

RADIANT FLOOR HEAT INSTALLATION MANUAL

Vinyl | Laminate | Hardwood | Linoleum | Carpet Flooring

For Motor coach, Home building, Remodeling, Flooring Installers

Need Help?

We are happy to assist you in a trouble-free installation!

Service | (877) 789.4328 | 6 am – 4:30 pm PST

Sales | (866) 935.7782 | 7 am – 4:30 pm PST

What you will find inside

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Welcome to Gold Heat®

Gold Heat's, Black Gold® electric radiant heat radiant floor heat film is a unique under floor heating system designed to be used for primary and supplemental heating of indoor residential, commercial, and RV flooring.

Black Gold® heat radiant floor heat film is factory-terminated and constructed of a low-heat density, heating film that covers an open floor area, in most any room.

Tools needed

Assorted Hand Tools	Conventional electrical wiring and flooring hand tools.
Ohm meter	An accurate ohm or multi-meter will be used during the testing phase to ensure that the system is correctly installed. It is suggested that a digital meter is used rather than an analog (needle) type.
Router	Slim style with ½" bit.

Materials you will need

Component	Description
Black Gold® heat radiant floor heat film	Determined ahead of time as outlined in PART 1 – SYSTEM Panels DESIGN.
Junction boxes	(2) boxes required for each room or area. One box at floor level for parallel connection of heating panels to thermostat output; (1) deep box for the thermostat.
Thermostat w/ floor heat sensor	Gold Heat a floor-sensing thermostat with a built-in ground fault circuit interrupter (GFCI) available for purchase
Floor sensor	Floor temp sensor included with Gold Heat provided thermostat
Romex wire	#12/2 Romex for connections between the thermostat and floor warming elements.
Tape	Duct or similar tape for anchoring panels rated for at least 194°F (90°C).
Vapor barrier	Depending on flooring material stack-up

Installation Summary

Step 1 - Design your Black Gold system (page 13)

Draw out the element locations with your design clearances according to the heating panel size you select (10" or 20") and the cold lead length (10', 15', 20').

Step 2 – Installation (page 19)

- Install Black Gold film and junction box(es) for control and non-heating lead terminations
- Install subfloor
- Install heating elements and route wires to the termination junction box.

Step 3 – Black Gold system inspection | testing | installation completion (page ____)

- Inspect heating elements for damage
- Perform electrical resistance checks
- Test the system for heating (if power is available)
- Install flooring and trim

What's inside in your Black Gold® box

- The Black Gold® heat film(s) (as specified when ordered) cut to length, factory terminated, tested, and labeled
- Bus bars sealed at cut-end
- A 10' 16AWG stranded conductor type THHN/THWN Per UL1683



Read this entire manual before installing the heating system.

The designer and installer must be familiar with all details of the installation and noted concerns.

When installed, as directed by these installation instructions, the Black Gold® heat radiant floor heat film will comply with United States and Canadian electrical codes' requirements.



WHAT YOU NEED TO KNOW BEFORE YOU START!

Symbol definitions

Throughout this manual are (3) types of notes that direct your attention to crucial information about planning and installing your Black Gold® heat radiant floor heat film(s).



This symbol indicates a fire hazard



This symbol indicates a shock hazard



General notes



The installation of this heating product shall be following the manufacturer's instructions and the regulations of the authority having jurisdiction.



The equipment shall be installed only by a qualified licensed electrician.



Black Gold® is not intended for use in wet areas such as bathrooms, kitchens, and mudrooms, per National Electrical Code. Consider using the Gold Heat® brand of electric radiant heat radiant floor heat films for these rooms.



The Black Gold® heating elements should not be installed at or below 32°F (0°C).



The Black Gold® heating radiant floor heat film is not recommended for a primary heating system in colder geographic areas.



Ensure that all flooring materials (including flooring and subfloor) are rated for use in conjunction with floor heating systems.



Do not fold, cut, or otherwise alter the Black Gold heat radiant floor heat film's heating elements.



Do not install elements under walls or partitions, or locations where they will be covered by fixed furniture, cabinets or fixtures.



Do not place futons, floor rugs, beanbag chairs, or similar furniture on heated floors.



Black Gold® electric radiant floor heat film is for indoor use only.

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WHAT YOU NEED TO KNOW BEFORE YOU START



Flooring Warnings

Recommended: check with your flooring manufacturer to make sure that the flooring you choose can accept radiant floor heat.

<u>Flooring type</u>	<u>Description</u>
Vinyl sheet	Follow manufacturer's instructions for installation and use with radiant floor warming systems
LVT	
LVP	
Hardwood	Must be rated for use with electric floor radiant floor heat films 1/16" (1.55mm) minimum thickness subfloor
Lauan	1/8" (3mm) Lauan or plywood used as base for carpeting
Carpet	Standard wall-to-wall carpeting and padding Black Gold® may be used with wall-to-wall carpeting as long as the padding and carpeting does not have a combined thermal resistance greater than R-11 (RSI-2) Use of radiant floor heat with thermal resistance greater than this may cause the heating panels to overheat



DO NOT INSTALL BLACK GOLD® HEAT RADIANT FLOOR HEAT FILMS DIRECTLY UNDER CARPET.

Lauan or plywood must be used under carpet.

WHAT YOU NEED TO KNOW BEFORE YOU START

Subfloor

Flooring materials in direct contact with the radiant floor heating panel MUST be rated to withstand 180°F.

The Black Gold® radiant floor heat films is approved for application on surfaces that are clean, structurally sound, underlayment grade plywood, oriented strand board, backer board, wood, hardboard underlayment, association grade particleboard, the concrete above grade in the absence of excessive moisture, and excessive alkali, and well-bonded VCT* and sheet vinyl* (non-embosses and non-cushioned).

Subfloor must meet NWFA (National Hardwood Flooring Association) or American National Standard Specifications (ANSI) for quality, thickness, and maximum deflection. The subfloor must also comply with any local building code standards.

The radiant Black Gold® floor heat radiant floor heat films will be most effective and efficient if installed over well-insulated areas. Insulation will minimize heat loss into the subfloor and below (basement, ground), allowing the heat to transfer to the surface quickly.



- If at all possible, remove the old sheet vinyl or VCT. Install over the original subfloor surface
- Double-check the subfloor material requirements from the manufacturer
- Vinyl must be well adhered to the subfloor throughout the entire floor
- If installing on top of the vinyl, make sure the setting radiant floor heat film is approved for use

WHAT YOU NEED TO KNOW BEFORE YOU START

Floor Coverings

Check with the manufacturer or the Radiant Panel Association to see if your floor covering can accept radiant floor heat. Total combined R-Values are not to exceed R- 2.5, R values

If you need to use a leveling compound for use under carpet, vinyl, and glue down wood

Installing the Black Gold® panel for use under the carpet, vinyl, and glue down wood will require a leveling compound to be used with a minimum thickness of ¼". This method creates a level surface for the flooring radiant floor heat film, protects the Black Gold film from damage, and also helps the floor's thermal conductivity for successful operation.

Installing under floating laminate

You can use a self-leveling compound to install Black Gold panel under floating laminate. Install the Black Gold film between a foam underlayment pad and the laminate material.

Maintenance

The Black Gold radiant heat radiant floor heat films have no moving parts and are virtually maintenance-free.

THERMOSTAT NOTE: Test the Sinope Sensor's internal GFCI (Ground Fault Circuit Interrupt) monthly as described in this manual's operating instructions section. All external GGCI should be tested monthly.

Design Power

Be sure to use the right power density for your specific application.

Black Gold operates at a power density of 15 watts/sq. ft.. This low-profile heating material is designed for use under sheet vinyl, LVT, LVP, laminate, hardwood, linoleum, and carpet.

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DO's & PLEASE DON'Ts

Do's

- Clean the floor of all debris before placing the radiant floor heat film on the floor
- Ensure there are no protruding objects, such as nails or staples, on the subfloor that could damage the radiant heat radiant floor heat film
- Use rubber-soled shoes if you need to walk over the unprotected Black Gold heat film
- Keep traffic to a minimum on the heating panel until the leveling compound or final for covering is installed
- Measure and record heating panel resistance as per instructions
- Install floor sensor before installing radiant floor heat film or leveling compound
- Make sure system components rate for the same voltage (120V OR 240V)
- Have all electrical work completed by a professional electrician per local and national codes
- Connect the heating panel set to a dedicated electrical circuit
- **Call Gold Heat Service at 877-789-4328** if you need answers to installation questions, need help solving a problem, or believe that the Black Gold film got damaged during shipment

Please don'ts

- **DON'T** shorten the heating radiant floor heat film
- **DON'T** cut the heating wire
- **DON'T** cut the cold lead. The correct cold lead length is determined during the design process
- **DON'T** drop or bang any tools (i.e., trowel) on the heating wires
- **DON'T** hit the heating wires with any sharp objects
- **DON'T** install any fasteners such as nails, screws, etc., through any area covered by the heating panel
- **DON'T** install radiant floor heating panel sets under cabinets, built-in appliances, etc., to avoid excessive heat from building up in those areas
- **DON'T** install radiant floor heat films over expansion joints
- **DON'T** install heating panel sets in or under walls
- **DON'T** overlap heating panels or allow any wires to cross or touch
- **DON'T** place rubber-backed area or throw rugs over the heated area to avoid excessive heat from building in these areas
- **DON'T** attempt to repair the heating wire without the proper instructions and repair kit
- **DON'T** install the heating panel in glues other than cement-based tile-setting mortars

SYSTEM DESIGN

Black Gold® electric radiant film is made up of (4) major components:

- Black Gold® heat film/radiant floor heat film
- Wiring
- Control device
- Floor structure

These components work together to create a radiant heat system that will provide comfortable, trouble-free heating operation. The selection and installation of each component is very important to the system's overall safe operation.

Designing a floorplan to use Black Gold® radiant heat film is very straightforward.

Follow the instructions to ensure a trouble-free installation that complies with your Gold Heat/Black Gold® warranty requirements.

Control Device Options

- The fuse or circuit breaker must rate for a maximum of **20 amps (no greater than 16 amp load)**.
- If using a lower-rated fuse or circuit breaker, it must be rated at least **25% greater** than the heating system load attached to it
- If an area requires more than the (16) amps allowed, additional branch circuits may be used (each having its own overcurrent protection)
- These branch circuits are controlled by a single thermostat (if used with a system of electric relays)
- Gold Heat® supplies a floor-thermostat, with a built-in GFCI



Each room or area must be controlled by its own thermostat/control.



The National Electrical Code specifies that each branch circuit, used in conjunction with a floor heat system, must be for the exclusive use of the heating system

Do not connect lights, outlets, etc., to any branch circuit connected to the Black Gold® radiant heat radiant floor heat film(s)

Floor Construction

Black Gold® can be installed on any standard subfloor as long as it is flat, smooth, and free from nails and screws.



Carpeting and padding must be installed in a way that does not require nailing through, stapling through, or otherwise piercing any of the Black Gold® heating elements. Glue is the preferred installation method.



Lauan or plywood must be used with carpeting. Do not install carpeting directly on top of the heating elements.



Black Gold® may be used with wall-to-wall carpeting so long as the padding and carpeting do not have a combined thermal resistance greater than R-11 (RSI-2). Use of radiant floor heat film with thermal resistance greater than this may cause the heating panels to overheat.



Glue or spray adhesive is the preferred adhesion method for Black Gold® heat radiant floor heat film.

Design Clearances

When designing your floorplan for your Black Gold® installation, make sure that you give proper clearance to fixtures that may be part of the floor. Make sure that there is at least 8 inches (200 mm) of clearance around fixed furniture, appliances, etc. between and the Black Gold® heat film.

DO NOT OVERLAP THE RADIANT FLOOR HEAT FILM.

Decorative trim

The Black Gold® heat film must not be covered by decorative trim, baseboards, or other structures on the floor. Black Gold panels that are covered will overheat and damage the floor and the floor heat system.

Wiring

Electrical wiring in the floor, other than that for the heating system, must be at least 2 inches (50 mm) away from the heating panels and/or separated from the heating panels by insulation or the building structure.

Heat Sources

Heat sources include hot water pipes, stoves, fireplaces, wood stoves, etc.

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Power to the Black Gold® heat radiant floor heat film

Black Gold® is available for use with standard 120 or 240 volt line power.

Watts per Square Foot: 15

Widths: 10", 20" overall

Voltage: 120 or 240 VAC

Maximum Total Power per Zone: 1800 watts @ 120 volts; 3600 watts @ 240 volts

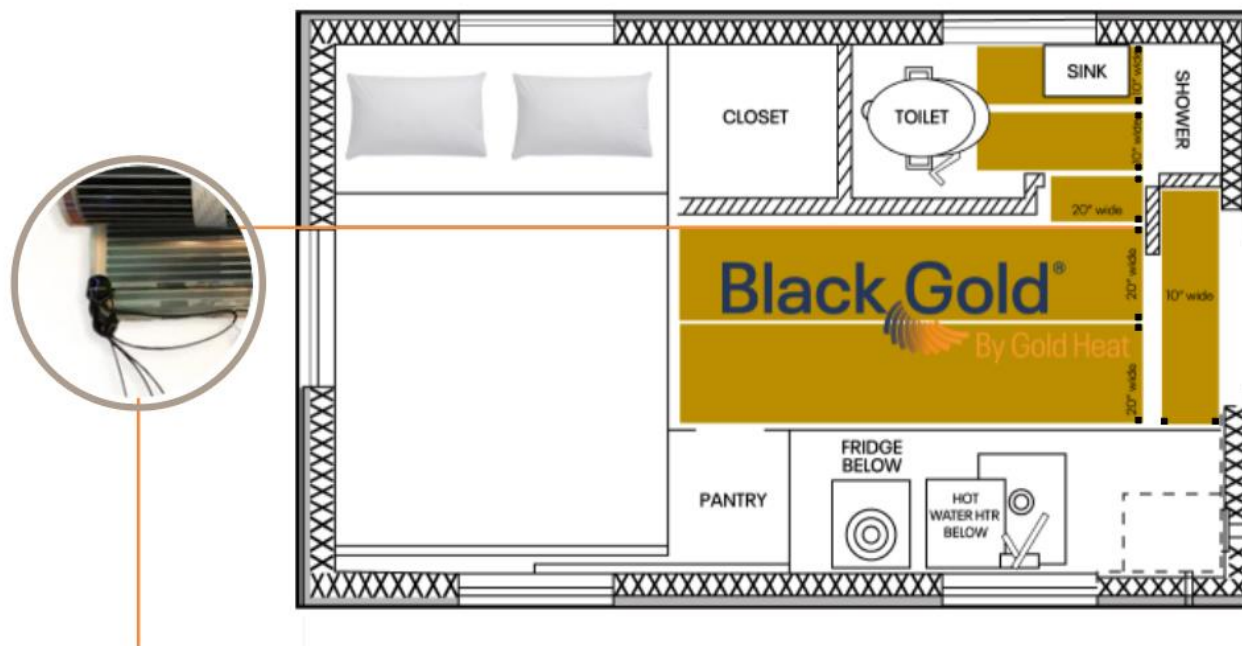
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EXAMPLE | Floorplan layout

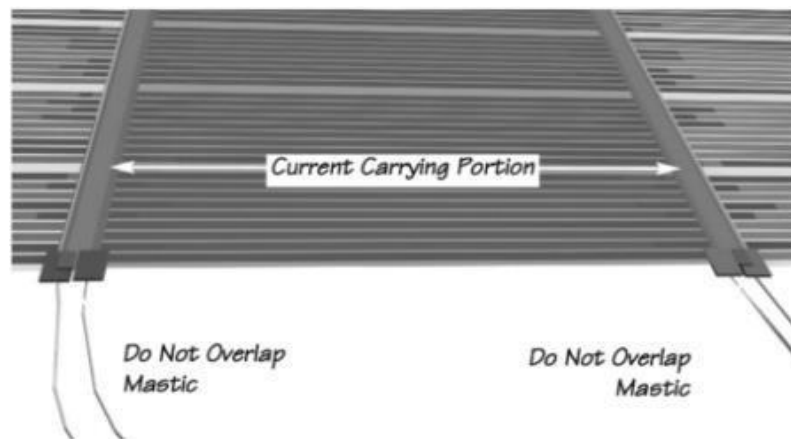


Black Gold's proprietary-design terminations are sealed in rigid thermoplastic. No special connector needed!

Black Gold™ is a thin, pre-terminated and pre-cut radiant floor heat film that lays on top of the subfloor, under the flooring material adding just 1/16" to the total floor stack-up*.



- Note that the thermostat is located on an interior wall where it will not be subjected to direct sunlight and that the length of the non-heating leads is considered.
- Ensure that non-heating leads will not cross over any heating elements.



Elements typically are not overlapped but may be overlapped **ONLY** as shown in the above illustration. Under no circumstances may current carrying portions of the elements overlap.

Need Help?

We are happy to assist you in a trouble-free installation!

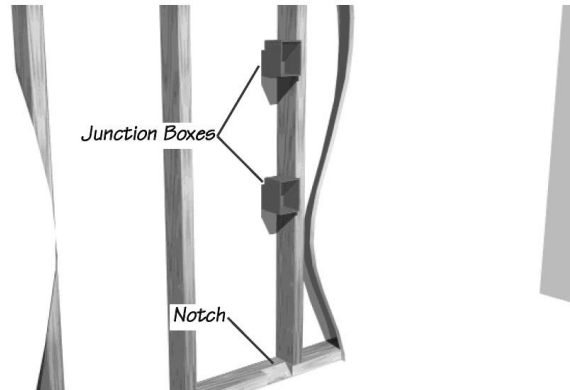
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BLACK GOLD® HEAT RADIANT FLOOR HEAT FILM **INSTALLATION**

Installing the junction boxes

1. Install a junction box for the control device (thermostat) according to the manufacturer's instructions.
2. This box should be located, unobstructed, on inside wall so that the device reads accurately.
3. Install a junction box for making the electrical connections between the elements and the thermostat.
4. Notch or drill the plate directly beneath the junction boxes to allow proper routing of the non-heating leads.



Need Help?

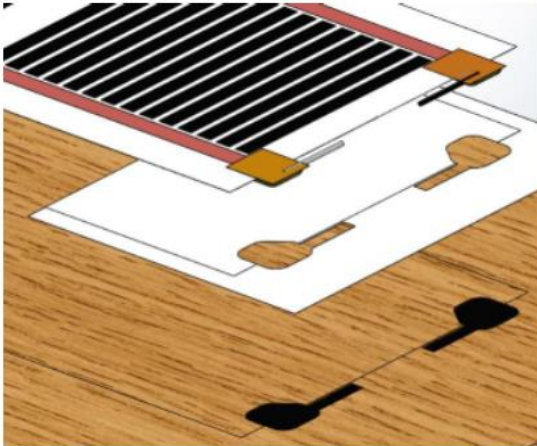
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Installing the heat radiant floor heat film

Using routing template, mark the pockets and wire channels, then route the pockets 3/16" deep.



During a typical installation, pockets and grooves are routed into the subfloor to accept the cold lead wires.

The Black Gold film is adhered to the subfloor and the flooring material is installed on top.

Gold Heat design engineers are standing by to help you before, during, and after the installation.



Use appropriate safety procedures for power tools

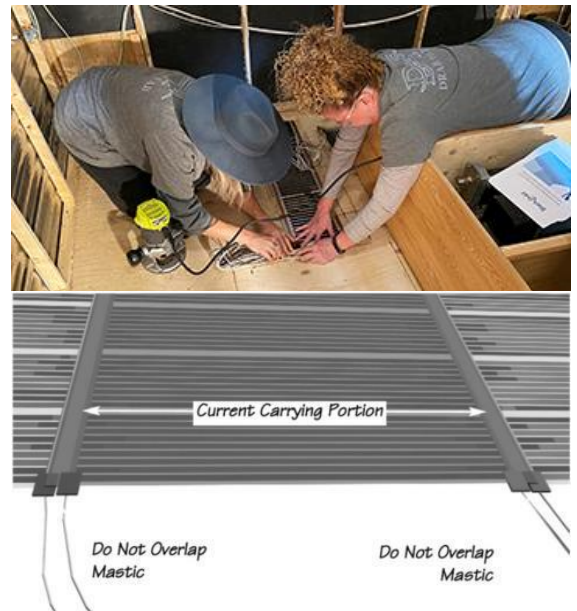
Roll out the elements over the floor surface according to your layout.



Elements may be overlapped ONLY as shown in the illustration below.

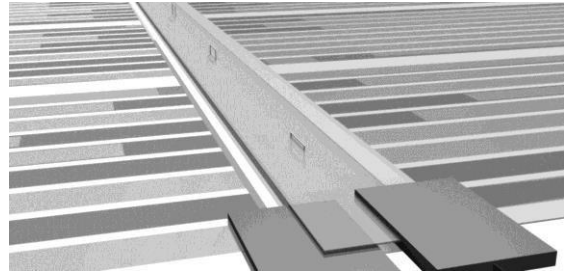
Under no circumstances may current carrying portions of the elements overlap. When overlapped properly, the elements will be spaced by their nominal width (10", 20").

1. Firmly attach the Black Gold film to the floor with adhesive (as shown).
2. If installing over a wooden subfloor, nailing, or stapling the elements in place is optional.





Nail or staple only through the clear border on the sides of the element. Do not staple closer than ½" (6.4mm) to any current carrying portion of the element, which includes the copper colored bus bar.



3. Route the wires to the junction box provided for the thermostat.



Exercise caution before and during flooring installation to avoid damaging the heating elements.

Need Help?

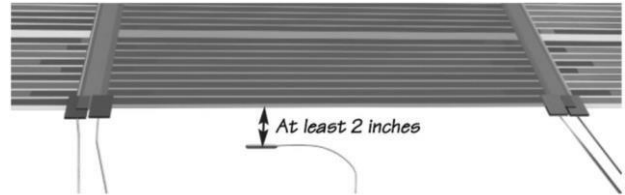
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Install Thermostat Floor Sensor

1. Tape the floor sensor to the subfloor directly under the element at least 2" (5mm) inside any heated (black part of) the Black Gold® heating panels
2. Route the sensor lead to the thermostat junction box.
3. Secure in place.

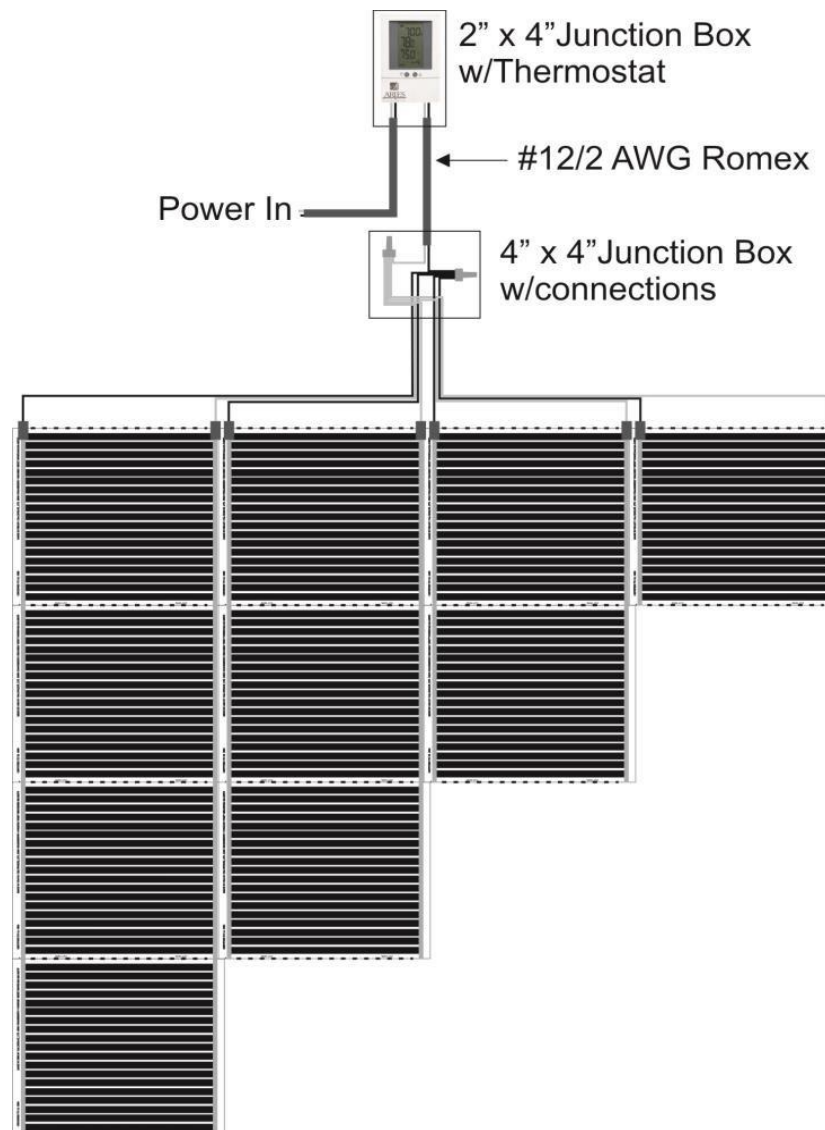




This illustration is a simple wiring diagram of a Black Gold® Radiant Heat radiant floor heat film installation.

All panel wiring is routed into the lower junction box where all connections are made to the thermostat (upper junction box).

Note that the conductor between the junction boxes is a piece of #12/2 AWG Romex.



Electrical inspection

Perform a visual and electrical check on the Black Gold heat film prior to activation. The heat test may be required by the laminate manufacturer based on the type of subfloor being used (i.e., concrete).

Always check with your laminate manufacturer for any restrictions and/or requirements concerning the use of their product in conjunction with Black Gold® radiant floor heat film.

Visual Inspection

When visually checking the panels, look for any signs of damage, wear, or scratches that might have occurred during installation. If any portions of a panel set appear damaged, the entire film system will have to be replaced.

Electrical Testing

A resistance check across the supply leads must be made to detect any short or open circuits.

Use the following formulas to determine the acceptable resistance values:

	<u>120 Volts</u>	<u>240 Volts</u>
High resistance limit =	$\frac{15,840}{\text{installed watts}}$	$\frac{63,360}{\text{installed watts}}$
Low resistance limit =	$\frac{13,680}{\text{installed watts}}$	$\frac{54,720}{\text{installed watts}}$

After any remedies for open or short circuits, make sure to retest the system.

Test for Heating

1. Install control device and connect to the electrical panel box.
2. Install and wire the control device according to the manufacturer's instructions in the junction box.



Before making electrical connections, make sure that the breaker will supply power to the heating panels has been turned off.

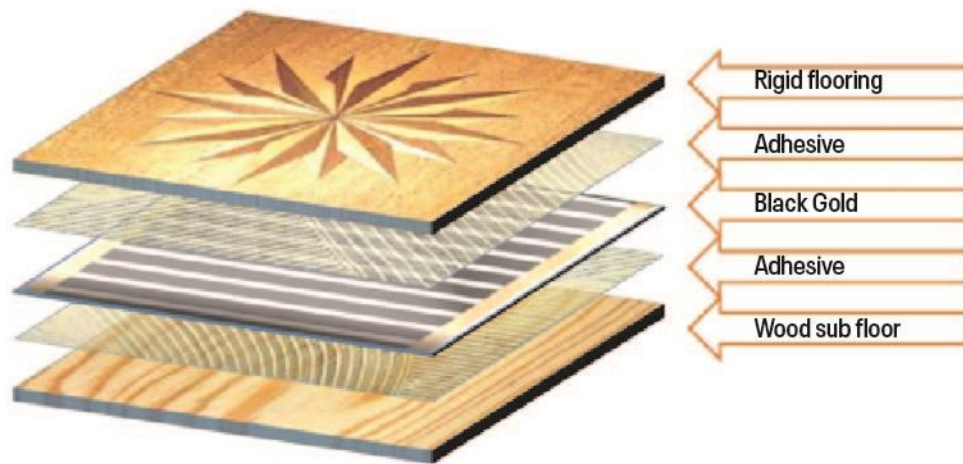
- Use 12/2 Romex wire to wire the heating panels according to the manufacturer's instructions
- Turn on the breaker and adjust the thermostat heat
- After the system has been on for several minutes, run your hand over the heating panels to ensure that they are warm
- **IMPORTANT!** The panels will not become hot. Instead, it will generate a comfortable warmth
- If the elements do not become warm, turn off the power and double-check all wiring and perform another electrical test.

INSTALLING YOUR FLOORING



DO NOT INSTALL BLACK GOLD® HEAT RADIANT FLOOR HEAT FILMS DIRECTLY UNDER CARPET.

Lauan or plywood must be used if you are going to be installing under carpet.



1. Install the flooring according to the manufacturer's instructions.
2. Retest the electrical to ensure that the heating elements are not damaged.
3. Turn on power at the breaker.

- The flooring manufacturer may require that the heating system be turned on for a while (perhaps several days) to help dry out particular subfloor types
- Always follow the manufacturer's instructions about this drying out period and ensure that no damage can occur to the heating panels during this period
- Install baseboards or trim around the perimeter of the room. Doing this will ensure that the floor will not lift and expose the Gold Heat heating elements

A flooring manufacturer will have instructions about installing the baseboard or trim to allow the floor to float properly.

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Ordering Black Gold® radiant heat radiant floor heat film

10" film

Part Number	# Panels	Width (inches)	Length (inches)	Length (feet)	Nominal Square feet	Watts
BGT15-10-1-	1	10	10	0.8	0.7	10
BGT15-10-2-	2	10	20	1.6	1.4	20
BGT15-10-3-	3	10	30	2.5	2.1	30
BGT15-10-4-	4	10	39	3.3	2.7	40
BGT15-10-5-	5	10	49	4.1	3.4	50
BGT15-10-6-	6	10	59	4.9	4.1	60
BGT15-10-7-	7	10	69	5.7	4.8	70
BGT15-10-8-	8	10	79	6.6	5.5	80
BGT15-10-9-	9	10	89	7.4	6.2	90
BGT15-10-10-	10	10	98	8.2	6.8	100
BGT15-10-11-	11	10	108	9.0	7.5	110
BGT15-10-12-	12	10	118	9.8	8.2	120
BGT15-10-13-	13	10	128	10.7	8.9	130
BGT15-10-14-	14	10	138	11.5	9.6	140
BGT15-10-15-	15	10	148	12.3	10.3	150
BGT15-10-16-	16	10	157	13.1	10.9	160
BGT15-10-17-	17	10	167	13.9	11.6	170
BGT15-10-18-	18	10	177	14.8	12.3	180
BGT15-10-19-	19	10	187	15.6	13.0	190
BGT15-10-20-	20	10	197	16.4	13.7	200
BGT15-10-21-	21	10	207	17.2	14.4	210
BGT15-10-22-	22	10	217	18.0	15.0	220
BGT15-10-23-	23	10	226	18.9	15.7	230
BGT15-10-24-	24	10	236	19.7	16.4	240
BGT15-10-25-	25	10	246	20.5	17.1	250

Cold Leads

- A = 10'
- B = 15'
- C = 20'

10" actual width - 9.84"

20" film	#	Width	Length	Length	Nominal	Watts
Part Number	Panels	(inches)	(inches)	(feet)	Square feet	
BGT15-20-1-	1	20	10	0.8	1.4	21
BGT15-20-2-	2	20	20	1.6	2.7	42
BGT15-20-3-	3	20	30	2.5	4.1	62
BGT15-20-4-	4	20	39	3.3	5.5	83
BGT15-20-5-	5	20	49	4.1	6.8	104
BGT15-20-7-	7	20	69	5.7	9.6	145
BGT15-20-8-	8	20	79	6.6	10.9	166
BGT15-20-9-	9	20	89	7.4	12.3	187
BGT15-20-10-	10	20	98	8.2	13.7	208
BGT15-20-11-	11	20	108	9.0	15.0	228
BGT15-20-12-	12	20	118	9.8	16.4	249
BGT15-20-13-	13	20	128	10.7	17.8	270
BGT15-20-14-	14	20	138	11.5	19.1	291
BGT15-20-15-	15	20	148	12.3	20.5	311
BGT15-20-16-	16	20	157	13.1	21.9	332
BGT15-20-17-	17	20	167	13.9	23.2	353
BGT15-20-18-	18	20	177	14.8	24.6	374
BGT15-20-19-	19	20	187	15.6	26.0	394
BGT15-20-20-	20	20	197	16.4	27.3	415
BGT15-20-21-	21	20	207	17.2	28.7	436
BGT15-20-22-	22	20	217	18.0	30.1	457
BGT15-20-23-	23	20	226	18.9	31.4	477
BGT15-20-24-	24	20	236	19.7	32.8	498
BGT15-20-25-	25	20	246	20.5	34.2	519

Cold Leads

- A = 10'
- B = 15'
- C = 20'

20" actual length = 19.69"

Need ordering help?

Call Gold Heat™ to place an order, today!

We are happy to assist you in a trouble-free installation!

Contact Gold Heat sales: (866) 935.7782

Monday – Friday . 7am – 4:30pm PST



The motorcoach, home building, remodeling, tiny house, and flooring installation professionals' source for radiant floor heat.

5295 NE Elam Young Pkwy, Suite 130

Hillsboro, OR 97124. Tel: 877-789-4328

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