

Electrical Heating for Frost Protection of Water Supplies



Introduction

Frozen and burst pipes waste time and can lead to expensive repairs. Low wattage heating elements can solve this problem simply and with very low running costs.

External Elements

Suitable electric heating elements are taped along the length, or spiralled round the pipe. Insulation, preferably at least 25mm thick, should then be fitted over the pipe. The aim is to create a warm micro-climate between the pipe and the insulation. Without insulation operating costs will be excessive and very cold winds blowing over the pipe may still cause freezing.

Mains voltage and low voltage cables are obtainable, the latter being suitable for use in livestock areas when fed from a 24V centre-tapped transformer.

Where it is possible for the cable to be damaged by livestock, mechanical protection should be provided.

Although manual control is feasible, the installation should ideally be controlled by a frost thermostat. An air temperature thermostat mounted on a north-facing wall will switch on the heating element when the temperature falls below a preset value, usually between -1°C and 3°C .

Heating elements are specified according to thickness of pipe, type of insulation, maximum temperature of operation and electrical loading in Watts/metre or Watts/foot length. The table below gives the loading requirement for various diameters of water pipe.

It is important to distinguish between the cable rating and the pipe heating requirement. The cable should be selected such that, when taped to, or spiralled round the pipe, it will give the loading shown in the table below. Obviously, shortening the gap between successive spirals will increase the pipe-heating loading.

Nominal pipe diameter (mm)	15	22	28	40	50
Electrical pipe-heating requirement (W/m)	6.5	10	12	13	14

It is recommended that electrical installations should be carried out by an NICEIC approved electrical contractor. Where hosing-down is to be carried out in the vicinity of the installation, the heating cable should be waterproof rated (not merely water-resistant).

Internal Elements

Internal frost protection cables, which are designed to be threaded down the inside of the pipe to be protected, are available. These are useful where attack by vermin is a potential problem.

Quartz Linear Heaters

Where large exposed areas require frost protection the use of quartz heating can be very effective. Details of this can be found in the Farm Energy Centre publication entitled *'Quartz Heaters for Farmers and Growers'* (Ref. FEC 2101).

Underground Pipes

In most winters, pipes buried to a depth of 0.5m are safe from freezing. In exceptionally cold winters, or in particularly severe climates, a depth of 0.8m may be necessary. It is advisable to use insulation where cables are buried at shallower depths.