

ENERfoil underfloor heating systems

Resistance values for 600mm ENERfoil widths -

Foil Size (m)	*Resistance Reading (Ω)
0.5	23.3
1.0	12.0
1.5	8.2
2.0	6.4
2.5	5.3
3.0	4.7
3.5	4.2
4.0	3.9

Resistance values for 400mm ENERfoil widths -

Foil Size (m)	*Resistance Reading (Ω)
0.5	31.1
1.0	15.8
1.5	10.7
2.0	8.3
2.5	6.9
3.0	5.9
3.5	5.3
4.0	4.9

Resistance values for 300mm ENERfoil widths -

Foil Size (m)	*Resistance Reading (Ω)
0.3	68.6
0.6	32.4
0.9	23.0
1.2	17.5
1.5	14.2
1.8	11.8

* All readings have a $\pm 10\%$ tolerance.

Introduction

The Enerfoil Underfloor Heating System has been designed to operate at low (24/28v) voltage beneath either ceramic tile or other suitable floor coverings. The system is designed to raise the temperature of the flooring material by generating a steady, even heating at the rate of approximately 80 watts per square metre at 24 (vac). Enerfoil underfloor heating systems are especially suitable for installation in wet areas such as bathrooms in hotel, hospitals or domestic situations. Under normal conditions the Enerfoil system will maintain ceramic floor tiles at temperatures of 24-28C in an ambient temperature of approx 18/20 degrees cent. The actual temperature maintained will vary according to the ambient temperature, supply voltage and insulation.

The system comprises a number of manufactured heating panels, each measuring 600mm x 500mm supplied as continuous sections in lengths ranging from 0.5m to 4.0m (1 to 8 panels) to be used in any configuration to achieve the best coverage of the intended area. A low voltage AC current, supplied via a transformer, powers the heating panels. 24vac (normal) or 28 vac can be selected to provide optimum heating for the installation and ambient conditions involved. The size of the transformer is determined by the number of panels used in the installation, one panel section measures 600 x 500mm (see Technical Information Section).

Panels should only be connected to the low voltage (24-28v) side of a suitably rated transformer.

The Enerfoil heating panels are manufactured under strict quality control conditions. It is important that no attempts are made to modify the panels in any way and that they are laid on a flat smooth floor with no irregularities.

Under no circumstances should the panels be cut

The Enerfoil system has been proven to be capable of providing many years of trouble free use if it is installed correctly. The Enerfoil underfloor heating system is designed for ease of installation and safe, economical operation. The installation of the system however requires electrical checks and connections to be made. This work should be carried out by a suitably qualified electrician in accordance with current IEE regulations. All systems should be wired through an MCB or RCCD as appropriate.

Following the instruction contained in this leaflet will ensure the reliable and effective operation of your Enerfoil Underfloor Heating System.

Installation

The Enerfoil underfloor heating system can be installed in any area where the ceramic floor tiles require to be heated for comfort. **Before attempting to install the system read the following instructions. If in doubt contact your system supplier or Enerfoil Ltd. for further advice.**

1. Ensure that the floor area on which the panels are to be laid is flat and free from sharp edges or projections. On wooden floors make sure that there are no nails or screw heads protruding and if rough, sand to a smooth finish. Tongue and groove floors should be covered with plywood of minimum thickness of 15mm firmly secured at 300mm centres. Concrete floors should have a smooth floated finish. Concrete floors, which are uneven or have protrusions should be smoothed with BAL MULTIBASE. Floors must be **completely** clean and free from grease and other adhesives or contaminants.
2. Lay the panels flat on the floor and position them to ensure that they cover the required area. If required the area where the termination pad contacts the floor can be chiselled out to depth of approx 3 to 4mm, chamfer and smooth the sides, so that there is no shearing edge on the foil. (if recessing concrete fill the area with tile cement for a smooth base). The panels should be laid with no gap between them, a maximum side overlap of 70 mm is permissible. In areas where continuous floor temperatures are required, care should be taken to avoid gaps between adjacent sections. Each panel section is supplied with power cables of approximately 3.0 metres attached during manufacture. Panels should be positioned such that the power supply cables are all located along one edge of the room to facilitate connection to the power transformer. Do not lay the cables over the foil. **Note! Under no circumstances should the panel sections be cut or modified in any way, as this will affect the electrical continuity and their effective operation.**
3. Before setting out the panels, identify a suitable location for the transformer. The transformer should be located on a secure foundation in a dry, ventilated environment and never exposed in a bath or shower room. (Max ambient temperature 35 °C)

4. Care should also be taken to plan the cable runs both for the 230vac supply to the transformer and the 24/28vac supply from the transformer to the panels. If more than 3 panels sets are to be installed in parallel it will be necessary to use a suitably rated junction box.
5. Before laying the panels, check the electrical continuity of the installed panel section by connecting a suitable multimeter across each pair of feed wires. The resistance of each panel section should be in the range shown in the technical specification section, and should be noted.
6. Prepare the surface to receive the panels by applying the BAL ENERBOND with a vinyl spreader in accordance with manufactures instructions. After 2 or 3 mins place the foils onto the ENERBOND, and using a rubber float with a sweeping action from the centre, press the foils into the adhesive ensuring there are no air bubbles.
7. Repeat the electrical test set out in step 5 and then allow the adhesive to cure. During the curing period the panels should not be connected to the electrical supply.
8. After allowing the fixing adhesive to cure the panels should be primed using a coating of BAL-ENERBOND prior to laying the ceramic tiles. The priming coat of Enerbond can be applied with a paintbrush. It is ready for tiling when the Enerbond does not come away from the Enerfoil surface when touched. On large areas it is advisable to lay the foil in sections and tile same. This avoids walking over the foil. If it is necessary to walk on the foil (before priming) do so with soft shoes making sure there are no sharp objects embedded in the sole which may penetrate the foil. **Avoid walking on the foil once it has been primed. If it is necessary to step onto the primed foil place a sheet of silicon paper onto the foil, do not leave the paper on the Enerfoil, remove after use. If the foil is laid in wet areas or under shower sumps BAL WP1 tanking must be used. If laying heavy floor coverings such as slate marble or limestone it is advisable to cover the foil with a layer of BAL FASTFLEX or similar to protect the foil (this should be allowed to harden) prior to laying the floor covering.**
9. The ceramic tiles should now be fixed in place using a suitable flexible floor tile adhesive such as BAL-FASTFLEX or BAL-RAPIDSET FLEXIBLE floor tile adhesive. It is preferable to use a plastic trowel or comb, or if using a new trowel it is advised to remove the sharp edges from the comb as these may damage the foil. Normal floor tile fixing techniques are suitable for tiling over Enerfoil systems details of which can be obtained from the BAL technical advisory service. Care must be taken to ensure that the panel sections are not damaged during the fixing of the ceramic tiles. Tiles dropped onto the panel sections during fixing may puncture the surface of the heating panels reducing the operating effectiveness of the installation. Grout the tiles using either a flexible cement based tile grout or an epoxy grout and finish in accordance with normal tiling practice. Do not connect the Enerfoil system to the electrical supply until the adhesive and grout have been allowed to cure fully (normally at least 48hrs).
10. Before connecting the power cables of the panel sections to the transformer or junction box carry out the final continuity check. If satisfactory, connect the cables. Do not fit more cables into the transformer terminal than will easily slide into the terminal (3 max) - use a suitably rated junction box. Do not reduce the thickness of the wire, as this will affect the performance of the foil. Ensure that the cables of each panel section are connected in parallel at the transformer. Care should be taken to keep the cables approximately the same length.
11. The junction box should be connected to the low voltage side of the transformer using a tri-rated multi-strand insulated cable.(do not use a solid copper single strand cable) The cable used should be rated for the maximum current to be drawn by the panels and should be selected to provide no more than 1v drop at that current. For example, a 6.0mm cable running a 22 amp current from a EN 16 transformer feeding 16 panels will provide a 1v drop at 15m length (7.5m run of dual cables).
12. Select the output connection required, **24 or 28 vac** Connect the black cable to the common or black connection and the blue cable to the **24 or 28 vac** connector. **It is important that all connections are tightened securely.** Connect the transformer to the 230vac supply. The tiles should begin to feel warm after a few hours.
13. If there is no noticeable heating of the tiles, check the output at the low voltage side of the transformer. If there is no voltage, check the fuse. If the problem persist refer to the system supplier or Enerfoil Technical Advisory Service for further information.
14. Following completion of the installation a suitable notice should be displayed in a prominent position warning of the need to avoid drilling or penetrating the floor particularly when replacing or repairing damaged or defective tiles. It is also recommended that an accurate record be made of the layout of the panel section s and any buried wiring for future reference. For any further technical advice or assistance on the installation of this system or on any aspect of ceramic tiling please contact **the Enerfoil Technical Advisory Service on 01887 830638 BAL Products Technical Advisory Service 01782 591120**

Enerfoil

Resistance readings

Date:

Electrician's Signature/Co. stamp

Readings	Ohms
Initial Reading	
Enerfoil Laid	
Completion	

Installation – Interlocking Laminate or Parquet Flooring

Enerfoil can be laid under interlocking wooden laminate flooring. The base can be either wood or concrete. The floor must be clean and smooth and free from projections. The base floor requirements are the same as for tiling (Read installation instructions for floor preparation. Paragraph 1 (tiled floors) On concrete or wood base floors lay the foils out and mark the positions, mark an area approximately 20mm bigger than the termination pad and chisel out to a depth of approximately 3 to 4mm. Smooth and slope the edges so that there is shearing edge on the foil (on concrete floors the recess can be smoothed with tile cement). The foil is laid dry and no adhesive is required on either side of the foil. If it facilitates fitting the foil, it can be taped down. First lay the insulation that is supplied with the laminate flooring onto the floor. Check the resistance of the foil against the specification sheet and note. Lay the first length of Enerfoil onto the insulation, (the pad will sink into the recess) then lay the first sections of the laminate flooring on top. Move to the next section and lay the second sheet of Enerfoil then the laminate flooring, carry on until the floor is completed. If laying the laminate flooring at right angles to the length of the foil, start at the pad and unroll the foil as you lay the laminate. This reduces walking movement on the foil. On completion check the resistance readings, these should be the same as the first. If it is necessary to walk on the foil do so with soft shoes making sure there are no sharp projections in the sole.

IT IS YOUR RESPONSIBILITY TO READ ALL INSTRUCTIONS AND CHECK THE SIZE OF THE AREA TO BE COVERED. The guarantee for the foil is 10 years and is guaranteed only when the foil has been fitted according to the instructions. The recording of the resistance readings forms part of the guarantee. The guarantee is limited to replacement of Enerfoil only and does not include installation or mechanical damage. All electrical connections/installations must be carried out by a qualified electrician in accordance with current IEE regulations