Specification: Sub-floor heating cable installation.

Application

This specification is suitable for freezer floors on ground as frost heave protection, or for both freezer floors and cold room floors that are suspended, for underfloor condensation prevention.

Installation and Warranty

Dual circuit sub-floor heating cables shall be installed in a duplex interwoven pattern so that either cable can provide the necessary design output. The cable must be of a type that includes an earthed screen and outer sheath as supplied by Heatec, or an equivalent heating cable that is approved for floor heating use. The installer must be able to supply evidence of approval to the appropriate International or Australian heating cable standard (eg.IEC800) if requested. The installation must be backed by a warranty period of 10 YEARS against cable failure.

Common installation method

Unroll the heating cable over the base slab, avoiding twisting and tension on the hot/cold end joins. Cover with a layer of reinforced aluminium foil. The installation of the vapour barrier and floor insulation follows.

Alternative methods

Note: Although the above method is commonly used, any of the following are also acceptable, and may be preferable in some circumstances – replace the paragraph wording as necessary:

1. Unroll the heating cable over the base slab, avoiding twisting and tension on the hot/cold end joins. Cover with a sand/cement screed. The installation of the vapour barrier and floor insulation follows.(*This method is recommended where the floor is too irregular for the normal installation of the vapour barrier)*
2. (*Where an insulated panel floor is used*) Unroll the heating cable over the base slab, avoiding twisting and tension on the hot/cold end joins. Cover the floor with approximately 8mm of sand to prevent the lower skin of the panel from compressing the cable, then install the panel.

And as frost heave protection for freezers on ground, these additional methods are an acceptable option:

3. Unroll the heating cable, avoiding twisting and tension on the hot/cold end joins. Then attach the cable to the base concrete reinforcement mesh. The maximum spacing between attachments shall be 600mm. Monitor the cable condition during the concrete pour. *This method is only to be used by specialist installers who are capable of locating damage to covered heating cable and repairing it afterwards.*
4. At the time of the base slab floor preparation, unroll the heating cable, avoiding twisting and tension on the hot/cold end joins and lay the cable runs over packing sand using temporary spacing guides until the layout is complete. Test the cable after the base floor vapour barrier and steelwork is prepared for the concrete pour, then again at the time of the pour.

Testing

Heating cable testing must be for continuity, and for insulation resistance using a 500V insulation tester.

Layout design and control

The cable circuits are to be designed using the spacing and loading recommendations outlined below. Use 240V circuits, with more than one circuit being used if the load is over 25A. Only one circuit (or group of circuits) is to be connected, with the duplicate being redundant. For floor areas over 30 sq.m, control the supply with a remote sensing thermostat. Set this to 8°C where the system is used as frost heave protection, and 25°C where used as

condensation protection beneath elevated floors. The thermostat shall have an alarm feature to indicate failure to maintain temperature, including an alarm contact for optional remote signalling if required by the customer. Dual sensors are to be installed, or a single sensor installed within a conduit, in a manner that provides for replacement. The sensor is to be positioned between cable runs and a minimum 4m in from the external wall, or central to the room width, whichever is the lesser of the two.

Spacing

Where the sub-floor heating system is used for frost heave protection beneath freezers on ground, the maximum spacing for each of the two (duplex) circuits shall be 700mm between runs, and to the external walls. Where the system is for the purpose of preventing condensation beneath elevated floors, the maximum spacing beneath the runs is reduced to 375mm.

Loading: Watts/sq.m

The following nominal design recommendation is based on the use of 150mm of polystyrene, or 100mm of polyurethane or equivalent beneath rooms running down to -25°C. And for cold rooms, 75mm of polystyrene or 50mm of polyurethane or equivalent.

- Frost-heave prevention beneath freezer floors: 15 – 18 Watts/sq.m
- Condensation prevention beneath exposed floors (Freezers or cold rooms): 18 – 25 Watts/sq.m

For conditions outside this range, the suggested Watts/sq.m must be calculated by dividing the required temperature difference between the room and sub-floor by the thermal resistance of the floor insulation used and allowing a suitable (e.g. 25%) design margin. The design sub-floor temperature should be 5°C for frost-heave applications and for condensation prevention, 20°C in temperate areas or 25° in tropical areas.

The design margin must be further increased if the client wants an allowance to provide for the input hours to be restricted in order to take advantage of lower rate off-peak or time-of-use tariffs.