



March 2026 Webinar

Tile Substrate Basics: What Works with Floor Heating

WELCOME & INTRO

Your Product Expert

Mary



20 years Radiant Heating Expertise

WarmlyYours Sales Manager

Residential & Commercial Radiant Project Management

Problem-solver and customer advocate

Your Tech Expert

Scott



17+ years Radiant Heating Expertise

WarmlyYours Engineering Team

24/7 Technical Support Specialist

Tech Tip Video Series

Quick housekeeping:

- Questions go in the Q&A panel—we'll tackle them at the end
- Recording + resources will be sent soon after our session
- Reward coupon for attending will be sent to you by Julia (Owner)

TODAY'S OUTCOMES

Today's Outcomes

What you'll leave with

01

Green/Yellow/Red Light Mindset

A tile-substrate "green light / yellow light / red light" mindset

02

Failure Prevention

Prep rules that prevent the most common failures (bond + movement + moisture)

03

Material Selection

When to use cement board vs uncoupling vs SLU/SLC (and how to avoid float)

04

System Specification

How to spec the right heating system + key accessories for the substrate



The Big Idea: The Heater Rarely Fails—The Assembly Does

Most job failures trace to:

Movement/deflection

Poor bond / contamination / delamination

Moisture issues

Wrong underlayment choice or rushed prep

📌 **Goal:** build a stable, bondable, tile-ready assembly before heat goes in



The Rules of the Foundation

A successful installation begins before the heater is unrolled. These are the professional non-negotiables:

Structural Integrity

Subfloor must be "deflection-free." Minimum requirement is L/360 (Standard Tile) or L/720 (Natural Stone).

Surface Cleanliness

Substrate must be Clean, Sound, and Dry. No dust, oils, or curing compounds.

Flatness Standard

- Standard Tile: Max variation of 1/4" in 10'.
- Large Format Tile (LFT): Any side >15" requires a stricter 1/8" in 10' tolerance.

Moisture Levels

Concrete must be fully cured (min. 28 days) and tested for MVER (Moisture Vapor Emission Rate) to ensure thinset and primers can bond.

❏ **Why it matters for floor heat:** dips/highs change embed depth → uneven warm-up + perceived “cold spots”

Substrate Categories You'll See on Real Jobs

Wood subfloors

(plywood/OSB assemblies)

Concrete slabs

Existing tile

(overlay scenarios)

Cement backer board

(CBU) assemblies

Uncoupling membranes

SLU/SLC

(self-leveling underlayment) builds



Wood Subfloors: Building a Solid Foundation

For floor heating to perform optimally, the underlying wood subfloor must provide unwavering rigidity. Heat causes expansion, and any inherent movement in the subfloor will inevitably lead to tile and grout failures.

Deflection is the Enemy

Ensure your subfloor meets strict deflection limits to prevent cracking and bond failure:

- **Standard Tile:** Max flex of $1/360^{th}$ of the span ($L/360$).
- **Natural Stone:** Demands twice the rigidity at $1/720^{th}$ of the span ($L/720$) for optimal stability.

Plywood vs. OSB

- **Plywood:** The preferred substrate for bonding. Always use Exterior Grade or Exposure 1 for durability and moisture resistance.
- **OSB (Oriented Strand Board):**
WARNING: Waxes used in OSB can act as bond-breakers. Requires a specific primer or a cement-based underlayment (CBU) overlay before heating membranes are applied.

The Rigidity Myth

Understand this critical distinction: A heating membrane functions as an uncoupler, not a structural stabilizer. If the floor exhibits bounce or excessive deflection, the issue must be resolved by adding a second layer of subfloor or stiffening the joists from below **before** the heating system is installed.

Concrete Slabs & Thermal Management

Integrating floor heating with concrete slabs requires careful planning to prevent heat loss and ensure system efficiency. Address these critical factors:



The "Heat Sink" Effect

Concrete's thermal mass siphons heat into the earth. Without a thermal break, warmth is pulled away from the tile, increasing energy consumption and response time.



Thermal Breaks are Essential

Implementing a thermal break, such as a specialized insulating board like ThermalSheet, is crucial. This layer reflects heat upwards, significantly preventing "downward" heat loss and improving system efficiency by up to 50%.



Curing & Moisture Control

New concrete needs a full 28-day cure to avoid shrinkage cracks. High Moisture Vapor Emission Rates (MVER) necessitate a vapor reduction membrane to protect the thinset bond from breakdown.



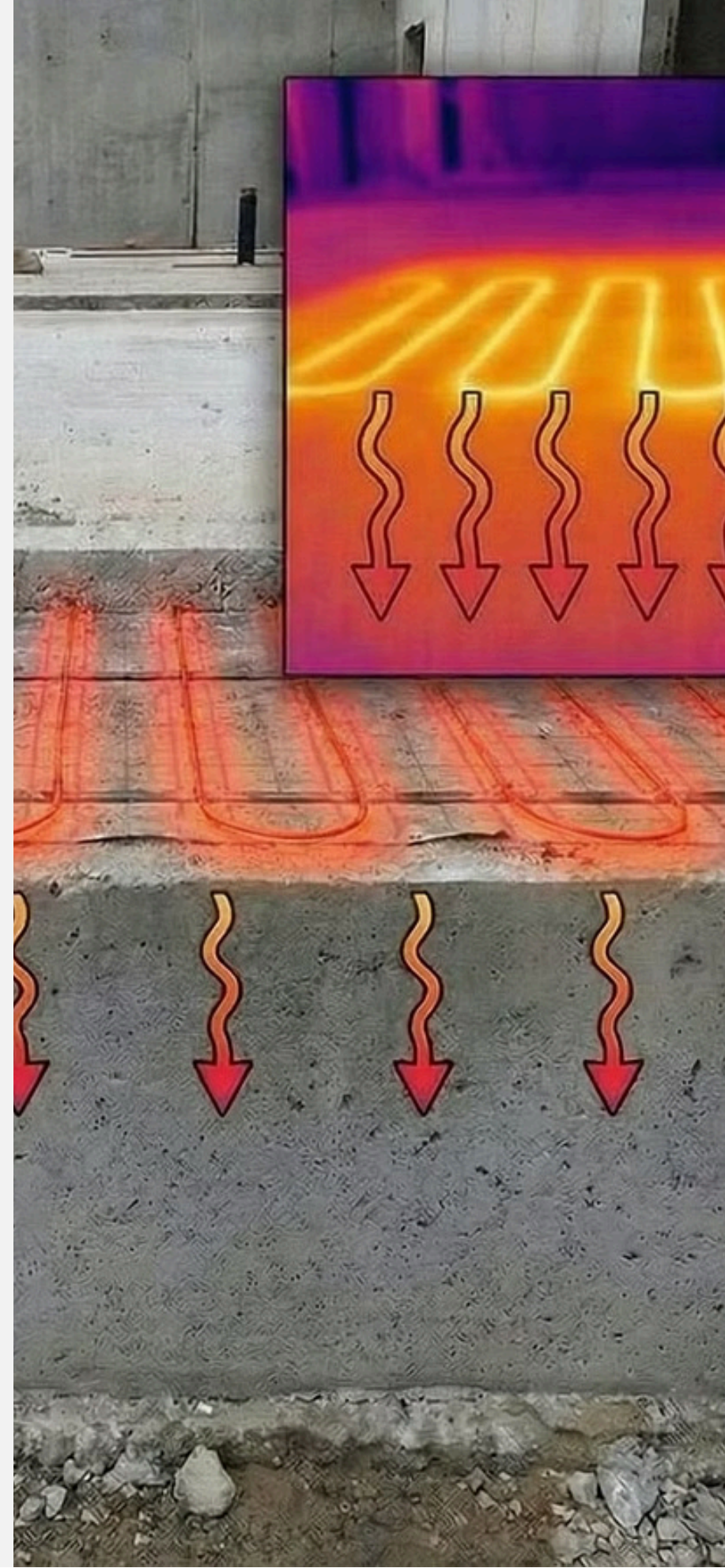
Mechanical Surface Prep

Concrete surfaces must be cleaned (CSP 1-3) to create a profile that allows primers and thinset to penetrate and bond effectively. This removes laitance and contaminants for optimal adhesion.



Pro Tip:

Always perform moisture testing (e.g., calcium chloride or in-situ RH) on existing concrete slabs, regardless of age, before installing any flooring system.



Existing Tile Over Tile: The "Stoplight" Protocol

Bonding to existing tile is a high-risk, high-reward strategy for floor heating installations. Follow this "stoplight" protocol to assess the existing substrate's viability:

✓ GREEN LIGHT (PROCEED)

The existing tile is:

- Flat and level (within industry standards).
- Well-bonded with no "hollow" sounds when tapped.
- Clean, dry, and unglazed (or has a suitable profile for bonding).

⚠ YELLOW LIGHT (CAUTION)

The tile is structurally sound but has:

- Minor lippage.
- A high-gloss or smooth finish.

📄 The Pro-Fix:

Must use a specialized **Bond-Promoting Primer** (e.g., Ardex P 82) to create a mechanical "key" for the thinset, ensuring proper adhesion.

❌ RED LIGHT (STOP/TEAR OUT)

Do NOT proceed if you observe any of the following:

- Multiple cracked tiles or failing grout joints (indicates subfloor movement).
- Hollow "thumping" sounds when tapped (indicates delamination).
- "Tile on Tile on Tile"—too many layers create a vertical height disaster and potential instability.

Underlayment Selection: Rigid vs. Uncoupling

CBU vs. Prodeso Membrane

CBU (Cement Backer Board) Tends to Win When:



- **Structural Rigidity is Priority:** Familiar, non-compressible base for standard tile.
- **"Green Light" Substrates:** Perfectly flat, stable floors meeting deflection limits ($L/360$ for tile or $L/720$ for stone) with no moisture issues.
- **Cost-Driven Standard Jobs:** A baseline rigid bond is acceptable in stable, low-stress environments.

Prodeso (Uncoupling Membrane) Tends to Win When:



- **Movement & Crack Isolation:** Addressing "Yellow Light" scenarios like concrete shrinkage or minor wood subfloor movement.
- **Vapor Management:** Essential for concrete slabs; air channels allow the substrate to breathe.
- **Zero Cure Schedule Control:** Eliminates 24-hour wait times; install membrane, cable, and tile in a single day.
- **Large Format Tile (LFT):** Prevents lippage and grout cracking by managing differential expansion.

SLU/SLC: Managing the "Chemical Bond" Risk

The Critical Prep Checklist

01

Substrate Decontamination

Mechanical abrasion (grinding) often required; sweeping is not enough for a PRO-grade bond.

03

The "Tack" Window

You must pour while the primer is in its active state (typically 4–6 hours). Priming today and pouring tomorrow creates a bond-breaker.

02

The Primer Protocol

Primer is the "glue" of your assembly. Skipping it or using the wrong type is the #1 cause of debonding.

04

Perimeter Containment

Use caulk or ThermalSheet to seal every gap and to dam areas. SLU is like water; a single unsealed floor-to-wall transition can lead to a costly "blowout" into the floor below.

Heating Element Bonding & "Float" Prevention

The Risks of "Floating" Cable

- **Manual Tacking**

Securing cable every 6–12" with hot glue is **slow and labor-intensive**, increasing installation time.

- **The "Floating" Risk**

Without a physical lock, cable will rise to the surface of a pour, causing **damage from trowels**.

- **Bond Breaker Warning**

Never use **Duct Tape**. Don't overuse masking tape. It creates hollow voids that lead to **tile delamination and premature failure**.

Professional Mechanical Solutions

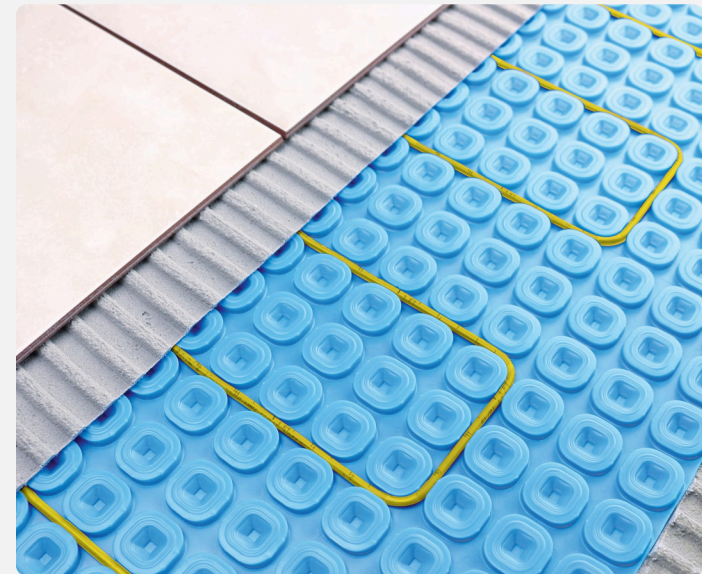
WarmlyYours GripStrips



(Included Free with Cable)

- **Mechanical Spacing:** Custom-designed studs "lock" the cable at 3", 4", or 5" spacing, ensuring precise heat distribution.
- **Tension Control:** Durable plastic design won't nick wire insulation (safer than metal straps) and holds cable flat to prevent floating during SLU pours.

Prodeso Uncoupling Membrane



- **The Ultimate Template:** Studded membrane locks the cable in place automatically—**no glue or strips needed**.
- **100% Encapsulation:** Guaranteed embedment at a consistent depth for optimal heat distribution and longevity.
- **Schedule Boost:** Go from wire layout to setting tile immediately.

Managing the Stack-Up (Height Planning)

Unplanned height differences create trip hazards and door interference. Calculating your total "sandwich" **before** the first bag of mortar is opened is critical to avoid costly rework.

Door Clearance

Verify if the bathroom door will still swing freely, or if the bottom edge requires trimming to accommodate the new floor height.

Transition Strips

Proactively plan for reducers or transition profiles at all adjacent room transitions to create seamless, safe thresholds.

Liability & Safety

Ensure the final height meets all safety and ADA standards to prevent trip hazards and protect your client (and yourself) from potential liability issues.

Choose Path A OR Path B

Components	Typical Height
Path A: Standard CBU Underlayment	1/4" — 1/2"
Path B: Prodeso Uncoupling Membrane.	7/32" (5.5mm)

TOTAL ESTIMATED BUILD-UP = 3/4" — 1 1/8"

Components	Typical Height
Heating Element + Mortar/SLU Embedment	~1/8"
Finished Tile (Standard or Large Format)	3/8" — 1/2"

Cross Sections



Moisture, Contamination, and Bond Breakers

Fast Checklist: Watch-outs that Kill Bond & Performance

1 Surface Contaminants

Dust, paint, sealers, curing compounds, overspray, and old adhesive residue are all enemies of a PRO-grade bond.

2 Old Adhesive Residue

Old mastic or glue can act as a permanent bond breaker; it must be mechanically removed or mitigated per underlayment requirements.

3 Unverified Moisture

Never guess—verify the substrate is within product limits before you bond or pour. Excessive moisture causes delamination.

4 Substrate Movement

If the substrate is moving, the tile assembly will eventually fail—address structural cracks and deflection before adding heat.

Missed Primer Window

Always prime and pour within the manufacturer's specific "*tack window*"—missing this window turns your primer into a bond breaker.

Inadequate Perimeter Seal

Use caulk or ThermalSheet at wall-to-floor edges and HVAC surface mounted ducts to prevent SLU leaks into wall cavities or the floor below.

Rushing Critical Steps

Schedule pressure leading to rushing cure times or prep steps is the #1 lead-in to bond failure and costly rework.

Incorrect Adhesive Mixing

Follow the instruction on the bag. It's a recipe for success. Do not use pre-mixed thinset.

What Fails (and How to Prevent It)

Understanding common failure modes is key to a successful, durable floor heating installation. Here's what to watch for:



Tile Cracks & Lippage

Almost always symptoms of movement or flatness issues in the underlying substrate. Address deflection and levelness before tile goes down.



Cold Spots & Uneven Heat

Usually caused by layout mistakes or substrate irregularities.
Recommended distance from cable to the top of the tile is 1" to 1 1/2".



Sensor Complaints

Often traced to poor placement during install, or boundary effects when sensors are too close to external heat/cold sources.



SLU Debonding

The direct result of primer or prep failures, such as missing the critical "tack window" or bonding to dusty, contaminated surfaces.



"It worked until..."

Highlights the danger of hidden damage during construction, or missing documentation that leaves future professionals guessing.

Spec the Right Product + Accessories

Don't Guess—Confirm Every Detail for Flawless Installation

To specify a job correctly and eliminate costly callbacks, you must confirm these four critical pillars:

N

Substrate Type + Condition

Is it wood, concrete, or an overlay? Does it need a primer or a thermal break for optimal performance?



Room Geometry

Precisely identify obstacles like cabinets, toilets, and vents, along with all transition points, before finalizing the layout.



Insulation Strategy

Evaluate whether the slab requires supplemental insulation, such as ThermalSheet, to prevent heat loss, especially in colder climates.



Control/Sensor Plan

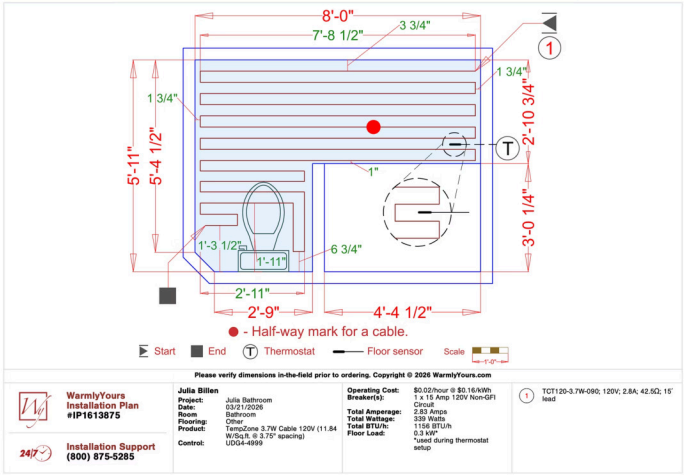
Ensure the floor sensor is positioned in a neutral zone, away from external heat sources or cold drafts that could skew readings.

This meticulous approach is precisely why PROs consistently utilize our comprehensive **Floor Plan Service**.

WarmlyYours Floor Plan Service

Spec Accuracy + Fewer Surprises

Designed to simplify your projects and ensure every detail is accounted for, providing peace of mind from planning to installation.



Electrical Plan & Information
Share this information with your Electrician

Exclusively designed for:

Julia Billen
Date: 03/21/2026
Room: Bathroom
Plan Number: IP1613875
Notes:

1. All power leads travel back to thermostat or junction box.
2. Always test cable/cables out of the box with an Ohm meter and Mega-Ohm meter (optional). See manual for other required tests.
3. Thermostat: Install a 3"x3"x1/2" single gang, 2-1/8" deep electrical box according to NEC and local code requirements. Electrical boxes should be located on interior walls, commonly 60" from the floor.
4. Power lead Conduit: The shielded power lead can be installed with or without electrical conduit depending on local code requirements. In either case, remove one of the knock-outs in the 3"x3"x1/2" single gang box to route the lead. If electrical conduit is not required by code, install a wire collar to secure the leads where they enter the box.

Heating System: 120V* TempZone 3.7W Cable
Wattage: 11.84 W/Sq.ft. @ 3.75" spacing
Control: 120V* nSpire Touch Programmable Thermostat

* Verify that the heating system and control is supplied this voltage from the breaker panel.

TempZone 3.7W Cable Specifications						
#	Spacing	Length	Lead	Volts	Watts	BTU/h
1	3.75"	90'	15'	120	339	1156
					2.83	42.47

Control Specifications	
Model #	UDG-4999
Ground Fault Protection (GFCI)	Class A, 5 mA
Floor Load	0.3 kW"
* used during thermostat setup	

Service Panel
BREAKER SIZE NEEDED: 1 x 15 Amp 120V Non-GFI Circuit

System Electrical Consumption
\$0.02/hour*
This calculation is based on the average rate of \$0.1599 per kWh for zip/postal code 80047, but consumption may vary based on individual conditions. Operating cost is estimated based on the average thermal inertia due to the thermostat cycling the power during the heating period.

Custom System Alignment

We confirm the precise heating system and electrical required based on your specific substrate and application, eliminating guesswork.

Critical Accessory Identification

We identify essential accessories like ThermalSheet insulation, highly recommended for concrete slabs in colder climates to prevent heat loss.

Simple Professional Process

Submit dimensions, obstacles, and preferred thermostat location to receive a comprehensive, easy-to-install plan with total confidence.

Documentation That Protects the Job (Substrate Edition)

Your project record is your best defense against future liability and ensures clarity for any future maintenance or repairs.



Before Photos

Capture the substrate condition, cleanliness, and any existing cracks or irregularities before any material is applied. This creates a baseline.

Process Photos

Document every critical stage of prep, specifically primer application, proper cure times, and underlayment installation (CBU or membrane) with the heating elements.



WarmlyYours "One-of-a-Kind" Plan

Keep your custom-designed installation and electrical plan on-site and in your records. This confirms:

- **Best Product for Application:** Verification that the system matches the specific substrate type.
- **Precise Layout:** Exactly where the cable and sensors are embedded for accurate troubleshooting.
- **Electrical Plan:** Breaker size, watts, Volts.
- **Operating Costs:** Provides real data to share with the homeowner for long-term transparency and expectations.



Product & Cure Notes

Record specific underlayment brands used, primer types, and the exact cure times followed before tile was set. Date and initial all records.

Keep a Simple Job Record

Consolidate all documentation into a concise, accessible job file. Future you, and your clients, will appreciate the thoroughness and peace of mind. If you lose your job record - WarmlyYours' has it! We've got your back.

Rapid-Fire: Top Substrate Mistakes

Avoid these common pitfalls to ensure a callback-free installation:



Skipping Primer for SLU/SLC

Without a primer, there is no chemical bond; the leveler will eventually debond, leading to costly failure.



Ignoring Movement Symptoms

If the floor bounces or has structural cracks, heat and tile will not fix it—you must stiffen the structure first.



Neglecting Height Planning

Failing to calculate the total stack-up leads to doors that won't swing and dangerous transition "lips".



Pouring over Contamination

Sweeping isn't enough; dust, paint, and sealers act as permanent bond breakers, compromising adhesion.



"Fixing it in Thinset"

Using thinset to bridge major flatness problems leads to uneven heating, tile lippage, and bond weakness.



Rushing Cure Times

Most bond failures occur because a crew didn't wait for the substrate or leveler to reach full maturity.



LIVE Q&A

Now let's open it up for your questions.

When measuring with a mega ohm meter, what reading should I be getting before, during, and after the installation of the cable? - Karl A.

What is the correct placing of the sensor during installation? - Karl A.

How about going over a sound mosaic tile? - Chip D.

CLOSE + SUPPORT

Resources Coming Your Way

Via email:

-  PDF of today's slides
 -  PRO Resource: Heated Tile Substrate Compatibility & Risk Map
 -  Recording of this webinar
-
-  PRO Reward coupon - Look for an email from Julia

Watch Scott's Monthly PRO How-To



 www.warmlyyours.com 

Heated Tile Installation Guide: 3 Critic...

Avoid costly callbacks with our no-fluff guide to heated tile. Learn the 3 essential gates fo...

Next Webinar in the Series

Asphalt Driveway Snow Melt: Planning to Completion
Wed, Apr 29 — 1:00pm CST

[Register now](#)

24/7 PRO technical support: 800-875-5285

Need help on a job? Call us:

-  **800-875-5285**
-  techsupport@warmlyyours.com

We'd rather help you plan the install than troubleshoot a problem later. Don't hesitate to call.