**Comfortline Radiant Ceiling Foil Heating**

**Description**

Comfortline radiant ceiling foils consist of a thin composite carbon film, sandwiched between two layers of a transparent high temperature plastic. Thickness of the Devi foils is typically 0.4mm. The metallic film is designed to open circuit below the melting point of the plastic laminate. The conductive film is so fabricated to provide a radiant heating field in the order of 5 to 15 micron wavelength and reach in excess of 90% its rated output in approximately 10 to 15 minutes subject to ceiling fabrication and elected materials.

Comfortline foils are available in nominal loadings of 140Wm$^2$ and 200Wm$^2$ and are supplied in two different nominal widths of 400mm and 600mm. The foils are supplied in SKD format comprising cuttable roll of element, cuttable roll of cold tails supplied (in two colours) in accordance with the New Zealand Wiring Regulations, connector crimp lugs, insulating crimp guards, bus insulating tape and hi-tack double sided installing tape.

**Design and layout**

Devi Heating Systems offer a free ceiling foil design service which entails a heat loss assessment based on the building parameters of the respective zones. Comfortline ceiling foils may be used in conjunction with other forms of heating and can be placed in flat or sloping ceilings maintaining a minimum of 2.0M above floor level.

When planning the layout for a Comfortline ceiling foil installation particular notice should be taken to ensure a clear space of 100mm is maintained from all ceiling fixtures including but not limited to light fittings, sprinklers, ventilation ducts, cupboards, shelves or any other fixtures that are in contact with the ceiling.

**Installation**

1. **General**

Comfortline ceiling foils are available for installation to ceiling battens spaced at 400mm or 600mm centres. All roof trusses, battens or furring channels to which the battens are secured must be spaced accordingly with minimum face to face dimensions between battens of:

- 310 mm for the 400 series foil and
- 510 mm for the 600 series foil.

The following notes assume that the installation will be over 12 or 18 (mm) plasterboard or 12mm pine. Although not limited to these surfaces you should first consult Devi Heating Systems for information regarding suitability of any alternative materials. Please note the following special precautions:

- The heating elements should be installed in direct contact with the continuous flat surface of the ceiling cladding material and be so arranged to prevent any folding, creasing or puckering of the elements adjacent to ceiling joists and the like, avoiding contact with existing electrical, data or telecommunication wiring, lighting fittings or any other structural members and materials forming part of any other service, such as water or gas pipes.

- In each case, there shall be a minimum clearance of 10mm between the Comfortline foil copper bus strips and adjacent ceiling battens. Any Dwangs or spreaders between the battens shall be set back a minimum of 6mm from the face of the battens.
• If a vapour barrier is required it should not be installed until after the heating system, insulation and all wiring is complete. The barrier must be of a non-conductive type e.g., Plastic Sheeting.

• The Devireg foils should be carefully installed to ensure that they are not damaged during installation and that they are not overlapped with one another.

2. Insulation

Only non-combustible, non metallic thermal insulation such as high density mineral heat insulating material (eg fibre glass batts) shall be installed over all Comfortline radiant ceiling foil elements and shall be no less than R2.6 thermal resistance as recommended by the Devi Heating Systems.

The insulation must be fitted so that the insusation is in full contact with the foils, ensuring that there are no air gaps, as this may affect the efficiency of the system.

3. Installing from below

• Installation of the heating foils should take place as late as possible prior to the fitment of the ceiling cladding. The building should be airtight with all windows and doors in place. The ceiling cladding should be installed with minimum delay to avoid the possibility of damage.

• When installing from below the building should be pre-wired with all lights, air conditioning ducts, speakers etc. in place. The insulation batts must be installed by friction fit between the ceiling joists or using a string line to hold the batts in place.

• The foils must be fixed only through the fixing strips along each side edge of the foil. They must never be fixed through the metallic or carbon film areas or through the tape covering the connecting end.

4. When fixing to timber

Each foil is firstly stapled at one end, then carefully unrolled without kinks stapled to the battens before the ceiling linings are fitted. The staples are to pass through the unheated wing sections of the foil only and care taken that the foils are installed with no wrinkles or or stretching.

5. When fixing to metal furring channels or battens

Double sided tape is first placed on the furring channels of the metal battens. The foil is then unrolled without kinks and pressed against the tape ensuring that the element is installed parallel to the furring channel or metal battens.

6. Installing from above

Comfortline radiant ceiling foils are also designed to be installed from above after the ceiling material is installed and before the insulation is in place, such as in retro-fits and renovations, or in new homes where it may be deemed an easier method of installation. In all cases the following points must be observed:-

• Any existing insulation must be removed.
• Sweep the surface, removing any foreign objects such as nails and lumps of plaster.
• Check for protrusion of any nail points missing the plasterboard supports.
• Check that the underside of all heated areas is unobstructed and not over cupboards.
• The building should be pre-wired with all lights, air conditioning ducts, speakers etc. in place.
The Comfortline foils should always be rolled out completely flat over the ceiling. If the distance between the ceiling joists is a little less than than the width of the foil, some of the edge fixing area of the foil may be cut away before installing. The cutting away of the edge fixing area must be done carefully to avoid damaging the metallic area of the foil. A minimum clearance of 10mm between the copper bus strip and the batten should be maintained. The foils must be taped or otherwise secured to the surface of the ceiling or the battens so that they cannot roll back before the thermal insulation is laid and to prevent creepage over an extended period of time. Insulation over the foils should be close fitting to avoid air circulation above the foils. Non-combustible non-metallic batt type insulation material must be used.

**Ceiling materials**

The heat produced by the Comfortline radiant ceiling foils is transferred through the ceiling material by conduction. Only ceiling material with a sufficient heat conduction capacity should be used in conjunction with foil heating as the temperature of the foil depends on the thermal conductance of the ceiling material. The lower the conductance, the higher the resistance therefore the hotter the heating foils.

The thermal resistance of the ceiling material must not exceed the highest advisable value as recommended by the Devi Heating Systems. Ceiling foils must not be used to accelerate the drying or curing of ceiling materials, compounds or finishers. Only dry materials should be used as faults or problems may occur if the materials used have too high a moisture content or have not been installed in a professional and tradesman like manner.

1. **Joints**
   - All joints must be taped and set using a reinforcing tape and to the manufacturers recommendations.

2. **Painting**
   - When painting you should use plastic based paint, eg. acrylic paint.
   - The ceiling material must be fully dry before starting to paint.
   - The ceiling heating system must be off before painting, and should not be turned on until the paint is dry.
   - It is also recommended to protect the thermostats when painting.

**Electrical installation**

The installation of the Comfortline radiant heating foils must comply with the New Zealand Wiring Regulations and all relevant and inferred New Zealand Electrical Standards. The circuit wiring normally goes from the main distribution panel board to the foils via a room thermostat. In all instances, the installation of circuit wiring used to supply and interconnect heating units must be undertaken by a registered Electrical Contractor and the system shall be installed in accordance with the manufacturer’s installation instructions and with the relevant requirements of the New Zealand Wiring Regulations.

An approved residual current device having a maximum earth leakage current of 30 milliamperes shall be included in the supply circuit, the relay to be mounted on the switchboard and suitably labelled.

The operating voltage and the rating in amperes or the loading in watts of the heating elements supplied from a final sub-circuit shall be permanently and indelibly marked at the controlling thermostat or control panel and on or adjacent to the switchboard from which the final sub-circuit originates.

The wiring of the electrical installation shall not be subjected to temperatures in excess of the temperature rating of the insulation of such wiring. In this regard, *all* electrical conductors within the ceiling cavity must be clear of the elements and lay on top of the ceiling insulation or clipped to the top of the ceiling joists.
Where the heating foil is laid directly in contact with a metal ceiling, the metal must be effectively bonded to an earthing conductor.

A plastic warning tape having the wording "CAUTION - ELECTRIC HEATING SYSTEM BELOW" permanently and indelibly marked thereon should be suitably fixed in position at right angles to the ceiling joists at no greater than 1M spacings to retain the thermal insulation in position.

For any questionms or queries about heating with Devifoils systems, please feel free to contact us on

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Let us design for you