6
Services

Water supply

All water fittings and their installation should conform to WRAS (*Water Regulation Advisory Scheme*).
This is an organisation which provides guidance to the *Water Supply (water fittings) Regulations 1999.*
These regulations have superseded the former *Water Byelaws* issued by individual water companies.

Installation of water fittings should be undertaken by members of a recognised trade association, such as the Institute of Plumbing.

Pipework must be readily accessible, not chased into plaster or in floor ducts under cabinets. Make sure that stop cocks which should be provided under sinks, before dishwashers and any other appliances with water supplies, are reasonably accessible.

Where a sink waste discharges over a gully outside, this is a good place to incorporate a branch for a hose union tap, set about 600 mm high for garden use. The tap must be fitted with double check valves and be isolated by an inside stop cock to prevent freezing in winter.

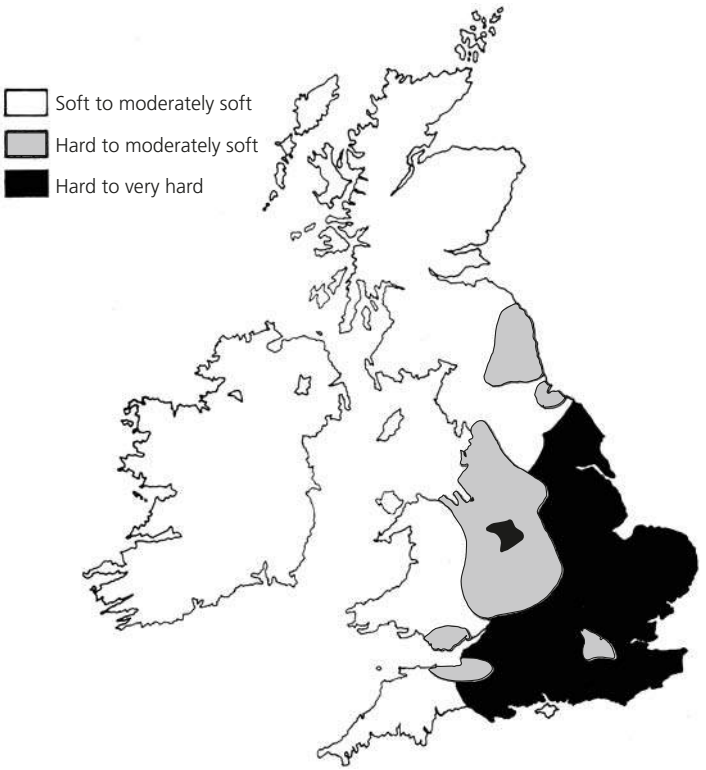
Sinks are best fitted with 75 mm deep seal *bottle traps* which are easy to undo should anything unintended fall down the waste.

Hot water for sinks can either be supplied by a central storage cylinder or, where pipe runs are long, by a separate under-counter 'point-of-use' electric water heater. However, where dishwashers and washing machines are plumbed-in nearby, it is

generally more energy efficient to connect them to both hot and cold supplies as the programme time will be reduced. However, in this case, the water supplied should not exceed 60°C.

Water treatment

Approximately 60% of the UK is supplied with *hard water.* The resulting limescale build-up on heating elements can considerably reduce heating and hot water efficiency. Corrosion can



Water hardness

occur beneath the scale, reducing life expectancy and scale particles will clog shower heads and mixer outlets, reducing flow and proper mixing of hot and cold water. It will also leave unsightly, but not harmful, limescale deposits round tap bases, plug holes, and water marks on stainless steel sinks and metal implements.

The hardness of the water can be obtained from the water company. It is usually classified as soft: 0–50 ppm (parts per million) to very hard: over 300 ppm.
The hardness is determined by the geology of the ground through which the rainwater runs. Water will pick up calcium or magnesium from chalk or limestone, but not if it passes through granite or peaty soils.
Soft water can pick up trace metals from pipework which may eventually cause leaking pipes and corrode copper cylinders.

Water softeners

Water softeners consist of a resin cylinder which is filled with sodium chloride (salt). They are plumbed into the cold mains supply inside the house. As water passes through the cylinder, calcium and magnesium are removed and are replaced by sodium salts.

Water softeners are usually fully automatic and only need periodic filling with salt.
They take up space typically about 300 × 450 × 800 mmh and need a drain connection for the hose waste and an electricity supply for a time clock.

Water softeners should be fitted after the mains supply of water to any drinking water taps because the taste of softened water is unpleasant and is not good for brewing tea. There is also some evidence that drinking soft water can aggravate heart conditions and may be unsuitable for people who require a low sodium diet.

Scale inhibitors

Scale inhibitors present a far cheaper alternative to dealing with limescale, but opinions vary as to how effective they really are. The difference between scale inhibitors and water softeners is that they break up the limescale and leave it in suspension, rather than eliminating it altogether.

This is done by passing the mains water through powerful magnets which alter the structure of the hard water salts, or by electrolysis where the water passes through a copper cathode and a zinc anode which creates a mild electric current, leaving the limescale in suspension rather than clinging to the surface of the pipes. Some scale inhibitors involve polyphosphate dosing whereby a very small amount of a compound of sodium, calcium, phosphorus and oxygen is added to the water, either in the form of small containers hung in an expansion tank feeding the hot water system, or by a chemical cartridge plumbed into the pipework. Both methods require the chemicals to be replaced every six months.

It is thought that scale inhibitors are more effective where a large volume of water is used on a frequent basis, as it is the action of the running water which promotes the action. They have the virtue of taking up very little room – typically 150–200 mm length of pipe run and are maintenance free. They have a typical life expectancy of at least 10 years.

Filtered drinking water

According to the Drinking Water Inspectorate, drinking water quality in the UK is improving with 98.95% of 2.9 million tests meeting EU standards. However, some people worry about the smell of chlorine, sediments and rust particles affecting taste and prefer to have their water filtered.

There are various jug devices on the market but if a plumbed in solution is required, under-sink cartridges can be fixed into

the mains water supply pipe before entering the sink mixer. Cartridges/filters generally need renewing every six months. See p. 85 for filtered water mixers.

Boiling and chilled water on tap

There are over-sink and under-sink water heaters which can provide boiling water and some can also provide chilled water. It is claimed that they use less electricity than a jug kettle and have the advantage over a kettle of not cluttering the work-top as they are connected to a dual-control tap over the sink.

Sources: WRAS and Salamander Engineering Ltd

Gas supply

Gas pipes should be accessible for leak detection, suspended on clips away from the wall surface and encased in sleeves where passed through walls. They should not touch hot water pipes or electric cables.

Stop cocks should be provided before each appliance and connected to cookers, ovens and hobs with flexible hoses to enable them to be pulled out for servicing.

Where no mains gas is available and gas is the preferred fuel for cooking, this can be provided in the form of propane gas cylinders. This gas has a higher calorific value than mains gas and can therefore be connected to appliances with small bore pipework.

As the propane gas is under pressure, the containers should be positioned outside the house, in free air, away from any heat sources. It is usual to provide twice the number of cylinders required, which allows half to be in use and the other half to be in reserve. This allows time for the empty cylinders to be renewed by the local supplier.

Electrical wiring

All wiring should be in accordance with the current Wiring Regulations issued by the Institution of Electrical Engineers (IEE). It is advisable to use electrical contractors approved by the National Inspection Council for Electrical Installation Contracting (NICEIC).

Above the *worktop*, socket outlets will be needed for the following typical appliances: kettle, blender, food processor. These are likely to be permanently sitting on the worktop. In addition there may be more occasionally used items such as: whisk, juice extractor, coffee mill, tin opener, etc.

At the *cooking area*, sockets may be needed for an electric frying pan and hand-held tools, like a whisk or blender which are used directly into saucepans on the hob.

At the *serving area*, sockets may be needed for: toaster, carving knife, warming hot plate.

All sockets should be twin sockets to save space and to discourage the use of adapters.

Note that an electric kettle can have a rating as high as 3 kW. It is therefore important that the socket outlet likely to be used for this is not on the same ring main as a major appliance.

Spur boxes or unswitched socket outlets for appliances not exceeding 3 kW should be provided behind large appliances and connected to switches above the worktop for: dishwasher, waste disposer, water heater/chiller, extractor fan/cooker hood, refrigerator, freezer, fridge-freezer.

Major cooking appliances will need a separate circuit to cope with the high voltage of electric cookers, ovens and hobs, connected to a consumer unit or switch of appropriate watt rating. Saving energy should be considered when specifying cooking appliances, as their wattage can vary considerably.

Lighting

Good lighting in kitchens is an essential pre-requisite. Inadequate lighting can cause accidents, fatigue and lead to bad hygiene. During daylight hours there may be sufficient light, but this will vary according to the size and orientation of the window, the season and time of day.

Worktop lighting

The main source of artificial light is needed for the worktops. This can best be achieved by mounting light fittings behind battens fixed to the front edge of wall cupboards.

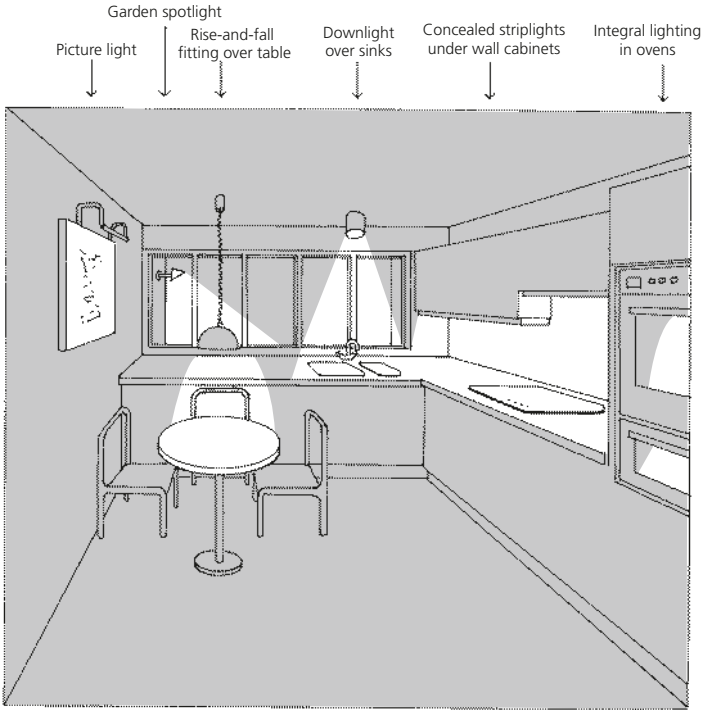
There are several types of *linear* light fittings suitable for use under wall cabinets such as the following:

Small diameter fluorescent tubes with electronic ballast for instant start fitted with 8 W and 13 W warm-white lamps.
This is the most economic option as the tubes have a very long life. They also have the advantage of giving off relatively little heat.

Low voltage fittings with two, three or four 10 or 12 W halogen capsule lamps fitted into linear rectangular section tubes with integral transformers.
These lamps give a bright white light and are reasonably long lasting.

'Architectural' tungsten 35, 60 and 120 watt striplights in three different lengths.
Elegant in appearance with a warm coloured light, but lamps are short lived so are not popular as they are hideously expensive to replace.

Source: Mr Resistor



Kitchen lighting

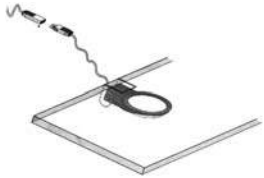
General lighting

Where there are no wall cupboards, such as over a sink in front of a window, then a downlighter, directional spotlight or shaded pendant light can be fixed to the ceiling.

Ovens, cooker hoods and refrigerators usually have their own interior lights to aid visual recognition and promote hygiene by showing up dirt.

General lighting can also be provided by lights fixed above cupboards or at high level on walls to illuminate the ceiling. Alternatively, several individual low voltage spotlights can be recessed into the ceiling, or into cabinet plinths to light the floor.

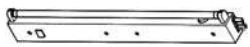
LV stainless steel triangular light with 10/20 W halogen lamps by Hettich



LV light for mounting under glass shelves with 10 W halogen capsule lamp – by Hettich

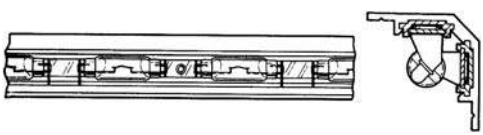
LV brushed nickel fitting with integral transformer and 4 × 20 W halogen capsule lamps by JCC Lighting

Energy saving fluorescent lamps housed in aluminium body with white perspex diffuser and integral switch with 2 × 9 W tubes – by Häfele



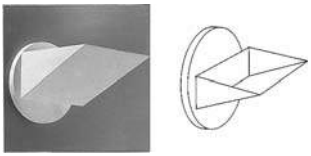
Standard fluorescent striplight with rocker switch for 6 W, 8 W and 13 W tubes by Häfele

Aluminium reflector with polycarbonate diffuser 25 mm × 25 mm for 6 W, 8 W, 11 W and 13 W fluorescent tubes – by Light Graphix

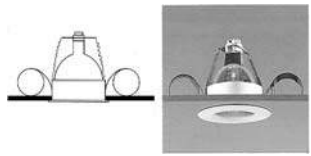


LV linear festoon system with 5 W or 10 W lamps mounted on integral transformer in rigid housing in any length up to 3 m max. – by Light Graphix

Worktop illumination



Wall washer with 100/150 W linear TH lamp – by John Cullen



LV fully recessed sealed glass down lighter for wet areas with 20–50 W dichroic lamps – by John Cullen

LV chrome picture light with 2 × 20 W capsule lamps by JCC Lighting

External die-cast aluminium spotlight with 150 TH linear lamp – by Contract Lighting

Picture light in polished chrome with 8 W, 11 W or 13 W fluorescent tubes by Light Graphix

White rise-and-fall fitting with max 100 W lamp – by First light

General illumination

Dining tables can be lit with rise-and-fall pendant lights which are best connected to a plug-in ceiling rose so that the fitting can be completely removed if the table is moved to the wall for a large party.

Where there is an adjacent garden which is fully visible from the dining area, external spotlights can illuminate it at night making it possible to light the dining table solely with candles.

Heating

In the kitchen, high ambient temperatures are gained from cooking so, except for a dining/kitchen room, heating levels need not be as high as for other living spaces.
As wall space is at a premium there is seldom room to fit a conventional radiator but there are other forms of heating which may be considered.

Underfloor heating

Underfloor heating is one of the more convenient ways of heating kitchens as it leaves the walls entirely free for cabinets and appliances. The disadvantage is its slow response time to heat up and cool down.
There are various types: hot water pipes, warm air ducts and electric cables.

The most recent advance has been electric mats embedded with such small diameter heating cables that the overall thickness is no more than 3 mm. These can be laid within the thickness of the bedding mortar under stone or ceramic tiles. This is therefore particularly suitable for installing in existing buildings as it barely raises the finished floor level.
Typical rating is 125 watts/m^2 with sizes up to 15 m^2.

For small kitchens, there are also mats with low voltage flexible heating elements encapsulated in a 2 mm thick polyester sheet which provide safe and cheap background heating.
Typical panel is 600 $\times$ 500 mm with ratings of:
24 watts @ 24 volts and 33 watts @ 28 volts.

Kickspace heaters

These are small fan convector heating units designed to be fitted into the plinth board below base cupboards.
The plinth board must be a minimum 140 mm high and recessed no more than 75 mm.
There are two basic types: all electric models or those which can be connected to central heating pipework.
Outputs range from 1–2 kW.

Typically they measure about 500 w × 400 d × 100 h (mm).
During summer months the fan-only option can be used to circulate air.
Low voltage models are also available for use in wet areas.

Wall-mounted fan heaters

Compact heaters with a downward flow of hot air.
They have a fast warm-up time and are rated at 2 kW with a splash-roof protection rating of IPX4.
Typical size is about 250 w × 250 h × 110 d (mm).
They are normally operated with a pull cord and some incorporate an energy-saving thermostat.
While efficient and space saving, the noise of the fan can be irritating.

Infra-red heaters

Radiant electric wall heaters with elements encased in silica or ceramic sleeves, with ratings of 0.5 to 1.8 kW and a spray-proof protection rating of IPX3. Mounted at high level, they provide rapid, silent warmth which can be beamed down at angles from 20°–40°.

Towel radiators

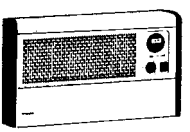
Ladder-type towel radiators in enamel, stainless steel or chrome finishes. Designed primarily for bathrooms they can

also be useful for kitchens where the larger models can provide full heating and smaller models provide a place to hang and dry towels.

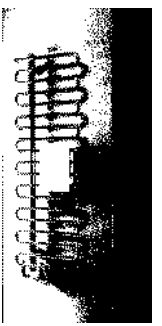
Ratings from 150–1700 W.
Sizes from: 500–750 w, 90–150 d and 650–1800 h (mm).

Sources: Enerfoil
Myson
Dimplex
Zehnder

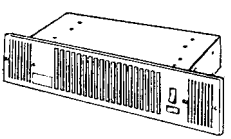
High level wall-hung infra-red heater by Dimplex



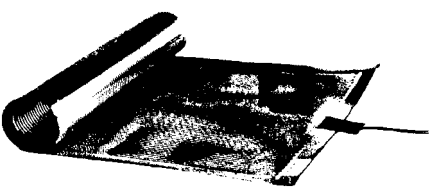
Wall hung fan convector heater – by Dimplex



Cobra-Therm towel radiator – by Bisque



Kickspace convector heater by Myson



Low voltage panel heater for bedding in ceramic floor tile adhesive – by Enerfoil

Heaters – other than conventional radiators

Ventilation

Good ventilation is essential in a kitchen, not only to extract heat, steam and fumes from cooking, but to satisfy the Building Regulations as set out below.

Building Regulations

An extractor fan or cooker hood is a mandatory requirement:

TYPE OF KITCHEN	BACKGROND VENTILATION	MECHANICAL VENTILATION
kitchens with opening windows (no minimum size)	4000 mm^2	30 litres/second adjacent to hob* **OR** 60 litres/second elsewhere **OR** passive stack ventilation (PSV) to BRE information paper 13/94 **OR** with appropriate third party certification such as a BBA certificate
kitchens without natural light	air inlet such as 10 mm gap under door	extract fan as above with 15 minute over-run with fan operated by light switch

*When incorporated within a cooker hood **OR** when located near the ceiling within 300 mm of the centreline of the hob and under humidistat control.

Where there is an open flue within the same room as an extract or fan, difficulties can occur – such as the fan drawing noxious flue gases into the room. If the following conditions can be met, the need for an extractor fan may be dispensed with:

Where there is a *solid fuel* open-flued appliance that is the primary source of heating, cooking or water heating

OR

Where the appliance is burning *other fuels*, it is required that: the appliance has a flue with a free area at least 125 mm diameter

AND

the appliance has combustion and dilution air inlets which are permanently open when not in use so that the ventilation path is unrestricted (i.e. no dampers).

With flued *gas* appliances which are located in a kitchen where a fan is desired – it has been found that an extract rate of not more than 20 litres/second will be unlikely to cause spillage of gases, although it will be necessary to carry out a spillage test in accordance with BS 54440: part 1, clause 4.3.2.3.

Advice on the construction of *oil-fired* appliances is contained in Technical Information Note T1/112 from OFTEC
(Oil firing technical association for the petroleum Industry).

Where kitchens are combined with a *habitable* room such as in a kitchen/dining room, the provisions for ventilation need not be duplicated provided the greatest provision for rapid, background and mechanical ventilation is made.

A habitable room must have an opening window of at least 1/20th of the floor area **AND**
background ventilation of at least 8000 mm^2.
Note that for the purposes of ventilation in the Building Regulations a kitchen is not considered a habitable room.

Source: *Approved document F, the Building Regulations 1995*

Communications

As the hub of the household, where so much time is spent, it is important to consider installing in the kitchen some of the following forms of communication.

Notice board
At its simplest, a board made of cork or softboard with drawing pins or a metallic sheet with magnets for messages, shopping lists, reminders, family photos, postcards, etc.

Telephone
A wall-hung telephone extension or pocket for a mobile phone with adjacent note pad and pen.

Entry phone
Where the kitchen is far from the front door, an entry phone system is useful.

Baby alarm
Essential for new babies – either simple battery operated or by closed circuit TV.

Desk
Where space allows, a small desk top or piece of counter with knee space for a stool is much appreciated by serious cooks for studying and writing recipes, paying bills, sorting post, etc.

Radio and TV

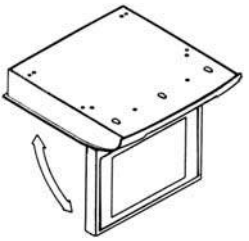
There are some small format combinations of radio, television, CD and DVD players designed specifically for kitchen use, which can be mounted under kitchen wall cabinets. Some can even be wall fixed.

Televisions should be kept away from direct sources of heat and moisture, and the screens out of the path of direct sunlight.

Television, radio, DVD and CD players, internet browser and key board for mounting under wall cabinets – by Kitchenvision

Television with 15'' swivelling screen in SS frame to suit 500 and 600 mm wide tall cupboards – by Kitchenvision

LCD television and radio – by Häfele



Mounted under wall cabinets, screen folds up when not in use

Wall mounted

Kitchen radio/TV/CD players