

New developments in French cooking appliances: professional and domestic cooking

Jacques Pistien, Gaz de France

1. SYNOPSIS

This article presents four new gas systems designed for use in-catering and domestic cooking. In addition to the specific advantages of each of these systems, they all offer substantial energy savings.

2. THE SEQUENTIAL BURNER (PROFESSIONAL CATERING)

Used on covered or uncovered burners on a variety of cooking appliances, it improves heat distribution in and underneath vessels and inside appliances.

Because this burner has a periodic, on off operation, the heat it emits is spread evenly and regularly throughout the vessel and to the food being cooked.

Due to the burner's intermittent operation, heat input can be controlled precisely, eliminating the localized overheating sometimes noted on vessels walls and bottoms. This is due to the fact that the heat can be turned down to as 1/20 th of rated output, compared to the usual 1/6 th or 1/4 th.

Depending on the appliance, the length of the different cycles may range from 30 seconds to 3 minutes, with the burner operating for between 10 % and 100 % of the cycle.

Ignition supervision and safety are controlled automatically (continuous pilot or electric spark train and flame ionization).

In the catering field, the sequential system has been adapted not only to open flames, but also to directly heated saucepans and brat pans, lowering energy consumption by as much as 30 % and reducing the weight loss in prepared dishes to 20 % of that observed with a regular burner.

3. THE ECONOMIZER SYSTEM (PROFESSIONAL CATERING)

This system mechanically detects the presence of a pan on the burner and automatically controls burner ignition and cut-off.

Its operation is similar to that of an on-off control valve ; the stem on the valve controlling gas supply to the burner injector is displaced vertically when the pan is put on the burner or removed. The system is mounted on the gas supply line between the appliance cock and the burner injector.

A continuous pilot or electric spark train igniter lights the burner.

This system can lower consumption from 20 % to 50 % while enhancing user safety and comfort.

4. DIRECT HEATING COMBINATION OVEN (PROFESSIONAL CATERING)

A wide variety of dishes can be cooked with the combination oven, so called because it works equally well using steam alone, hot air or a combination of the two.

The new combination oven being studied comprises two separate units compactly combined in a single structure :

- a hot air, forced convection, direct heating oven with a 22 kW output,
- a compact, atmospheric pressure steam generator with a 15 kW output.

The forced convection, direct heating oven (without a heat exchanger, because the burner is mounted in the cooking chamber) enables the following types of cooking :

- steaming only, ideal for vacuum processed or delicate dishes (fish, vegetables, etc.),
- mixed, through injection of steam according to programmed sequences. This type of cooking limits weight loss in the dishes.
- conventional, hot air without steam.

The advantages of this oven over conventional ovens with exchangers are :

- energy savings of up to 50 %,
- low thermal inertia, allowing for very precise temperature adjustment (+/- 1°).

5. THE ROTATING TO BURNER (HOUSEHOLD COOKING)

This burner, which has an adjustable output range of 600 et 200 Watts, is used in domestic cooking tops for simmering (slow cooking) only.

It rotates under the cooking vessel (at 3 revolutions/minute), spreading the heat it liberates evenly across the bottom.

This system was developed, not so much as an energy saver, in that it requires a very low heat input, but rather specifically for use in simmering. It is ideal for dishes that require cooking over a very low heat or for a long time and keeps the vessel from bubbling over or burning.

The burner is ignited electrically by a built in electrode.