SafeTech-EGS

SafeTech-EGS Standard Voltage Floor Heating Installation Guide

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1. Introduction

1.1 System Overview

The SafeTech-EGS is a radiant electric floor heating system that converts electrical energy directly into heat by means of an ultra-thin, flexible heating element embedded beneath the finished floor surface. Heat is distributed primarily through infrared radiation (approximately 60–70%), supplemented by convective heat transfer, providing even and comfortable warmth throughout the space.

Core system characteristics:

- **No pipework or boiler required:** The SafeTech-EGS generates heat directly from the film element, eliminating the complex infrastructure of conventional hydronic heating systems.
- **Concealed, low-profile installation:** At only 1.4 mm thick, the film is fully embedded beneath the floor finish and does not compromise room height or usable floor area.
- **Independent zone control:** Individual thermostats allow precise temperature regulation in each zone, maximising energy efficiency.

Product Specification Table

Product number	EGS21E/F-220-	EGS21E/F-220-	EGS21E/F-220-	EGS21E/F-220-	EGS21E/F-220-	EGS21E/F-220-
Voltage input	220v	220v	220v	220v	220v	220v
Power density	220 W/sqm	220 W/sqm	220 W/sqm	160 W/sqm	160 W/sqm	160 W/sqm
Power	181.5W	270W	386W	132W	196W	281W
Total width of the material	1500mm	1500mm	2000mm	1500mm	1500mm	2000mm
Heating width	1450mm	1450mm	1950mm	1450mm	1450mm	1950mm
Length	600mm	900mm	900mm	600mm	900mm	900mm
current	0.825A	1.23A	1.76A	0.6A	0.89A	1.28A
Maximum current	16A	16A	16A	16A	16A	16A
Maximum installation power	3500w	3500w	3500w	3500w	3500w	3500w
weight	1.4kg/m2	1.4kg/m2	1.4kg/m2	1.4kg/m2	1.4kg/m2	1.4kg/m2
Insulation strength	5 KV/mm	5 KV/mm	5 KV/mm	5 KV/mm	5 KV/mm	5 KV/mm
Chamber operating temperature	60℃	60℃	60℃	60℃	60℃	60℃
Thickness	1.4 mm	1.4 mm	1.4 mm	1.4 mm	1.4 mm	1.4 mm

Product code key — example: EGS21E-220-220-600×1500

- EGS21E / EGS21F – Standard-voltage heating film; E = embedded, F = floating (see 1.4)
- 220 – Operating voltage: 220 V
- 220 – Rated power density: 220 W/m²
- 600×1500 – Nominal film dimensions: 600 mm × 1,500 mm

1.2 System Advantages

- **Direct body warming:** Far-infrared radiation penetrates the skin surface, producing a natural warmth effect comparable to sunlight exposure, offering superior comfort to conventional convective heating.
- **Reduced thermal stratification:** Heat rises uniformly from the floor, preventing the accumulation of hot air at ceiling level and improving energy efficiency by 20–30%.
- **Minimal structural impact:** The ultra-thin profile does not affect floor-to-ceiling height or room layout; the concealed installation is fully compatible with all interior design styles.
- **Dedicated connection system:** Purpose-engineered cables and connectors are supplied to ensure a safe and compliant electrical installation.

1.3 Scope of Application

The floor finish over the SafeTech-EGS system should have a thermal resistance of less than 0.05 m²·K/W. The following floor coverings are recommended:

Cement mortar + floor tiles

High-density hardwoods (e.g., teak, oak)

Stone floor

Cement mortar plus epoxy flooring

1.4 Connection Versions — EGS21E / EGS21F

SafeTech-EGS heating film is supplied in two connection versions. The heating film itself is identical in both (1.4 mm thick, electrical data as in the Product Specification Table). The versions differ in the overmoulding at the cable connection point, in the cables supplied and in where the film sits in the floor build-up. Select the version for the floor finish before ordering.

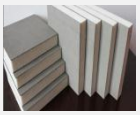
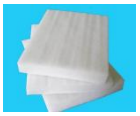
	EGS21E — Embedded	EGS21F — Floating
Overmoulding at connection point	12 mm total thickness	5.4 mm thickness
Heating film thickness	1.4 mm	1.4 mm
Cables supplied	1.5 m 3-core cable (3 × 1.5 mm²) with connection gland	3 individual silicone double-insulated cables, 5 m each
Position in the build-up	Beneath the levelling layer (levelling compound or screed); the connection point is concealed within the levelling layer	On top of a 4–6 mm underlayment, directly under a floating floor; or within the tile adhesive layer under tiles where required
Typical floor finishes	Tile, natural stone, resin and screeded floors; wood over a levelling layer	Click laminate, engineered wood, LVT / vinyl; tiles in the adhesive bed where required
Installation sections	5.2, 5.3 and the build-up diagrams in Section 11	5.1 and the Floating Floor diagram in Section 11

Product code key — example: EGS21E-220-160-900×1500

- EGS21 – Standard-voltage electric heating film
- E / F – Connection version: E = embedded (12 mm), F = floating (5.4 mm)
- 220 – Operating voltage: 220 V
- 160 – Rated power density: 160 W/m²
- 900×1500 – Nominal film dimensions: 900 mm × 1,500 mm

> Do not lay EGS21E directly under a floating floor: its 12 mm connection point must be concealed within the levelling layer. For floating floors use EGS21F on top of the underlayment.

2. Materials and Tools

List of materials	Specifications:	Schematic diagram
Heating film	See 1.1	
Dedicated power cord	EGS21E: 1.5 m 3-core cable (3 × 1.5 mm²) with connection gland EGS21F: 3 × 5 m silicone double-insulated cables	
Insulation	20 mm extruded board	
	Polyurethane sheet	
thermostat	BHT-1000-GBLW	
Leakage protector	30mA	
Boundary insulation strips	EPE expanded polyethylene 10mm	
Insulation resistance tester		
Multimeter		

3. Pre-Installation Preparation

3.1 Site Inspection

Objective: Confirm that the substrate meets the physical and environmental requirements for SafeTech-EGS installation.

(1) Floor Flatness

Standard: Maximum deviation ≤ 3 mm over a 2 m straight edge

Inspection tools: Laser level or straight edge with feeler gauge

Remedial action: Depressions > 3 mm: repair with self-levelling compound. Protrusions: grind flat with an angle grinder

(2) Surface Cleanliness

Requirement: Free from dust, oil, gravel and all loose debris

Method: Vacuum thoroughly with an industrial vacuum cleaner; degrease contaminated areas with an alkaline cleaner and allow to dry

(3) Substrate Moisture Content

Standard: Concrete substrate ≤ 18% (general areas); timber substrate ≤ 10%

Inspection tool: Electronic moisture meter (probe type)

Remedial action: Allow natural ventilation drying (3–5 days in summer; 7–10 days in winter). In persistently damp areas, apply an epoxy moisture-barrier coating

(4) Electrical Infrastructure Check

- Confirm supply cable is in place (minimum conductor cross-section: 2.5 mm², dedicated circuit)
- Verify that the circuit capacity is sufficient for the full rated output of the system
- Check that the thermostat back-box is installed in the wall (Type 86 flush box, 1.5 m above finished floor level)

3.2 Substrate Preparation

(1) Floor Levelling

Material selection:

- Sand-cement screed (height differences > 5 mm): mix ratio 1:3 by volume; screed flat and cure for 7 days
- Self-levelling compound (fine tolerance ± 3 mm): mix with water, pour, spread with a notched squeegee, allow 24 hours to cure

(2) Removal of Sharp Debris

Scan the entire floor area with a metal detector; remove all nails, broken glass and similar objects. Pay particular attention to wall junctions and the edges of cable conduit slots.

(3) Crack Repair

- Cracks < 2 mm wide: inject epoxy resin adhesive
- Cracks ≥ 2 mm wide: chase out to a V-profile and fill with cement-based repair mortar

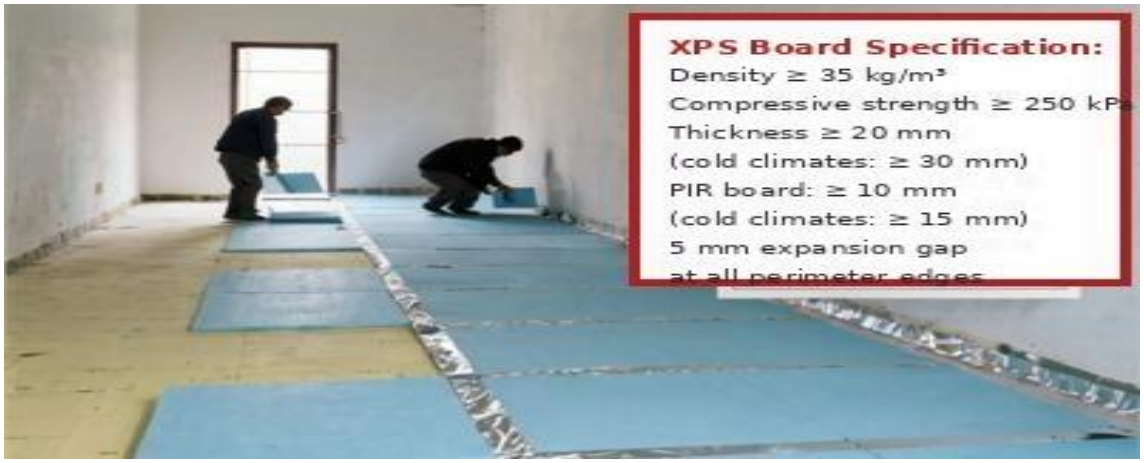
(4) Special Substrate Conditions

- **Existing timber floor:** Remove existing floor covering and inspect joists for level. Fill gaps between joists with acoustic insulation.

- **Existing ceramic tile:** Remove hollow or de-bonded tiles, fill voids with cement mortar, and apply a bonding primer to the surface.

3.3 Insulation Layer Installation

(1) Insulation Board Installation



XPS insulation boards being laid; foil tape sealing joints

XPS extruded polystyrene — selection criteria:

- Density ≥ 35 kg/m³, compressive strength ≥ 250 kPa
- Minimum thickness: 20 mm (≥ 30 mm recommended in cold climates)

Polyurethane / PIR board — selection criteria:

- Density ≥ 35 kg/m³, compressive strength ≥ 250 kPa
- Minimum thickness: 10 mm (≥ 15 mm recommended in cold climates)

Installation method:

- Lay boards from the far end of the room towards the door opening, with staggered joints to minimise thermal bridging
- Seal all joints with aluminium foil tape, minimum 50 mm wide
- Leave a 5 mm expansion gap at all walls and columns

(2) Perimeter Insulation Strip Installation

EPE perimeter insulation strip installed at wall/floor junction, corners mitre-cut at 45°

Material: EPE expanded polyethylene, 8–10 mm thick, ≥ 50 mm high, self-adhesive backing, rated ≥ 80 °C

Installation requirements:

- Apply continuously along all walls and column bases
- Overlap joints by 20–30 mm; mitre-cut corners to 45° for a tight fit
- Ensure firm contact with the floor — no lifting or gaps

(3) Quality Checks and Prohibitions

- Press the insulation boards after installation — no deflection or hollow sound
- Confirm reflective film surfaces are undamaged and free from creases

> Never install the SafeTech-EGS on an unlevelled substrate — local voids cause the film to overheat. Do not substitute XPS/PIR with low-density EPS foam.

4. Installation

4.1 Laying the SafeTech-EGS

(1) Pre-Installation Resistance Check

Measure the resistance of each SafeTech-EGS panel on site before installation. The measured value must not deviate from the factory-stated nominal resistance by more than ±5%.

(2) Zone Planning

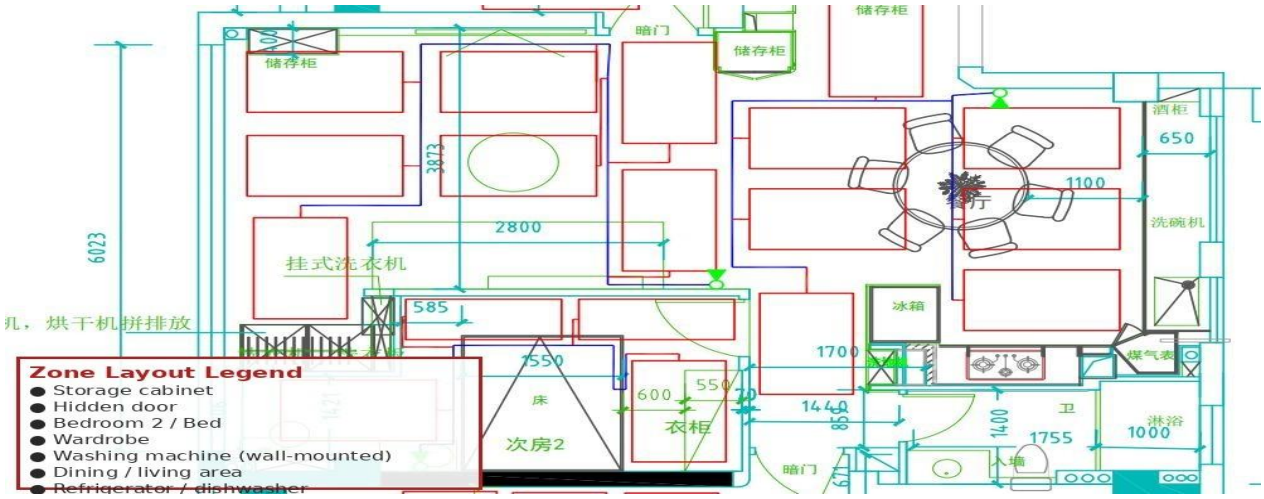
- Divide the system into independent circuits by room function (e.g. one circuit per bedroom, one per living area)
- Do not install the SafeTech-EGS beneath fixed furniture such as built-in cabinets or beds; maintain a clear 200 mm film-free margin around all fixed furniture footprints

(3) Dry Layout Simulation

Lay the SafeTech-EGS panels flat on the floor in accordance with the design layout drawing, confirming that each panel's model number corresponds to the correct item in the material schedule. Example schedule:

Item Description	Model / Reference	Unit	Qty
SafeTech-EGS Heating Panel	EGS21E-220-220-900×1500	pcs	18
SafeTech-EGS Heating Panel	EGS21E-220-220-600×1500	pcs	4
Smart Thermostat	BHT-1000-GBLW	sets	3
EGS Connection Cable — 3-way splitter (1.2 m spacing)	Split T-connector	pcs	6
EGS Connection Cable — 1 m male lead	1 m male connector	pcs	22
EGS Extension Cable — 1.5 m	1.5 m extension	pcs	4

4.2 Electrical Connections



Example zone layout drawing — red outlines indicate heated zones; blue lines show supply cable routes

- **Parallel connection of multiple panels:** Each group of panels must be individually wired to the thermostat. Series ('daisy-chain') connections are strictly prohibited.
- **Residual current protection:** Install a 30 mA RCD in the main circuit with a trip time ≤ 0.1 seconds. The earth conductor must be connected independently to the distribution board earth bar (earth loop resistance ≤ 4 Ω).

4.3 Floor Sensor and Thermostat Installation

(1) Floor Temperature Sensor — Position Selection

- Position the sensor in the centre of the gap between two adjacent panels, away from external walls and door/window openings
- Minimum distance from the nearest panel edge: 100 mm

(2) Sensor Embedding Procedure

1. Cut a hole (Ø 8 mm) in the reflective film and thread a PVC conduit tube through the insulation layer to the wall
2. Apply thermal conductive silicone grease to the sensor probe and insert into the end of the conduit tube
3. Seal the conduit end with plaster or gypsum to prevent mortar ingress

(3) Thermostat Wiring Sequence

4. Neutral wire (blue) — connect to terminal N
5. Live wire (brown) — connect to terminal L
6. Load wire (SafeTech-EGS live output) — connect to terminal L1
7. Earth wire (yellow-green) — connect to earth terminal

4.4 Insulation Testing

Objective: Verify electrical safety after installation; eliminate short-circuit and leakage risk

Insulation resistance test:

- Test points: live conductor to earth; neutral conductor to earth
- Standard: ≥ 50 MΩ (500 V DC, sustained for 1 minute without decay)

Loop resistance test:

- Measure the actual resistance of each circuit and compare with the nominal design value
- Acceptable deviation: ≤ ±10% of nominal (e.g. nominal 20 Ω → acceptable range 18–22 Ω)

Test procedure — Megohmmeter:

8. Switch off the main breaker and disconnect the thermostat wiring
9. Attach test leads to live wire and earth conductor; apply 500 V DC
10. Record the stable reading; repeat between neutral and earth

Use a multimeter (resistance mode) to measure loop resistance at both ends and compare with design parameters.

5. Floor Covering Installation

5.1 Direct Overlay Method (for LVT / Timber Flooring) — EGS21F

Click-lock timber flooring

- Assemble floating — no adhesive or fixings required
- Leave an expansion gap at all walls: 8–10 mm to accommodate thermal movement

Engineered / solid wood composite flooring

- Use a floor-heating-compatible adhesive (temperature rating ≥ 50 °C); apply as spot-bonding at 300 mm centres
- Apply uniform load (e.g. sand bags) for 24 hours after installation to ensure full bond

LVT / PVC sheet and roll flooring

- **Sheet vinyl:** Allow to acclimatize and relax on site for 24 hours. Weld seams at 180–200 °C using a hot-air welding gun with matching filler rod.
- **Self-adhesive LVT tiles:** Peel release liner, press firmly into place, and roll with a floor roller to expel air bubbles.

> STRICTLY PROHIBITED: Do not fix any floor covering with metal nails or screws — penetration of the SafeTech-EGS will cause a short circuit. Do not concentrate heavy loads on areas where adhesive has not yet fully cured.

5.2 Thin-Bed Adhesive Mortar Method (for Ceramic Tile / Natural Stone)

(1) Flexible Tile Adhesive Application

Adhesive specification: C2TES1 flexible tile adhesive (anti-slump, high-temperature resistant)

Mix ratio: Powder : water = 4 : 1 by weight; mix with a mechanical paddle until lump-free

Open time: ≤ 30 minutes (reduce to 20 minutes in warm weather)

Application procedure:

11. Surface preparation: lightly mist the SafeTech-EGS surface with water (no standing water); apply bonding primer at approximately 200 g/m²
12. Adhesive application: apply with a 5 mm notched trowel held at 45°; back-butter tiles to achieve ≥ 90% mortar coverage; lay from the centre outwards, maintaining 2–3 mm joint gaps
13. Bed thickness: minimum 3 mm (to protect the film), maximum 5 mm (to avoid excessive thermal resistance)
14. De-airing: tap each tile with a rubber mallet to expel air; no hollow-sounding tiles permitted

(2) Curing and Power-On Restrictions

- **Initial curing (0–24 hrs):** No foot traffic. Cover with polythene sheet to retain moisture.
- **Full cure:** 72 hours at 20 °C ambient; extend to 7 days if temperature falls below 10 °C.
- **Grouting:** Proceed after minimum 48 hours' curing. Use flexible epoxy grout rated −20 °C to +100 °C; grout depth ≥ 3 mm; movement joints at all cross-intersections.
- **Initial power-on:** Only after full 72-hour cure and confirmed grout cure.
- **Temperature ramp-up:** Set thermostat to 15 °C for the first 24 hours, then increase by 5 °C per day until design temperature is reached.

5.3 MAPEI System — Recommended Construction Build-Up for LaminaHeat Installations

(1) Substrate Preparation

Substrate Type	Primer	Levelling Compound (if required)	Second Prime Coat (post-levelling)
Concrete	PRIMER MF	ULTRAPLAN XTRA	ECO PRIM T PLUS (1:2–1:3 dilution)
Sand-cement screed	ECO PRIM T PLUS (1:3 dilution)	ULTRAPLAN XTRA	ECO PRIM T PLUS (1:2–1:3 dilution)
Calcium sulphate screed	ECO PRIM T PLUS (1:2 dilution)	PLANITEX FAST	ECO PRIM T PLUS (1:2–1:3 dilution)
Existing ceramic tile	ECO PRIM GRIP PLUS	ULTRAPLAN XTRA	ECO PRIM T PLUS (1:2–1:3 dilution)
Poured asphalt	ECO PRIM T PLUS (1:1 dilution)	PLANITEX FAST	ECO PRIM T PLUS (1:2–1:3 dilution)

(2) Heating Panel Embedding

Stage	Recommended Product
Panel bonding adhesive	KERAFLEX EXTRA S1 LD flexible tile adhesive
Heating panel	LaminaHeat® SafeTech™-EGS heating panel, EGS21E (embedded, 12 mm connection overmoulding)
Levelling mortar over panel	FIBERPLAN XTRA fibre-reinforced levelling mortar (≥ 5 mm bed thickness)
Waterproofing (where required)	MAPELASTIC waterproofing membrane — apply prior to ceramic or natural stone finish

(3) Finish Floor Layer

Floor Finish Type	Recommended Adhesive	Trowel Notch	Coverage
LVT / creative vinyl tile	ULTRABOND ECO 4 LVT or ECO V4SP	TKB A1/A2	~250 g/m²
PVC sheet / roll vinyl	ULTRABOND ECO V4SP or V4 EVOLUTION	TKB A1/A2	~250 g/m²
Linoleum	ULTRABOND ECO 530 or V4SP	TKB B1	~350 g/m²
Textile floor covering	ULTRABOND ECO TX3 or TX2	TKB B1/B2	~350–450 g/m²
Engineered timber (multi-ply)	ULTRABOND ECO S948 1K or S940 1K	TKB B11/B15 (by board width)	~1.0 kg/m²
Solid hardwood*	ULTRABOND ECO S968 1K, S958 1K, or P909 2K FAST	TKB B3/B11/B15 (by board	~1.0 kg/m²

Floor Finish Type	Recommended Adhesive	Trowel Notch	Coverage
		width)	
Ceramic / porcelain tile**	KERAFLEX MAXI S1 ZERO / VARIO QUICK S1; ULTRALITE S1/S2 FLEX series	By tile format	~0.8–1.1 kg/m²/mm
Natural stone**	MAPESTONE MAXI S1, MAXI S1 ZERO, or ELASTORAPID	By tile format	~1.1–1.6 kg/m²/mm

* Not suitable for solid wood strip flooring or wood mosaic.

** Where the area of a single tile exceeds 1.2 m², an S2-class flexible adhesive must be used.

5.4 Common Problems and Remedies

Problem	Root Cause	Remedy
Timber floor warping / cupping	No expansion gap; humidity out of tolerance	Remove and relay; leave 8 mm wall gap; maintain ambient humidity 40–60%
Hollow / de-bonded tiles	Adhesive open time exceeded or tiles not beaten in	If hollow rate > 5%, remove and relay; use fast-setting tile adhesive
Localised temperature anomaly	Uneven thermal resistance; mortar too thick	Investigate with thermal imaging camera; correct bed thickness in affected areas

5.5 Floor Covering Acceptance Criteria

- **Flatness — tiled floors:** Maximum deviation ≤ 2 mm under a 2 m straight edge.
- **Flatness — timber floors:** No hollow sound when walked upon; joint straightness ≤ 1 mm per linear metre.
- **Bond integrity:** Tile hollow rate ≤ 5% (individual tiles must not be hollow at centre); timber floor shows no localised depression.
- **Thermal performance:** After 24 hours of operation, floor surface temperature must reach ≥ 90% of the thermostat set point; thermal imaging must show no cold zones or localised hot spots (max. floor temperature differential ≤ 2 °C).

6. Commissioning and Handover

6.1 Commissioning Procedure

Objective: Verify the operational stability, electrical safety and energy performance of the installed system.

(1) Pre-Energisation Checks

- **Electrical safety:** Confirm all circuits are isolated and the thermostat is in the 'off' position. Review insulation resistance records (≥ 50 MΩ).
- **Physical inspection:** Confirm no panels are buckled, damaged or insecurely fixed. Confirm the floor covering is fully cured (minimum 72 hours).

(2) Staged Power-Up Test

Principle: Apply temperature in graduated steps to avoid thermal shock to the floor structure.

Stage	Set Temperature	Duration	Checks Required
Stage 1 Low-temperature pre-heat	15 °C	4 hours	Thermostat display active; current within ±10% of theoretical value (e.g. 1,500 W circuit → ~6.8 A)
Stage 2 Stepped heating	+5 °C every 4 hours	Until design temp. reached (e.g. 24 °C)	Floor sensor ≤ safety limit (tile: 45 °C; timber: 35 °C); voltage within ±10%
Stage 3 Sustained operation	Design temperature	24 hours	Thermostat cycling correctly; zone temperature uniformity ≤ 2 °C differential

(3) Performance Testing Instruments

- **Thermal imaging camera:** Scan the entire floor to generate a heat distribution map. Maximum permissible temperature differential within any zone: 2 °C.
- **Clamp ammeter:** Measure actual operating current per circuit; compare with theoretical values (deviation ≤ ±10%).
- **Digital thermometer (multi-point):** Measure floor temperature at room centre, corners and furniture perimeters to verify thermostat accuracy.

6.2 Acceptance Standards and Sign-Off

(1) Electrical Safety Acceptance

- **Insulation resistance retest:** Live/neutral to earth: ≥ 50 MΩ (500 V DC test).
- **Earth continuity test:** Earth loop resistance ≤ 4 Ω.
- **RCD functional test:** Press test button; RCD must trip within ≤ 0.1 seconds.

(2) Functional Acceptance

- **Thermostat verification:** Switch between floor-sensor and room-temperature modes; confirm display matches set point. Test timer and remote-control functions (if equipped).

- **Heating rate:** The system must heat from 15 °C to 24 °C within ≤ 2 hours (standard 2.8 m ceiling height, adequately insulated enclosure).
- **Temperature uniformity:** Floor temperature differential within a single zone ≤ 2 °C; vertical temperature gradient (floor to ceiling) ≤ 3 °C.

6.3 Troubleshooting Guide

Symptom	Probable Cause(s)	Corrective Action
Localised area not heating	1. Oxidised / corroded connection 2. Open circuit in film panel	1. Clean and re-make connection 2. Locate break with multimeter; repair or replace panel
Thermostat display error	1. Faulty floor sensor 2. Unstable supply voltage	1. Replace floor temperature sensor 2. Install voltage stabiliser; check incoming supply
Uneven floor temperature	1. Damaged insulation board 2. Excessive gap between panels	1. Repair insulation layer 2. Install additional panels to fill gaps

6.4 Safety Precautions During Commissioning

Do not cover the floor with rugs, carpets or furniture during commissioning — restricted heat dissipation will cause overheating.

Do not remove or dismantle the thermostat before the floor has fully cooled.

i Emergency action: If a burning smell or smoke is detected, immediately switch off the main supply isolator. Contact a qualified electrician. Do not attempt to dismantle the film yourself.

7. Safety Requirements and Prohibitions

7.1 Safety Standards

Objective: Safeguard the system throughout its entire service life; eliminate risks of electrical fault, fire and personal injury.

(1) Electrical Safety

- **Earthing:** All metal enclosures (junction boxes, thermostats) must be connected to an independent PE earth conductor. Minimum cross-section: 2.5 mm². Earth loop resistance ≤ 4 Ω.
- **Prohibited earthing practice:** Do not use building structural steelwork or pipework as an earthing point.
- **Circuit protection:** RCD rating must match the total connected load (e.g. 32 A RCD for a 6,000 W installation); trip sensitivity ≤ 30 mA; trip time ≤ 0.1 seconds (Type A or B).
- **Wiring convention:** Live (L) and neutral (N) conductors must be clearly identified and correctly terminated. PE earth conductor must be connected independently to the distribution board earth bar — never combined with neutral.
- **Insulation protection:** All connection joints must be double-insulated (heat-shrink sleeve + high-voltage insulating tape). Bare conductors must be routed in flame-retardant PVC conduit; minimum bend radius: 6 × cable diameter.

(2) Thermal Management

Prohibited installation areas:

- Carpets or rugs with thermal resistance > 0.15 m²·K/W must not be used over the SafeTech-EGS
- Leave a minimum 200 mm film-free zone around all fixed furniture — measure from the furniture perimeter edge
- Timber floor coverings require ≥ 8 mm expansion gaps at all walls
- Floor ventilation slots (e.g. skirting-board ventilation slots) must remain unobstructed

(3) Wet Area and Environmental Safety

Bathrooms and kitchens:

- Use an overmoulded (fully waterproofed) SafeTech-EGS variant; apply three layers of waterproof sealant to all connection points (silicone + polyurethane + epoxy resin)
- Thermostat must have a minimum IP54 protection rating and be installed in a dry zone
- Seal all moisture barrier seams with butyl tape; turn the barrier up 100 mm at all walls
- **Temperature-resistant materials:** All floor covering materials and adhesives must be rated to ≥ 80 °C. Do not use standard foam underlays or wax-based floor polish — these may release harmful vapours at elevated temperatures.

7.2 Installation Prohibitions

(1) Handling the SafeTech-EGS

> Do not cut the film at any point other than the manufacturer-designated cut lines
>
> Do not stretch, fold or crease the film
>
> Do not operate the film without an approved floor covering in place

(2) Floor Covering Installation

Tiling:

- Do not use standard rigid cement mortar — it may crack and damage the film. Use only specified flexible adhesive

- Do not mechanically hammer tiles into position — vibration may dislodge cable connections

Timber flooring:

- Metal profile battens must not be used (risk of nail penetration); use plastic clip profiles only
- Solid timber planks with moisture content > 12% are prohibited — they will deform at operating temperatures

(3) Ongoing Maintenance

- No drilling, nailing, or screwing into any area of the installed floor system — use thermal imaging to locate the system before any penetration work
- Furniture must be fixed using adhesive or non-penetrating clamp systems only
- **Cleaning:** Steam mops are prohibited — high temperature and humidity will accelerate insulation degradation. If liquid is spilled, switch off the system immediately and allow 24 hours of drying before re-energising.

7.3 Emergency Response

Emergency Type	Immediate Actions
Electric shock / leakage	1. Immediately switch off the main supply isolator 2. Use an insulating pole to free the casualty from contact 3. Call emergency services; administer CPR if trained
Localised overheating	1. Isolate the affected circuit 2. Remove floor covering above the affected zone and inspect the film 3. Replace any damaged film; repeat insulation resistance test before re-energising
Thermostat or wiring fire	1. Extinguish with a CO_2 or dry-powder fire extinguisher 2. Isolate the main supply 3. Contact LaminaHeat technical support

8. Acceptance Test Record

Acceptance Test Record Form for Standard Voltage Electric Heating Film Heating System		
	Number:	
Project name		
Project address		
Construction unit		
Construction leader		
Agent/Principal		
Inspect the item	Quality requirements	Check the results
Temperature control switch	Follow the installation instructions for proper wiring	
	The temperature control switch is installed 1.4 meters above the ground, and the installation position should reflect the average temperature of the room	
	The temperature control switch is installed horizontally and vertically, and is tightly attached to the wall	
	All temperature control switches are individual power cords, and the power cords are tightly connected, secure, and not loose	
Electric heating film	Before installation, check whether the appearance is intact, the copper strip must not be damaged, the electric heating film should not be bent, and check that the electric heating film comes with a power cord and is well connected	
	Measure and record the resistance value before installation	
	Mounted on the wall to ensure firm and stable	
	Electric heating film grounding test	
	After the installation is completed, make sure that the heating film is laid in the correct direction	
	After the installation is completed, measure whether the resistance value is normal and record it	

Wire connection	When the single-core conductor is connected to the multi-core soft wire, the multi-core soft wire should be tin-enameled	
	The wire core should not be exposed after connecting with the wire	
	When making wire joints by mechanical pressing, special tools should be used to ensure the crimping force	
	When the wire is connected by winding tin enamel, reliable insulation measures should be taken after the connector is wound with tin enamel	
Electrical safety	Insulation resistance retest: live wire/neutral wire to ground insulation resistance ≥ 50MΩ (500V DC test).	
	Leakage protection test: press the test button, the leakage switch should trip within ≤0.1 seconds	
	Make sure that the electric heating film has an overheating protection device	
Debugging	Turn on the power supply to measure whether the temperature is normal	
	Test whether the current is normal during operation	
	After stable operation, measure whether the room temperature matches the design temperature	
Acceptance conclusion	Acceptee: Acceptance date: year month day	

9. Warranty

Owner name	
Order/Purchase Contract Number	
Faulty product model/specification	
Product installation date	
Date of detection/observance of failure	
Is the resistance meter detected during installation well preserved? If so, please attach this table	
Is the complete project record sheet well preserved? If so, please attach this table	
Are the accessories faulty? (including but not limited to transformers/thermostats) If yes, please fill in the corresponding product name and code	
What is wrong with the heating system? (Please describe the product failure specifically) here:	
Actions taken:	
Fault photos (to help verify the problem):	
Other circumstances	

9.1 Warranty Period

The warranty period commences from the date of delivery to the end customer. Warranty terms by component are as follows:

- Carbon fibre heating film (SafeTech-EGS ten (10) years
- Thermostat and installation service: two (2) years

> ℹ Distributors and installers must not make warranty commitments to end customers that exceed the above terms without prior written consent from LaminaHeat.

9.2 Warranty Exclusions

The following circumstances are not covered under this warranty:

15. Physical damage or loss caused by inadequate site management during equipment delivery, positioning or installation
16. Damage resulting from operations carried out in the heated floor area that could damage the film (e.g. drilling, nailing)
17. Damage caused by failure to operate the system in accordance with this guide, or by covering the heating area with excessively insulative materials
18. Damage resulting from the system being moved, dismantled, modified or repaired by a non-LaminaHeat authorised service provider
19. Claims submitted without a valid, unaltered warranty certificate
20. Damage caused by force majeure events or operation in excessively harsh environmental conditions
21. Products that have exceeded the applicable warranty period

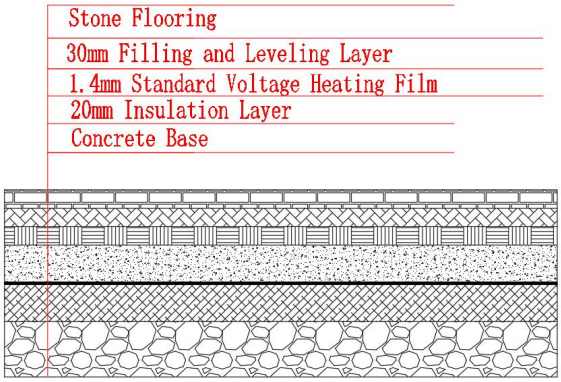
10. Applicable Regulations and Reference Standards

Standard Designation	Code
GB 50303-2015	Quality Acceptance Directive for the Construction of Electrotechnical Installations in Buildings
JGJ 142-2012	Technical Guideline for Radiant Heating and Cooling
<UL 2683>	is the safety standard for heating membranes (electric floor heating, wall heating, etc.) in North， Electrical insulation (withstand voltage 1500V AC for 1 minute, insulation resistance ≥100MΩ)）、Leakage Current ≤ 0.75mA，Overload Protection (110% Voltage for 7 Hours, No Abnormalities)；Mechanical Strength (Resistant to Bending and Compression)、Waterproof (IPX4 Damp Environment)；Temperature Control (Surface ≤80°C, Concealed Installation ≤90°C) and Overheat Protection (Automatic Power Off)；Material Flame Retardant (UL 94 V-0/V-1)；Marking must include power, warning, and installation manual clearly specifies laying specifications.
IEC 60335-2-30	Safety of household and similar electrical appliancesPart 2: Particular requirements for room heaters

11. Floor Build-Up Diagrams

The following diagrams illustrate the recommended floor build-up for each finish type. Note: the SafeTech-EGS EGS21E (embedded) connection point is 12 mm high and is concealed within the levelling layer. The EGS21F floating build-up is shown at the end of this section.

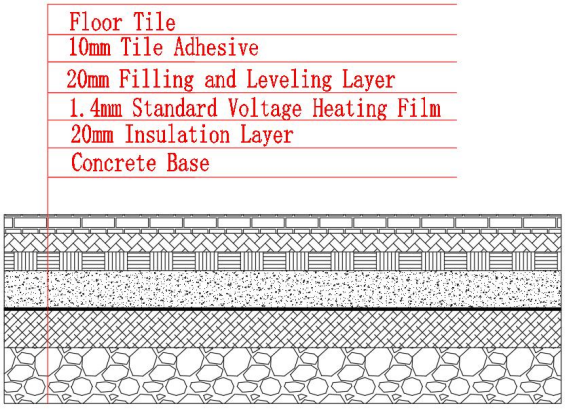
Natural Stone Floor



Note: The EGS21E heating film wire connection is 12mm high and can be hidden within the leveling layer.

Stone Flooring Layer Diagram

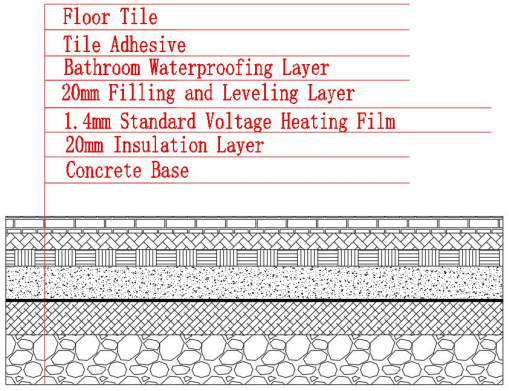
Ceramic / Porcelain Tile Floor



Note: The EGS21E heating film wire connection is 12mm high and can be hidden within the leveling layer.

Floor Tile Layer Diagram

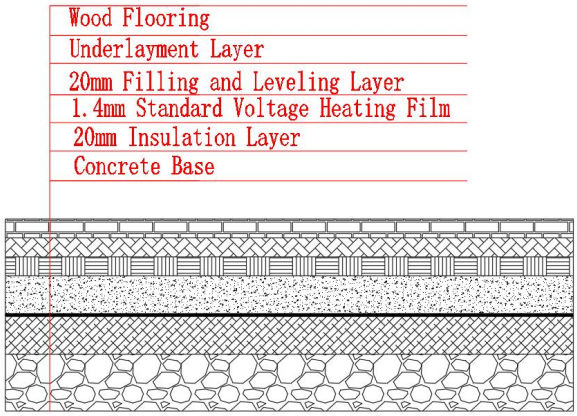
Bathroom / Wet-Area Tile Floor



Note: The EGS21E heating film wire connection is 12mm high and can be hidden within the leveling layer.

Bathroom Floor Layer Diagram

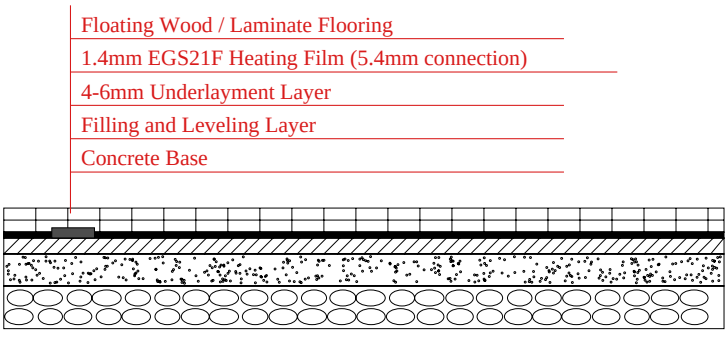
Timber / Engineered Wood Floor



Note: The EGS21E heating film wire connection is 12mm high and can be hidden within the leveling layer.

Wood Flooring Layer Diagram

Floating Floor — EGS21F (Thin Overmoulding)



Note: The EGS21F heating film is laid on top of the 4-6mm underlayment; the floating floor goes directly over it.

Floating Floor Layer Diagram