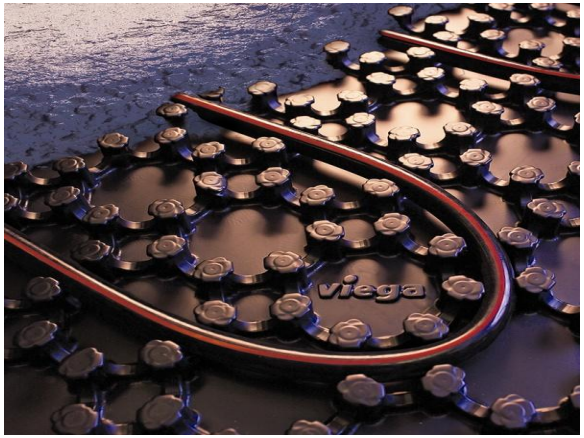
Michael Norgan
Radiant Sales Manager
michael.norgan@viega.com
Michigan – Indiana - Ohio



Why Radiant?

Advantages Of Radiant

Homeowner

- Comfort
- Energy Efficiency
- Versatility
- Clean
- Quiet
- No Furniture Restrictions

Advantages Of Radiant

Contractor

- Less Labor = More $$$
- Ease of Installation
- Connection Methods
  - Durable
  - Reliable
- Support (The Viega Partnership)
  - State of the Art Educational Facility
  - Technical Support
    - Design & Layout Service
  - Factory Field Sales
  - Distributors

Heat Transfer

- Convection
  - Natural Convection – buoyancy differences within the fluid itself cause it to move along a surface.
    - Baseboard
    - Radiant
    - Radiator

  - Forced Convection – a fluids motion is created by either a circulator or a blower. This will create more motion thus more heat transfer over the surface
    - Forced Air

Heat Transfer

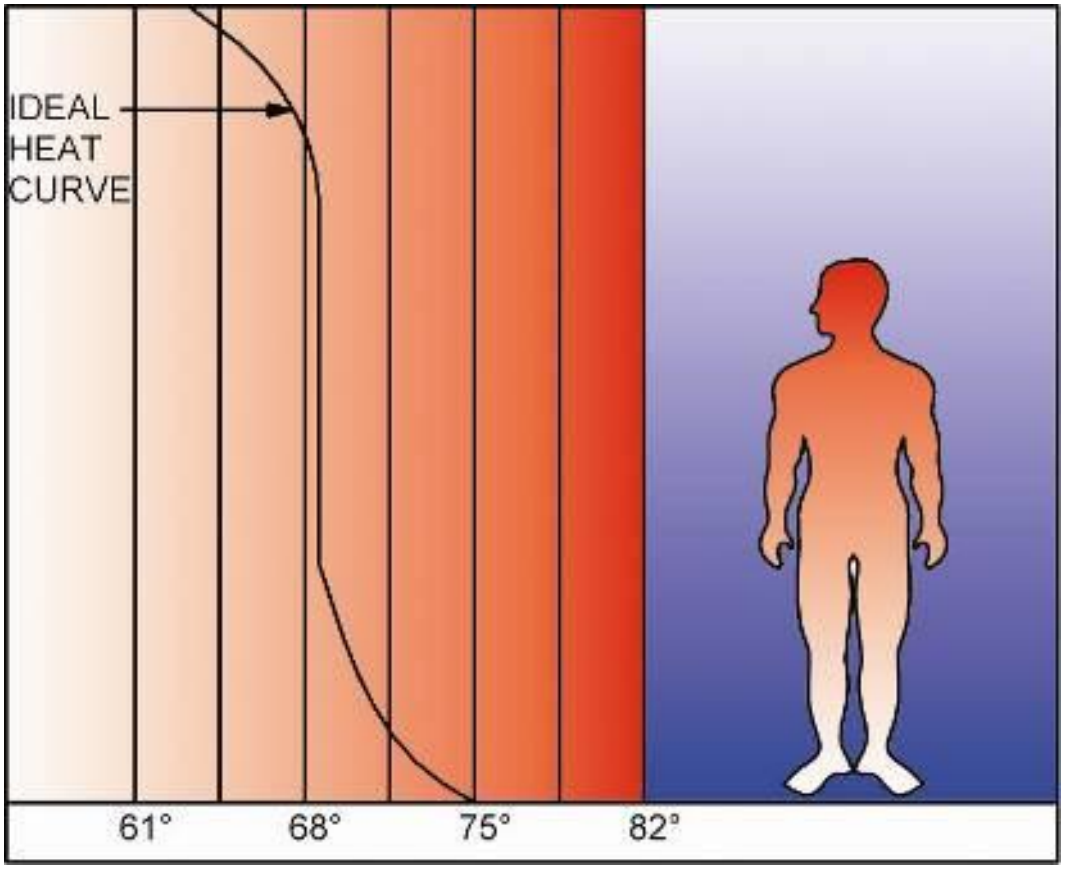
- Radiation
  - For example a fire is radiating heat toward you without a medium between the two
    - Baseboard
    - Radiant
    - Radiator

Heat Transfer

- Conduction
  - An example of this is walking on hot asphalt in the summer; your feet feel hot through conduction.
    - Radiant

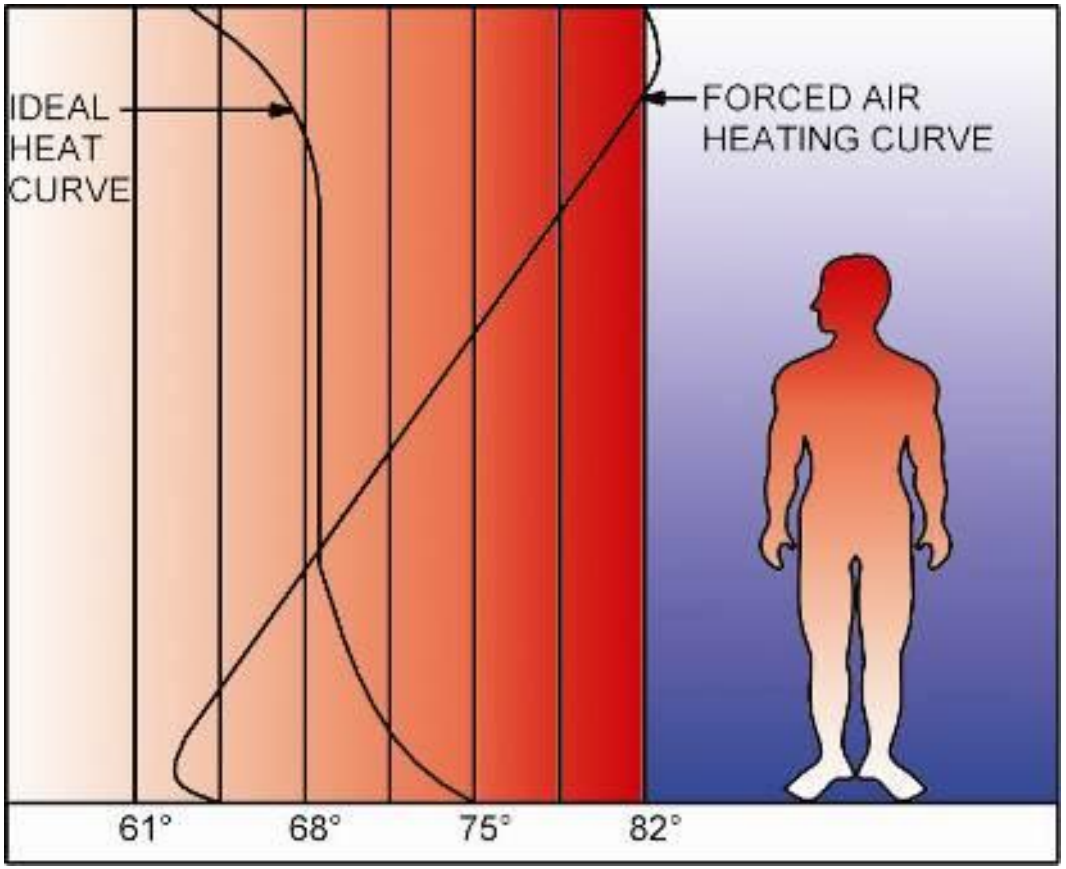
Ideal Heating Curve

- Extremities typically receive minimal heat from the bloodstream.
- Head has a good supply of heat-carrying blood.
- Air temperature should vary from floor to ceiling.
- Warm at floors.
- Cool at head level.



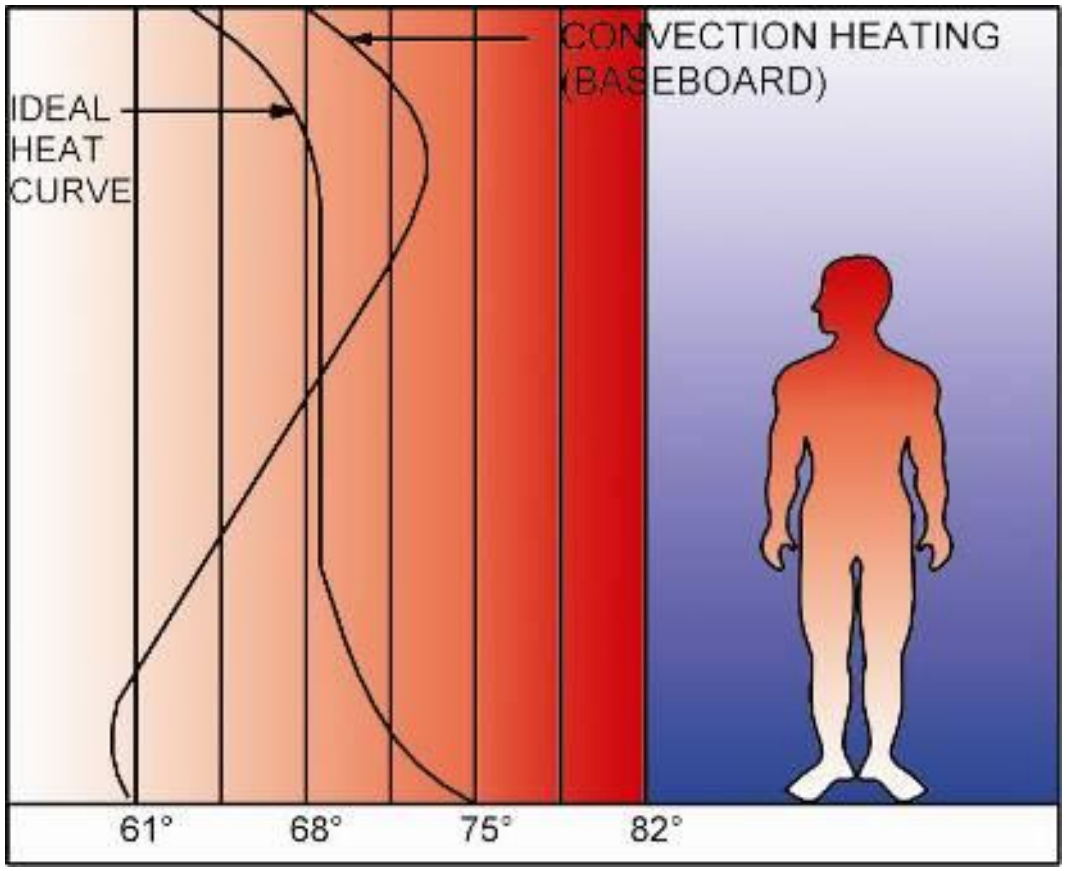
Forced Air Heating Curve

- Exact opposite of the ideal heat curve.
- Cold feet – hot head
- Cold drafts may occur.
- High temperature air may be blown at occupants.



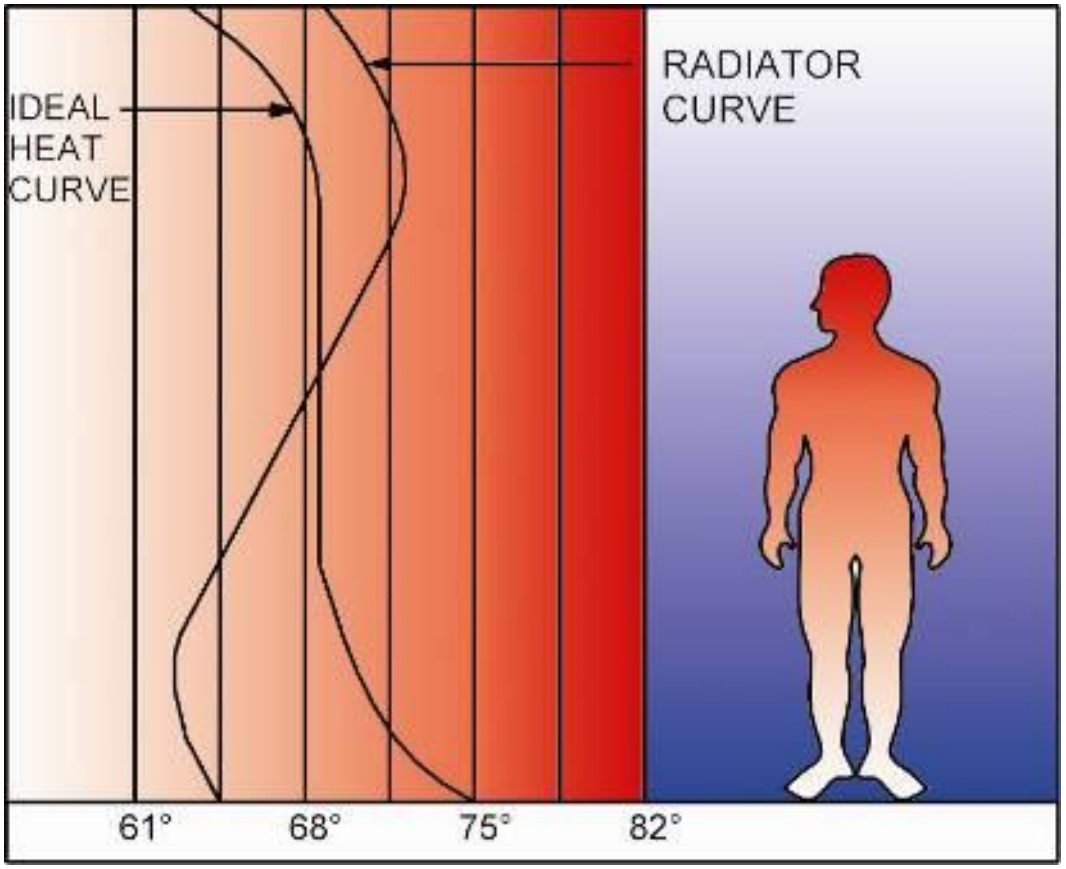
Baseboard Heating Curve

- Has minimal surface area.
- Operates at high water temperatures.
- Tends to create uneven pools of warmth.



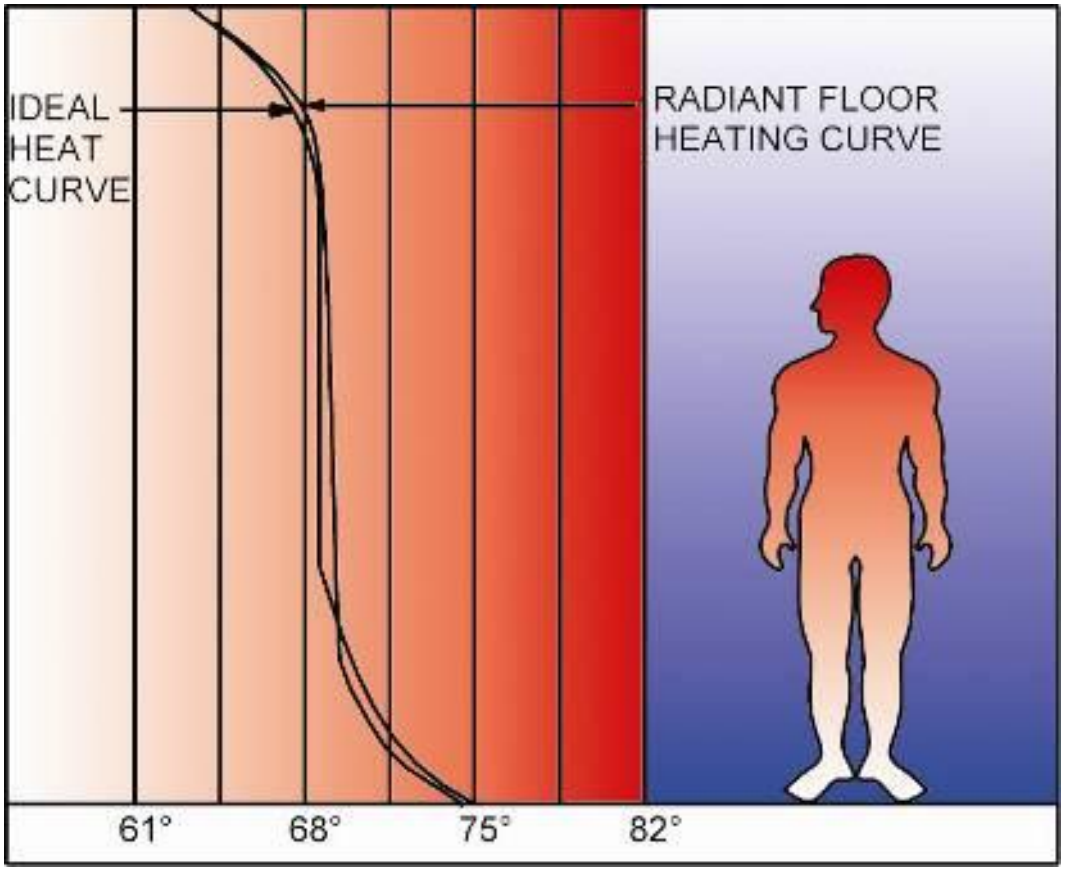
Radiator Heating Curve

- Operates at high water temperatures.
- Most of the heat is delivered by convection.
- Creates convective warm air currents.

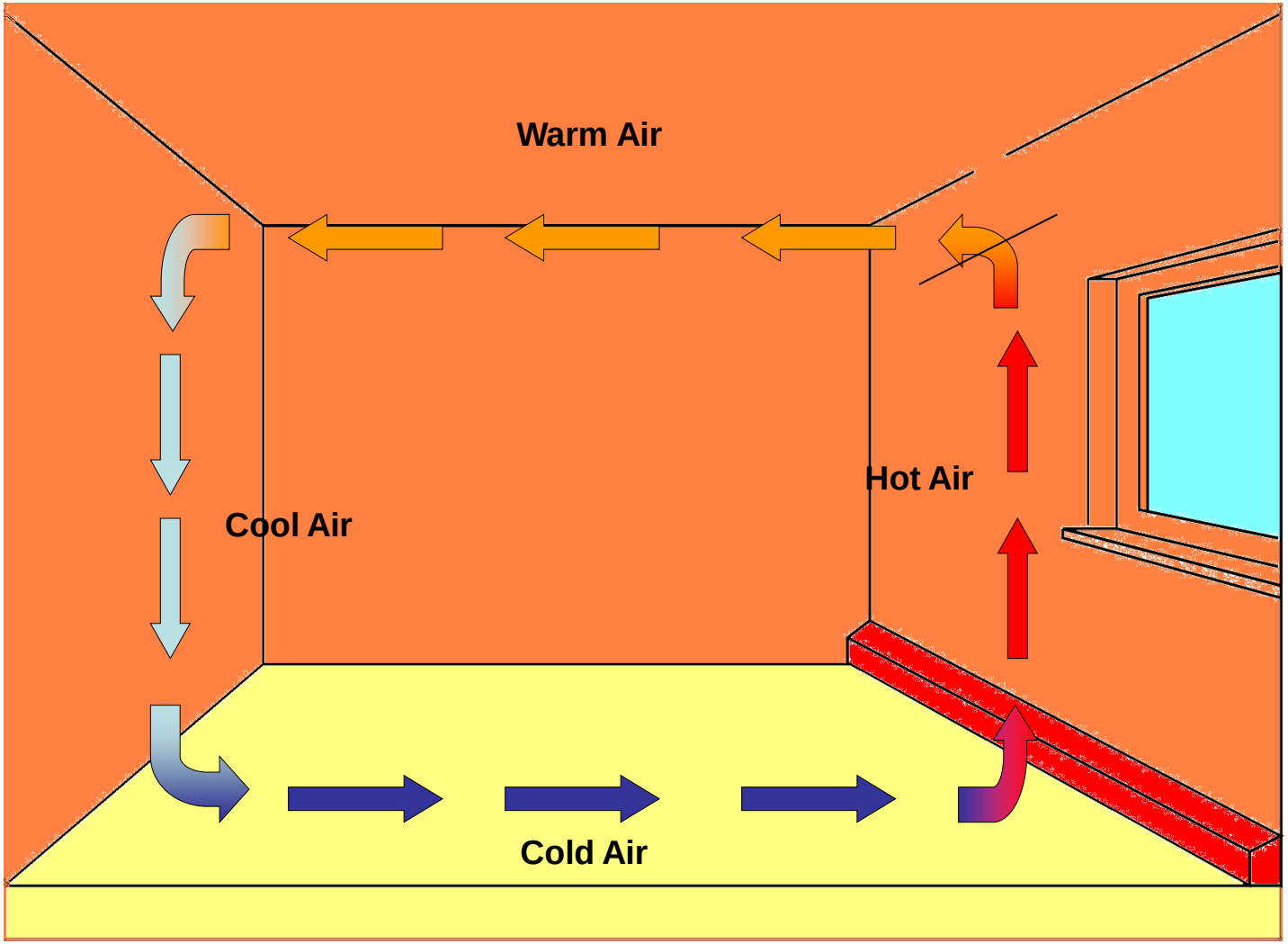


Radiant Floor Heating Curve

- Warm at floors.
- Entire floor surface area is in effect a low temperature radiator.
- Warms other surfaces in the room.
- Has superior energy efficiency.

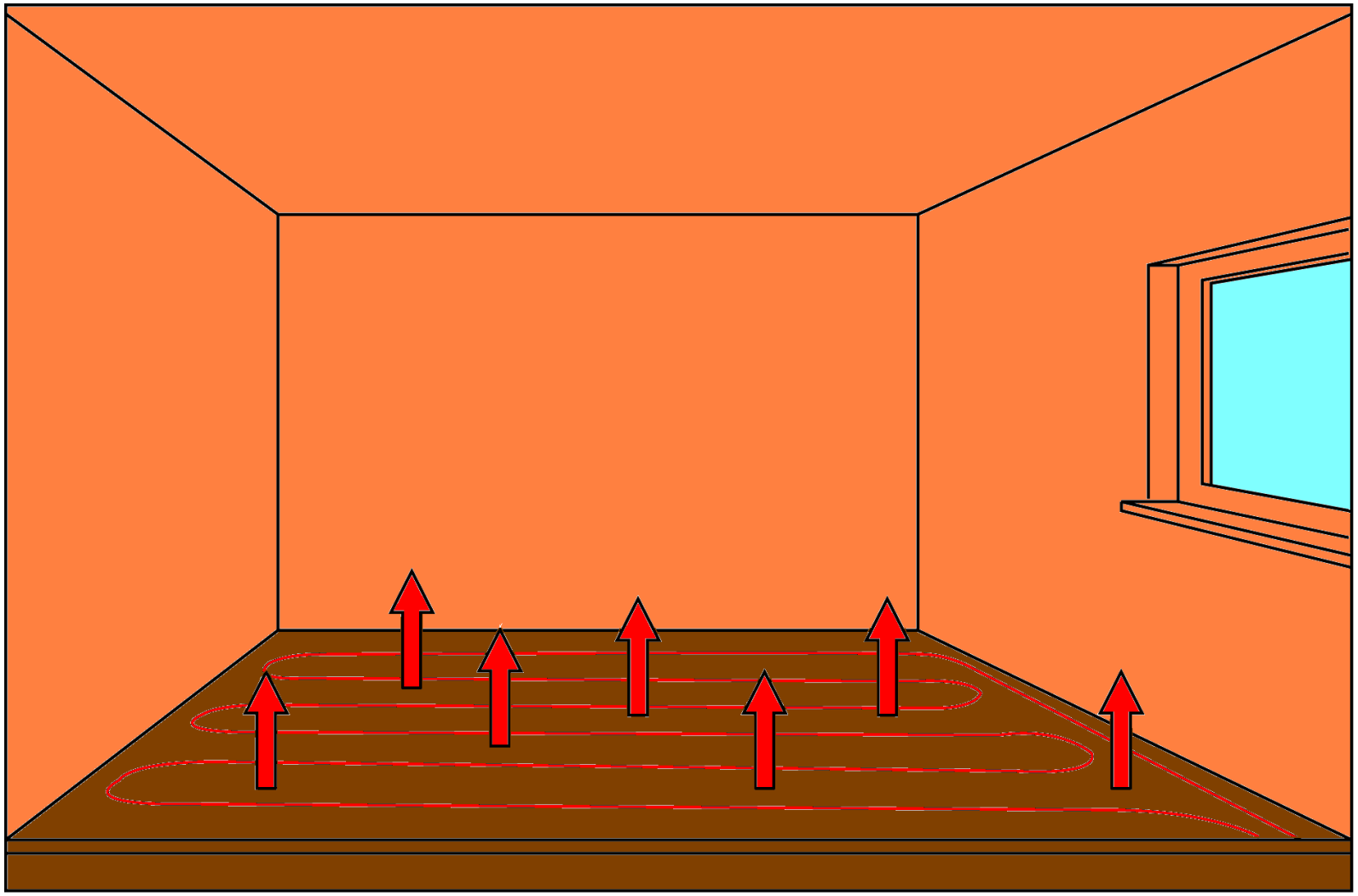


NATURAL CONVECTION



Warm air circulates around room

RADIANT

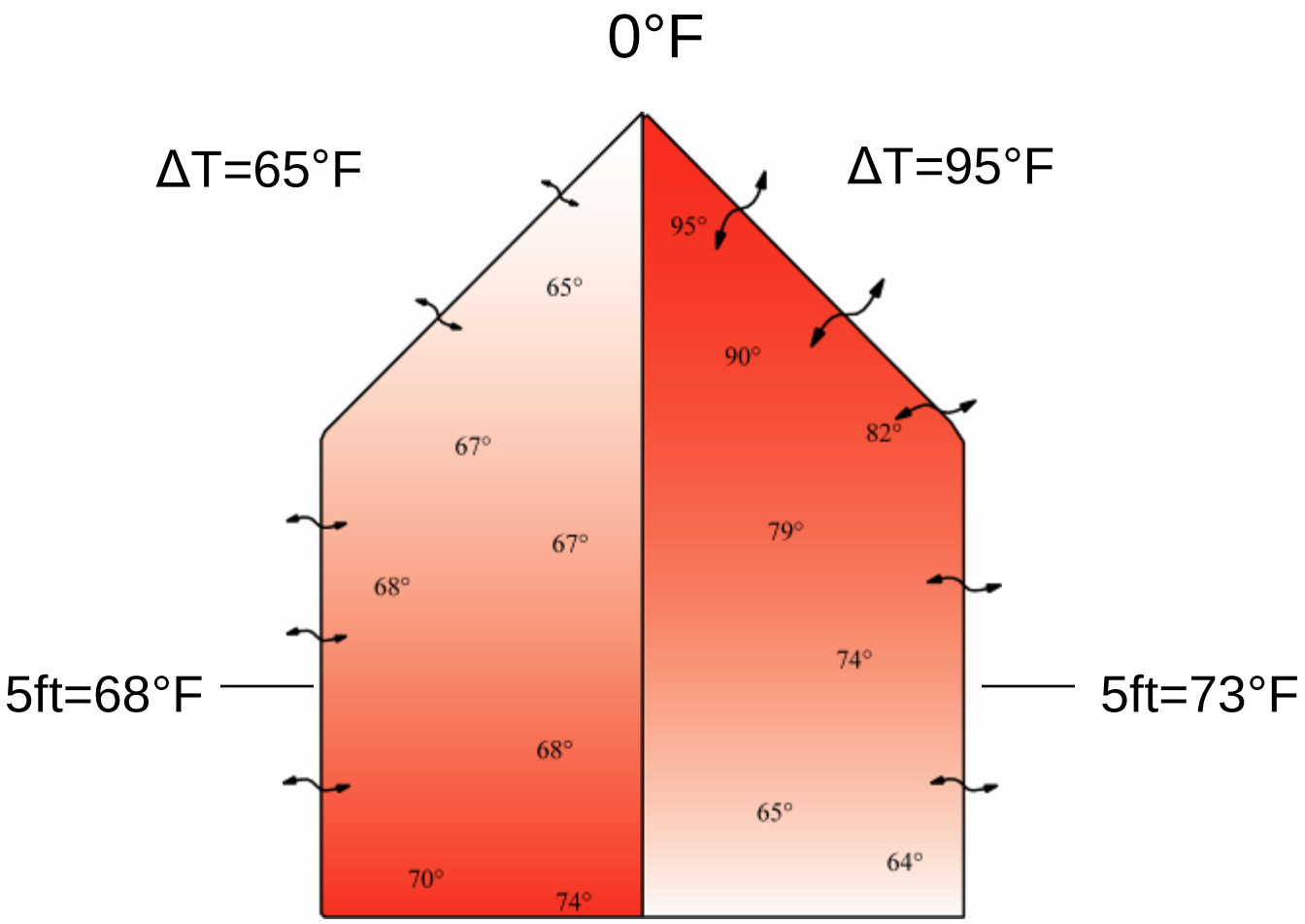


Even Heating

Temperature Distribution

Radiant

Forced Hot Air



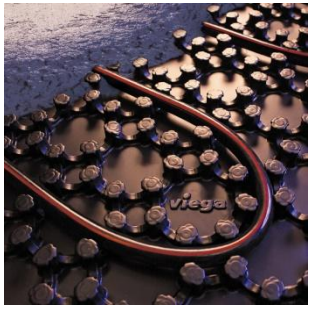
Installation Methods

- Climate Panel®
- Concrete Slab
- Thin-Slab Concrete
- Snap Panel
- Heat Transfer Plate
- Climate Trak

Climate Panel

Concrete Slab

Thin-Slab Concrete

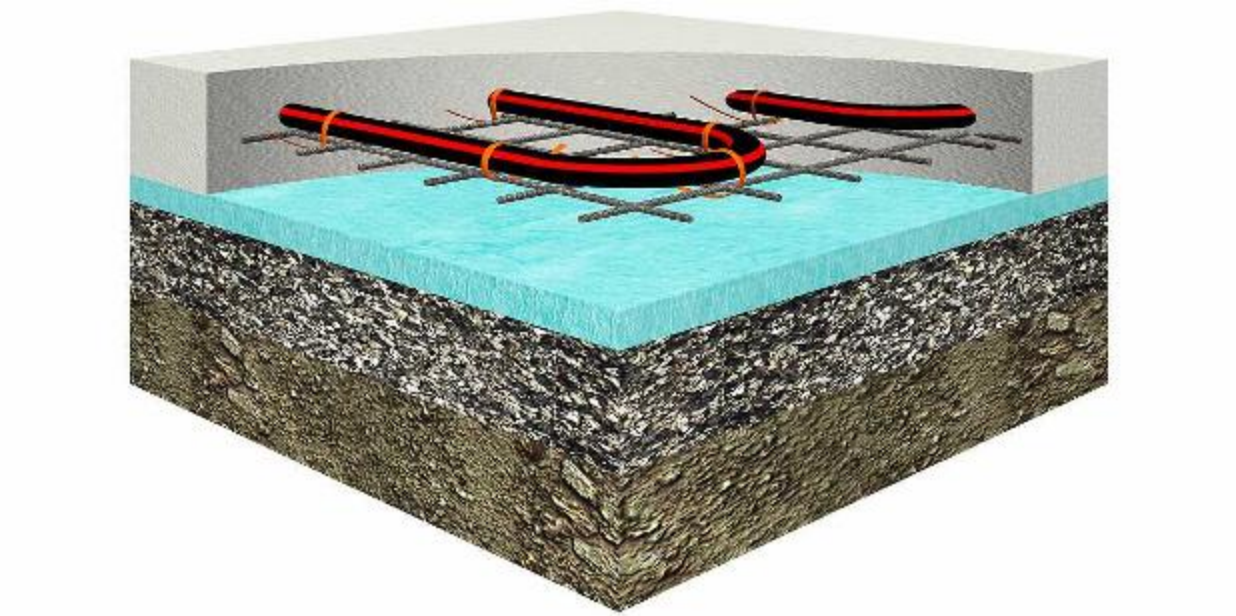


Snap Panel

Heat Transfer Plates

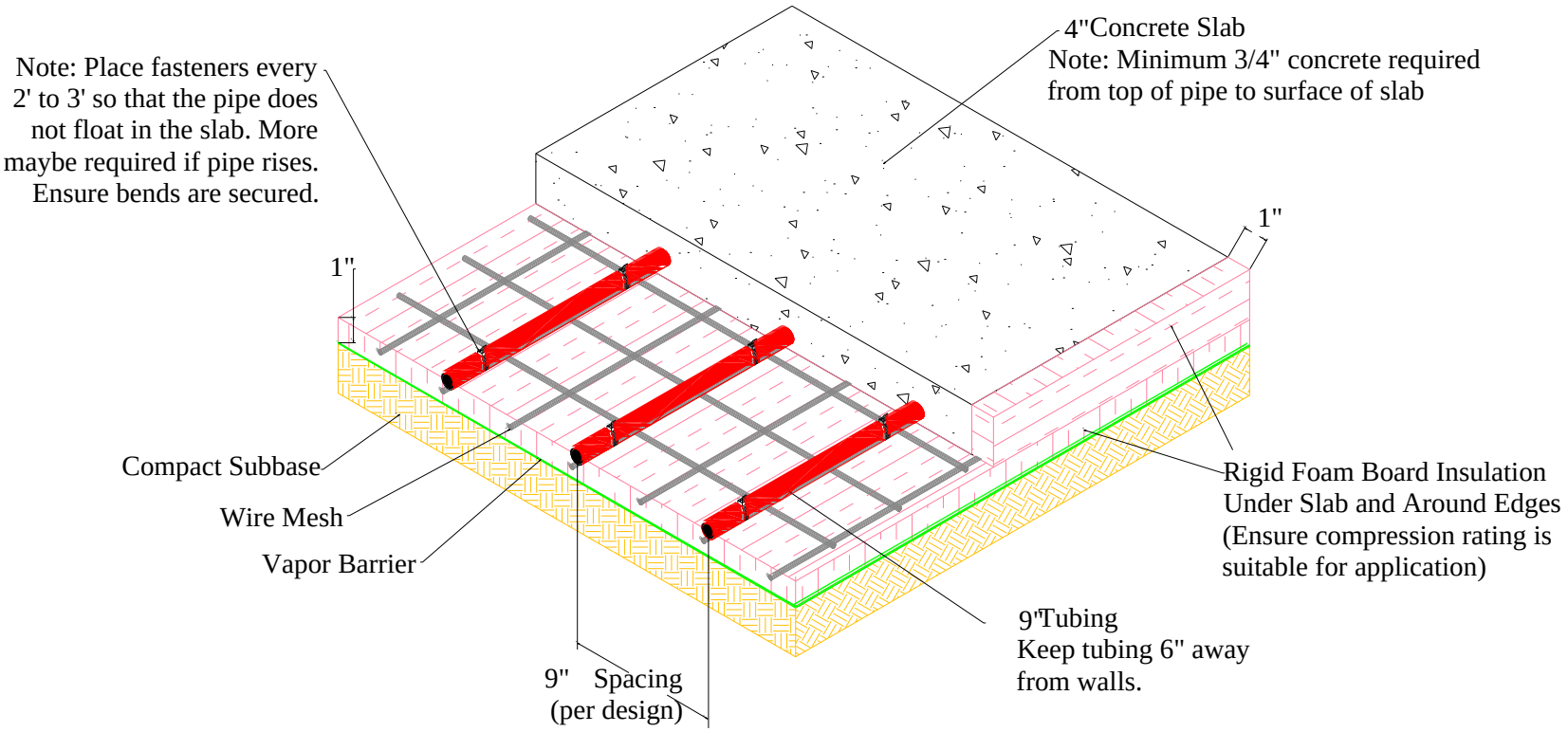
Climate Trak

Installation Methods Slab on Grade



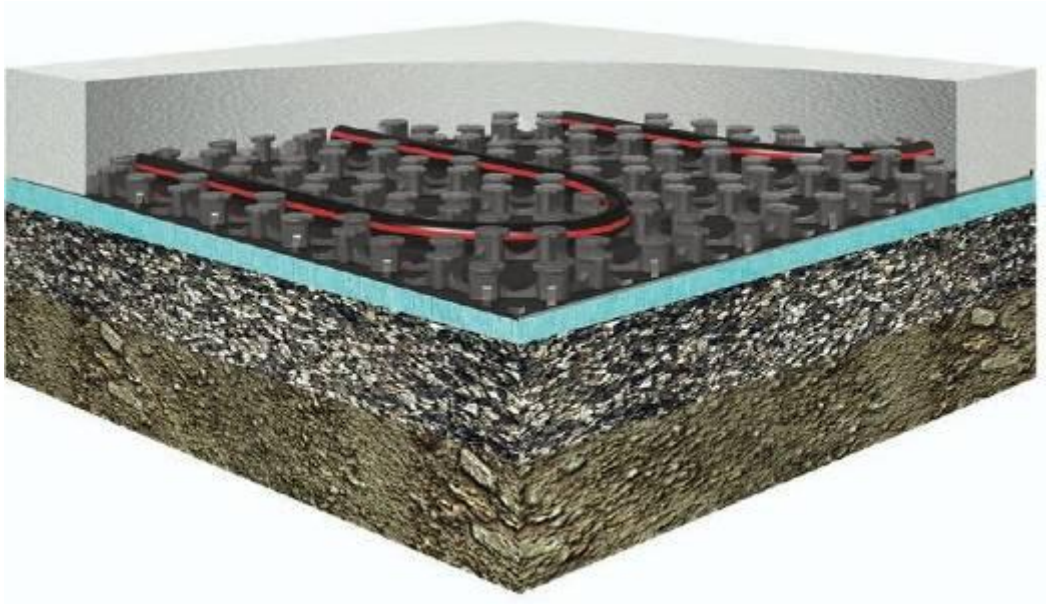
- Mostly used in basements or first floors, when new slab is poured
- High mass system
- Tubing is attached via screw clip plastic fasteners to insulation or wire mesh
- Wet system

Installation Methods Slab on Grade



Slab-on-Grade: Nylon Pipe Ties

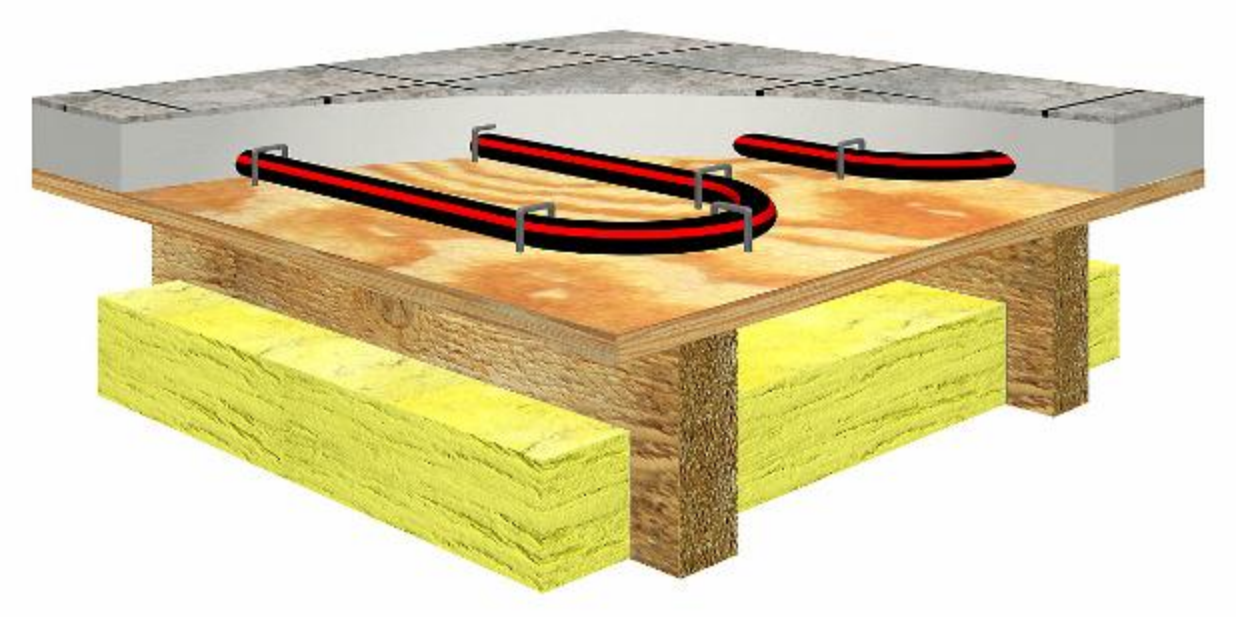
Snap Panel Wet Mass installation



- 3’ x 5’ polystyrene grid fastener system
- 3” spacing increments for fast easy installation
- ½” ViegaPEX Barrier or FostaPEX tubing

Commercial Pour

Installation Methods Thin-Slab



- Mostly used in wood frame construction
- High mass system
- Tubing is attached via plastic fasteners or staples to subfloor
- Wet system

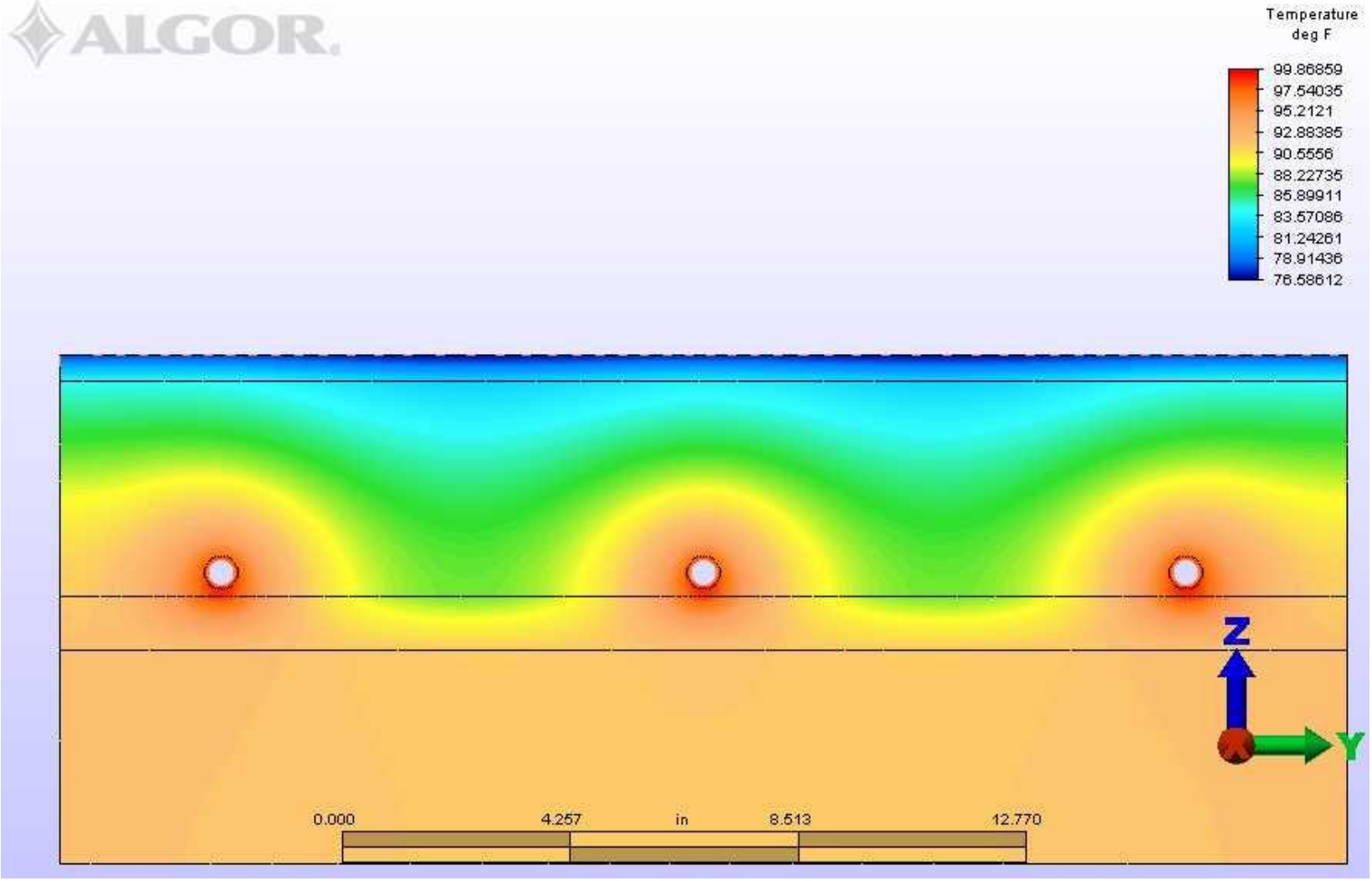
Residential Lightweight Pour

Before

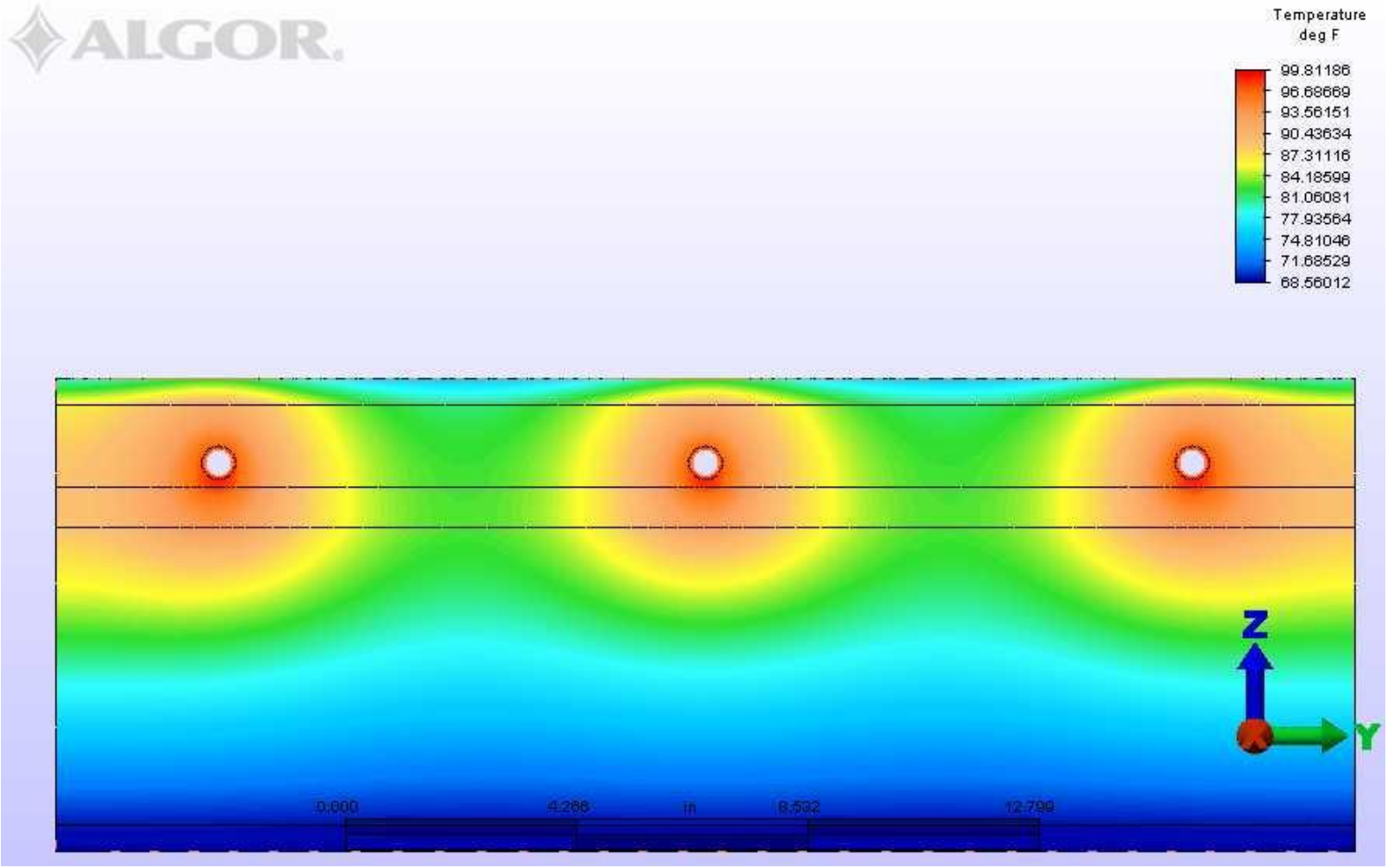
After

Residential Lightweight Pour

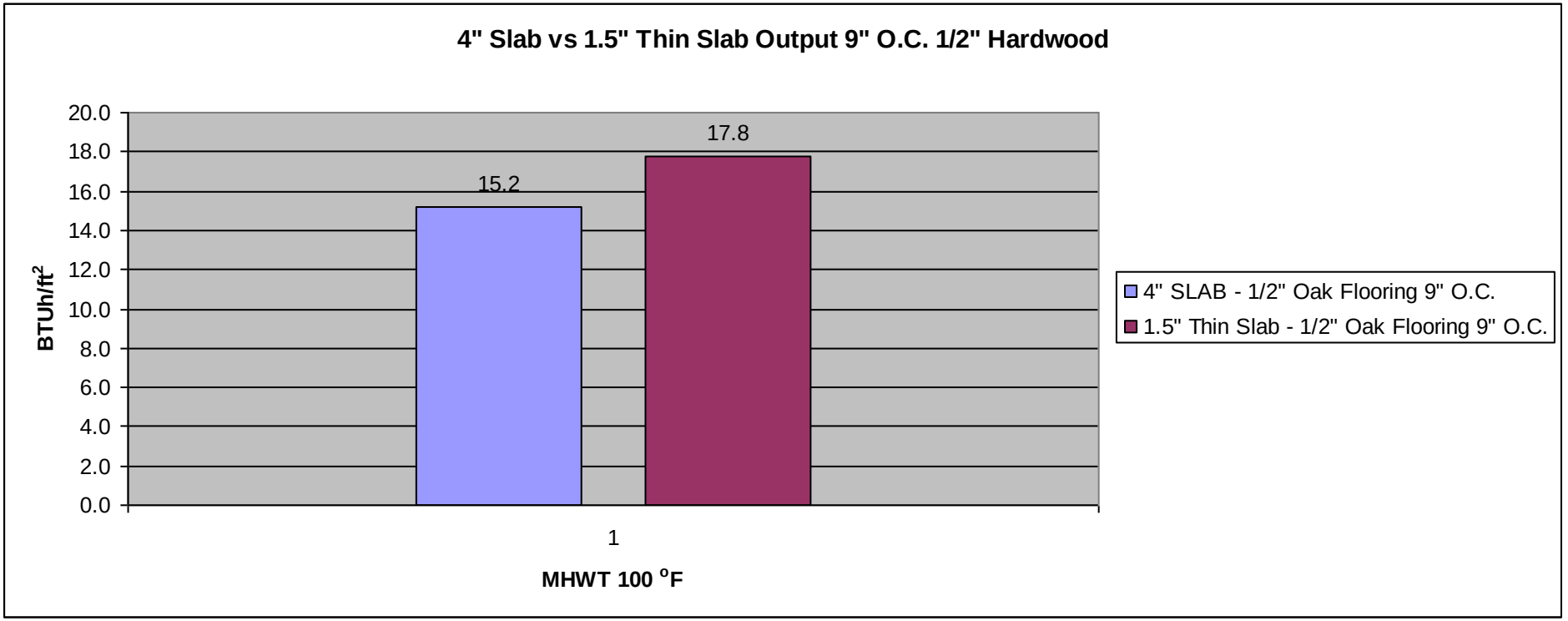
4” Slab vs 1.5” Thin Slab



4” Slab vs 1.5” Thin Slab

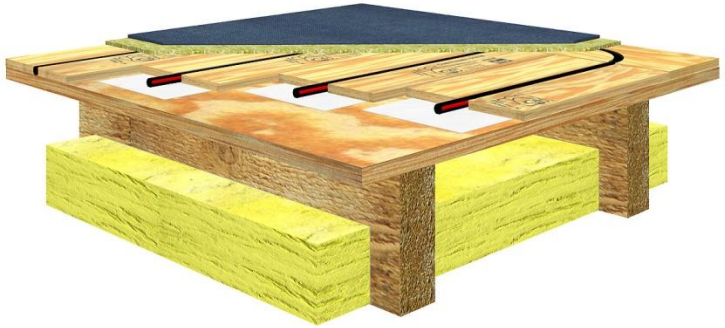


4” Slab vs 1.5” Thin Slab



Climate Panel® Finish Floors

Hardwood



Carpet

Tile

Linoleum/Vinyl

Climate Panel® Hardwood

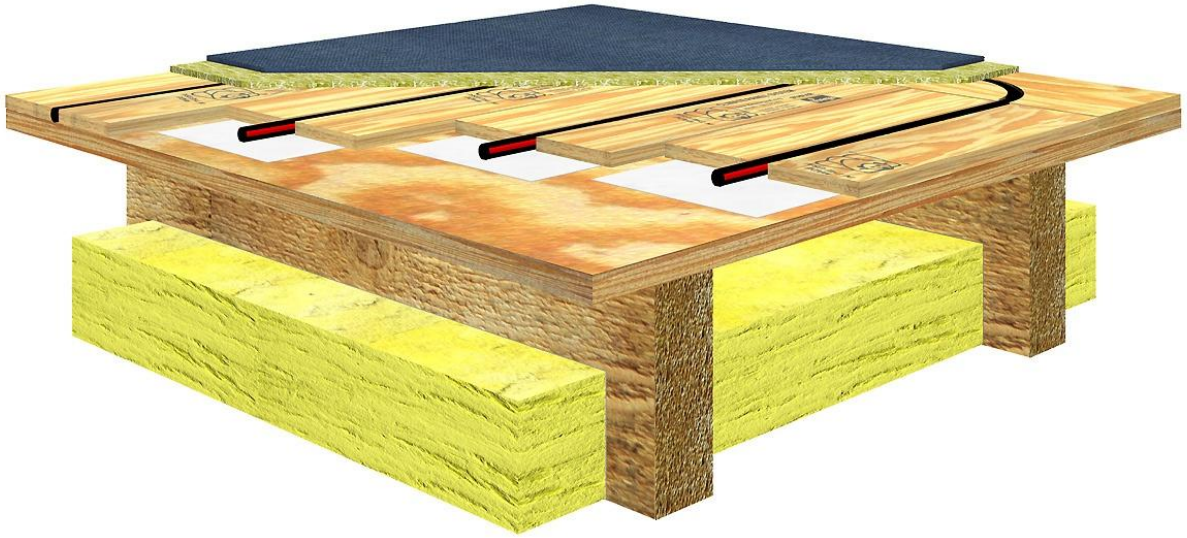
- Climate Panels® must be installed perpendicular to wood floor direction.
- Stagger the seams of the Climate Panels®
- Install finished floor as per manufacturer’s recommendations.

Residential Foyer

Before

After

Climate Panel® Carpet



- For minimum height build up, install carpet and pad directly over Climate Panels®
- If height allows ,a luan plywood cover sheet can be installed over the Climate Panel® system
- Install carpet and pad with nailing strips

Climate Panel® Tile

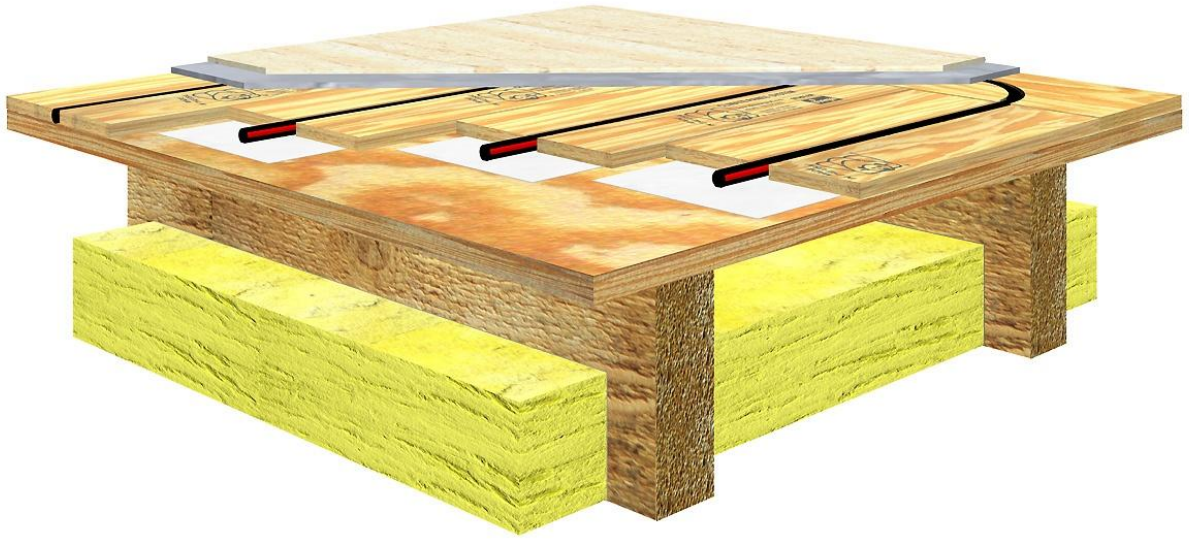
- Glue and screw a concrete fiberboard to Climate Panels® (1/4” – 3/8”)
- Set tiles into thin set

Residential Master Bath

Before

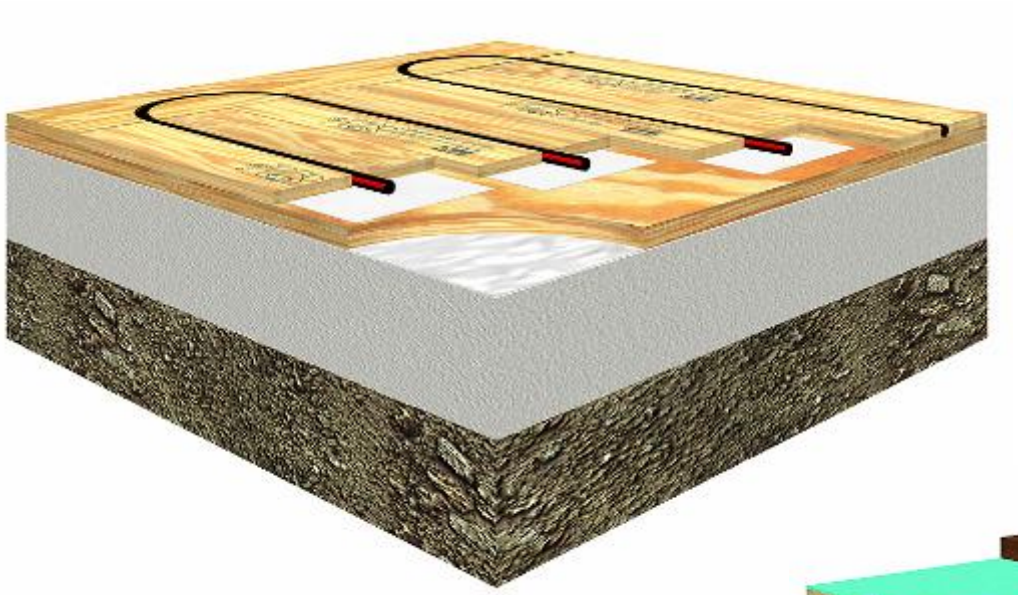
After

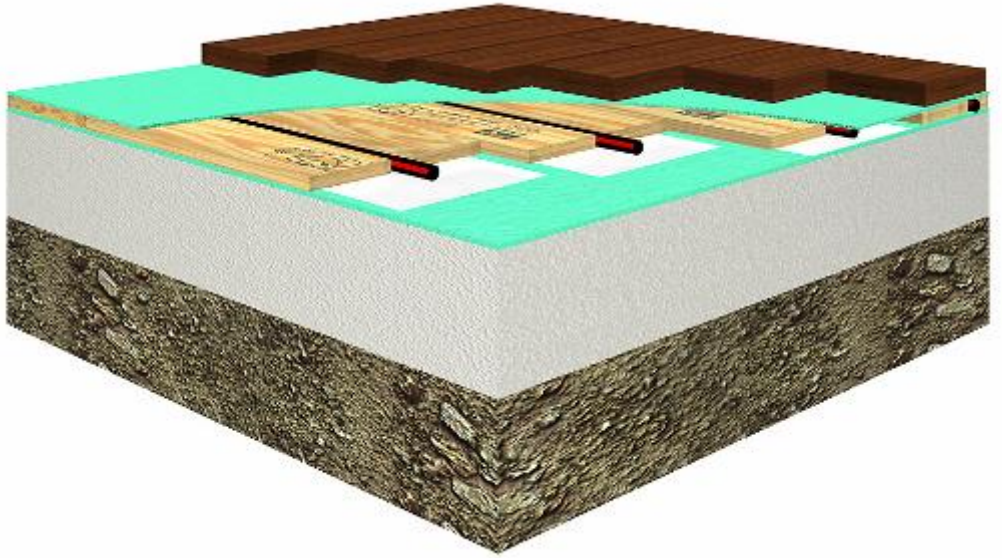
Climate Panel® Linoleum/Vinyl



- Glue and screw plywood or concrete fiberboard to panels
- Glue linoleum/vinyl to plywood or concrete fiberboard

Climate Panel® Over Concrete





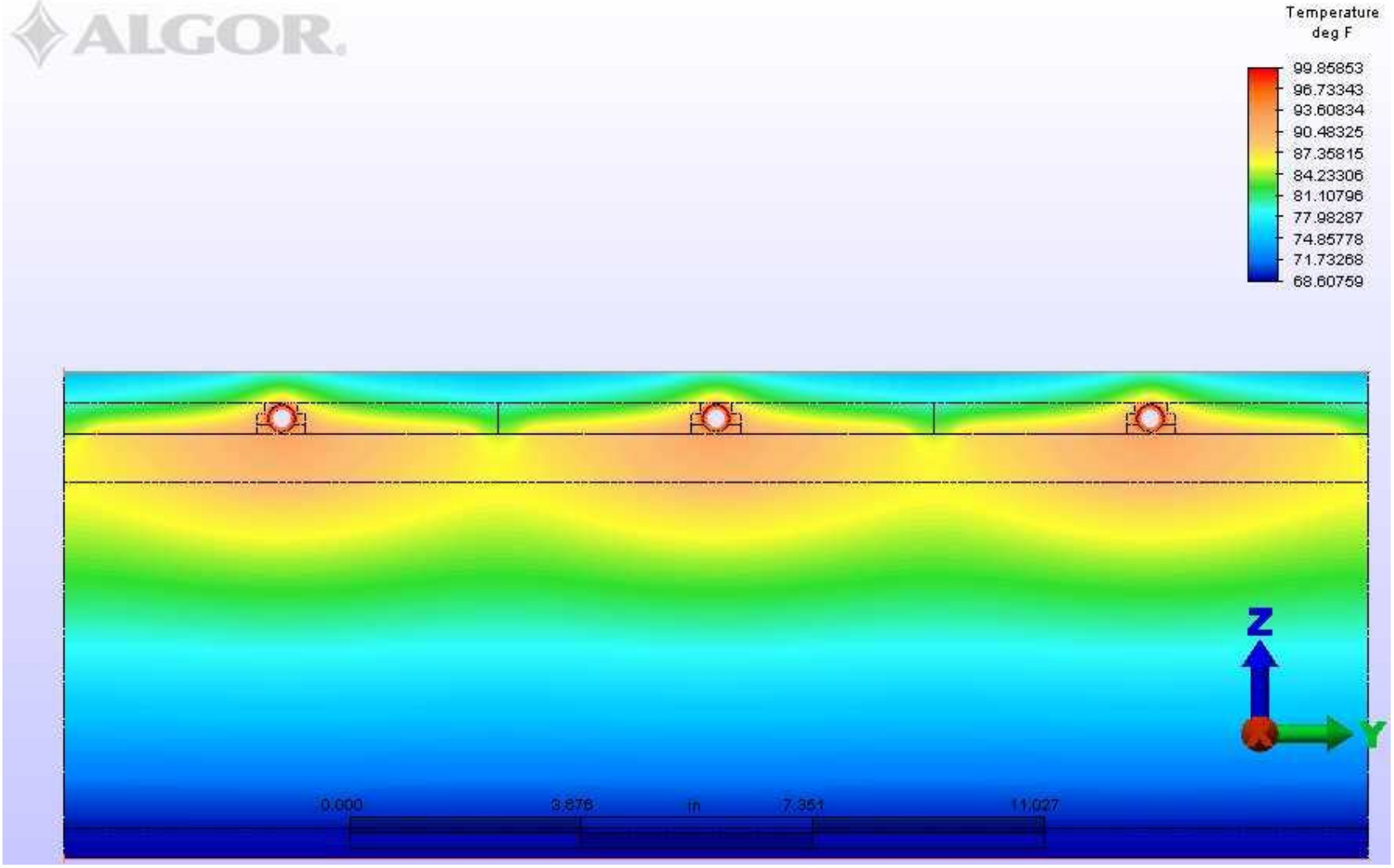
Climate Panel For Radiant Wall / Ceiling

Heat Transfer Plates

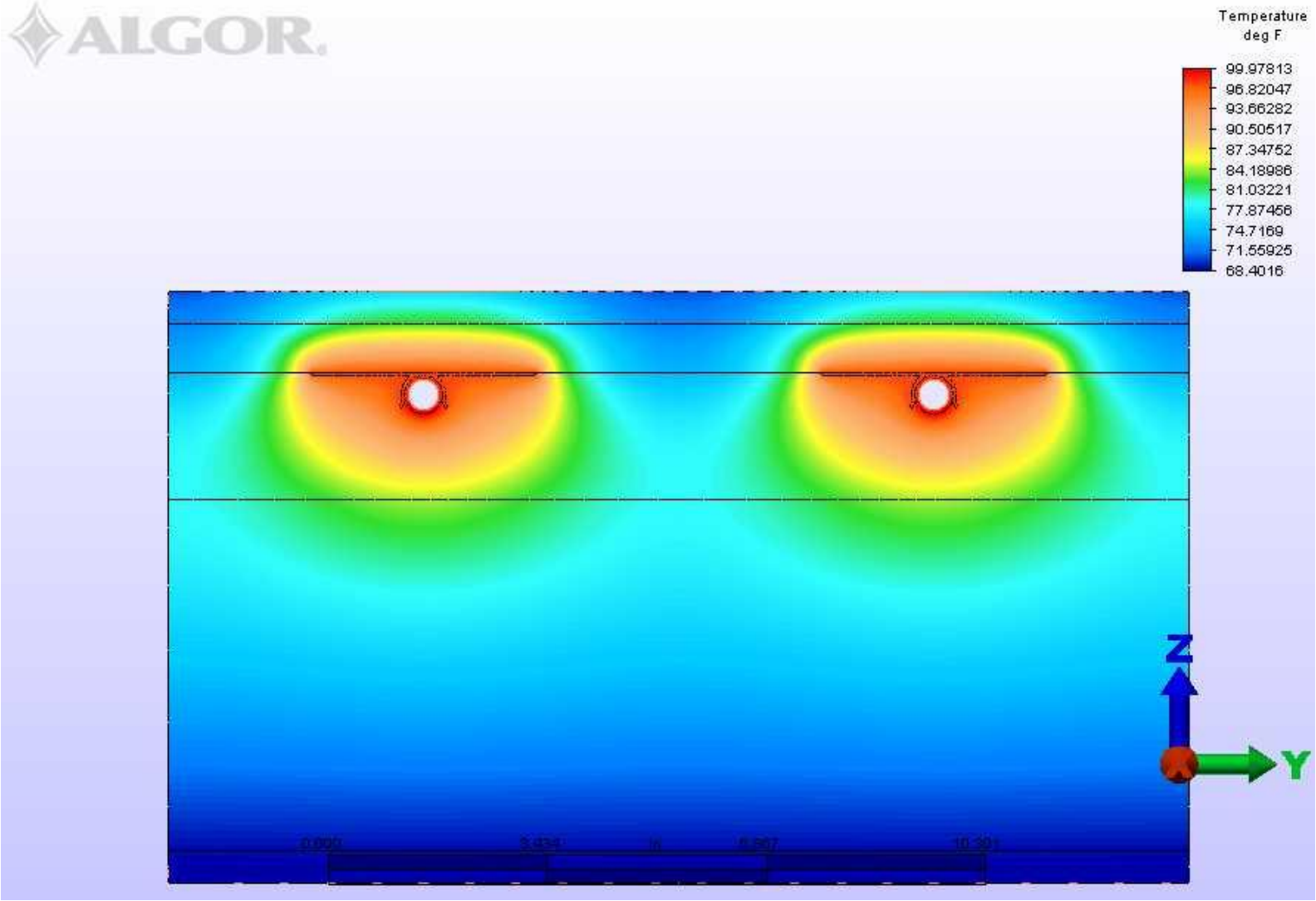
Climate Trak

Residential Below Subfloor

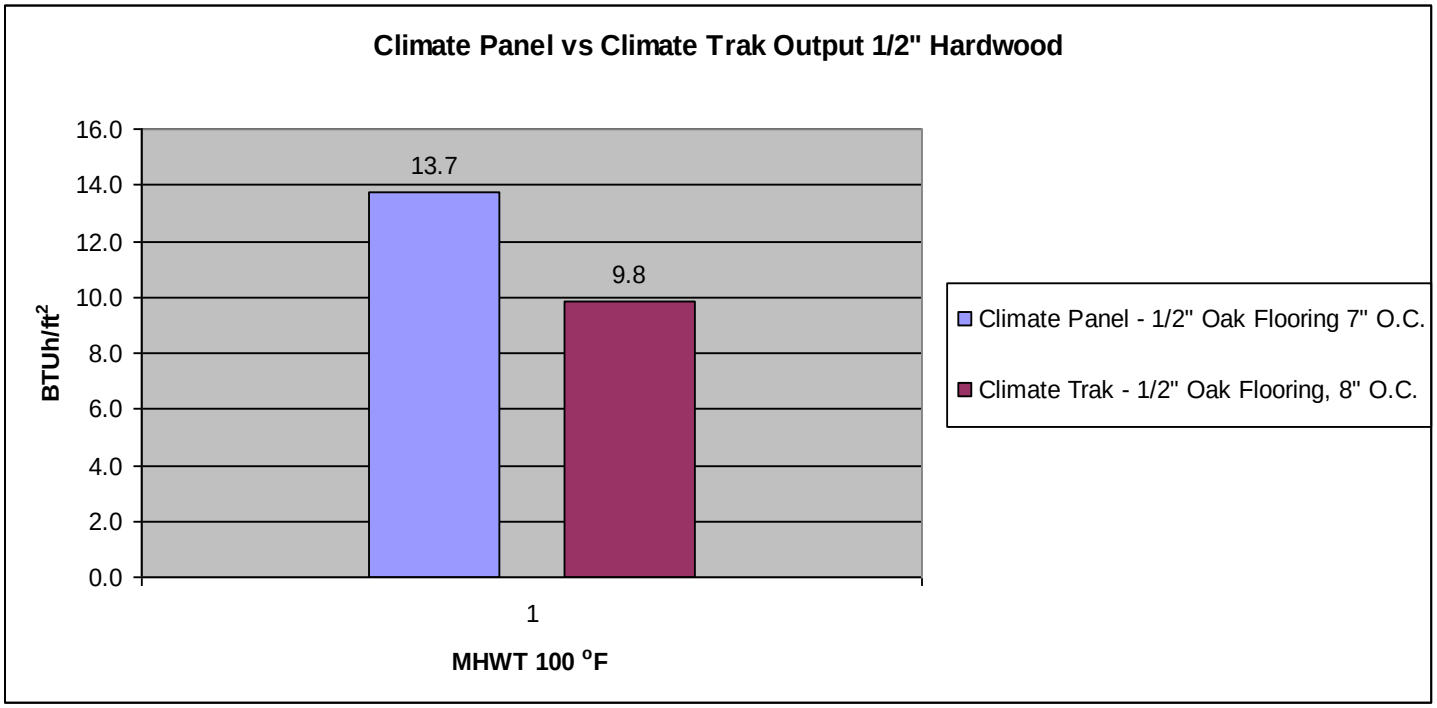
Climate Panel Output



Climate Trak Output



Climate Panel vs Climate Trak

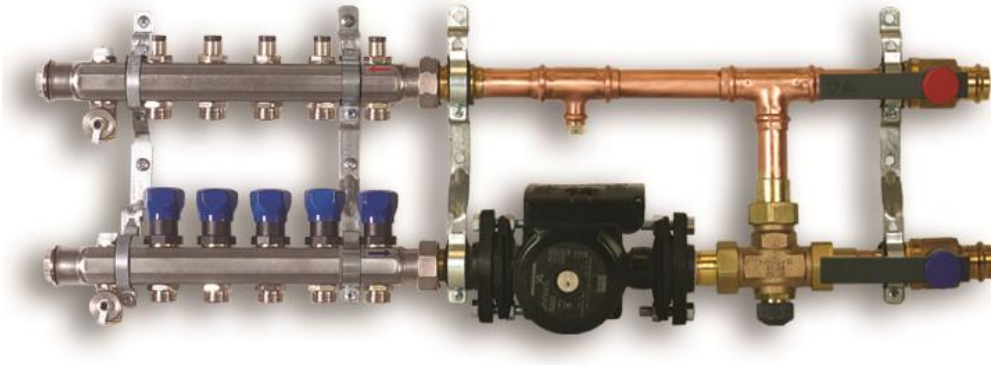


VIEGA STATION OFFERINGS

Mixing Station

Features & Benefits

- Modulates supply mixed water temperature being supplied to radiant floor
- Compact (18”x8”)
- Factory preassembled
- Easy installation
- Available in 2, 3 speed pump sizes (Low &High Head)
- 3-way Diverting valve with internal mechanical flow limit
- Patented design with circulator on return
- Ideal for residential, commercial & some industrial applications
- High temperature capacity
- Higher flow characteristics



VIEGA STATION OFFERINGS

Mixing Station (Function)

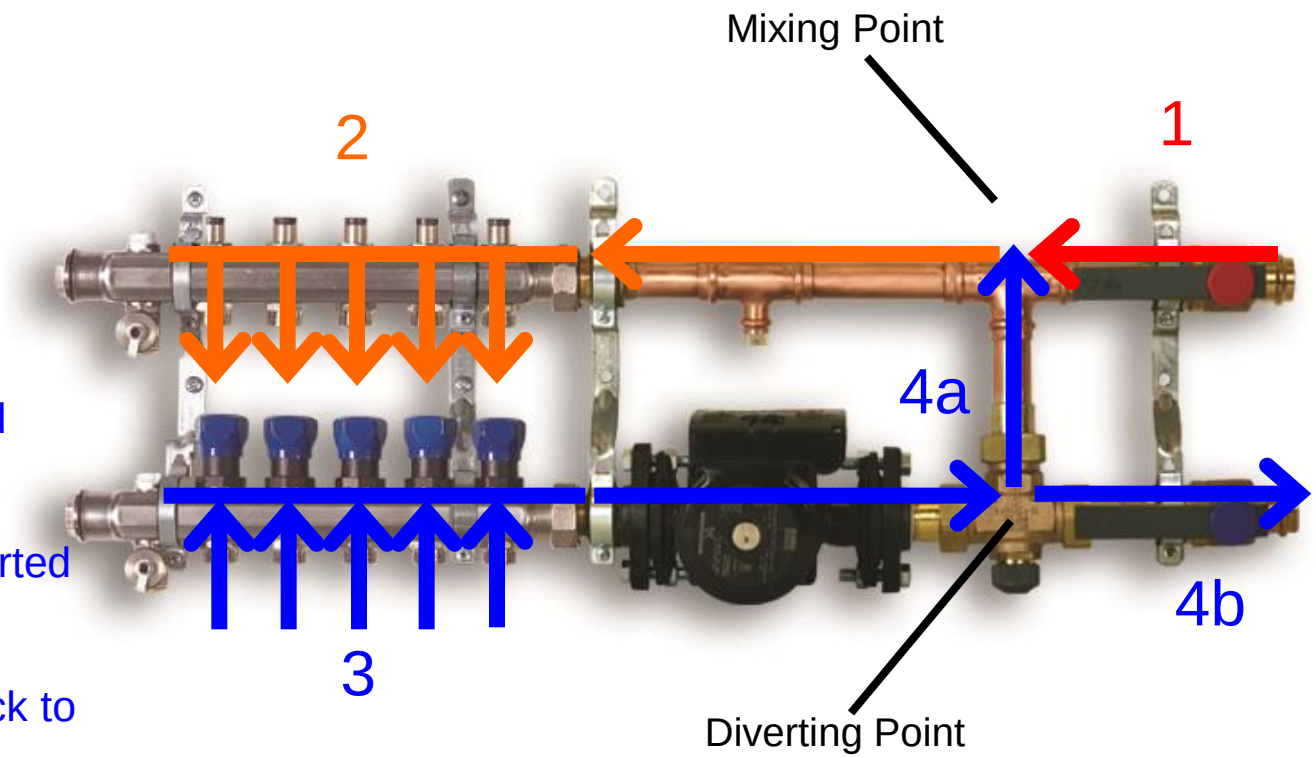
1-Supply water from heat source

2-Supply mixed water temperature delivered to heated area

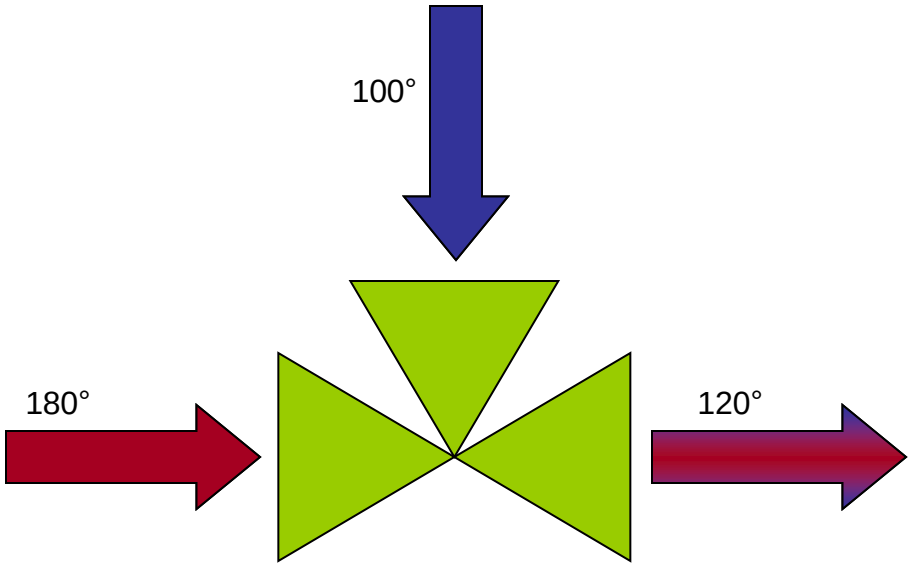
3-Return water from heated area

4a-Return water being diverted to mixing point

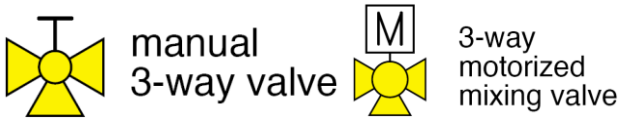
4b-Return water exiting back to heat source



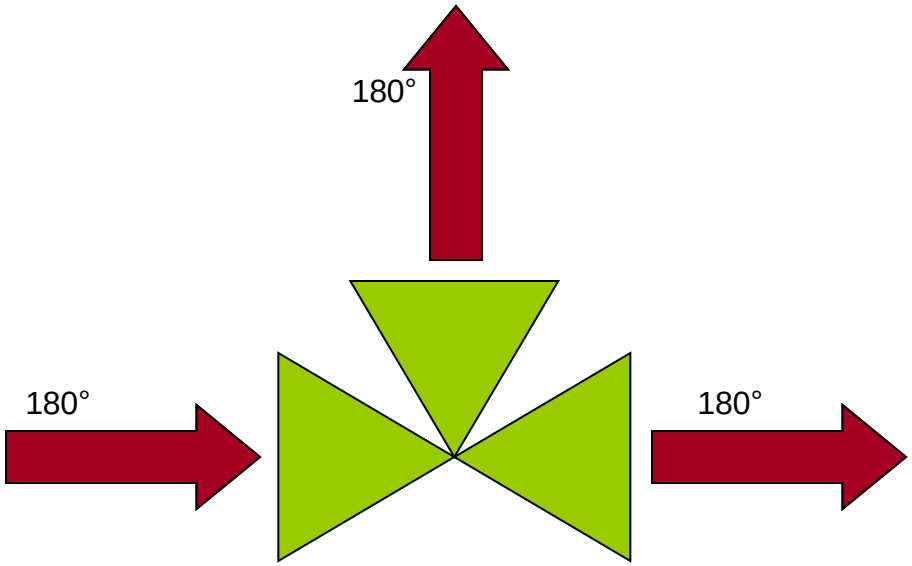
3 Way Mixing Valve/ Diverting Valve



Mixing Valve



3 Way Mixing Valve/ Diverting Valve



Diverting Valve

Outdoor Reset Options

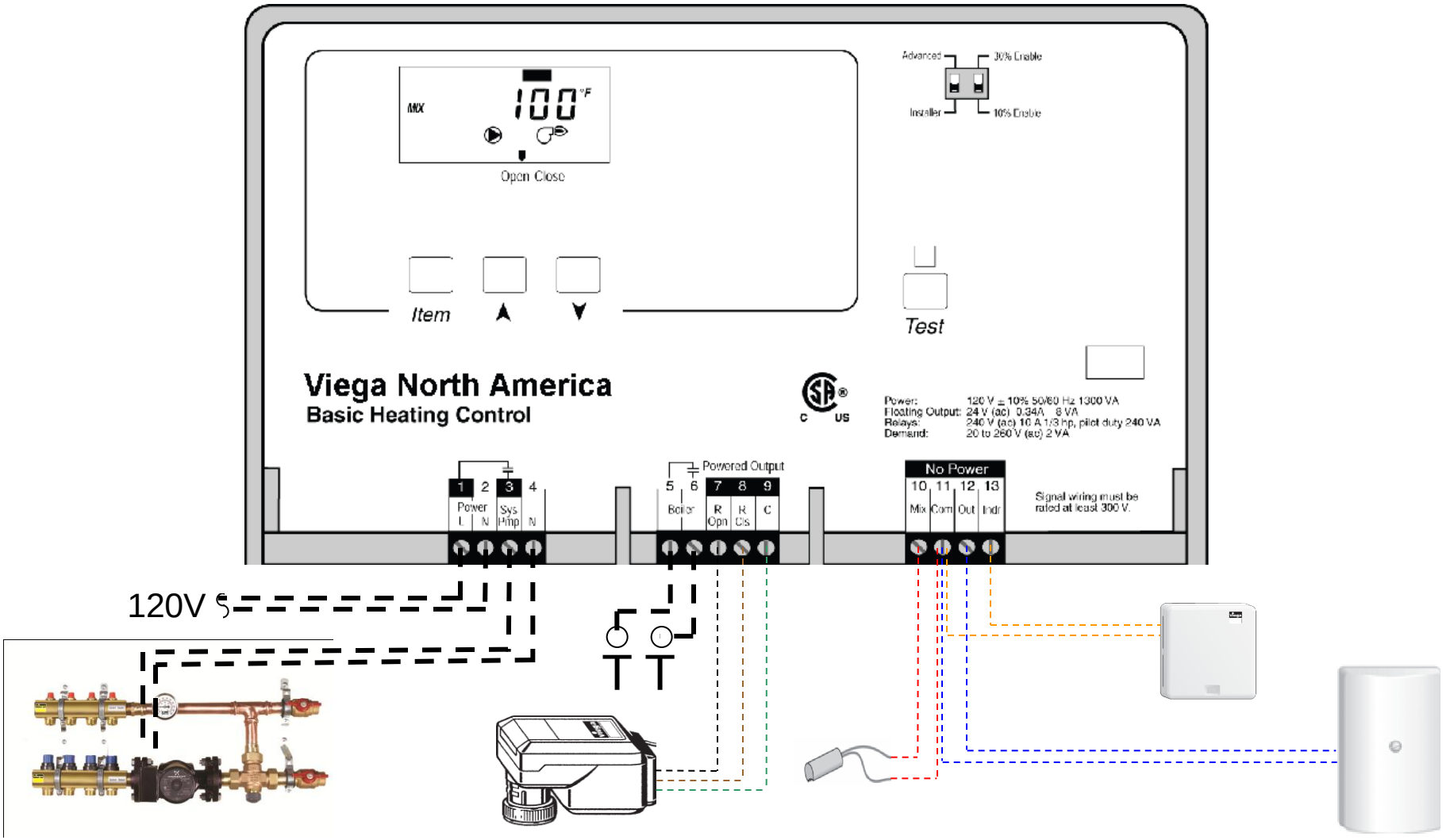
- Basic Heating Control
  - Modulating mixing valve control
  - Supply temperature high limit
  - Seasonal pump activation
  - Boiler activation
  - Mixing valve and pump exercising

- Advanced Heating Control
  - Mixing reset (floating or variable speed output)
  - Boiler reset
  - Domestic hot water control (optional sensor required)
  - Mixing valve and pump exercising

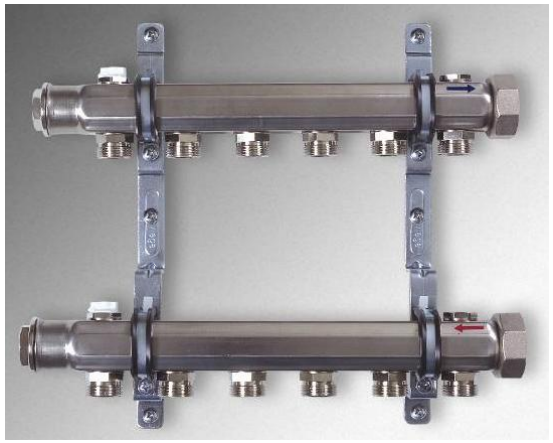
Outdoor Reset Options

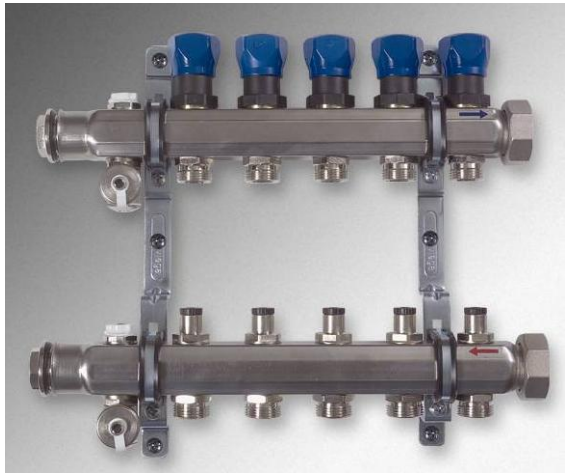
- Three Position Actuator
  - 24V
  - 3-wire
  - Floating action

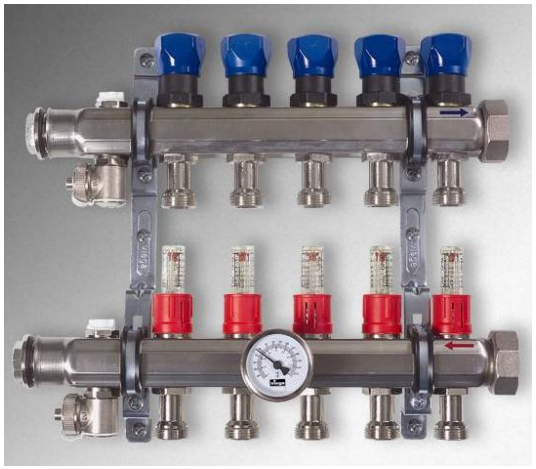
Basic Heating Control & Component Wiring



Manifold Options







Zoning Options

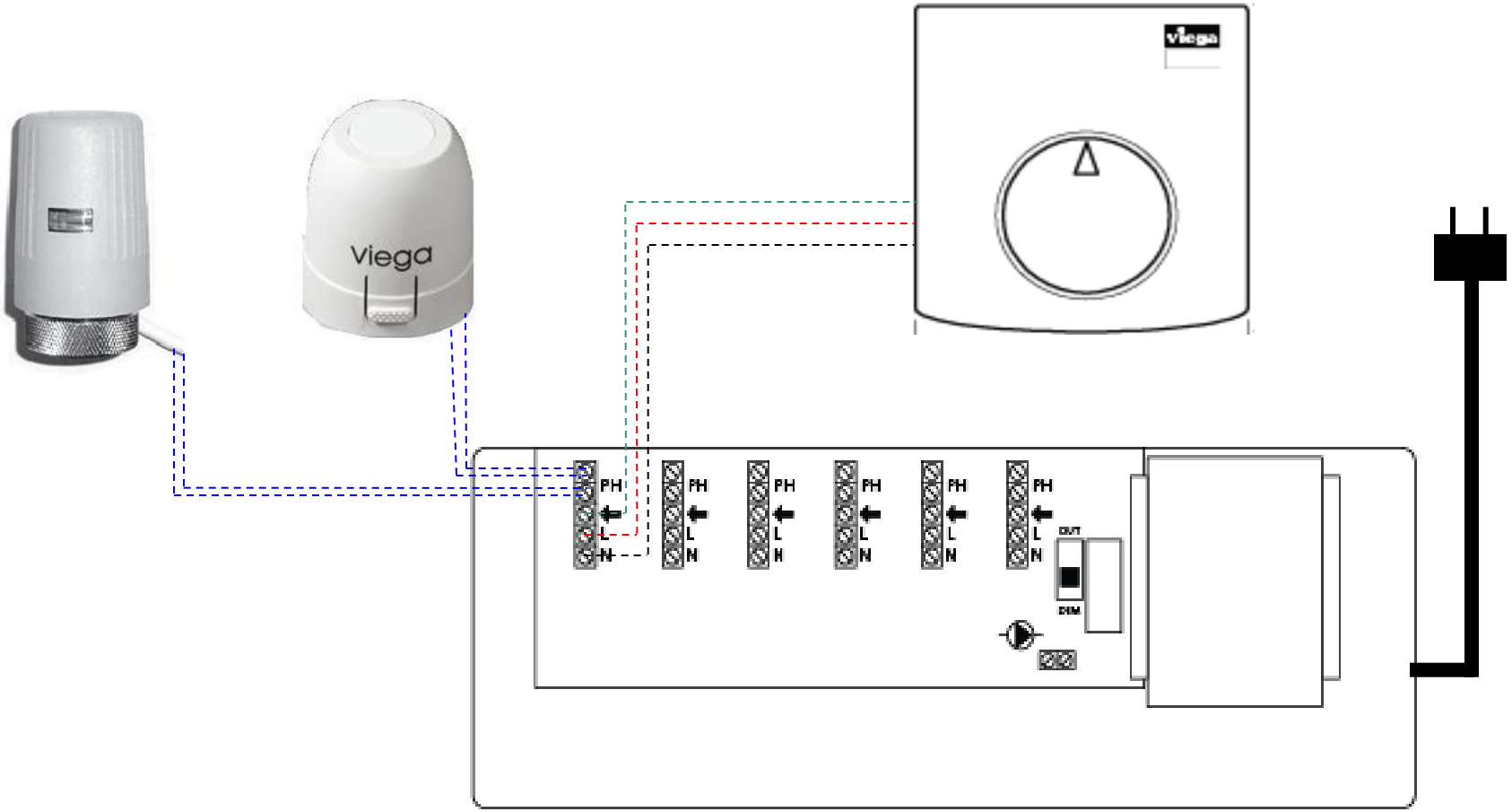
- Thermostat – Basic
  - 3-wire
  - Live anticipator
- Thermostat – Setback w/ floor sensor option
  - 9°F manual setback
  - Floor sensor option high / low limit
- Thermostat – Remote sensor
  - Seasonal pump switching capability

Zoning Options

- Zone Control
  - 5 or 6 zone control box for thermostats and powerheads
  - Demand or outdoor pump control
  - Plug and play

- Powerheads
  - 24V (available for stainless & brass)

Zone Control & Component Wiring



Snow Melting

Designing Systems

Snow Melting Applications

Snow Melting 10 Step Design

1. Selecting level for design criteria
2. Calculating the snow melting load
3. Calculating the tube spacing
4. Calculating the fluid supply temperature
5. Calculating the circuit information
6. Water/ glycol design
7. Calculating the flow rates
8. Calculating the pressure drop
9. Adjusting the pressure drop and flow rate
10. Selecting the pump

Snow Melting
1) Selecting the level for design criteria

- Define customer intention and expectation for snowmelt system
  - Residential (ASHRAE level 1, 95%)
  - Res./Commercial (ASHRAE level 2, 98%)
  - Critical (ASHRAE level 3, 99%)

Snow Melting Level 1

- Completely free of snow 95% of the time
- Occasional snow or ice buildup
- Typically 5/8" Viega Pex Barrier tubing with 9" (1/2" for small areas)

Snow Melting Level 1

- Common Applications:
  - Residential applications
  - Driveways
  - Sidewalks
  - Hot tub areas

Snow Melting Level 2

- Completely free of snow 98% of the time
- Typical level selection
- Typically 5/8” Viega Pex Barrier with 6" or 9" spacing (3/4” for large areas)

Snow Melting Level 2

- Common Applications:
  - Commercial and light commercial applications
  - Public access areas to buildings
  - Handicapped ramps
  - Commercial stairways

Snow Melting Level 3

- Completely free of snow 99% of the time
- Advanced Snow Melt Control for sensitivity
- System must melt snow with no accumulation
- Typically 5/8” Viega Pex Barrier tubing with 6" spacing (3/4" for large areas)
- System idling is often needed for quick response

Snow Melting
Level 3

- Common applications:
  - Critical applications
  - Hospital emergency ramps
  - Helipads
  - Access areas for emergency vehicles (fire stations, etc.)
  - Areas deemed critical for public safety

Snow Melting Load

- Select location and level for Btu/h ft²
- Values do not include back and edge losses

Output Requirements Btu/ h * ft²			
City	Level I	Level II	Level III
Albany, NY	149	187	212
Albuquerque, NM	168	191	242
Amarillo, TX	168	212	228
Billings, MT	187	212	237
Bismarck, ND	231	275	307
Boise, ID	100	126	146
Boston, MA	165	202	229
Buffalo, NY	210	277	330
Burlington, VT	154	184	200
Cheyenne, WY	201	229	261
Chicago, IL O'Hare Int'l AP	153	186	235
Cleveland, OH	157	195	230
Colorado Springs, CO	167	202	219
Columbus, OH Int'l AP	123	149	175
Des Moines, IA	208	255	289
Detroit, MI, Metro	156	192	212
Duluth, MN	201	238	250
Ely, NV	116	134	162
Eugene, OR	139	165	171
Fairbanks, AK	144	174	202
Baltimore, MD, BWI AP	172	235	282
Great Falls, MT	193	233	276
Indianapolis, IN	158	194	215
Lexington, KY	123	150	170
Madison, WI	164	206	241
Memphis, TN	172	200	206
Milwaukee, WI	164	196	207
Minneapolis-St.Paul, MN	193	229	254
New York, NY JFK AP	164	207	222
Oklahoma City , OK	215	248	260
Omaha, NE	189	222	259
Peoria, IL	166	201	227
Philadelphia, PA, Int'l AP	154	208	246
Pittsburgh, PA Int'l AP	159	194	219
Portland, ME	195	234	266
Portland, OR	102	177	239
Rapid City, SD	252	312	351
Reno, NV	89	116	137
Salt Lake City, UT	89	110	120
Sault Ste, Marie, MI	183	216	249
Seattle, WA	138	171	205
Spokane, WA	116	141	159
Springfield, MO	179	215	224
St. Louis, MO, Int'l AP	170	193	227
Topeka, KS	192	234	245
Wichita, KS	209	248	285

Snow Melting Back and Edge Heat Loss

Back and Edge Heat Loss*	
Application	**% Increase Multiplier**
Full Below and Edge Insulation	0%
Full Below but No Edge Insulation	4% (1.04)
Perimeter and Edge Insulation	10% (1.10)
No Insulation	20% (1.20)
Exposed Bridge or Parking Ramp	40% (1.40)

Snow Melting
3) Tubing Spacing

- Select the tube size
- Note the max. circuit length
- Note the recommended tube spacing under the load column

		Recommended Tube Spacing in Concrete				
		Snow Melting Load (Btu/h*ft²)				
Tube Size	**Max. Circuit Length**	100	150	200	250	300
1/2"	150 ft	9"	9"	6"	6"	6"
5/8"	250 ft	9"	9"	9"	6"	6"
3/4"	400 ft	12"	12"	9"	9"	6"

Snow Melting
4) Fluid Temperature

- Select the required Btu/h ft² load
- Based upon tube spacing find the required fluid supply temperature

	Fluid Supply Temperature (°F)*		
Snow Melting Load (Btu/h*ft²)	Tube Spacing (inches)		
	6	9	12
100	100	100	103
150	100	106	128
200	108	131	153
250	133	156	
300	158		