How microwaves work

Microwaves are high frequency, short length, electromagnetic waves similar to TV radio waves. At the heart of the oven is a *magnetron* which converts the electric current into micro-frequency waves (2450 MHz for an 850 W oven).

Microwaves are reflected by metal, but can pass through most other materials.

They are particularly attracted to moisture. As microwaves enter the oven, they are scattered to distribute heat evenly either by *stirrers* or by a *turntable.* They reflect off the metal walls of the oven and pass through the non-metallic containers into the food. Here they cause molecules in the food to vibrate millions of times per second producing great heat which cooks the food.

Microwaves generate heat but are not hot in themselves.

Food will continue to cook after being removed from the oven, not by the microwaves but by the conduction of heat within the food. This is why some dishes need a certain amount of *standing time* before being served.

Safety

Microwaves, unlike X-rays and gamma rays, are *non-ionising* which means they do not build up in the body and do not change the structure of body cells. As a result they do not damage food chemically or build up radiation in the oven. Should microwaves leak from the oven, say from a faulty door seal, only a small amount would escape and this would decrease rapidly with distance from the oven.

Microwave ovens have to meet stringent emission criteria and the leakage level allowed is much lower than that which could cause harm. To prevent microwaves from escaping, doors are sealed electronically with at least two interlocking safety switches. This ensures the oven cannot be operated unless the door is completely closed and also that microwaves cease instantly the door is opened.

Pros and cons of microwave cooking

As microwaves cannot pass through the metal walls of the oven, they are remarkably energy efficient. Microwave ovens use only about 1 kW/h of energy as opposed to about 5 kW/h in many conventional ovens.

Microwaves do not shrink meat, destroy the taste or nutritional value of the food.

It is a valuable tool for quick thawing of frozen food, softening butter, melting chocolate, warming plates and heating hot drinks. However, some foods can become somewhat limp, when they should be crisp or brown. This can be remedied by choosing a microwave oven with a grill or multi-function oven.

Types of microwave oven

There are basically three types:

microwave cooking only	usually small and often freestanding
microwave with grill	good for browning meat, etc.
combination microwave	includes a grill and conventional oven elements and a fan. This provides six cooking methods: microwave only microwave plus grill microwave plus fan microwave plus grill and fan conventional oven grill only

Built-in models are designed to suit 500 and 600 mm wide cabinets.

Freestanding models can also sometimes be built-in with a proprietary kit.

There are a few small models with a depth of 300 mm designed to be fixed under standard wall cabinets.