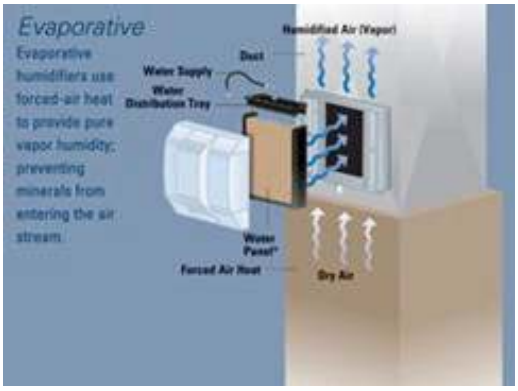
The Center for Disease Control and Prevention recom-mends humidity be set between 35%-50%. An ARIC report notes that areas with a relative humidity of lower than 50% had fewer rates of asthma.
Low humidity can lead to discomfort such as dry, itchy skin or throat irritation. Low atmospheric humidity pulls moisture out of humans and their pets. Lower moisture in the respiratory system can lead to upper respiratory distress. Low humidity and high humidity environments present multiple health challenges.

ENVIRONMENTAL CONDITIONING - SUPPORT SYSTEMS

Humidification Systems

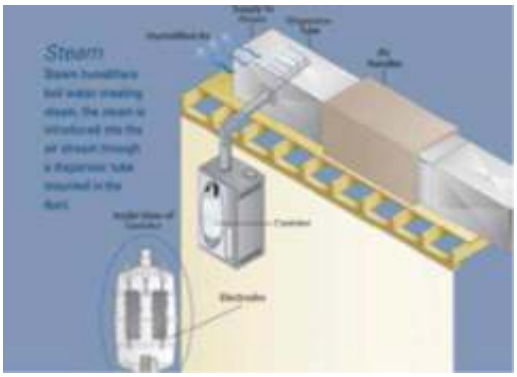
Climate Control Systems

A large number of options exist for the heating and cooling of structures. This publication will attempt to discuss the ba-sics and is for the purpose of general information. Consult HVAC specialist to assist in selecting the correct options for any residence.



Bypass Humidifier

Water vapor is delivered naturally. Water is delivered to the humidifier, The air temperature and air flow evaporate. The water into the air, increasing humidity.



Steam Technology

Water is heated to steam temp and is delivered into the HVAC duct system. The steam disperses into the ducting, through a dispersion tube. The HVAC or heat pump distributing the humidity through the structure.

NOTE:
PASIVE HEATING SYSTEMS:

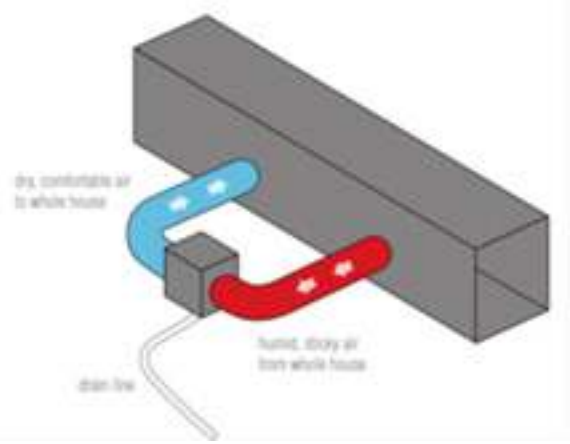
Ductless steam humidification systems are available for structures that do-not have HVAC or heat pump ducting. If the primary heat source is Radiant Heat, Baseboard Heaters, Wall Heaters, or Wood Heating, the structure must still be humidified. This can be accomplished with plumbed steam unit lite seen in Fig: 20-2 which is routed to a fan for dispersal of the humidity into the structure.

Proper humidity control means all forms of heating systems become far more efficient (moist air is more efficient at holding heat). It also provides protection for human health and cabinets, furniture, wood floors, vinyl floors, fabrics, and wooden musical instruments.

Countertop Humidifiers, are not satisfactory for whole house humidification. A 1,250 sq. ft. home in a dry region will require a humidity load that will use between 5.3 to 15.9 gallons of water per day. A 4,000 sq. ft. home in the same conditions will require 17 to 51 gallons per day to maintain proper humidity conditions. Countertop humidification systems cannot evenly distribute the proper amount of moisture to the entire structure.

ENVIRONMENTAL CONDITIONING - SUPPORT SYSTEMS

Dehumidifiers



The function of a dehumidifier is to remove excess moisture from the air and through drainage get the moisture out of the units. Portable dehumidifiers just like humidifiers have very low capacity and in the case of a dehumidifier pans or buck-ets must me regularly emptied. Portables are highly visible and noisy. Indoor hu-midity can come from several sources. Homes with basements or crawl spaces can be adding huge amounts of moisture to the residence and as a result rot, mold, and insect attack become more likely. Sometimes, with basements, crawl spaces, or attics a stand-alone unit with plumbed drainage is needed to address the microcli-mate found there. A separate dehumidifier can be in the HVAC to remove exces-sive humidity in the living areas of the structure. Crawl spaces especially which have no direct air exchange from the living areas can be very beneficial.

Dehumidification Systems & HVAC

There are months between summer and winter when outside temperature is below 76 degrees and the RH is above 60%. Air conditioner load is low and run time is not adequate to remove excess humidity. AIR CONDITIONING - ITSELF IS NOT THE ANSWER Example: 68% of the time homes in Tampa/St. Petersburg need a dehumidifier between October – April Temperature below 76° F and relative humidity above 60%. See NOAA National Climate Data Center.

In all areas that experience high outdoor humidity and temperatures HVAC-Air Conditioning can experience high unit loads to remove the excess humidity in the home. Addition of a whole hose dehumidifier can lessen the load on the ac unit.

Indoor Air Quality –Sick Building Syndrome
According to AHRI… (Air Conditioning, Heating and Refrigeration Institute)

Evolution in Building Construction
Prior to 1975, Houses were loose, which meant that while a good exchange of air took place it was not very energy effi-cient. The Energy Crisis of mid 1970s changed everything In the 1980s houses became tighter

- Higher quality windows
- More efficient furnaces
- More attention to passive solar practices
- Higher quality windows
- More efficient furnaces
- More attention to passive solar practices
- Far less air exchange

Resulting changes in construction practices…
- Houses became sealed too tight.
- As outdoor air became cleaner indoor air became more polluted.
- Gases, moisture, odors were trapped inside
- Houses were more energy-efficient, but comfort, health & energy preservation can be at cross purposes if HVAC systems are not well.

ENVIRONMENTAL CONDITIONING - SUPPORT SYSTEMS

Fresh Air Exchange

A shift towards healthy indoor living.
The solution to pollution is dilution = Ventilation/Air Exchange.

Controlled ventilation was required to improve indoor air quality due to tight energy efficient buildings.

- The industry realized the need to bring in fresh air to maintain acceptable indoor air quality levels.
- Fresh air is necessary for comfort, health and preservation of structure, furniture, cabinets.

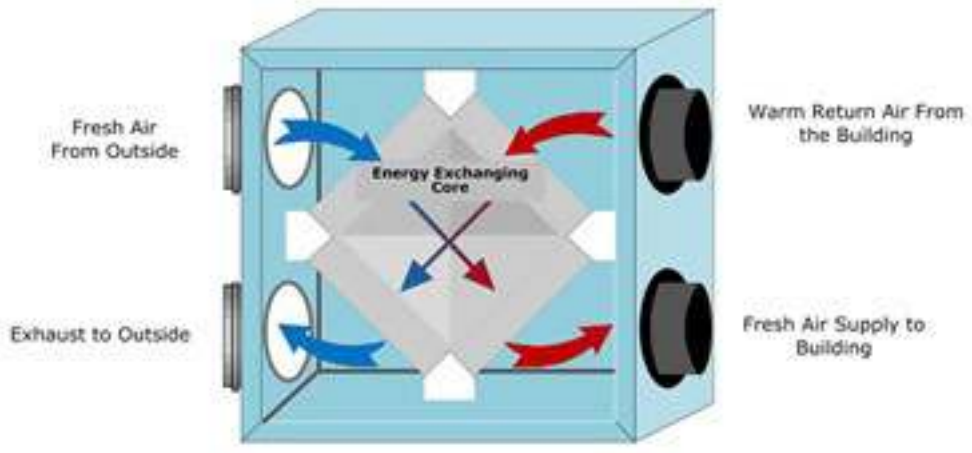
Introducing fresh air via outdoor air infiltration creates an unacceptable spike energy use and will lead to poor control of humidity.

ENERGY RECOVERY VENTALATION ERV - CONTROLLED

The object of ventilation is to return to the benefits of loose construction, without the corresponding energy loss. This is accomplished using Energy Recovery Ventilation (ERV). ERV does not replace climate and humidity control. It is designed to replace stale air with fresh air.

The goal is to increase total air replacement to more turns per hour. An ERV reduces indoor pollution while retaining indoor temperature and humidity levels.

ERV units allow the recovery of energy without loosing indoor humidity to the outdoor environment. As fresh air is cycled into building outdoor humidity conditions are prevented from influencing indoor humidity levels.
HEAT RECOVERY VENTALATION ERV – NOT CONTROLLED



CAUTION: HRV (heat recovery ventilation) also provides fresh air exchange in a way that is like an ERV. However HRV, does not control humidity exchange. Therefore the humidity levels outdoors whether high or low can negatively affect indoor humidity control.

NOTE: The purpose of this publication is to promote a better understanding of indoor environmental conditions. Home site conditions vary and the issues de-scribed do not affect all structures and situations equally. An HVAC specialist should always be consult-ed.

For additional research information:

Hallmark Floors
www.hallmarkfloors.com
Aprilaire Whole House Products
www.aprilaire.com/whole-house-products

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2024.v2