



# Domestic Sprinkler Systems

Each year in Britain there are over 60,000 fires in the home, these cause at least 600 deaths and 10,000 serious injuries. Many could be prevented by the installation of a domestic fast response sprinkler system. Designed to detect and control the fire automatically in the early stages, without reliance on personnel, sprinklers limit the growth of fire and minimise potential smoke, fire and water damage. When a fire starts only the sprinkler heads affected by the heat of the fire operate. The sprinkler heads are extremely reliable and are only activated by temperature, not smoke.

Copper tube to EN 1057 is the ideal material to use for the system. Compared to the other approved materials, copper has a smaller outside

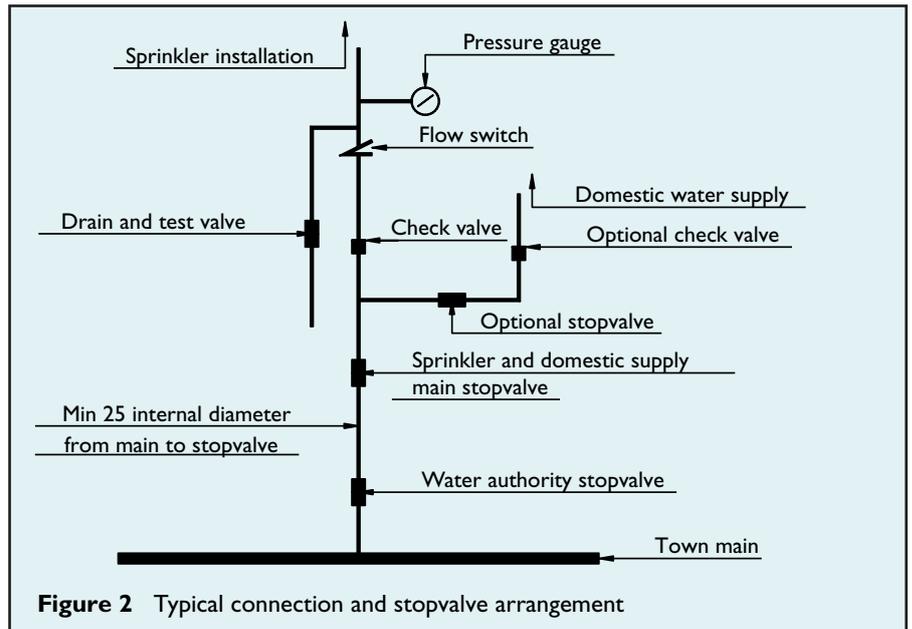


Figure 2 Typical connection and stopvalve arrangement

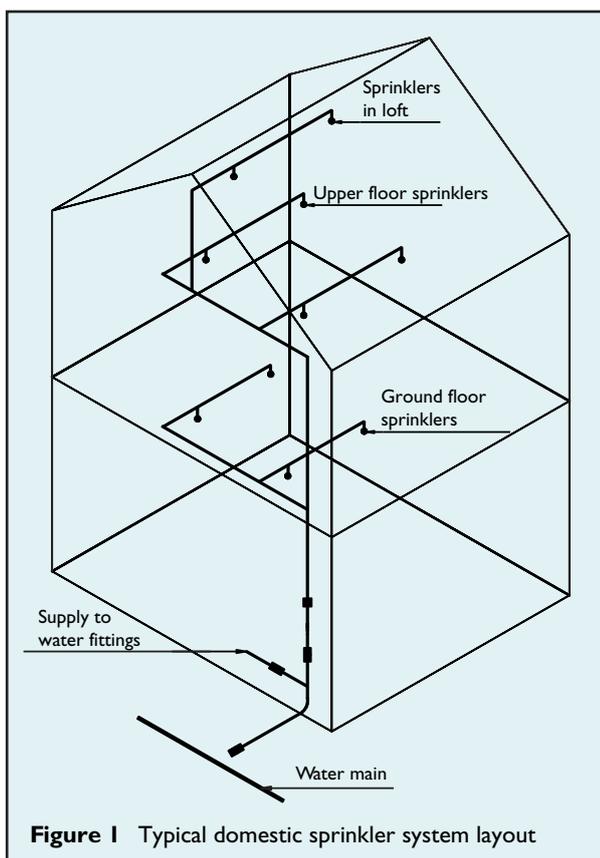


Figure 1 Typical domestic sprinkler system layout

diameter and low friction losses. It requires relatively few supports, is lighter to handle and easier to join, especially in confined spaces. Its excellent corrosion resistance gives a long trouble free service life. It can be jointed using the same EN 1254 Part 1 capillary fittings with tin/copper solder to EN ISO 9453 alloy number 23 that are used on ordinary water services.

## Installation pipework

A wet pipe installation must be used, so the system is constantly charged with water; preferably direct from the mains. Sprinkler installation pipe diameters must be chosen to supply not less than 60 l/min

through any single sprinkler and 42 l/min through any two sprinklers operating simultaneously in a single compartment. For a single dwelling the incoming service pipe must be at least 25mm nominal internal diameter; so 28mm plastic sheathed half-hard thick wall formerly Table Y copper tube will best meet this requirement. If the service pipe only serves the sprinkler installation it must be capable of supplying the above water flow rates. If the service pipe also supplies domestic water the above flow rate plus 50 l/min is required. The internal pipework should be run in the standard half-hard condition thin wall formerly Table X copper tube. Because no bending of the tube is allowed on the sprinkler installation pipework, fittings must be used for all changes of direction. Sprinkler heads are positioned in all parts of the dwelling, including the loft, wherever there is a potential ignition source. Figure 1 shows a typical layout. All pipework must be protected against freezing by either: the manner of its installation; insulation; or, for example in

the loft, by insulation and electrical trace-heating. The sprinkler heads must, of course, remain exposed.

### Control valves and monitoring equipment

Figure 2 illustrates a typical sprinkler connection arrangement. Where the sprinkler installation and the domestic water system share a common water supply the main stop valve must isolate both. A check valve must be fitted to the sprinkler installation. It makes good sense to fit another stop valve and check valve to the domestic supply so that the sprinkler installation can be kept operational whilst any work is carried out on the domestic side. A flow switch is fitted so that an alarm is activated if a sprinkler discharges. A drain and test valve, minimum 15mm nominal bore, is required; this enables both draining and a check of the water flow rate to be carried out. A pressure gauge is also required to enable monitoring of the water pressure.

### Sprinkler heads

There are two types of sprinkler head: one uses a glass bulb filled with heat sensitive liquid; the other has a fusible pellet and heat collecting fins, see Figure 3. Glass bulb sprinklers are available for concealed, recessed, pendant and ceiling mounting. Pellet types are pendant and ceiling mounted with escutcheon plates. Table 1 gives details of the temperatures and colour codes.

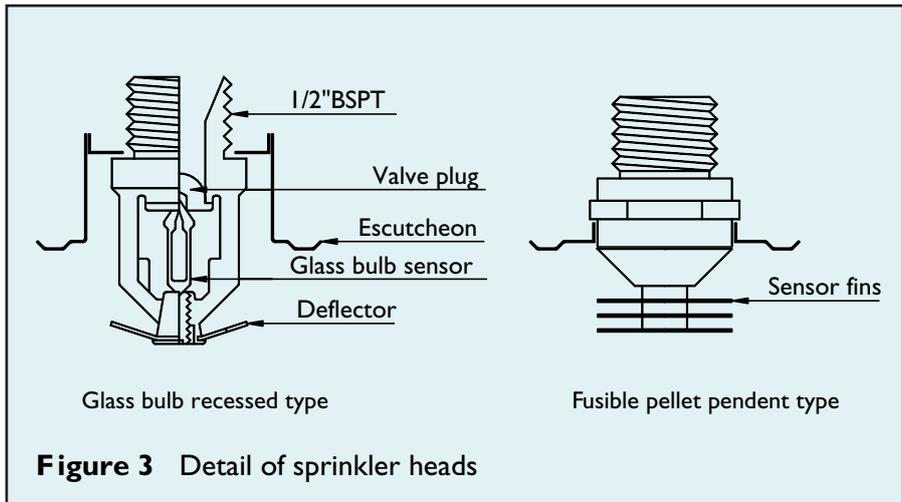
### Sprinkler spacing

Sprinklers should be spaced so that the area covered by a single sprinkler is not more than 12m<sup>2</sup> and the maximum distance between sprinklers does not exceed 4m. Also, the maximum distance from the sprinkler to any wall should not be more than 2m. The minimum distance between sprinklers in a compartment is 2m. Bearing the above in mind, most rooms will require only one sprinkler head.

### Commissioning

Commissioning of the system is straightforward and consists of a pressure test for leakage and a flow rate check. The installation must be tested by filling with water and visually checking each joint for leakage. The installation

Sprinkler type	Temperature rating °C	Colour code
Fusible link	68 to 74	Uncoloured
	93 to 100	White
Glass bulb	68	Red
	79	Yellow
	93	Green



pressure should then be increased to 110% of the maximum service pressure. The system should then be isolated and the pressure checked after an eight hour period. There should be no significant pressure drop. The drain and test valve should then be used to establish that the design flow rates can be achieved, this check should be carried out when the standing pressure is at its lowest level.

### Documentation

Full documentation should be provided for the building user. This should include a statement of compliance with all specifications, plans of the installation, details of approvals granted, an inspection and maintenance programme and an emergency telephone contact number.

### Customer peace of mind

Anything that can add value to a plumbing installation, give lasting peace of mind to the customer, and might one day save the property and lives of everyone in it, just has to be a good thing, both for the installer and the customer. We should follow the examples set by other countries and promote the installation of domestic fast response sprinkler systems. For example, in Canada domestic

sprinkler systems have more than fifteen years of proven service and many systems have been installed there.

Further technical information on domestic sprinkler systems can be found in BS 9251 Sprinkler systems for residential and domestic occupancies – Code of practice, published by British Standards Institution.

**Note:** the installation of new, or alteration of existing sprinkler systems, should only be carried out by contractors who have received the appropriate training.