

ovens and heat

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Ovens and Heat

Most baking failures are heat failures. A domestic oven cycles its element on and off around a set point rather than holding it, the dial is often wrong by a noticeable margin, and the air near the door is nothing like the air at the back. Understanding the box is usually a bigger improvement than changing the recipe.

Part of [Baking](#). The hardware is [baking equipment](#).

What the oven actually does

- Radiant, convective, and conductive heat, and the different jobs each does
- Thermostat swing, and why an oven thermometer is worth more than the dial
- Hot spots and rotating the pan
- Convection (fan) settings and the temperature reduction they usually need
- Preheating properly, including the long preheat a stone or steel needs

Steam

Steam in the first part of a bread bake keeps the surface pliable so the loaf can expand, then leaves so the

crust can set and colour. Professional ovens inject it; a domestic kitchen fakes it with a lidded Dutch oven, a covered skillet, or a tray of water.

- Oven spring and when to vent
- Dutch oven and covered-skillet methods — see [pan and skillet breads](#)
- Steam's role as leavening in [laminated dough](#) and choux under [pastry](#)

Browning

Crust colour is caramelisation and the Maillard reaction, both of which depend on surface temperature, sugar, and how dry the surface is. A sugar-rich dough colours long before it is cooked through, which is why enriched breads bake cooler and longer. See [sugar in baking](#).

Other heat sources

- Hearth and wood-fired ovens
- Tandoor, saj, comal, and griddle — see [flatbreads](#)
- Skillet and stovetop — see [pan and skillet breads](#)
- Bare oven rack, sheet pan, stone, steel, and glass — the vessel is what decides how much of the oven's heat actually reaches the base. Worked through in [oven pizza](#), which is the clearest case on the site of the same oven giving five different results
- Air fryer and countertop oven — see [air fry Recipes](#) and [Cooking Appliances](#)
- Open fire and camp baking — see [outdoor cooking](#) and [smoking wood](#)
- The full method taxonomy is [ways to cook](#)

Doneness

Internal temperature beats time and beats colour. Lean bread and enriched bread finish at different internal temperatures, and cakes and custards each have their own window.

Lean dough finishes at 88–99 °C / 190–210 °F; enriched dough sets sooner, at about 88 °C / 190 °F, because of the fat and egg. Both numbers matter most in a convection appliance, where colour runs ahead of the interior — see [air fryer bread](#).

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