

Best of both heating systems

THE FRENCH OVEN MANUFACTURER GOUET BAKING SYSTEMS – PART OF THE MECATHERM GROUP – IS INTRODUCING A NEW OVEN WITH SPECIAL HEATING FEATURES



photos: Gouet Baking Systems

+ The DAO (Double Action Oven) is a single deck tunnel oven. For the baking process, the DAO can be used as either a cyclothermic oven or turned into an impingement oven. It is also possible to combine both heating methods.

In the past, the design of an oven governed the type of heat transfer and with that the application of certain products. The new patented oven by Gouet allows the adjustment of the type of heat transfer or the combination of both systems, depending on the respective requirement. In this way, the baking process can be optimized for different products.

The DAO oven is available in several widths (1.3, 2, 2.4, 3, or 3.6 meters). The oven is composed of modules aligned one after the other. Each module has a maximum baking area of about 15 sqm. As an example, an oven with a width of 1.3 meters has a maximum length of one module of 12 meters, while for a 3.6 meter width oven, one module will be only 4 meters long to achieve the same maximum baking area. The total length of an oven can be up to a maximum of 50 meters for small widths. In the case of special high energy requirements, the surface of one module can also be less than 15 sqm. The oven is assembled on site with screws and original devices allowing for a very fast set-up. The modules themselves are delivered in sections that are insulated and covered.

Heating zones

Each module is fully autonomous in its heating performance. The modules are each equipped with one burner, one fan, one set of radiators and the necessary devices to adjust the heating parameters. An oven composed of x modules will have x heating zones in order to adjust the baking curve. The oven can be heated with gas, fuel or electricity.

The traveling belt

The DAO oven can be equipped with any kind of traveling belt: wire mesh, wire belt, steel plates, and steel belt. The necessary devices for centering, tensioning, greasing, cleaning the belts are all provided. As an option, wide openings on the sides of the oven will permit CIP.

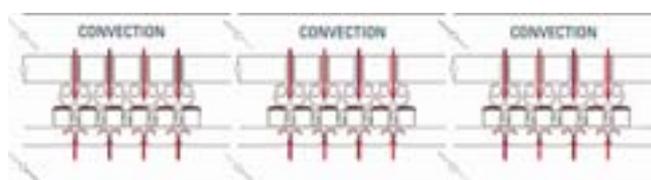
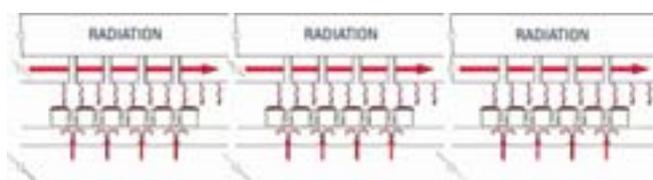
Baking features

- + Bottom heat:** The bottom heating is provided by air jets, blowing hot air at high speed (max. 10 m/s) towards the bottom of the baking trays and moulds, or towards the product if it lies directly on an open mesh.
- + Top heat:** Two modes are available (the interpretation of Double Action)
 - + Radiation:** the top radiator is heated by hot air blown across. It transfers the heat via radiation onto the product without any air circulation. The product is baked in a quiet environment, just as in a traditional cyclothermic oven.
 - + Convection:** in this mode, the hot air is blown from the top through openings towards the products allowing high convection heat transfer.
 - + Double action:** in this mode, it is possible to use radiation and convection at the same time: the radiators are heated by hot air and transfer the heat by radiation while hot air will also stream through the openings onto the product providing convection heat.

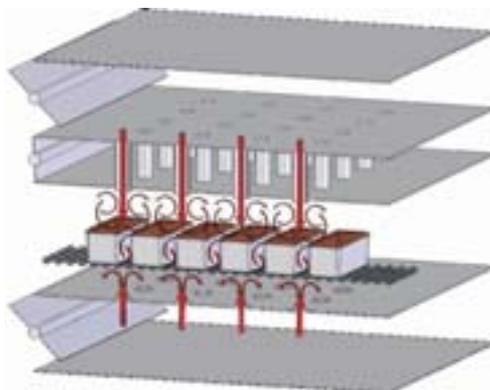
Advantages of the DAO

Convection, which means high air speed blown towards the product, is different from a simple air movement inside the oven. Convection is the most efficient way for baking:

- + the quantity of KW/sqm is much higher than with radiation (up to 50 KW/sqm)**
- + all surfaces of the product will be subjected to the heat because the hot air is “flowing” around the product. This is different from the heat transfer by radiation, where ini-**



- tially the surfaces pointing to the radiators are heated and then the heat has to be transferred from the surface through the product
- + there is no heat accumulation in the radiators. There is no flash effect for the first row of products coming inside the oven, and the distances between the products has no effect on the baking result
 - + for the same flow of energy, the temperature is much lower when using convection rather than radiation. In the case of putting empty baking trays or tins inside the oven, the protective coating will not be damaged because the temperature will not be so high
 - + due to the low inertia of the oven and the immediate impact convection heat can provide, it is possible to increase or reduce the temperature very quickly



- + high level of energy is required
- + shorter baking time is required for reducing the loss of water
- + easy heating of all the surfaces of a product is not difficult
- + CIP is important
- + very fine tuning of the heating process is required
- + operation of an oven that is not always completely loaded
- + first phase of baking needs no air movement

The oven can be used for baking bread, tin bread, pizza, cakes and cookies, buns, Danish pastries, vegetables, puff pastry, prepared meals and many more products.

The first double action ovens have already been delivered and are giving fantastic baking results. One of the ovens is used for baking a mix of bread, chocolate cakes and pizza, another oven bakes only briochettes (small brioches).

However, there is a limit to the use of high convection: most “bread products” require an atmosphere without much air movement in the first phase of the baking process, as the product needs to finish developing, and the skin of the product needs to be protected from any air movement to prevent drying. During this phase, radiation is ideal for the baking quality.

This oven is patented worldwide. A trial oven is to be installed in the company’s test center in Barembach, France and will be available for industrial scale tests in the first half of 2008. +++

Advantages of combining radiation and convection

When baking tin breads in an oven with, for example, three modules, the following advantages can be seen.

Baking bread in tins with lids – convection can be used for the entire baking process with all its advantages:

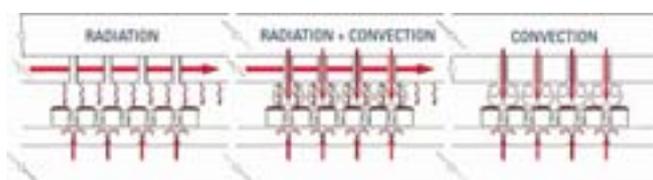
- + balanced temperature all around the closed tin
- + reduced baking time
- + better control of free water inside the product
- + no flash effect for the first row of products
- + protection of the coating of the tins

Baking bread in tins without lids – the oven can be adjusted accordingly for a proper baking result:

- + the first module is set to radiation
- + the second module combines radiation with low convection
- + the last module provides convection only

Radiation will support an excellent development of the product and a shiny surface while the advantages of convection will be used for the next two thirds of the baking curve.

Goüet recommends using the DAO in one or more of the following situations:



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