A Product of mti

Cooking Instructions

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Introduction

In the following pages you are going to find information and instructions regarding how to cook in the **MultiChef ™ Ovens.** This includes which heat sources are present, how they work and act with the food, and how they interact with each other.

**If you need specific instructions about the oven use, screen and programming instructions, please refer the user's manual.*

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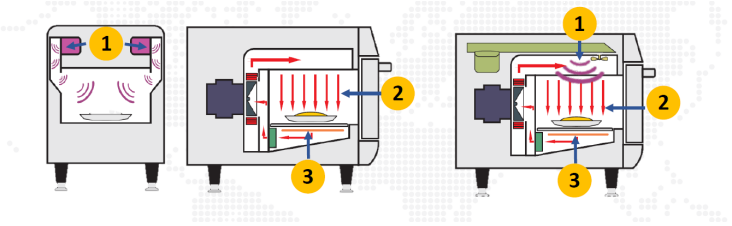
How does the technology work?

The MultiChef ovens combine different sources of heating to guarantee not only the heating, but also the external finishing of the food. These technologies will produce finished product up to 20 time faster when compared to conventional cooking methods.

The following heating sources are present in MultiChef ovens:

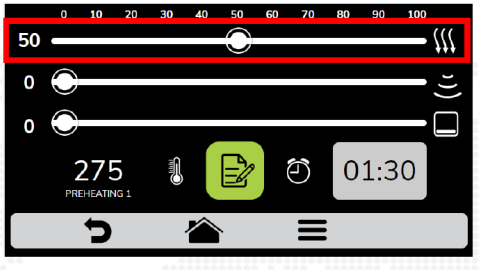
- **Microwaves**
- **High temperature impinged air**
- **Bottom heating IR element**



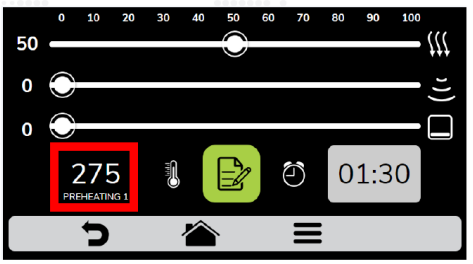
- Each one of the heating sources is mainly responsible for one aspect of the heating, but the interaction between them must be considered when you are developing a recipe.
- The recipes are pre-programmed based on tests, and for each one of the recipes it’s possible to manage the air speed, microwave level, bottom heating IR element, time and temperature.
- The **microwaves** are mainly responsible for heating the inside of the products.
- The **impinged air** mainly affords color and crispness to the products surface. The faster the air is, the quicker you can expect your product to brown.
- The **bottom heating IR element** keeps the floor temperature. This is to guarantee the bottom of the product finishing, even in higher volume businesses.

How does the impinged air work?

- The impinged air is mainly responsible for toasting the outside part of the products.
- It can be set faster or slower. The faster the air moves, the more color, browning, and crispness it will add to the outside part of the food.
- The control of the impinged air speed in the recipe is made through the first sliding bar in the settings screen. It can be set from **0% (no air flow)** to **100% (full air flow)**, always in a 10% scale.



- The capacity of adding color or crispness is equally related to the air temperature. A higher air speed increases the heat transfer to the food. As this heat comes from the air, the hotter it is, more heat will be transferred.
- The **initial temperature** will **always be the set pre-heating temperature**. This way, setting a temperature too high or too low will not be effective. It is recommended to use this temperature as a feedback to the oven to define if the heating elements are working during the step. A higher temperature if compared to the pre-heating temperature, means that heating elements are going to work instantly. A lower temperature means they will not work until the temperature falls.



- If the air is set to 0%, there is no air flow. This way the outside part of the food is protected from dehydration that can be caused by the air. The heating elements do not work in this situation to prevent overheating.

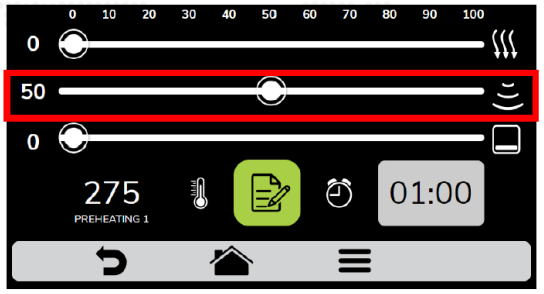
- The impinged air is directed from the top to the bottom and pressurized. For this reason results are much faster than air convection, but results on the sides of the product will differ. This is one reason why it is not considered a baking oven.

- For longer recipes with the same product (multiple units), the air speed must be decreased if compared to the shorter recipe (single unit). Longer times will have influence over the results.

How do the microwaves work?

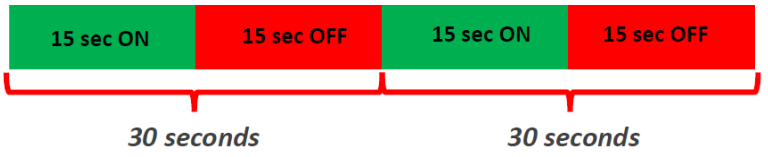
- The **microwaves heat from the outside in**, so the exterior of the product will always be subject to the microwaves while in use.

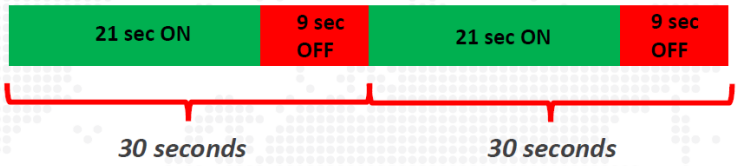
- The microwavesin the recipe is controlled through the second sliding bar in the settings screen. This scale ranges from **0%, (no microwaves)**, to **100% (full microwaves)**, always in a 10% scale.

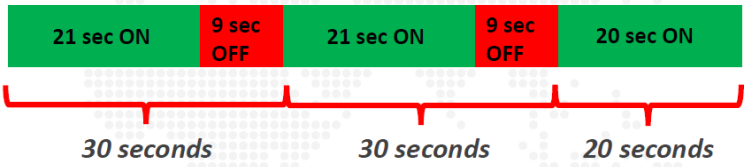


- Even though the microwaves are listed as a percentage it doesn't mean that the microwaves are going to be weaker or stronger. It depends on the set time.

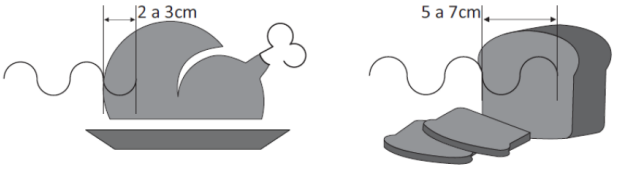
- The time is divided into 30 second breaks, and the set percentage works over these 30 second intervals. See the examples below.







- Microwaves are waves generated by devices called Magnetrons. The frequency of these waves makes it capable of generating friction between the water molecules of food products, generating the heat as a result.
- The microwaves have a capacity to penetrate the product up to 7 centimeters, depending on its density, physical state, and moisture content.
- The more dense and moist the product, the more microwaves are going to be absorbed at the surface. This means it will lose its capacity to penetrate to the core of the product.

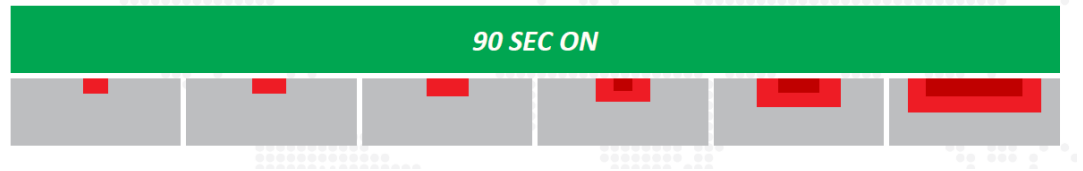


- If a product is too thick for the microwaves to penetrate, the heat will reach the core of the food by the conduction on itself. In order to allow this to happen without damage to the exterior of the product, lower levels of microwaves must be used in longer periods to provide the proper time for conduction.

- Microwaves heat from the friction between water molecules, and when cooking frozen products we must keep in mind that at the beginning there will be no water movement within the product. This means the recipe must begin with lower levels of microwaves, to defrost small portions, conduct the heat, and get the product ready to receive more microwaves in the next steps.

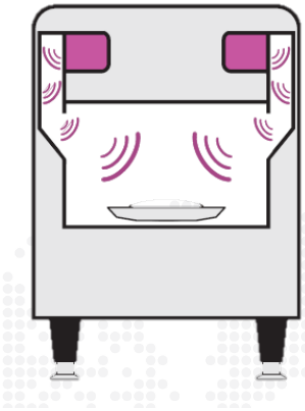
- Below illustrates a frozen product heated in a 1:30 minutes step with 50% microwaves:

- Below illustrates a frozen product heated in a 1:30 minutes step with 100% microwaves:

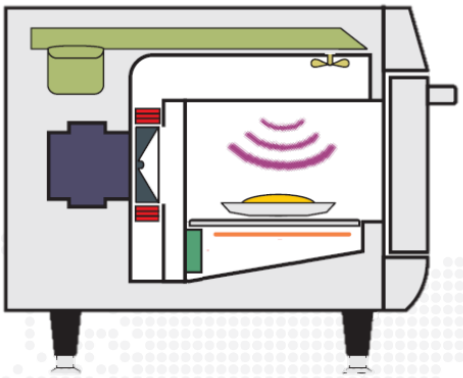


- The more food inside the chamber, the more microwaves will be needed. This means that a recipe for one product will not fit for four of the same product at the same time. Depending on the product composition the level of microwaves will need to be adjusted. It is also possible that the level must be kept the same and the time increased.

- As the microwaves acts different depending on the product characteristics, it is not common to set one recipe that can heat two or more different products at the same time. For example, a ham and cheese sandwich with a steak sandwich.
- To guarantee the standardization, once the recipe has started, it must run until the end as it was programmed without being interrupted, or having products added to the batch.
- Another key point to consider is how exposed the product is to the microwaves, while also being aware of the microwaves launching position. Having this in mind we are able to consider which part of the food is more or less exposed, helping to set the recipe. For example, if we want to melt cheese in a sandwich, it is easier to do if the cheese is the top layer of the filling. If we want to heat a sandwich with lettuce, tomatoes, etc., they must be under all the layers of meat and/or cheese. This way the vegetable items will keep their integrity.



Side Launched

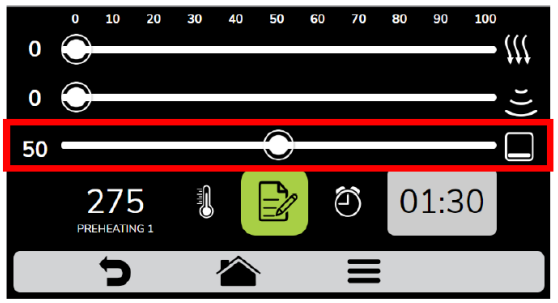


Top Launched

How does the bottom IR work?

- The **bottom IR element is responsible for keeping the heat under the product** to guarantee the bottom browning.

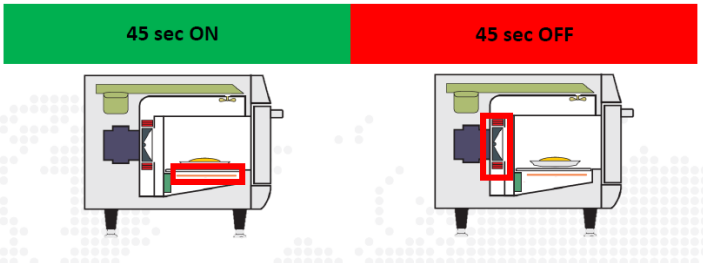
- The control of the impinged air speed in the recipe is made through the first sliding bar in the settings screen. It can be set from **0% (No impinged air being used)**, to 100% (**Full impinged air being used)**. It is always a 10% scale:



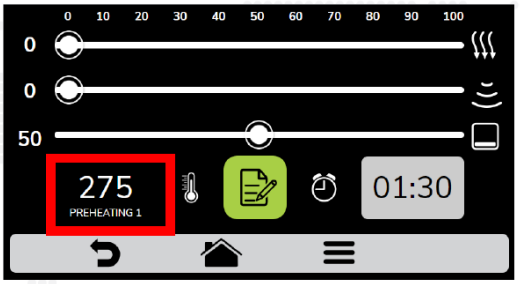
- Even though the bottom IR is listed as a percentage, this doesn't mean that the heating element will work weaker or stronger. The percentage is over the time set.

- The bottom heater works alternating with the back heater. Only one heater can work at the time. The percentage of the bottom heater controls the amount of time that it will work. When the bottom is not is use, the back heater will kick in.

- The total step time is divided according to the percentage set, starting always by the working time:



- The bottom IR element will only work if the current temperature is lower than the set temperature. Be aware of the settings between pre-heating and set temperature.



- Consider the setting of the IR element not only for results during the recipe, but also to keep the cooking accessories at the right temperature, one product after the other.

- The heating element takes some time after turning on to begin to irradiate the heat.

- Consider the cooking tray that is being used. Thick cooking devices require pre-heating. Make sure to provide enough time for heating thick trays during the recipe.

Interaction between heating sources

- The recipe must always be set by considering the ***aspect*** that takes longer. This means, if it takes longer to get crispy or for browning, reduce the microwaves to allow all the parameters to be reached at the same time and set the time that it needs to reach the external finished look. **DO NOT** consider *heat as fast as possible* as the guideline for developing recipes.

- Despite each one of the parameters being mainly responsible for one of the finishing aspects, there are cross effects between them.

- The impinged air and the bottom heater not only guarantees the color, it also contributes to the inside heating by the transmission that happens from the surface to the core of the food. It is slower than the microwaves, but depending on the dimensions of the product and the recipe time it may be important.

- The microwaves are mainly responsible for the internal heating, but as they heat from outside to inside, the outside layers are subject to the heating effects. The more the exterior is heated, the more sensitive to the air effects it becomes. This way less air is needed to reach the same finishing that it would get in a recipe with less microwaves.

Important Notes

- The products characteristics must afford the heating methods. The finishing acceleration happens due to the microwaves and the high temperature impinged air. **If the product cooking behavior cannot support one or more of these cooking methods, it is not able to be cooked with this technology**. An example is **raw bread,** which needs a gentle temperature rise for the yeast action. If you just heat this with the microwave the yeast is killed and the product has no volume.

- Most of the time it is necessary to run the tests with the products to guarantee the final results and temperature. In a short recipe a difference of weight, size, thickness, composition, or even storage temperature **may mean an adverse result**. This is true even if you are working with a similar product.

- Pay attention to the density difference between the ingredients in the product you are working with. When there is a light product and a thick and dense ingredient, for example a fully assembled Cheeseburger with thick meat. The bread is subject to damage caused by exposure to the microwaves while trying to heat the meat. In this cases you can use the instructions between parameters and break the recipe into different heating steps appropriated for each element. Refer to owner's manual.

- Depending on the product, high levels of microwaves may “burn” the surface by dehydrating it when the characteristics do not allow a fast heat to conduction. **This can be seen with frozen and dense foods.**

- The recipe settings must **ALWAYS** consider the cooking recipient materials, and geometries that make the microwaves act different because of the microwaves reflection. Using metal does not damage the oven, however, **the reflected microwave doesn’t act over the food, which may result in longer heating times.** Furthermore, other materials that contain mineral parts, such as porcelain, may cause similar effects. Be aware that the recipe setting suits the specific tested situation, considering product temperature, composition, dimensions and cooking recipient as well.

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