

As discussed in the Physics of Heat (page 6) Carbolite Gero defines ovens as operating up to 700°C, where heat transfer is predominantly by convection (as shown right).

Factors to consider when selecting an oven:

What temperature?

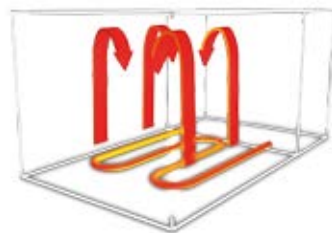
- Carbolite Gero offers several ranges of ovens with different maximum operating temperatures from maximum temperatures of 250°C to as high as 700°C with minimum working temperatures of ambient +30°C to +60°C
- Ovens are suitable for use at their maximum operating temperature.

What size?

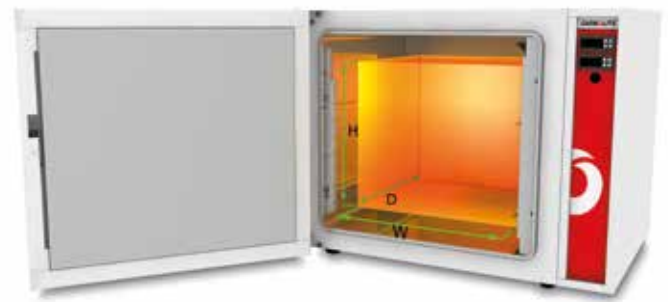
- Carbolite Gero's smallest bench mounted oven has a capacity of 30 litres, but larger standard volume ovens up to 14,000 litres are available.
- The uniform volume of an oven is smaller than the total volume due to the heat losses through the walls and door.

Natural or fan convection?

- Simple ovens do not have a fan fitted, but have elements mounted in the chamber base. Air circulates by convection; the warmed air at the base initially rises then falls as it cools. The resulting slow airflow is preferable, for example, for processes involving powders which may be disturbed by fan convection or where there is a risk of cross contamination between samples.



- In fan convection ovens the elements are located on the side of the oven and on smaller ovens the fan blows air through an air-guide, over the heating elements and around the chamber. On larger ovens, where there is room for a more complex air guide, the fan pulls air over the elements. The fan action thoroughly mixes the heated air, equalising its temperature before blowing it around the chamber and over the sample. This provides a uniform volume within the oven chamber for applications that require a specific temperature uniformity (the image top right shows a typical optimised uniform zone h x w x d).



Carbolite Gero's design features optimised uniform zone

Advantages of fan convection

- Ovens heat up and recover the temperature more quickly
- The higher airflow improves the contact between the sample/load and as a result the sample/load also heats up faster
- The airflow conveys the heat to the temperature sensor more quickly, resulting in improved control stability
- The temperature uniformity is improved
- The fan promotes higher airflow in and out of the chamber and speeds up drying by faster removal of vapour (water or solvents – see additional note regarding the use of solvents in ovens)
- Variable speed fans are also offered which can be a solution to the problem of disturbing the samples/ cross contamination

Exhaust options

Exhaust fan – an extraction unit is fitted to the oven and is provided with an on/off switch. Suitable for use in applications creating large amounts of fumes which need to be extracted from the oven.

Moisture extraction (MEO) – this option makes the oven suitable for drying processes which contain a lot of moisture. It includes the air exhaust fan option, plus the addition of sealing the chamber seams to prevent moisture from entering the insulation.

Stoving and curing – designed for use with paints, resins and solvents, this option can remove small quantities of volatile solvents from the chamber. It includes the air exhaust fan and sealing of the chamber seams. An airflow failure sensor cuts heating if the exhaust system is not working effectively. An explosion relief panel is also added: a section of the chamber lining and the outer case are replaced with a lightweight thermal insulation panel which is covered with aluminium foil; in the event of an explosion this panel is harmlessly pushed out of the oven to release the pressure. Electronic over-temperature protection is fitted as standard with this option. The fitting of the stoving and curing option enables ovens to meet the requirements of BS EN 1539 : 2009 'Dryers and ovens, in which flammable substances are released – safety requirements'.

NOTE: This option is suitable for small amounts of solvent only – please consult Carbolite Gero regarding your application before ordering this option.