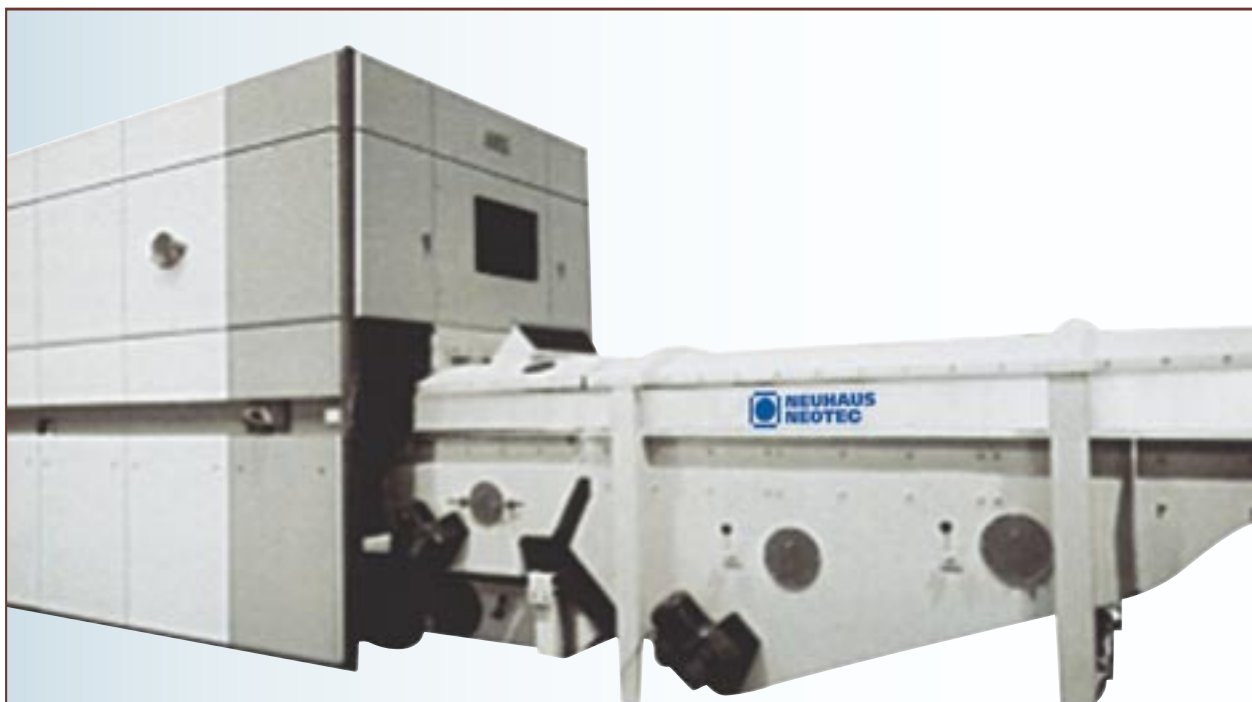
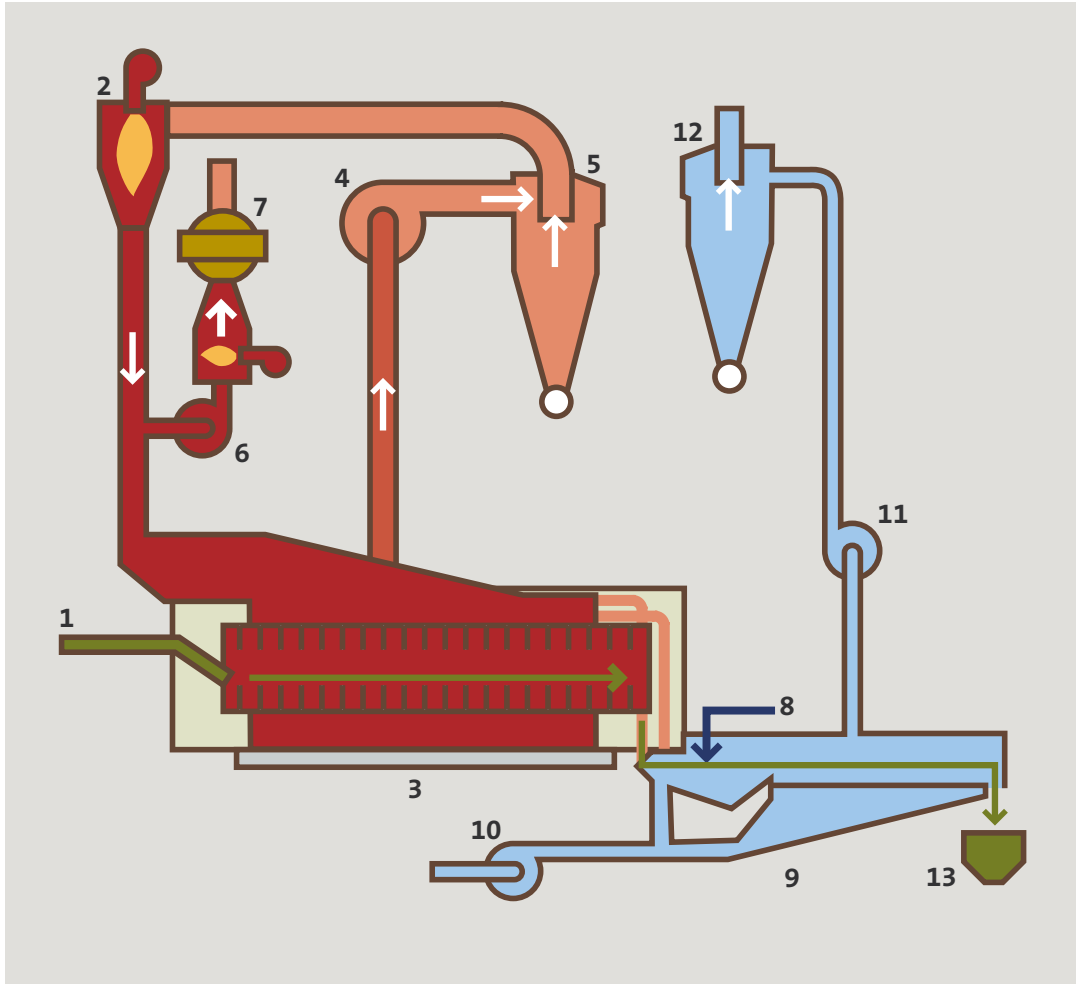


CFB-Continuous Coffee Roaster with Fluidized Bed Cooling

- High capacity
- For constant productions
- Less height for installation
- Low energy consumption



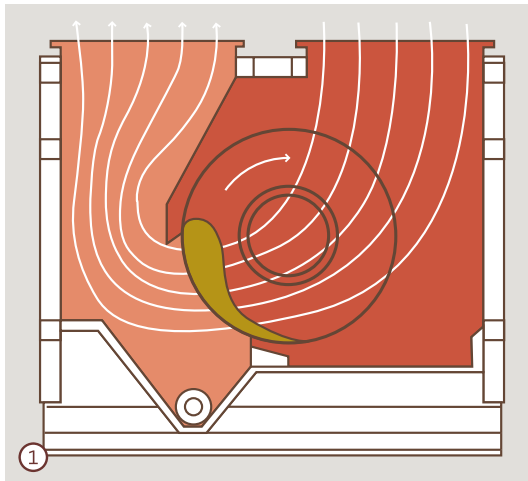
CFB Roasting Process



1. Green coffee feeding
2. Channel burner
3. Drum roaster
4. Recirculation fan
5. Recirculation cyclone
6. Exhaust air fan
7. Catalyst (optional)
8. Quenching
9. Cooler supply fan
10. Cooler exhaust fan
11. Cooler cyclone
12. Roasted coffee discharge

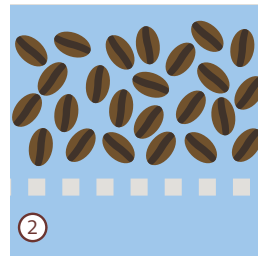
CFB-Continuous Coffee Roaster with Fluidized Bed Cooling

The plant consists of the three main components, i.e. the roaster, the quench section, and the air cooler, which the coffee continuously runs through. Characteristic of the roasting section is the horizontally supported drum, made of special perforated sheets. Via a feeding screw conveyor the green coffee is fed into the drum. With every turn of the drum, an auger inside the drum conveys the coffee continuously, slowly, and gently through the roasting section. The rotation and the static tools cause an efficient intermixing of the coffee beans. The roasting gas flows through the drum and the coffee bed perpendicular to the conveying direction. Adjustable drum sealings provide for a directed, optimum gas flow.



The roaster functions utilizing a recirculating air system. After the roasting gas has transferred part of its thermal energy to the coffee, it enters a high-efficiency cyclone for the separation of dust and chaff via a fan that generates the air current for the entire system. In the subsequent channel burner the roasting gas is reheated to the necessary temperature level before it enters the roaster again.

The exhaust gas caused by the roasting process is thermally pre-cleaned in the channel burner, then is sucked off from the recirculating air system, and



conveyed to the catalytic cleaning system (optional) before it is released to the outside. When the desired degree of roasting is achieved, the coffee is transported through the

encapsulated discharge unit at the end of the drum and due to gravity flow it enters the quench section, while the remaining chaff is removed in a sorting-process.

The addition of water takes place on the quench section, a swing sieve with adjustable drive and adjustable water nozzles arranged above. Due to the design of this unit, the layer of coffee in the actual quench section is not higher than one centimeter. Thus it is made sure that each bean is evenly quenched. At the same time, this efficient quench-



1. Cross section of the roaster:
The roasting air flows evenly through the coffee bed
2. The coffee beans float in the cooling air current

ing system causes a fast cooling down of the coffee. The small quantity of exhaust air is discharged via the recirculating air system of the roasting section. The air cooler directly following the quench section consists of a conveying channel with an adjustable unbalance drive and is operated on the fluidized bed principle. The coffee flows across the perforated floor, while the cooling air is fed as a countercurrent. The speed of air is adjusted in such a way that the entire bed of roasted coffee is homogeneously fluidized. The retention time in the air cooler can be regulated by adjusting the drive speed.

Measuring, Control and Regulating System (MCR)

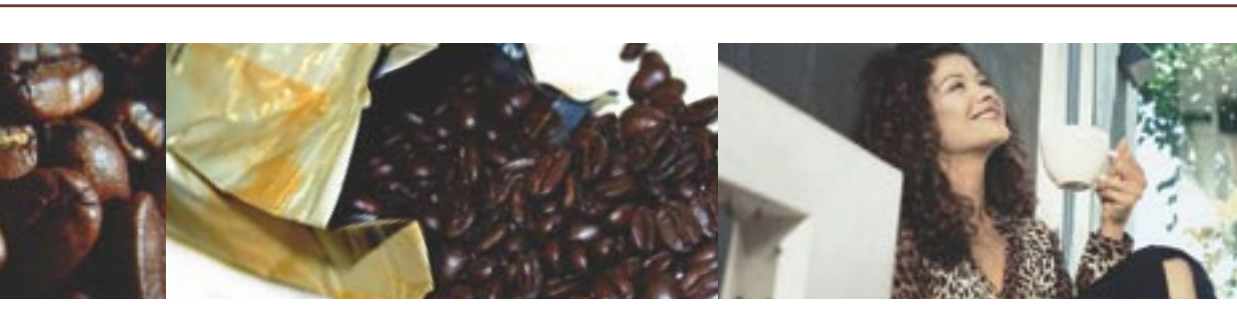
The roasting plant is controlled by a PC that visualizes the process data. Screen displays, such as process parameters, control circuits, monitoring parameters, and various trend curves, facilitate the operation of the plant. A PLC controls and monitors the plant. Any malfunction is registered in a protocol. The flow rate of the roasting gas is controlled by a damper. The roasting gas temperature is measured behind the drum roaster and kept constant by a controller. The speeds of the drives of the feeding screw, roasting drum, quench unit, and air cooler are controlled via frequency converters and are individually adjustable, or controlled via a special computer program, with only the roasting time being specified. The addition of water is determined by the residence time in the swing sieve and this adjusts the quantity of water. The quantity is measured and displayed. The flow rate of the cooling air is controlled by a damper.

Features:

- Optimum heat exchange due to an even air flow through the coffee at high speeds of air and a high volume flow.
- Separate quenching section.
- Excellent cooling of the coffee in a fluidized bed.
- Low energy consumption due to a closed circuit for the roasting gas.
- Simple, easy-to-maintain design.

Technical Data:

| | |
|-----------------------------|---|
| Throughput: | 3 models ranging from 2500 kg/h to 4500 kg/h |
| Roasting time: | determined by the model – 90 seconds to 6 minutes – 5 minutes to 12 minutes |
| Average energy consumption: | Heat/thermal energy: 0.288 kWh/kg (240 kcal/kg) to 5000 kg/h Electric energy: 0.045 kWh/kg |



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