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Cooling appliances

The choice of cooling appliances depends upon the shopping habits of the clients and the space available in the kitchen.

As the third component of the *kitchen triangle*, the refrigerator is both an essential and frequently used appliance.

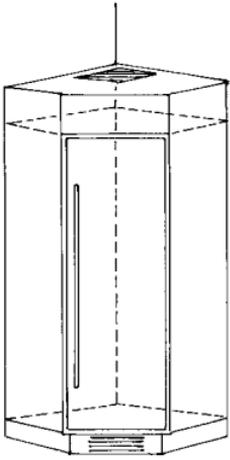
Urban dwellers with no children and no garden, with easy access to local shops and who do not mind frequent shopping trips, can make do with a relatively small refrigerator compared with the large family in a country house.

In the very large household, a north facing larder or a cold room will reduce the need for a large refrigerator and with a freezer in an outhouse, a fridge-freezer would be all that is needed in the actual kitchen.

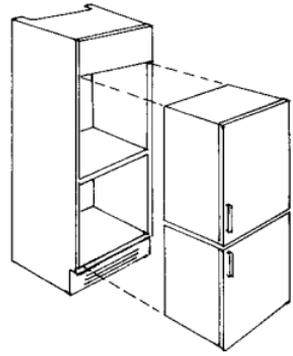
Model types

The various types and combinations of refrigerators and freezers can be loosely categorised as:

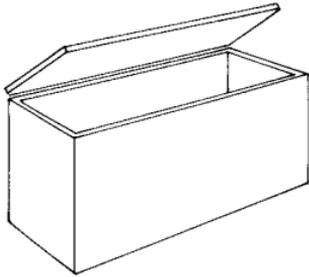
refrigerator with icebox	with small freezing compartment
larder refrigerator	with no freezing compartment
fridge-freezer	refrigerator stacked with freezer
'side-by-side'	American style, wide fridge-freezer with two doors, often with ice and chilled water dispenser
'bottom freezer'	fridge-freezer with bottom drawer as freezer
wine store	refrigerator set at 10°C for wine, cigars and cheese
upright freezer	freezer with side hung door
chest freezer	freezer with hinged lid



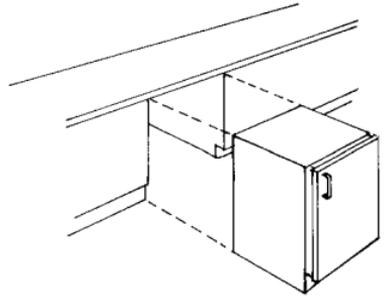
Corner refrigerator
1650 × 1050 mm
on plan



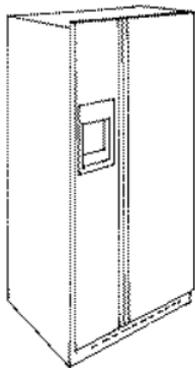
Typical integrated in-column refrigerator
stacked on top of freezer



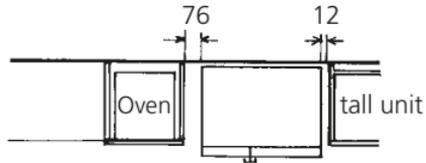
Typical large chest freezer
500 litres with counter-balanced lid



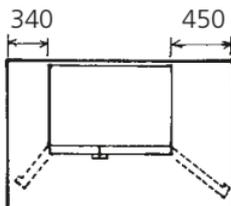
Typical integrated built-under refrigerator or freezer



Freestanding American style
Side-by-side refrigerator typically:
900 w × 660 d × 1800 h



Typical minimum clearances needed for
side-by-side freestanding refrigerator
between oven and tall unit



Typical minimum
clearance needed to
remove drawers from
interior of freestanding
side-by-side
refrigerator



Fully integrated fridge-freezer with ice dispenser by Gaggenau



Freestanding corner refrigerator in SS by Norcool



Freestanding 'Bottom Freezer' with freezing compartment in bottom drawer – by Gaggenau



Temperature control cabinet with three climate zones for red wine, white wine, cheese and cigars – by Gaggenau



Refrigeration unit for cold room or wine cellar by Norcool



So-called '50's style refrigerator available in silver and seven colours by Smeg

Fitting format

Most of the different models listed above are available as:

- freestanding* usually cheap small models or large side-by-side and 'retro style' (i.e. with rounded corners) fridge-freezers
- built-in* generally means appliance will fit into 500 or 600 mm wide spaces to suit standard cabinets with facility for a 'decor' panel to match cabinet door fronts
- in-column* means appliances built into tall cabinets, sometimes stacked one above the other. This may mean they are fully integrated but also, confusingly, can mean 'built-in'
- Check with the manufacturer
- built-under* as 'built-in' (above) but low enough to fit under a standard 900 mm high worktop so is about 865 mm high
- fully integrated* can be built into standard tall or base cabinets, accept matching doors and variable plinth heights

Note that *fully integrated* appliances fit seamlessly into standard cabinets.

Built-in and *built-under* appliances, which are not fully integrated, will have dirt trapping gaps at the sides and will break the continuous plinth line of adjacent cabinets.

Cooling appliances unless *freestanding* will need ventilation space at the back and at plinth level to suit manufacturer's requirements.

Side-by-side fridge-freezers are generally larger than a 600 mm deep worktop. They take up a lot of floor space and need from 250 to 450 mm both sides for full access to door storage. See p. 126.

Those with ice and water dispensers need a water connection.

Capacity

The volume of different models can vary from as little as 120 litres for a built-under larder refrigerator to 600 litres for a side-by-side fridge-freezer.

As a guide, allow about 28 litres (one cubic foot) for each person in the household.

This volume may be reduced if there is a separate freezer.

Most families find that 140–170 litres is adequate.

For the household with a kitchen garden, a total of 400 litres may be more suitable. Here a 250 litre chest freezer outside the kitchen and a refrigerator in the kitchen might be appropriate.

Defrosting

There are three methods:

- manual* appliance is turned off, contents removed and ice left to thaw and drain from the bottom shelf into a bowl
- auto defrost* during normal operation, ice builds up on the back wall which subsequently melts and runs down the back wall into a container from which it is evaporated by the heat of the compressor.
- frost free* sensors monitor the temperature and direct a fan at the back of the appliance to circulate chilled air through a system of vents evenly round the interior. This has the benefit that frozen packs do not stick together, labels stay legible and ice never builds up. However, it can make food somewhat dry, is expensive to run and tends to be less energy efficient.

Controls

The adjustable thermostats and the on/off switches should be easily visible and accessible.

Note that the numbers on the thermostats do not refer to temperatures. Normally (but not always), the higher the number, the colder the temperature.

Warning lights in freezers should be seen at a glance.

With fridge-freezers, it is much more convenient, but more expensive to have separate controls for the two compartments, particularly if the freezer has to be defrosted manually, this allows the refrigerator still to operate.

Refrigerator features

Some or all of the following features may be included:

adjustable shelves	wire/glass/plastic
interior light	
rollers	useful for servicing
ice cube tray	
egg tray	usually in door
dairy compartment	usually in door
wine rack	usually in door
wine/cheese compartment	set at 10°C
salad drawer (crisper)	usually at bottom

Freezer features

Some or all of the following features may be found in freezers:

food drawers	wire/clear or solid plastic
interior light	
warning light	
acoustic alarm	useful for freezer in outhouse
thermometer	

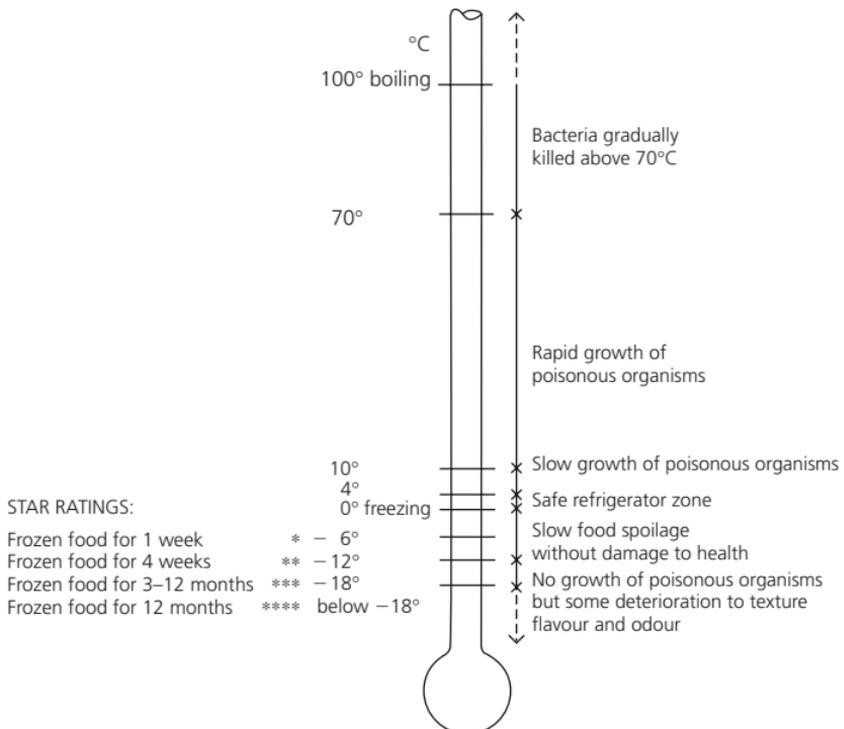
fast-freeze switch
 handle lock
 ice and chilled water dispenser

or fast-freeze compartment
 useful for freezer in outhouse

Temperature zones

Some refrigerators have compartments with different temperature zones. Typically this may be a relatively warm $+10^{\circ}\text{C}$ drawer for wine, cheese, etc.

Some have a salad/crisper drawer where the humidity can be adjusted for optimum freshness of fruit and vegetables. This drawer is the warmest part of the fridge and is generally found at the bottom where it picks up heat from the compressor.



Food storage temperatures

The coldest part of the fridge, between 0 and 5°C, is usually the lower two shelves, but refrigerators with an ice box at the top have the coldest part immediately under the ice box.

Upper shelves and door storage will be cool zones +5° to 7°C suitable for dairy and wine storage.

In frost-free appliances, the temperature is even throughout the interior.

Star ratings

Star ratings for freezers and ice boxes are as follows:

- *** = -6°C suitable for storing pre-frozen food for a week
- **** = -12°C suitable for storing pre-frozen food for 4 weeks
- ***** = -18°C suitable for storing pre-frozen food for 3 to 12 months
- ****** = -18°C (or colder) suitable for storing frozen food for 12 months and freezing fresh food up to 1/10th volume of freezer without using a fast-freeze facility.

Climate class

All cooling appliances are ascribed a climate class. This denotes the range of *room temperatures* that an appliance is designed to operate within effectively:

N = +16°–32°C

SN = +10°–32°C

N-ST = +16°–38°C

SN-ST = +10°–38°C

Noise levels

Some appliances can be a great deal noisier than others. Models which work by absorption are quieter but more expensive than those with compressors.

Noise levels are given for all cooling appliances and are expressed in decibels as dB(A) re 1 pW.

These range from low at about 33 to high at 47 decibels.

Energy consumption

All cooling appliances are given an energy-efficient class. These rate from A (good) to G (bad).

Most fridges and freezers are rated A or B.

Frost-free refrigeration tends to be less energy efficient.

All appliances should carry the *EU energy label* which describes the manufacturer, model number, energy efficiency class, energy consumption (kW/cycle), net volume of fresh and frozen food compartments (litres), noise levels (dB(A) re 1 pW). See pp. 40, 41.

Running costs can be high as cooling appliances operate all hours every day.

Most manufacturers state energy consumption for 24 hours (kWh) and an indication of annual running costs (£/kWh).

Larders and cold rooms

Before refrigeration was invented, houses were equipped with *larders*, either in an outhouse or in a north-facing room where part of the window would be fitted with perforated or woven copper or brass screens to let in the cool air but keep the insects out. The room would be lined with slate shelves and the ceiling fitted with hooks on which to hang game.

This type of room can of course be replicated as it is particularly useful for keeping cheese, fresh fruit and vegetables, prepared and left-over food.

Today it is possible to create a cold room without the need for north-facing outside walls by using two basic components – a *refrigeration unit* and a *cold room door*. The walls (and floor if necessary) should be suitably insulated.

Refrigeration units are designed for temperatures of 3–12°C and for different sized rooms. They are also available as 'split units' where the warm and cold parts are separately installed – the cold part inside the room and the warm part up to 12 m away in another room where heat emission is not a problem. The two components are connected by a copper pipe and electric wiring.

The cold room doors can be supplied with panelling to match the house doors or be faced in stainless steel. The door is insulated, has magnetic door seals and the inside is lined with storage boxes.

This type of installation is also suitable for making a *wine cellar*.

Source: Norcool

Green issues

Today the refrigerant and insulation of cooling appliances are CFC (chlorofluorocarbon) free and most are HFC (hydro fluorocarbon) free. However HFC, which does not deplete ozone, is still a powerful greenhouse gas.

The alternatives, which are more generally used today, are natural gases such as propane and isobutane which have no effect on global warming. Some appliances use a refrigerant called R600a which is considered safe.

Source: *Which?*