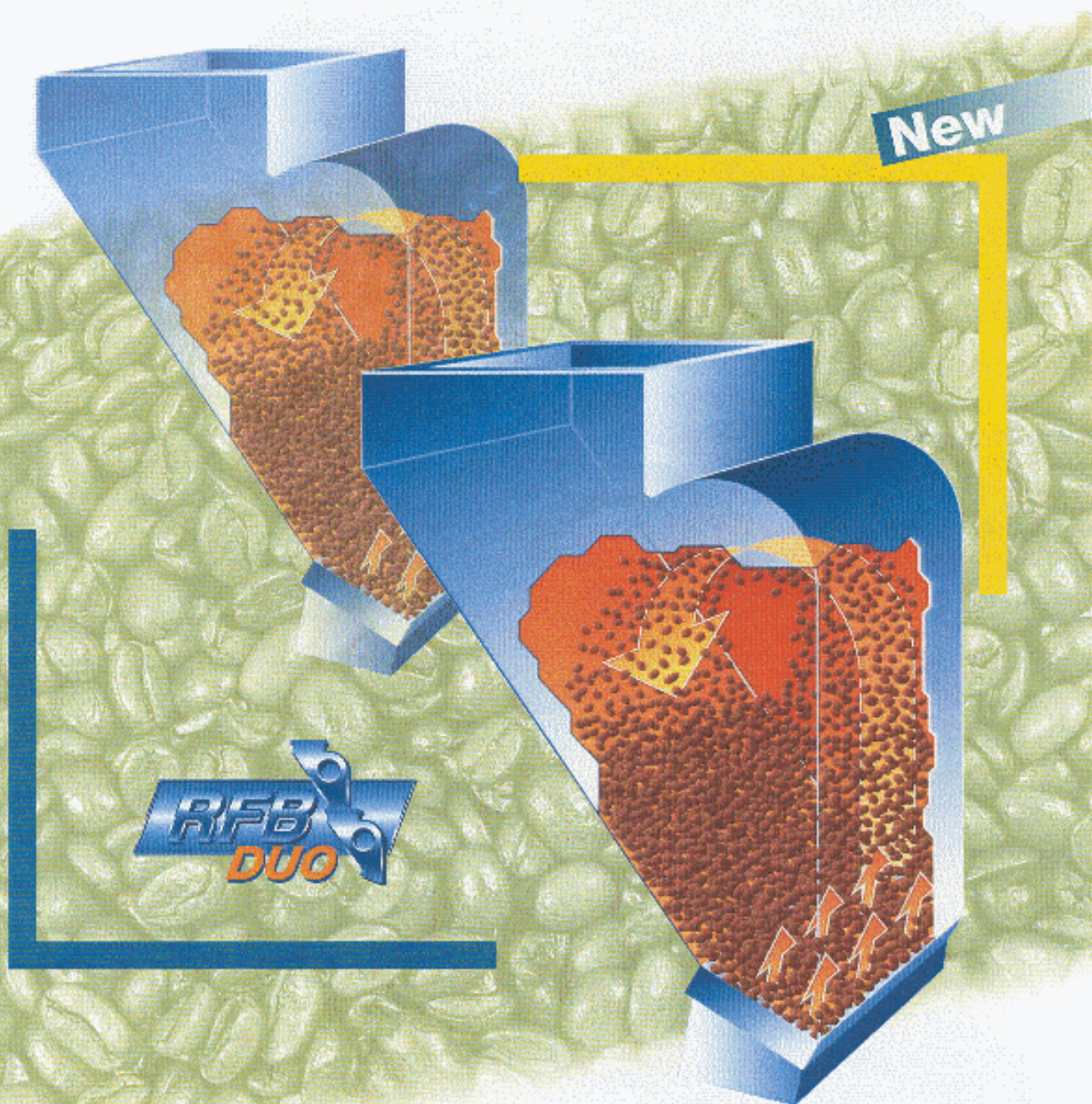


# RFB-Duo Two-Stage Rotating Batch Roaster



# RFB-Duo Rotating Fluidized Bed Roaster

## The RFB-Process

The RFB is a batch roaster. The complete system consists of a drying, roasting and cooling section, operating separately from each other. It is the shape of the chambers which leads to what is described as rotating fluidized bed. The bottom of the chambers are differently perforated plates through which the heating medium enters the chambers forming a rotating bed with the coffee beans. The coffee batch is lifted and cow-like conveyed from one side of the chamber to the other where it slides back to the bottom plate thus rotating around an imaginary axle.

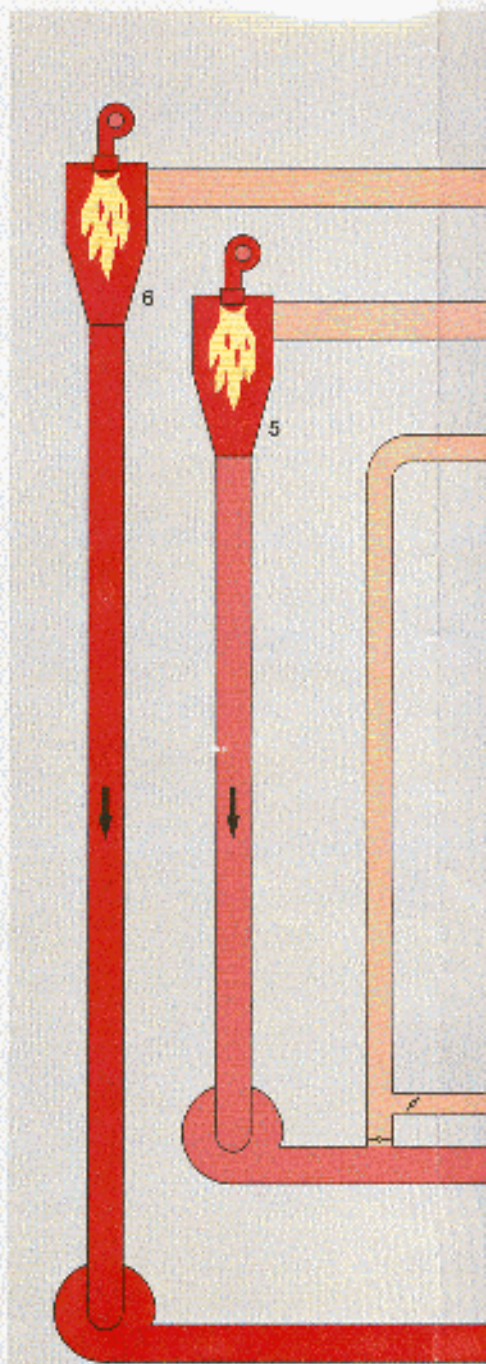
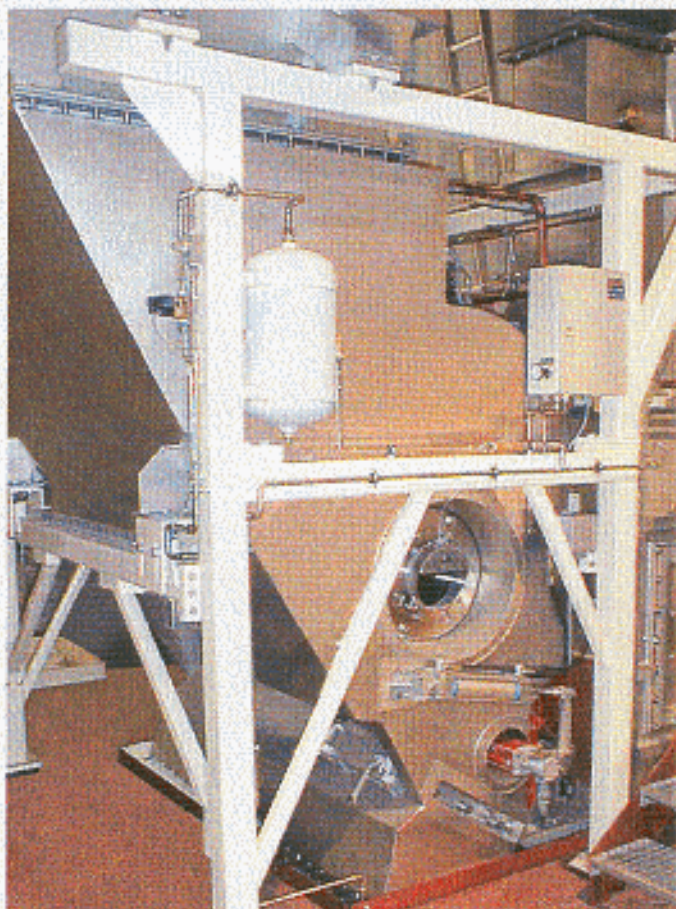
At the lowest point of the chamber the discharge gate, as part of the vertical chamber wall, is located. This discharge gate is designed in such a way that the complete batch of roasted coffee beans discharges by gravity within five seconds. At the side of the chamber a sight glass is provided through which the roasting respectively cooling process can be observed. For chamber inspection and maintenance purposes the sloping wall of both chambers has a large removable cover.

## Recirculation

The heating gases are recirculated. An fan provides the required volume and pressure for the heating medium to rotate the coffee during roasting. When the heating gases recirculate they pass through a channel burner which compensates for lost heat during roasting. The burner capacity allows the system to warm-up to its required temperature level within 10 minutes so that the plant can be operated automatically already shortly after start-up.

## Bypass

After the heating medium has transferred thermal energy to the coffee it passes through a cyclone to effectually separate dust and chaff prior to entering the channel burner. During feed and discharge of the roasting chamber the heating medium by-passes the chamber maintaining temperature, volume and pressure which has the advantage of energy savings and the possibility that roasting of the next batch can commence instantly at the required temperature.



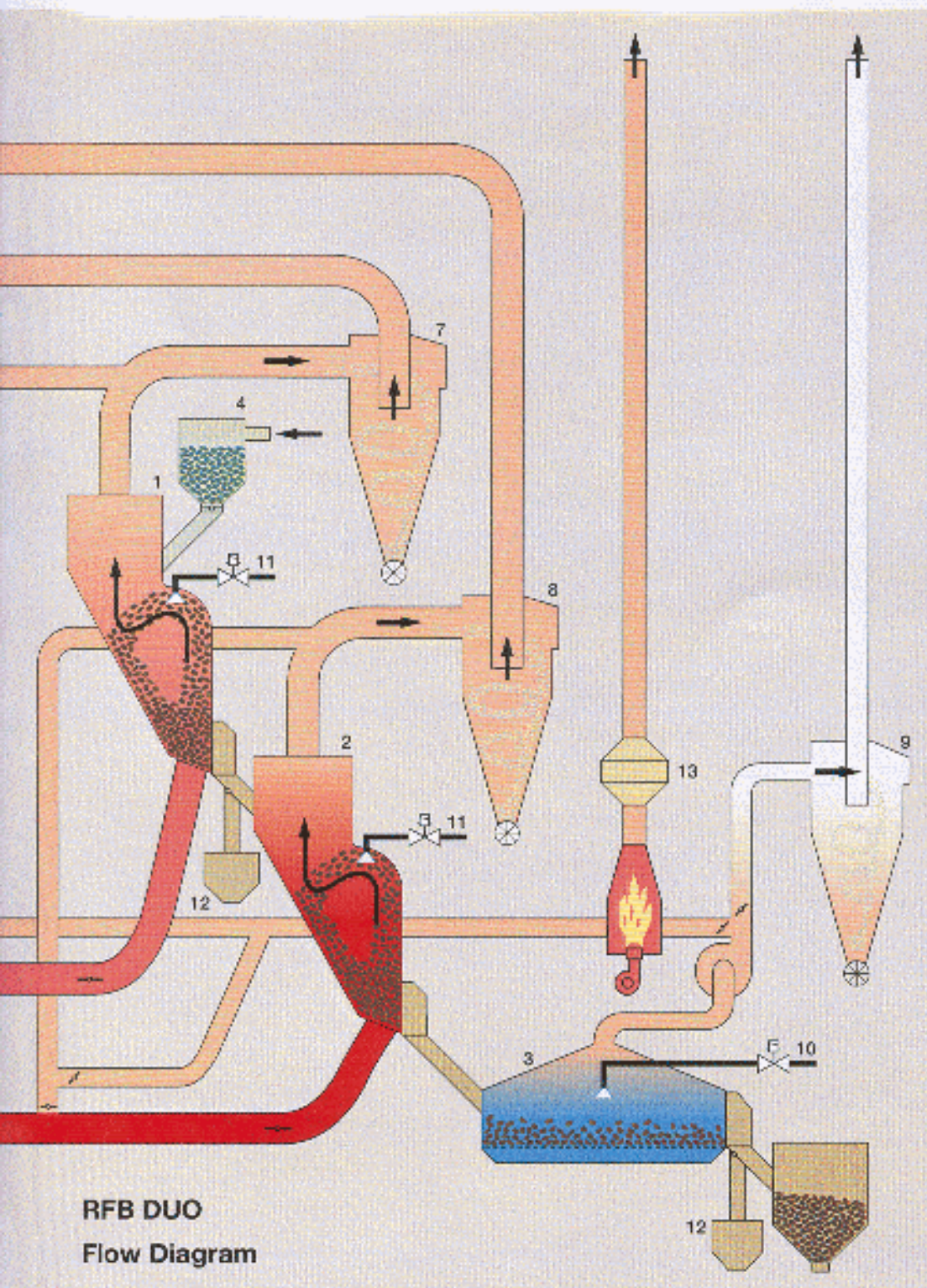
Main burner



Control panel



Cooler



**RFB DUO**  
**Flow Diagram**

- |                              |                          |
|------------------------------|--------------------------|
| 1 Drying chamber             | 8 Cyclone roasting phase |
| 2 Roasting chamber           | 9 Cooler cyclon          |
| 3 Cooler/Quench              | 10 Water quench cooler   |
| 4 Feed bin                   | 11 Optional water quench |
| 5 Main burner drying phase   | 12 Bleed air             |
| 6 Main burner roasting phase | 13 Catalyst              |
| 7 Cyclone drying phase       |                          |

**Catalytic afterburner system**

Excess gases of the drying and roasting process are let out to atmosphere through a flue stack. For cleaning of these exhaust gases catalytic afterburner systems are optionally available. The emission out of the cooler system is cleaned economically by using the roaster catalyst during the quench cycle. A damper is provided for economical control of the amount of exhaust gases.

**Cooler**

Cooling of roasted coffee is done in vibrating fluidized bed. For quenching purposes a number of spray nozzles are positioned in the upper part of the fluidized bed cooler. Quenching starts automatically at discharge of hot coffee beans from the roasting chamber. Optional quench is possible in the roasting chamber.

After the cooling cycle is terminated, the coffee beans are discharged in seconds. The cooler fan may take the cooling air from the room or from the outside.



### Measuring-, Control- and Regulating Systems (MCR)

The operation of the plant is effected by a PC showing all process data of the plant on a screen display.

Further screen displays, such as: input of coffee types, plant parameters and controller parameters with temperature curves, facilitate the plant operation.

If a visualization is not requested, the hardware controllers are included in the control panel.

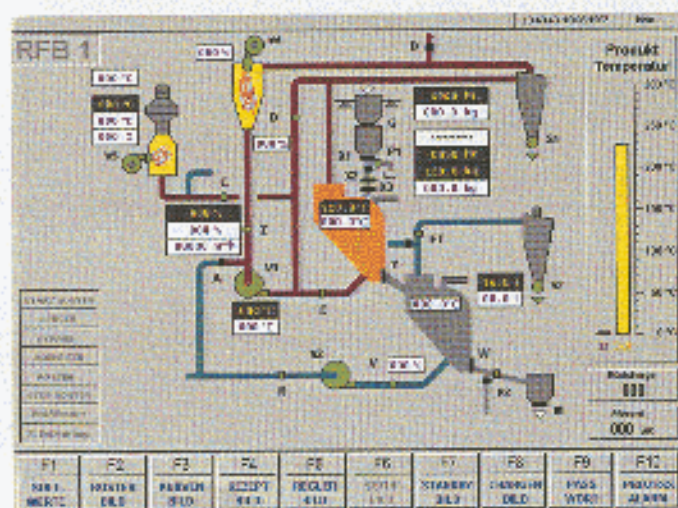
Both designs have a PLC which controls and monitors the plant. All interferences are recorded and printed out, if requested, a protocol of the batches is also printed out.

The required volume of the heating medium is controlled by

an adjustable damper. The temperature of the heating medium is measured before it enters the roasting chamber and kept constant by a controller.

The progress of the roasting cycle is controlled inside the roasting chamber by actual measurement of coffee bean temperature. When the predetermined temperature is

reached which governs the degree of roast, the coffee beans automatically discharge from the chamber. The next batch can enter the chamber for roasting.



A damper for the required volume of cooling air is present and does not need adjustment or control. The time of cooling depends upon the roasting time or ends automatically after a maximum set cooling time.

All drives, gates and dampers are interlocked logically and applicable to requirements of the system's process engineering. In case of breakdown of any important device the automatic program will be interrupted.

Screen display

### Features of the RFB-Duo

- Optimum heat transfer in a fluidized bed allows a low temperature roast
- Low energy requirements due to recirculation of heating medium
- Energy savings due to water quenching in the cooler
- Installation is flexible and adaptable to site conditions
- No moving parts – little maintenance – easy to operate
- Effective clearing of the roaster and cooler exhaust
- Two complete, separated and independent roasting units, one for the drying and one for the final roast allows unlimited control of the process with unmatched consistency
- Optional water quench in roasting and drying chamber
- Slow roast and fast roast. Super high yield is possible (S-H)

### Technical Data

- Batch sizes : from 60 to 400 kg
- Roasting cycles : 1.5 to 20 minutes
- Capacities : from 2000 kg/h to 6000 kg/h
- Energy requirements : Thermal 0,300 kWh/kg  
Electric 0,048 kWh/kg

Technical data are subject to alteration



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