



Forced Convection Roasting

Some background on Roastech's roasters:

We have patented the concept in 2007. Since then, we have manufactured more than 120 machines for clients in countries around the world.

In our designs, we focus on the following principles:

- Simplicity
- Reliability
- Efficiency
- Durability
- Versatility
- Sustainability

When designing the prototype, we had 3 major criteria on which we did not compromise:

1. Continuous roasting
2. Continuous gentle mixing of the product during the roasting process (zero damage to the product)
3. Heated air should travel right around the product during roasting, and should be recirculated for increasing efficiency.

The result's were a rotating perforated cylinder with a screw conveyor inside, enclosed in a housing. The screw conveyor turns the same speed as the perforated cylinder. This unit is the only moving part of the machine, and is called the rotor.

The screw inside the rotor thus pull's the product in and move's it forward in the rotor. The rotating perforated cylinder mix the product gently. (The nuts/beans slowly tumbles over each other while the hot air passes around them during roasting)

The hot air passing through the product transfer's heat *to the whole surface area of the nuts* all the time during roasting. There is *no thermal pinching* of the nuts, for the maximum temperature inside the machine is set by the operator and is accurately controlled by the electronic thermostat.

The speed of the rotor is also set by the operator and is controlled by a variable speed drive on the electric motor. The operator thus has the ability to control the time that the product spend's inside the machine (Faster rotor speed decrease's the roasting time, slower rotor speed increase's the roasting time).

The test results from the prototype were very exciting. The roasted products were 100% evenly roasted.

What we also discovered is that super-heated steam is created inside the machine from moisture escaping from the product during roasting. The super-heated steam builds up in the roaster, and replace the air, which travels out with the product at the outlet. This is a major advantage, because super-heated steam transfer's heat rapidly to any surface inside the machine that is lower than the boiling point of water. Condensing steam also has a huge advantage of killing bacteria effectively on the surface area of the product.

Please note that *equally sized particles roast equally*, so the nuts or beans should be sized as equally as possible before roasting. The cultivar also play's a role, for example with macadamias some trees may produce nuts with more sugar content. Nuts with higher sugar content will brown more during roasting than ones with lower sugar content, due to the Maillard browning process. (For background, you can Google "*Maillard browning*")

Our machines are not designed to handle dust and very small particles, these fine particles ends up in the recirculating air stream and may cause smoke. It will also cause more maintenance and cleaning of the machine.

Roastech roasters can thus be used to pasteurize nuts, blanch peanuts and roast any nuts or beans to the desired degree. The combination of temperature and time can be adjusted infinitely to an ideal combined set-point for the specific product.

We have estimated that you can use the roaster for more than 20 different products.

Our prototype machine is still in use in Cape Town, roasting coffee beans. Since 2007, Roastech has produced 15 new roaster models and has improved the initial successful working principle drastically.

We now manufacture machines to very strict specifications. Our machines can be easily cleaned inside and outside and comply with HACCP requirements and specifications.

We have also developed machines with different heat sources, comprising light fuel burners (Diesel, Biodiesel and Paraffin) with indirect heating through heat exchangers or direct heating.

We also manufacture bucket elevators, cooling bins, brush blanchers, picking conveyors, nut butter mills and complete turn-key production lines.

Roastech strive's to design and build machines that are the best in the world.