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Perfect espresso





Aims of the course:

- Improve your understanding of the espresso machine and grinder
- Manage all the variables for a perfect espresso
- Gain a suitable understand of the characteristics of espresso





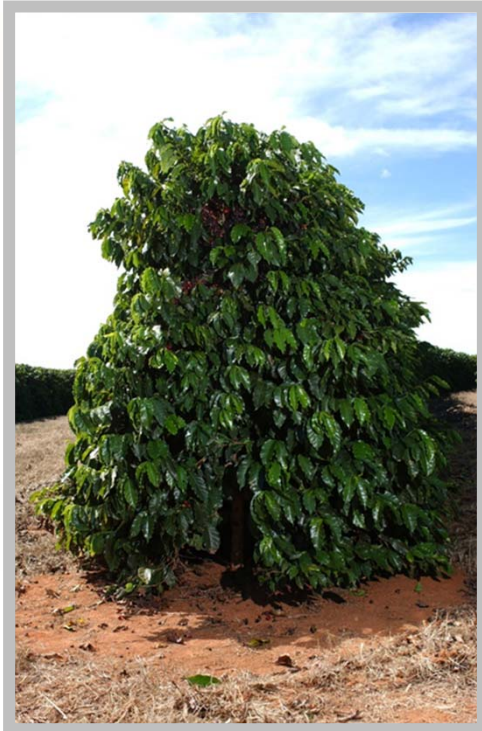
The coffee plant



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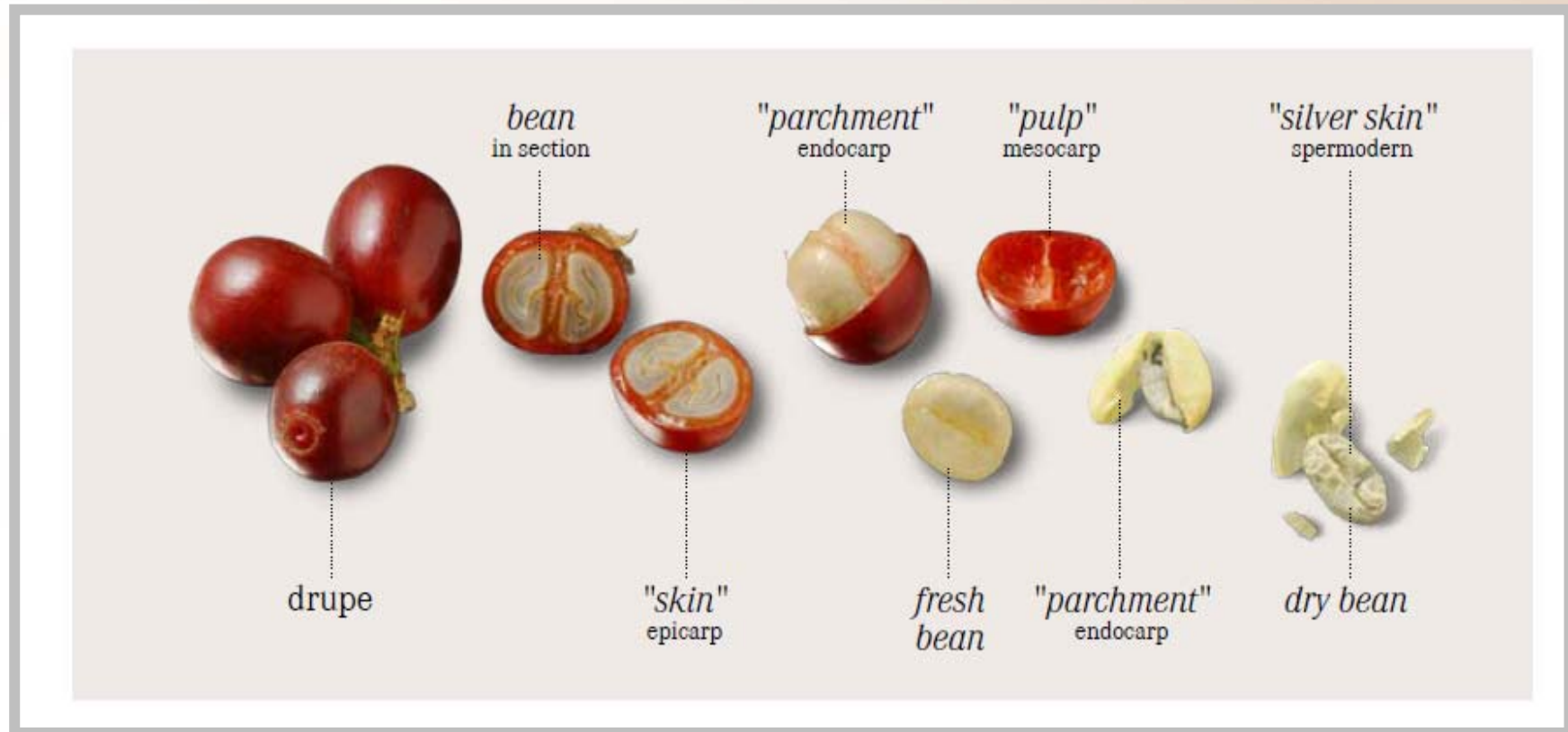
The coffee plant



- Family Rubiaceae (over 500 genera) described by Linnaeus in 1753, includes *Coffea*
- There are at least 100 species of coffee (Chevalier 1947)
- Most common species are Arabica and Canephora (variety *Robusta*)
- Cultivated in the inter-tropical zone
- Temperatures between 15° to 30° C
- Altitude from 0 to 2,500 m above sea level
- Annual rainfall from 800 mm to 3,000 mm (ideal is 1,400-2,000 mm)
- Needs soil rich with nitrogen and potassium



Coffee cherry





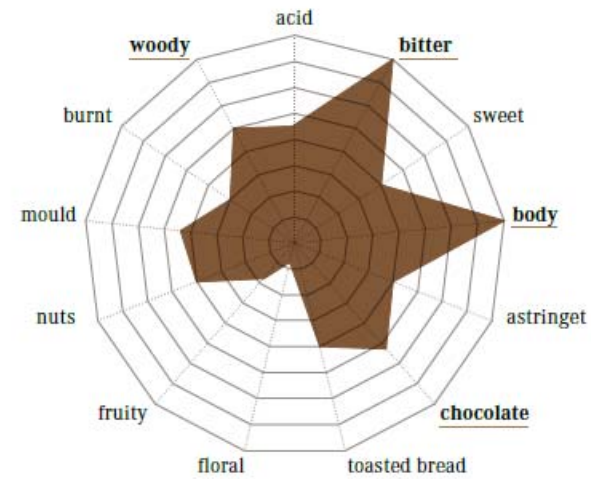
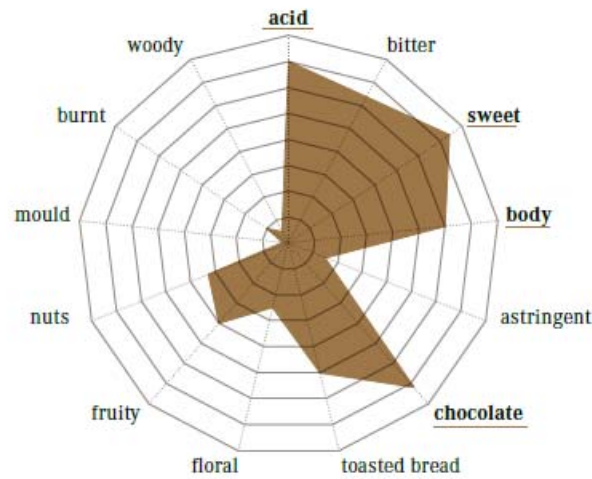
Arabica

Coffea arabica



Robusta

Coffea canephora



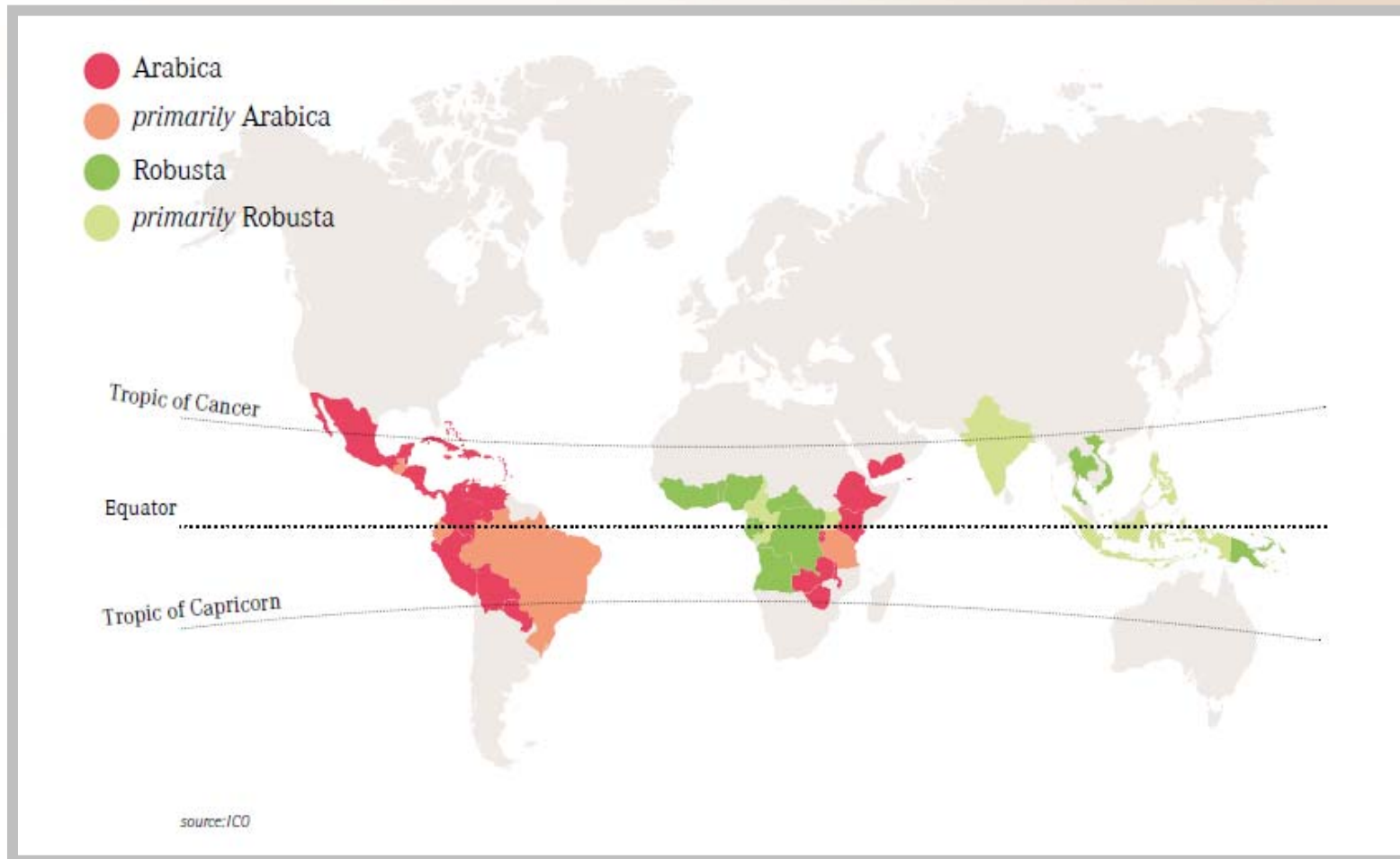
<i>Coffea arabica</i>		<i>Coffea canephora</i>
2/3	WORLD PRODUCTION	1/3
High planes	ENVIRONMENT	rain forest
600 - 2200	ALTITUDE (m above sea level)	0 - 800
44	CHROMOSOMES	22
0.9 - 1.7	CAFFEINE (% w.)	1.8 - 3.5
longer	SEED	rounder
intense and flower	AROMA	woody and bitter

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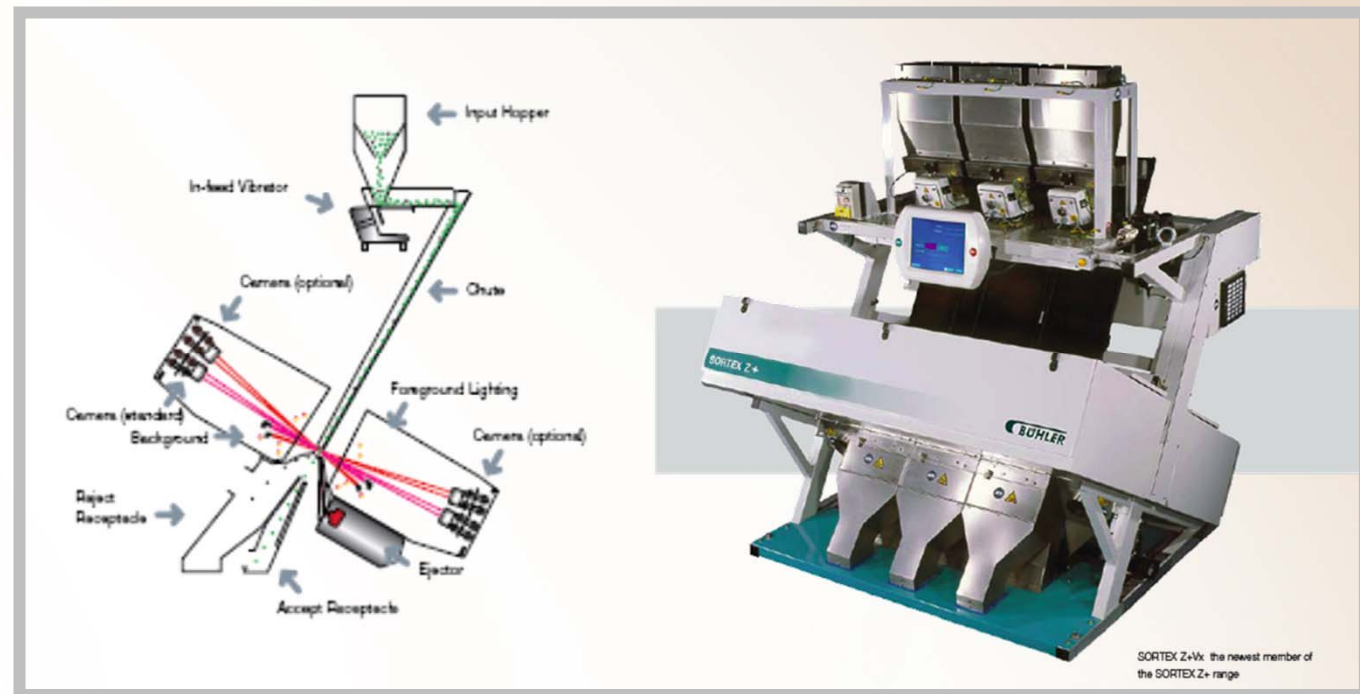
The countries of origin





The sorting machine

Two bi-chromatic Sortex sorting machines divide the potentially defective beans from good ones. Each machine can select up to 3,000 kg of coffee per hour





Roasting



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Roasting

Changes the weight, size and the density of the bean





Roasting: 3 degrees



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Our product

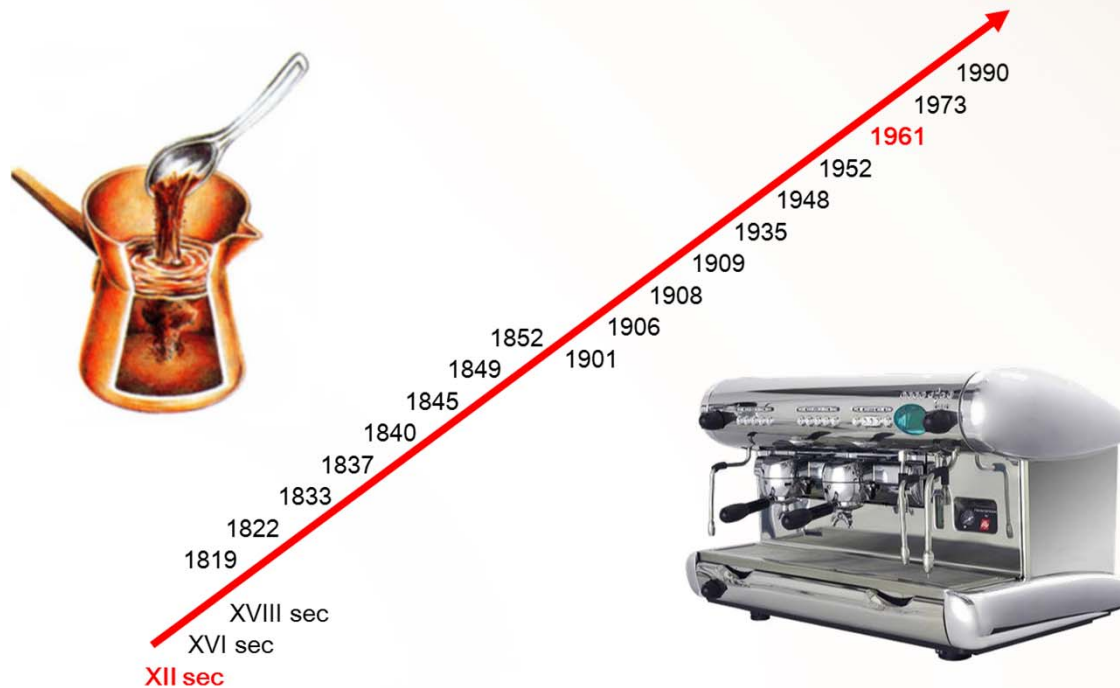
a blend created from **9 varieties of Arabica coffee** with quality standards that are exclusive and well above those found elsewhere in the market.

Double **selection of the beans**, at the origin and before roasting using electronic sorting.





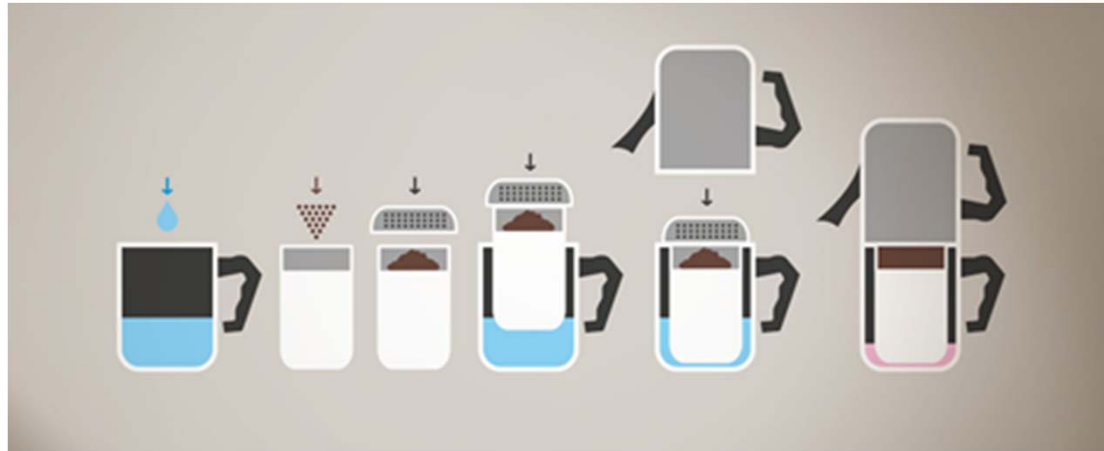
The transformation of coffee: from the origins to today...



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The transformation of coffee

- 1849 Potsdam boiler coffee maker



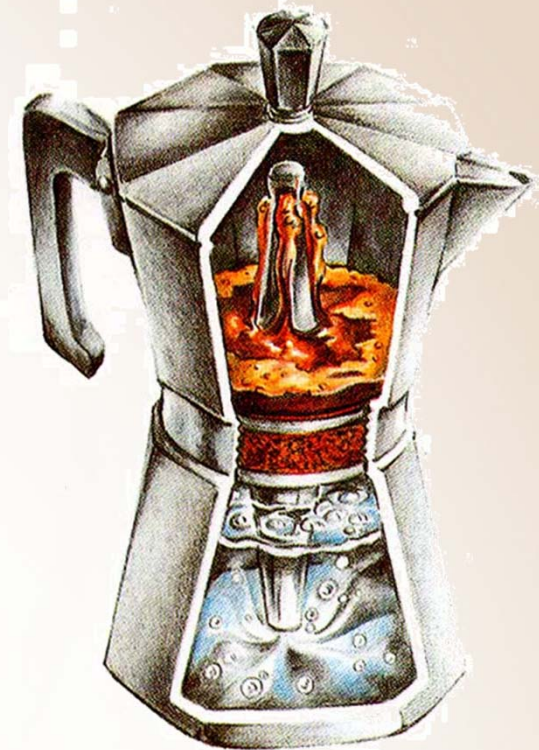
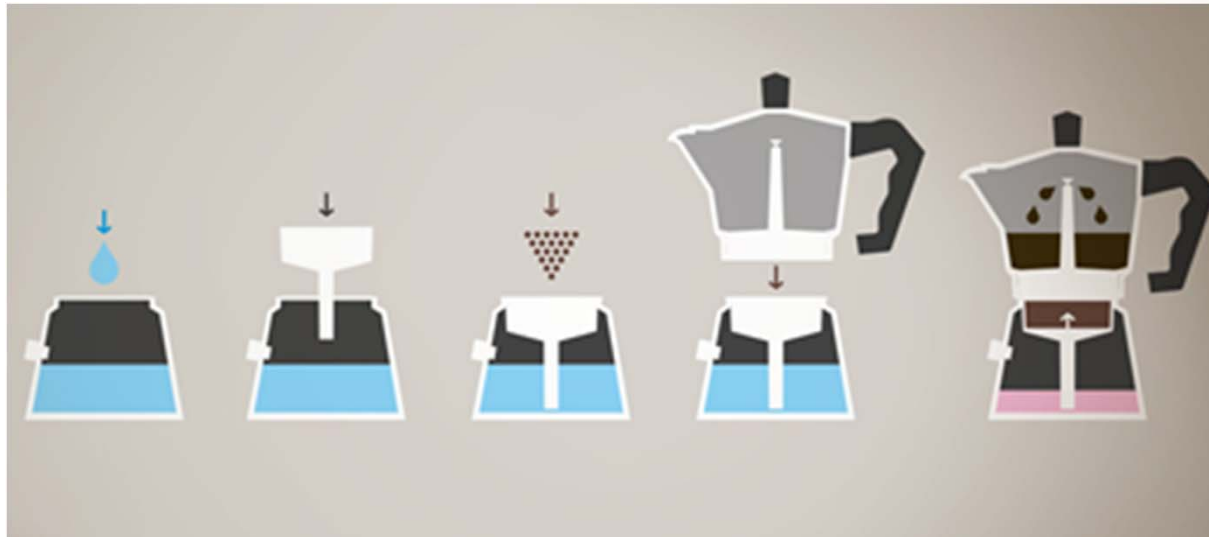
The transformation of coffee

- 1908 filter coffee
Germany



The transformation of coffee

- 1933 Alfonso Bialetti and the Italian moka

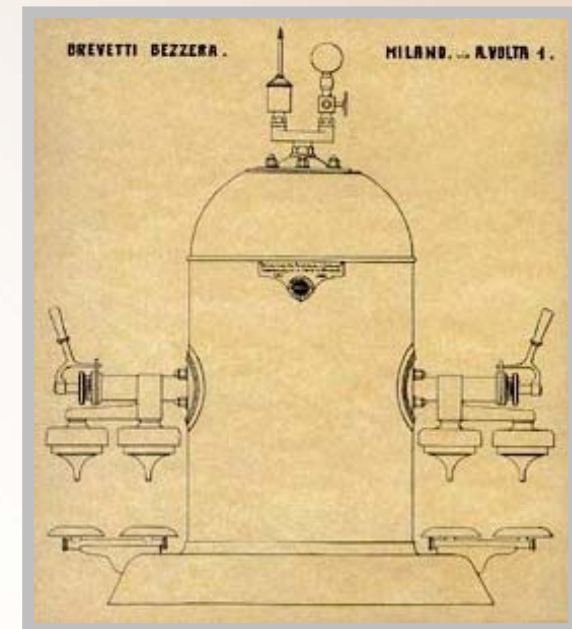
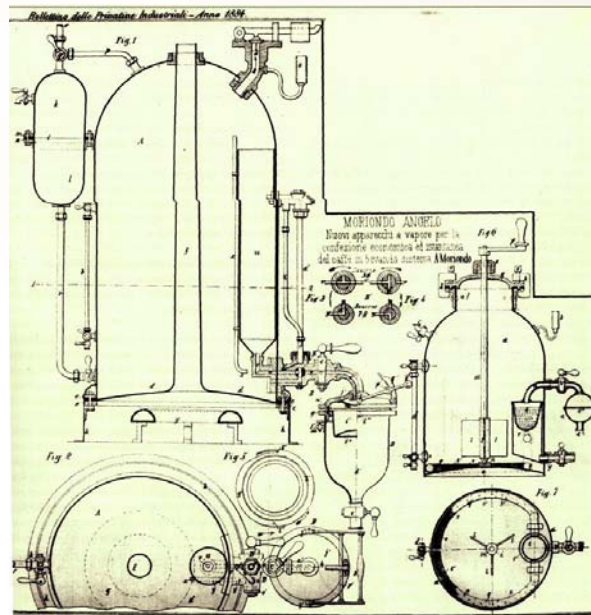


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The transformation of coffee

- 1884 A.Moriando first design (Expo Turin)
- 1901 L.Bezzera industrialization of the espresso machine



The transformation of coffee

- 1909 Vittoria Arduino
Italy





The transformation of coffee

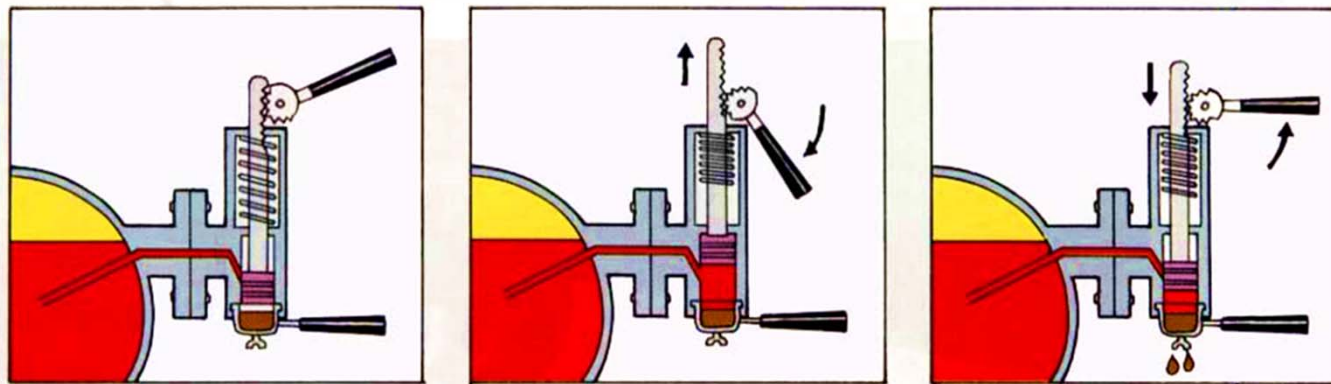
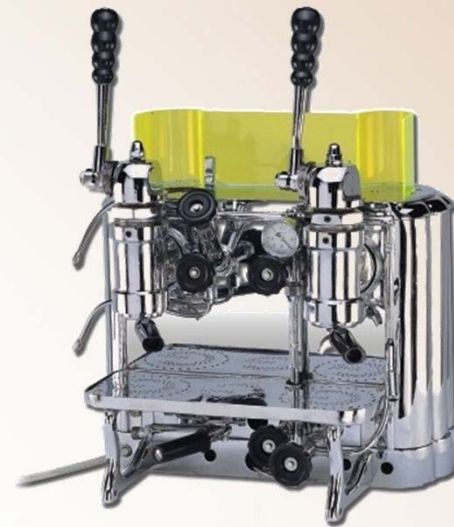
- History:
1935 ILLETTA





The transformation of coffee

- 1948:
Achille Gaggia and
the lever machine
Italy



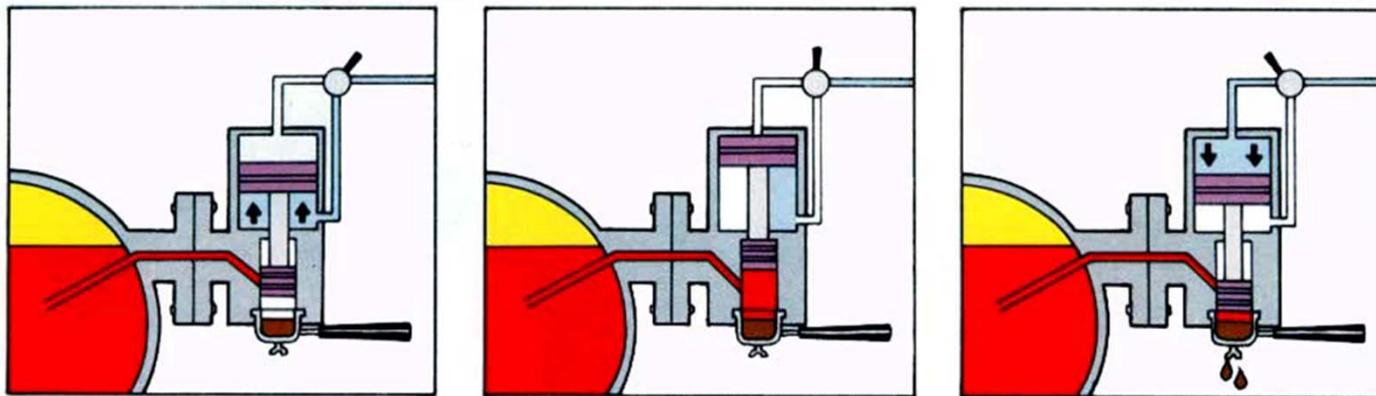
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The transformation of coffee

- 1956
- Cimballi and the hydraulic machine
Italy



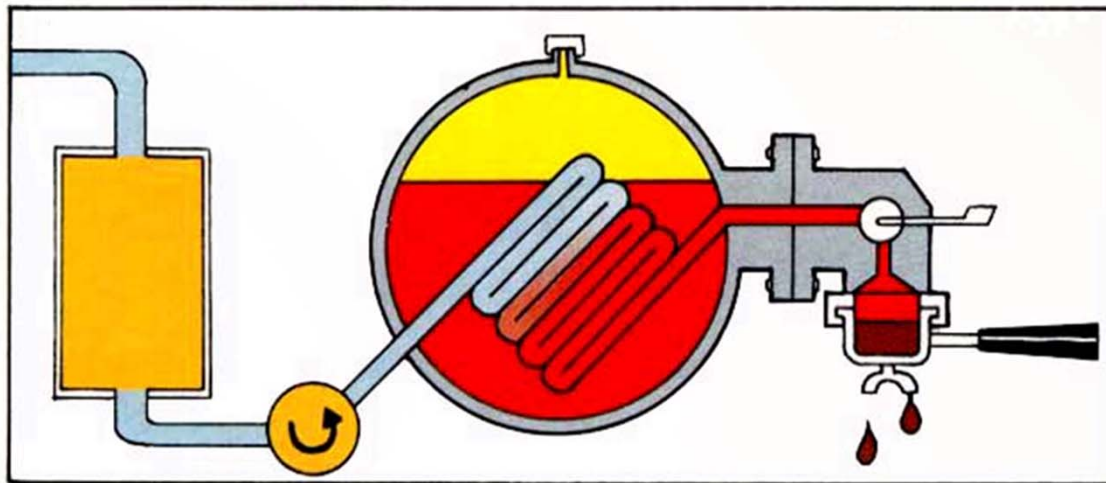
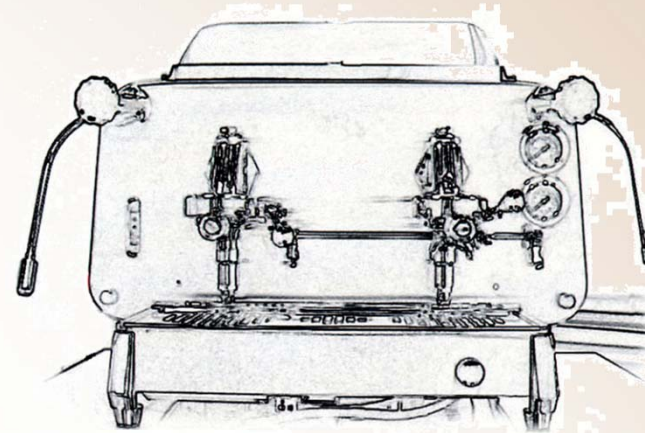
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The transformation of coffee

- 1961
Faema and
the continuous
delivery machine



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The espresso machine





The espresso machine

1.

Main components of the machine

- Cup warmer
- Brew group
- Water spout
- Steam spout
- Pressure gauges
- Display
- Switches

2.

Main components of the grinder-doser

- Knock box (*for collecting used coffee grounds*)
- Grind adjustment ring
- Coffee dispensing lever
- Ground coffee hopper and dispenser
- Dosing adjustment screws

→ **Burr grinders can be flat or conical in shape.**

Flat burr grinders are made up of two opposing discs. The coffee grounds are released as a result of the centrifugal force produced by the rotation.

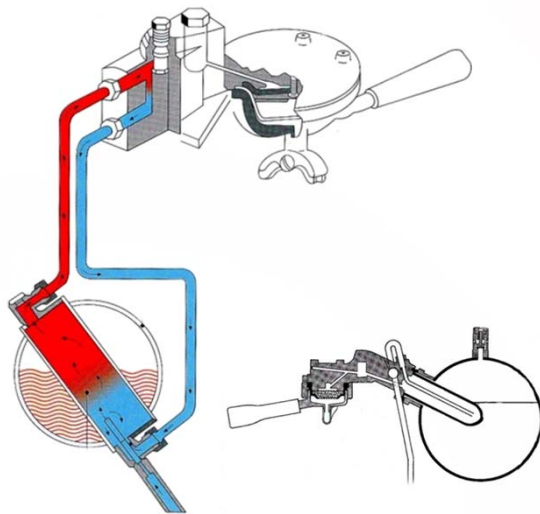
In conical burr grinders a shaft rotates inside a stationary truncated conical drum. The coffee is gravity fed and released.



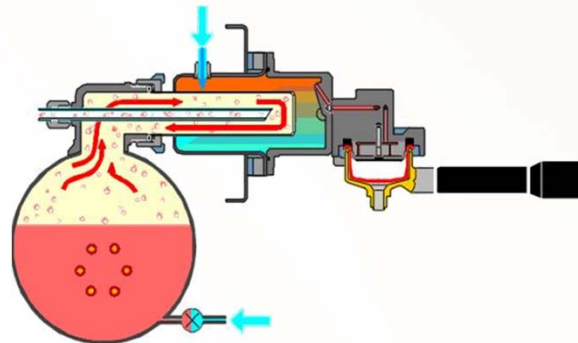


Heating systems

- La Cimbali



- La Spaziale



- La Marzocco

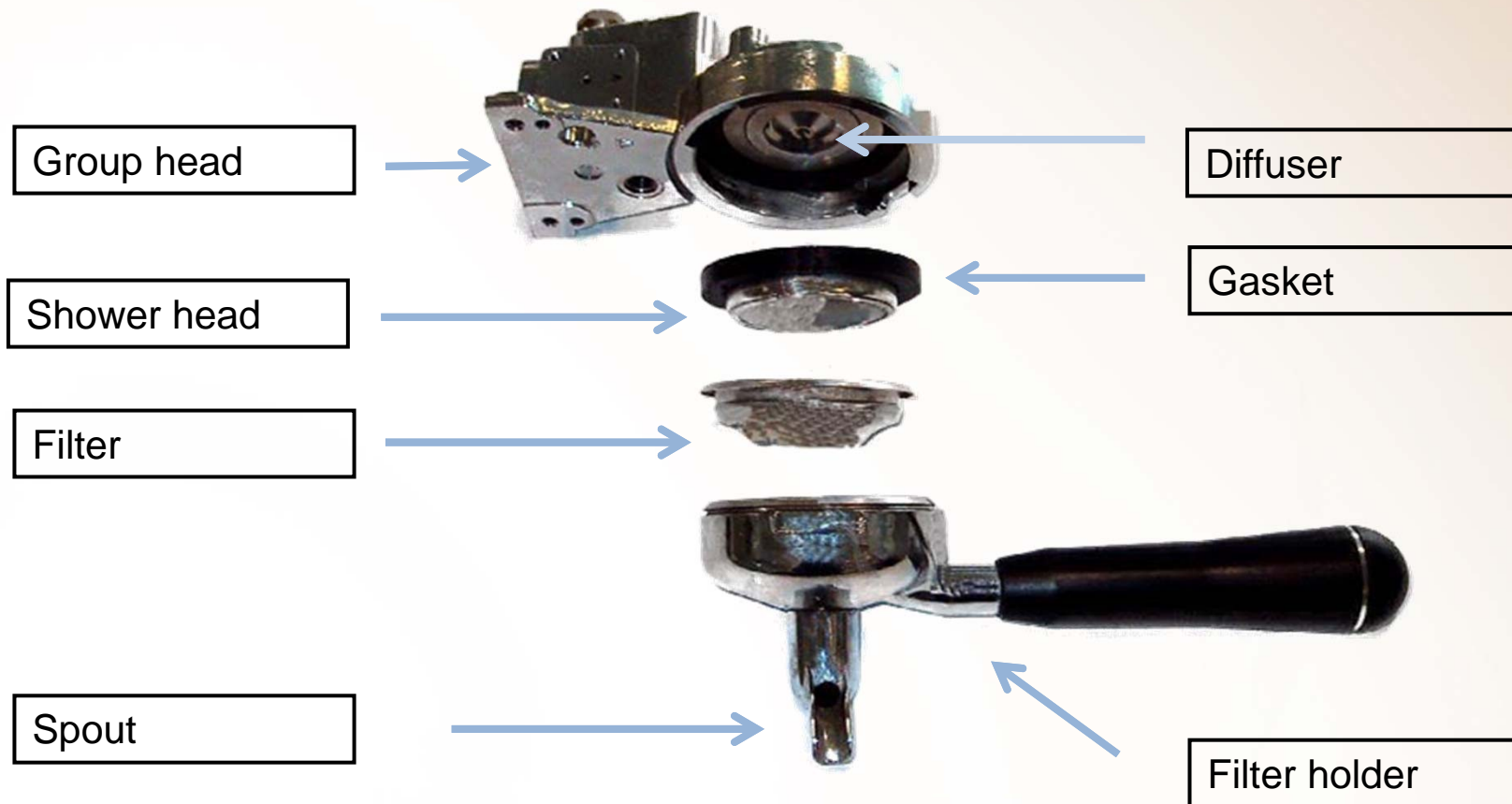


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The espresso machine: the group head



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Water softener

Manual



Automatic



$H_2O = 97.5\%$
of our Cup of coffee

The resins in the water softener capture calcium and magnesium ions and release sodium ions
The hardness of the water can be measured in French degrees ($^{\circ}fH$)





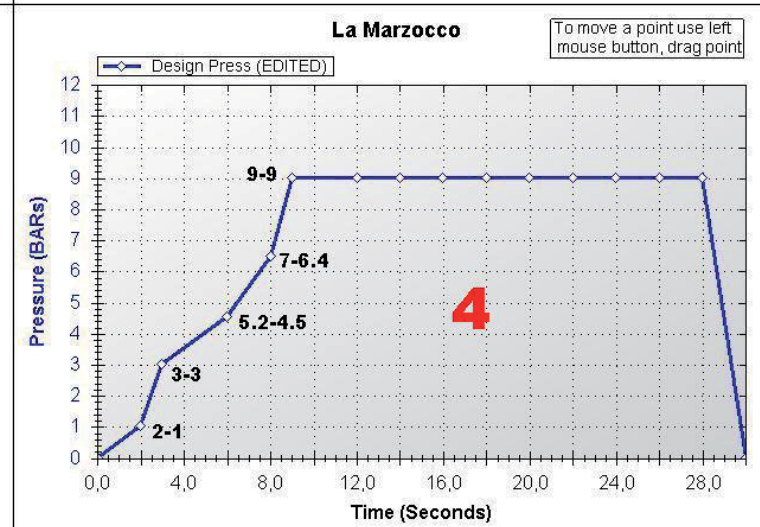
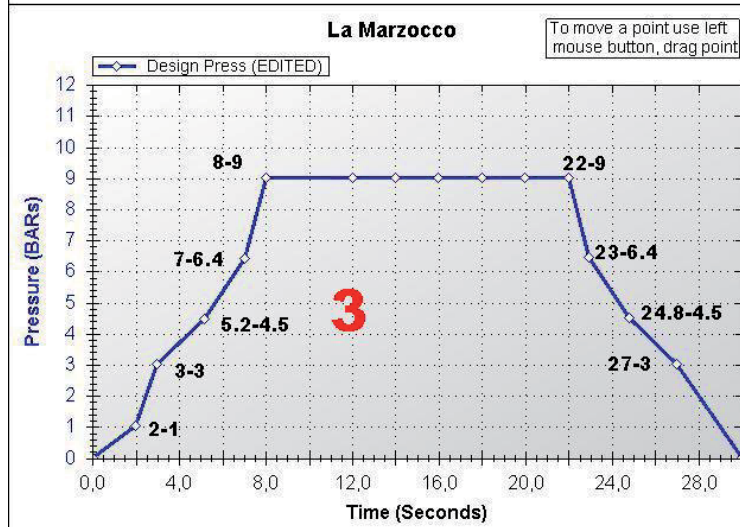
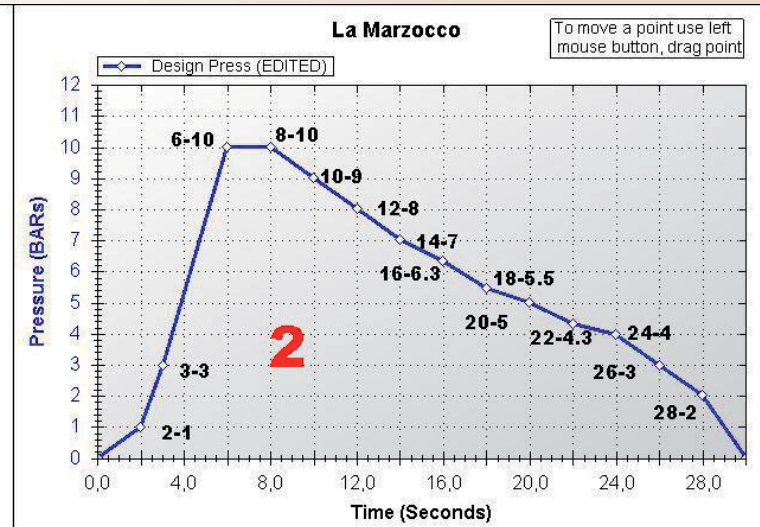
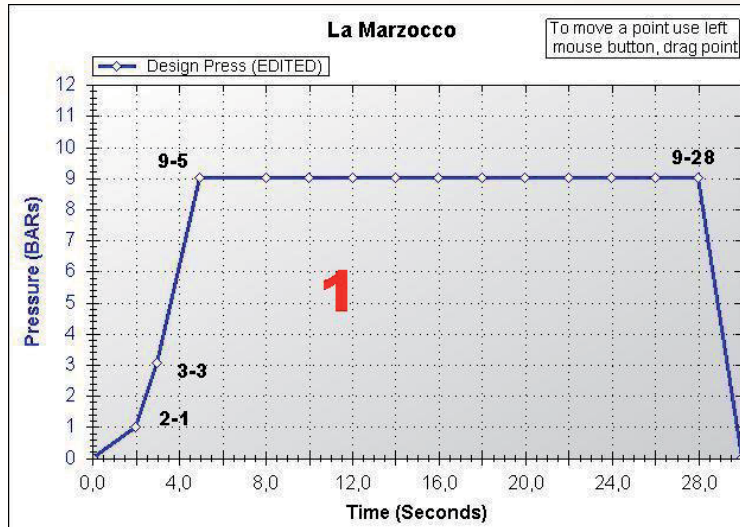
Today...



Extraction pressure control can be manual or via software (Marzocco, Cimbali)

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Today...



Bluetooth connectivity between Espresso Machine and Grinder-doser

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Today...



Temperature profile control (Rancilio)



Gravimetric control of extracted liquid
(Victoria Arduino 388 Gravitech)

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What does Espresso mean?



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Espresso

A drink prepared straight away, expressly for you.

Transformed by means of percolation: using heated water at high pressure

Rapid extraction: transfers the best soluble substances into the Cup

It is the elixir of coffee,
the quintessential interpretation of the drink





The rules for a perfect espresso

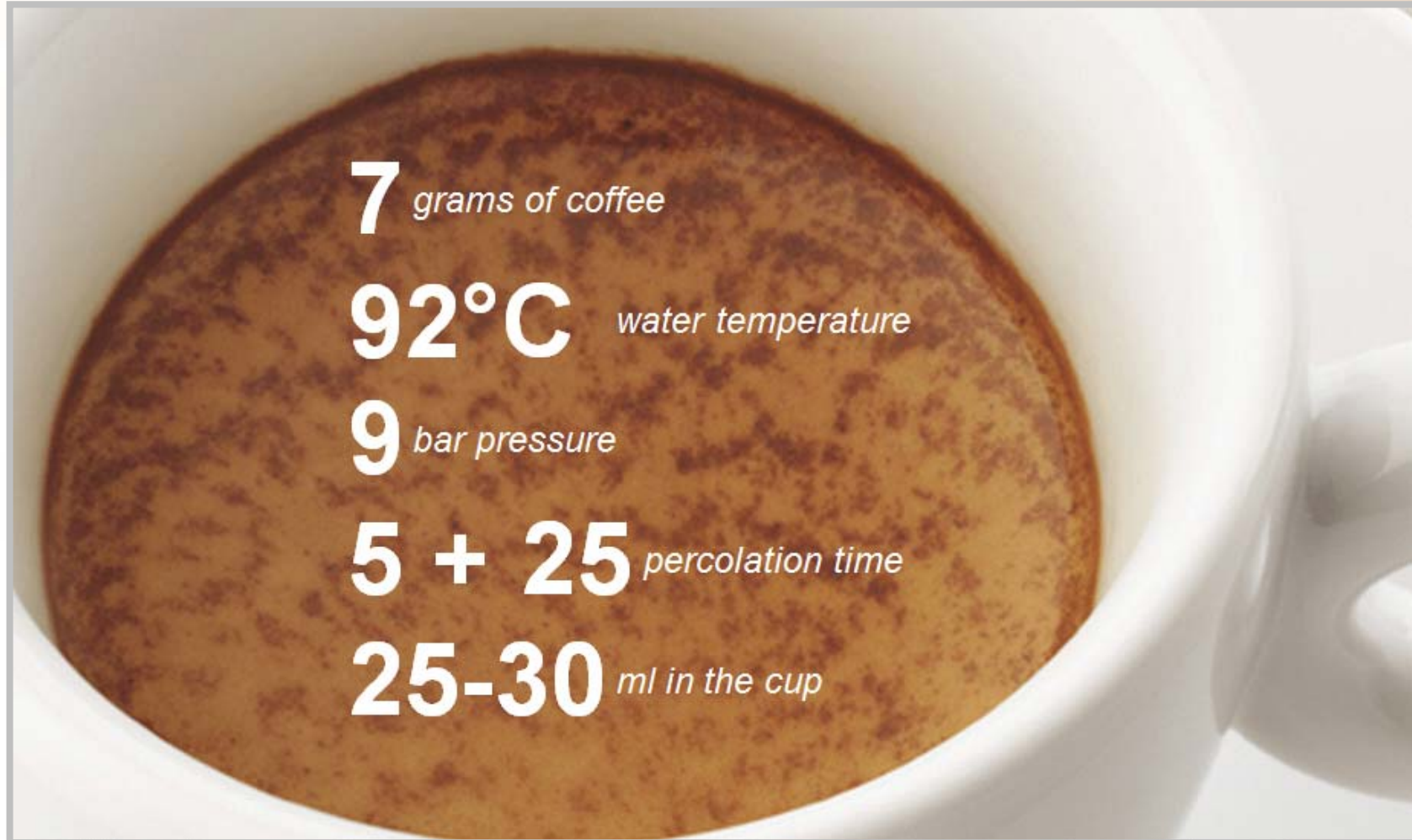
The rules for technicians

1. Water temperature: ?
2. Pump pressure: ?

The rules for the barista

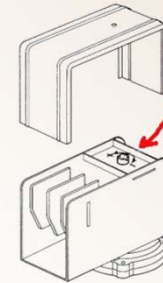
3. Dose: ?
4. Tamping: ?
5. Volume: ?
6. Extraction time: ?





Temperature regulation

- Pressure switch: regulates the water temperature in the boiler



- Electronic temperature control

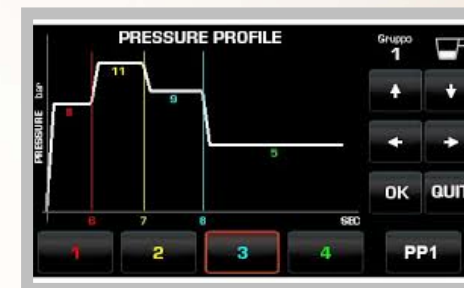


- The temperature must be $92 \pm 2^\circ$ Centigrade.



Pressure regulation

- Bypass: a tool that allows adjustment of the pressure.
- Electronic regulation
- The extraction pressure should be 9 bar.





Dose:

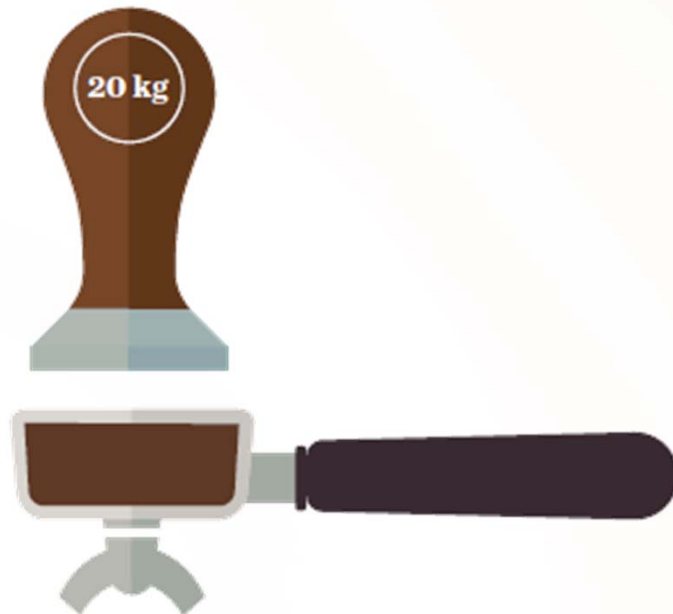
- Adjustment
- Quantity
- Loading
- Cleaning





Tamping:

The coffee must be tamped with a force of about:



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Tamping:



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Tamping:



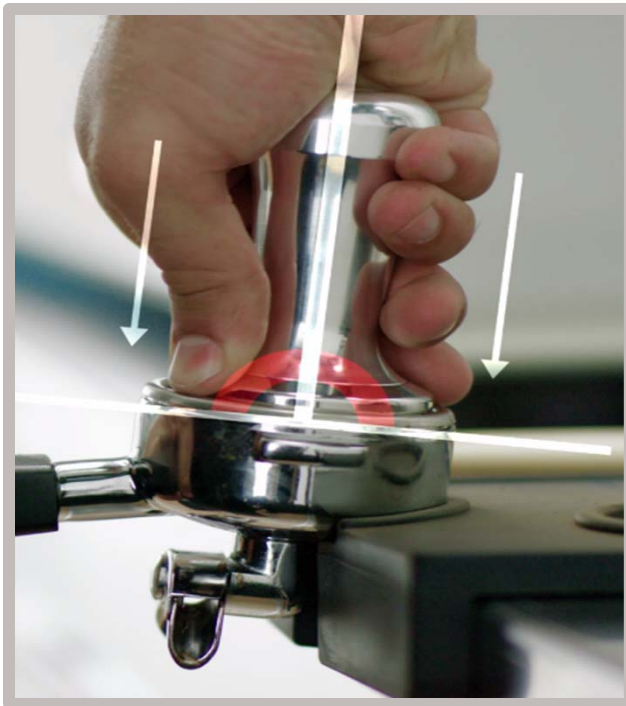
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Tamping:

Handling



Turning



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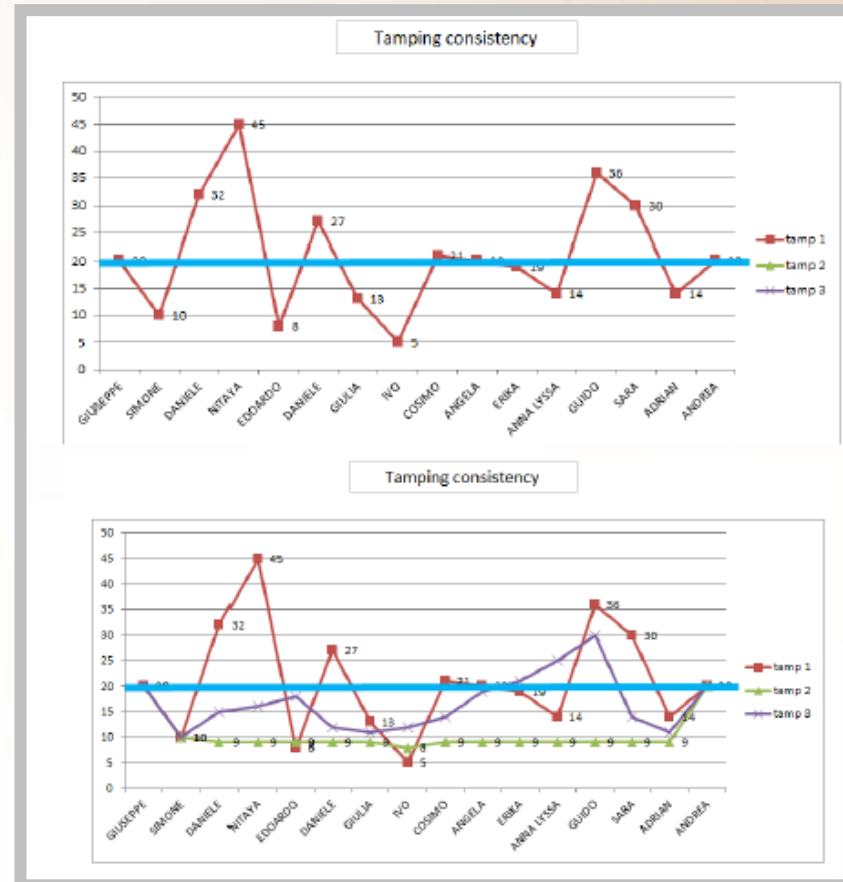
Tamping:

- Grip
- Movement
- Diameter
- Cleaning





Tamping: Practice

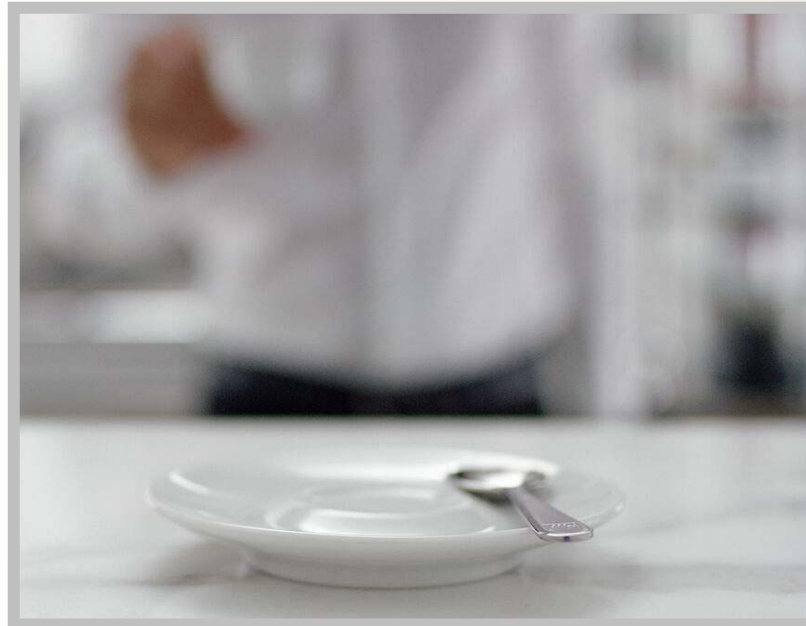


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Technique... Don't forget:



1. Set out the saucer and spoon





Technique... Don't forget:



2. Flush with water (2 seconds)



3. Knock out grounds (check for gasket wear)





Technique... Don't forget:



4. Clean with the brush

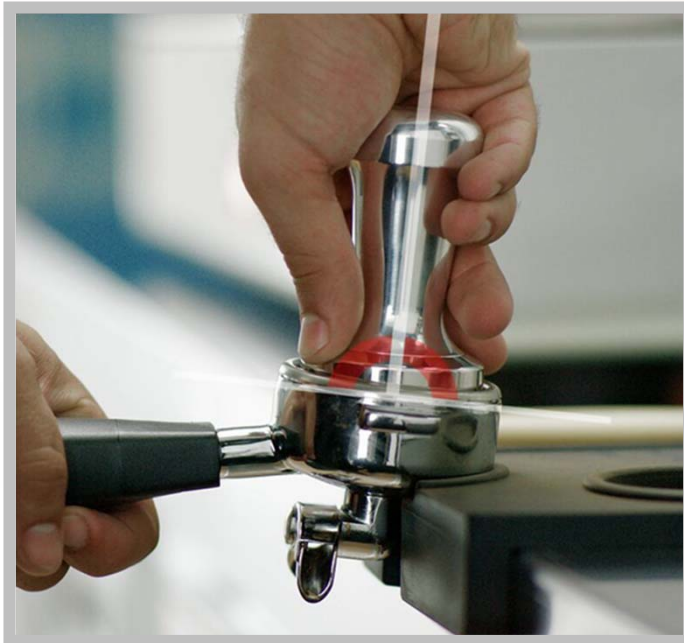


5. Load the dose (carefully)

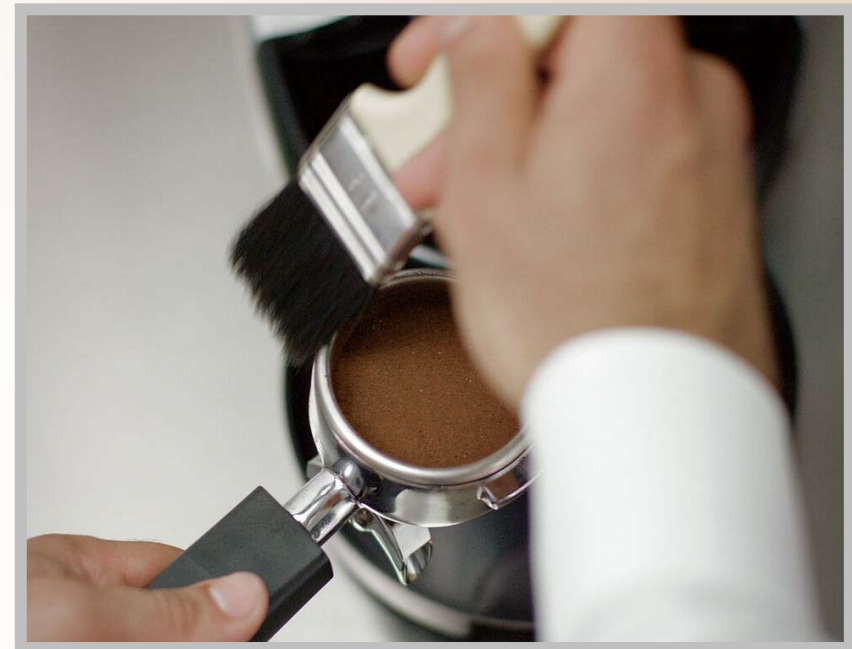




Technique... Don't forget:



6. Tamping



7. Cleaning

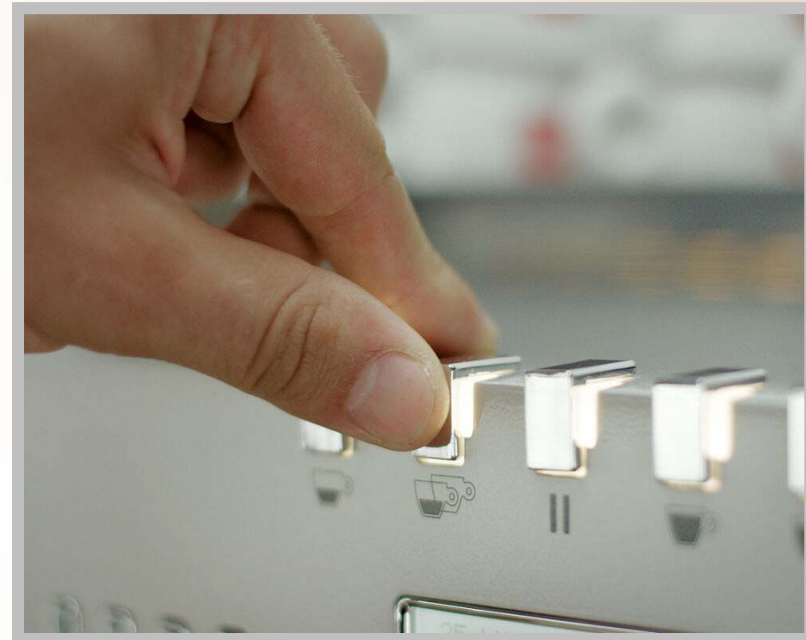




Technique... Don't forget:



8. attach the filter holder



9. Press the pour button





Technique... Don't forget:



10. Take the cups (use the handles)



11. Set up the cups under the spouts.





Technique... Don't forget:



12. Serve the espresso





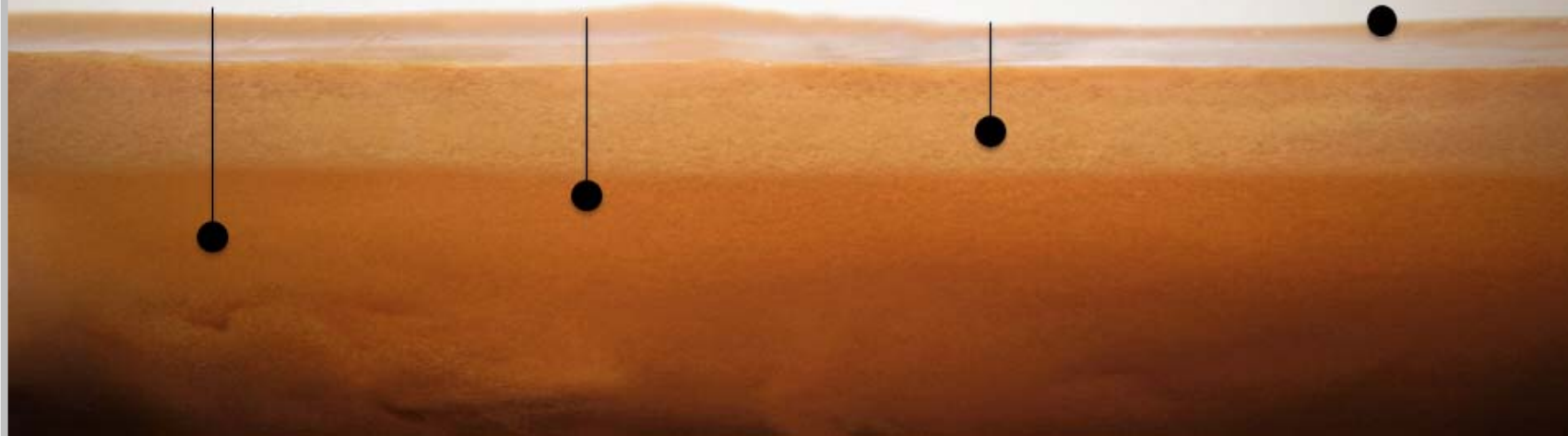
The crema.

COLOUR
hazelnut tending
towards deep brown

TIGER STRIPES
dark stripes
in the crema

CONSISTENCY
compact, fine grained,
thickness 2-5 mm

PERSISTENT
From 2 to 4
minutes





Espresso, other characteristics



TASTE

balance between
acidity, sweetness
and bitterness

POSITIVE AROMAS

broadest possible
spectrum of
positive aromas

BODY

velvety and
“syrupy”

AFTERTASTE

sweet and
prolonged



Grinder-dosers

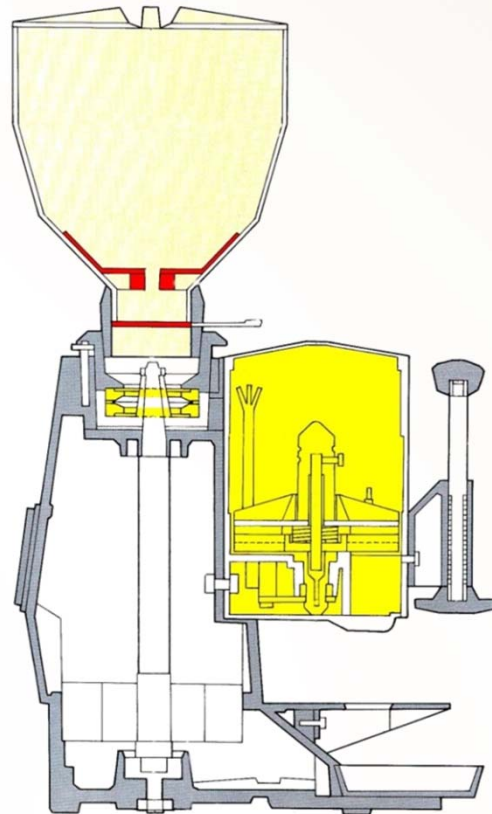


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Traditional grinder-doser

- Structure
- Hopper
- Motor
- Grinders
- Doser



On-demand grinder-doser



Ground coffee
chute

Control display



The on-demand grinder-doser grinds coffee in the same way as a traditional grinder-doser.

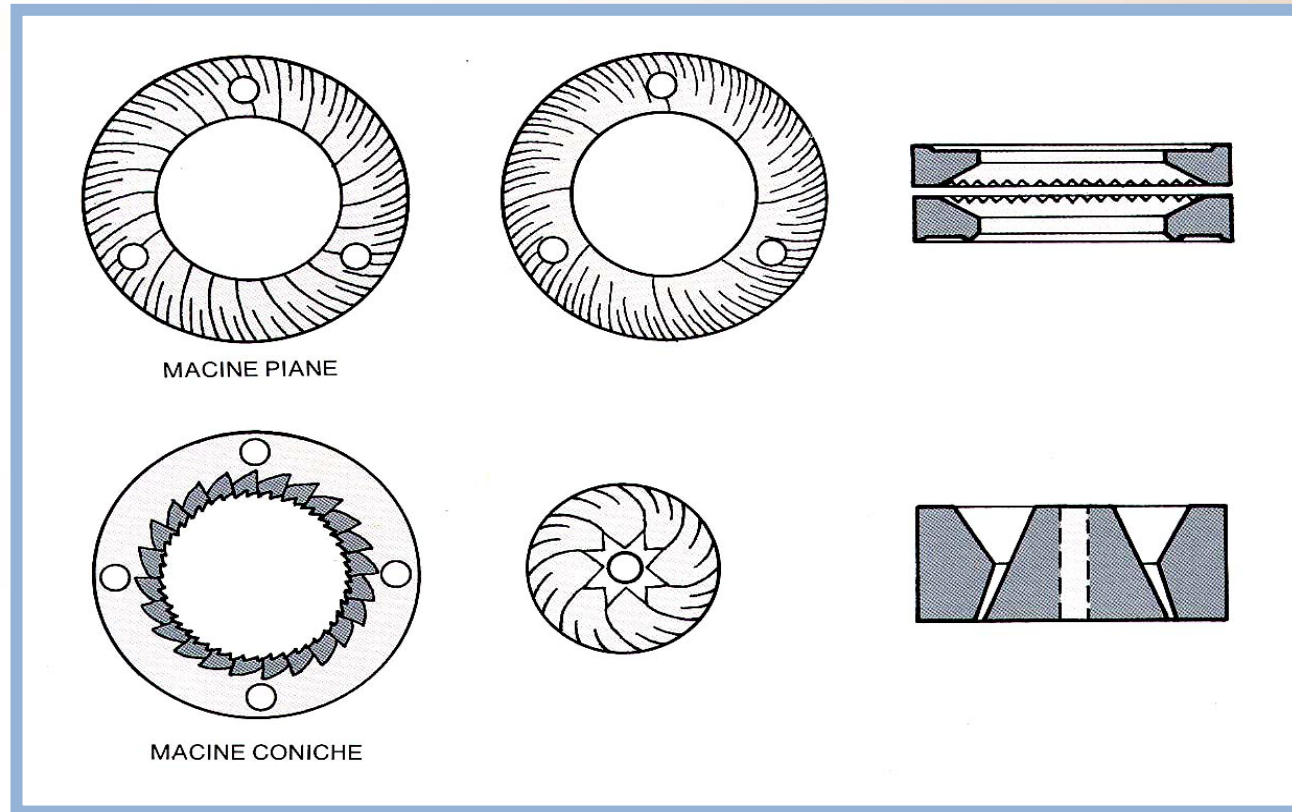
A button on the display automatically switches the motor on, and then switched off once the dose has been taken.

The amount of coffee dispensed depends on the amount of time the motor runs for.

Increasing or decreasing the time adjusts the amount of ground coffee.



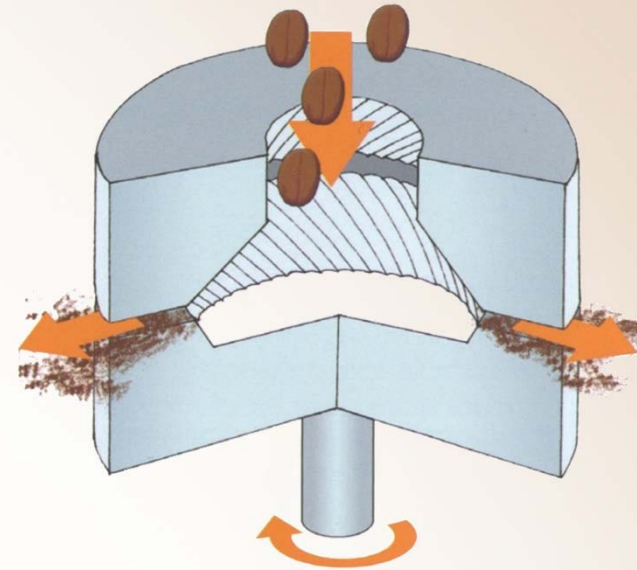
Grinder blades



The components that grind the coffee bean into powder



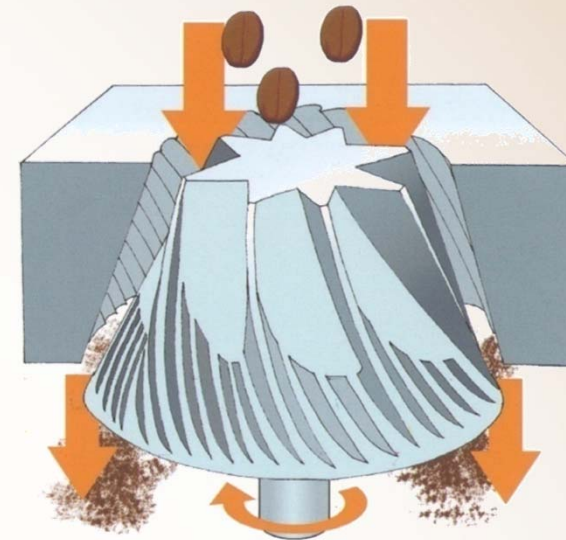
Flat plate grinders



Coffee is ejected by centrifugal force



Conical grinders

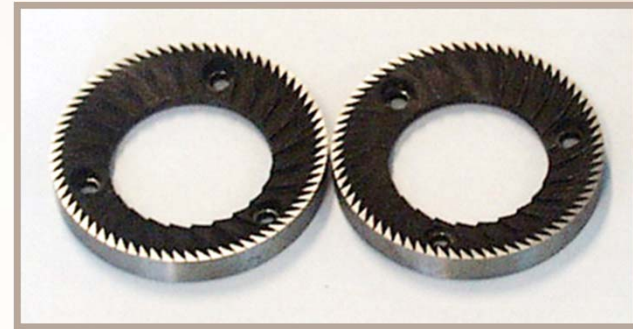


Coffee is ejected by gravity



Time for a change

- Kg of coffee consumed (300 Kg for flat plate grinders, 900 Kg for conical)
- Excessive grinding time
- Temperature of coffee powder after grinding
- Irregular pulverisation
- Very noisy when run empty
- Poor consistency or absence of crema





Mistakes:



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Under-extracted espresso:

crema is light and short lived, coffee has little body, increased acidity

- Low extraction pressure
- Low water temperature
- Low dose
- Tamping less than 20 kg
- Cold filter holder
- Cold cups
- Correct volume reached in less than 30 sec: **COARSE GRIND**



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Over-extracted espresso:

Crema has "holes" or white button in the center, "burnt" taste, unpleasantly bitter

- Extraction pressure too high
- Water temperature too high
- Excessive dose
- Tamping over 25 kg
- Filters clogged
- Dirty Shower head (clogged)
- Correct volume reached in over 30 sec: FINE GRIND

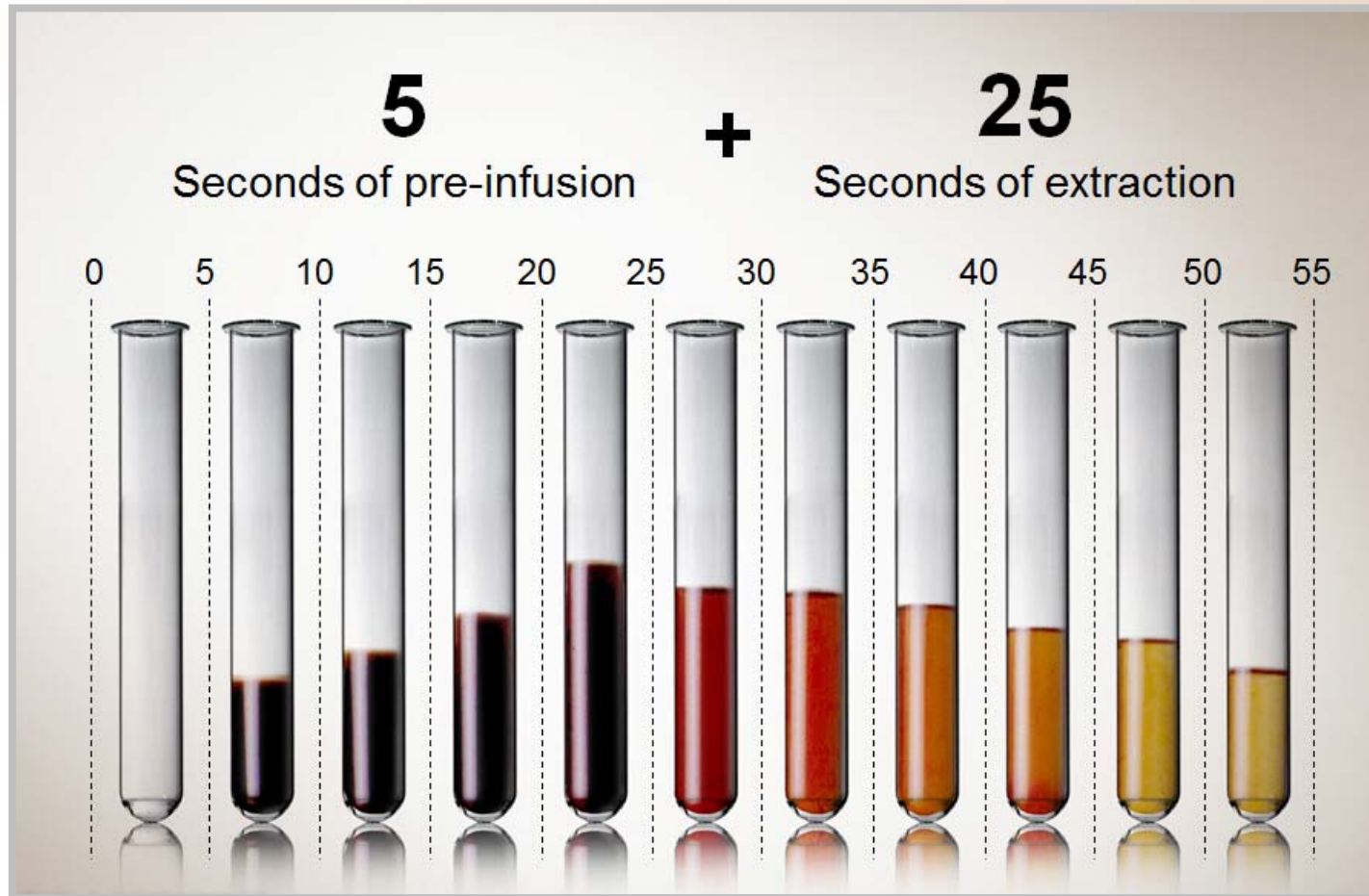


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Coffee: ristretto, regular, lungo



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Espresso.

Hot water passes through the coffee powder in about **30 seconds**, producing 25ml of coffee in the cup that draws out a concentrate of **aroma**, **body** and **taste**.

It is at the same time:

- **SOLUTION**
- **EMULSION**
- **SUSPENSION**
- **FOAM**





5
seconds of pre-infusion



25
seconds of extraction

finer grounds

coarser grounds



Ristretto

20 ml



Regular

25 ml



Lungo

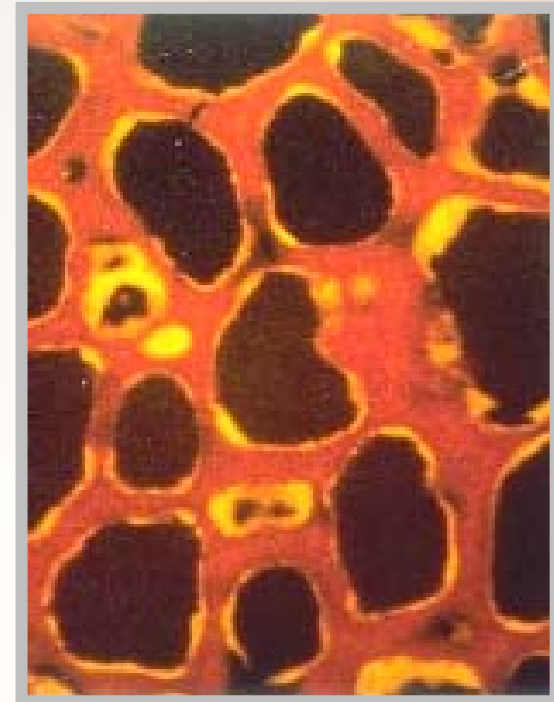
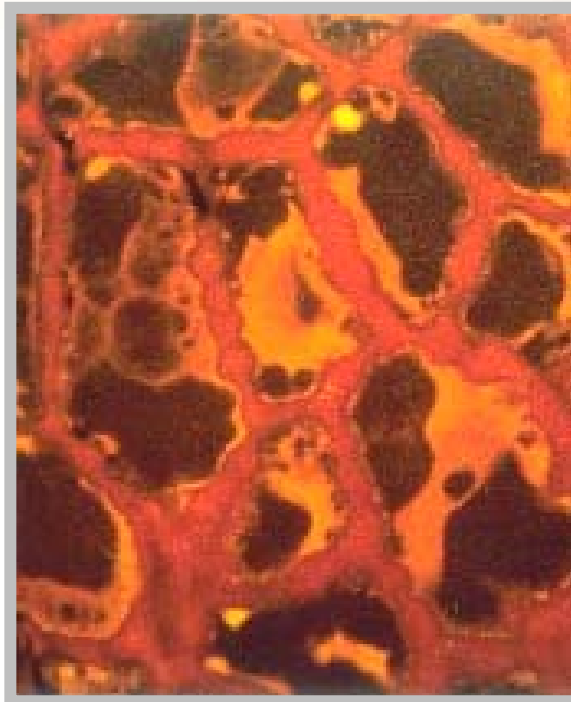
35 ml



Espresso coffee

During grinding the cells are broken and the aromas and CO₂ slowly begin to disperse into the environment.

Coffee cells contain many aromas in a gaseous state, as well as carbon dioxide (CO₂, largely responsible for the foam)





Espresso coffee

Remember that even though the aromas and CO₂ disperse slowly, just **two hours** after grinding the quantity will have decreased by about **50%**





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No other drink manages to convey such a pleasant, unforgettable taste and smell at the moment of drinking as a good espresso, even 30 minutes after savoring it .

Perfect Espresso

Ernesto Illy



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Don't forget:



Open the 3Kg can 4 to 8 hours before use

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The perfect work space



Clean, well-organized worktop: colour coded cloths and a brush ready to use

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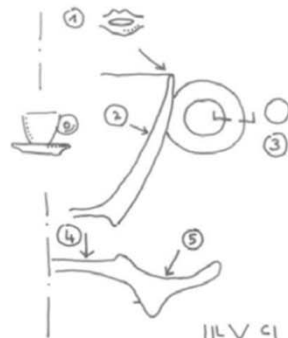


The espresso cup

Temperature

Cleaning

Position



- 1) BORDO AFFUSOLATO
- 2) UNICITÀ E RICONOSCIBILITÀ DEL MANICO AD ANELLO
DALLA FORMA ARROTONDATA
- 3) CORPO TAZZA ARROTONDATA E AVVOLGENTE
- 4) APPOGGIO TAZZA RIALZATO
"EFFETTO VE/SUVI/O"!
- 5) ZONA CUCCHIAIO + ZUCCHERO





Cleaning and maintenance



Cleaning and maintenance

An espresso machine cleaning kit must include:

- Specific cloths and sponges
- Detergent
- Brushes
- Can opening tool
- Blind filter...





Daily Maintenance





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Daily Maintenance



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Periodic maintenance

SCHEDULED CHECKS

DAILY

- Check espresso extraction times (*should be 25–30 seconds*)
- Clean the filters
- Clean the shower screens
- Clean the filter holders
- Use a blind filter (*except for lever machines*)
- Clean the grinder-doser
- Clean the espresso machine
- Clean the milk spouts

WEEKLY

- Check the coffee dose
- Clean the inside of the doser
- Clean the inside of the hopper
- Clean filters and shower screens with cleaning product
- Blind filter with cleaning product (*except for lever machines*)
- Clean portafilters with cleaning product

MONTHLY

- Check water temperature
- Check pump pressure
- Check water hardness

QUARTERLY

- Replace the group seal
- Check group gauges
- Replace water in the boiler

AS REQUIRED

- Replace grinders
- Replace filters and shower screens
- Top up water softener resin

PERIODIC CHECKS

ESPRESSO MACHINE

- Clean/replace blind filters
- Clean/replace gicleur
- Clean heat exchangers
- Replace heat exchangers
- Replace solenoid valves
- Adjust the pressure switch
- Replace the pressure switch
- Check espresso machine heating element
- Clean boiler
- Replace pump
- Alter pump pressure

GRINDER-DOSER

- Check motor coil
- Clean the doser
- Replace the doser
- Replace the release lever
- Check switch
- Check volumetric control





Periodic maintenance

TROUBLESHOOTING

The coffee has a white crema → the machine could be cold.

The coffee has a dark crema with a white spot → the machine may have clogged filters or dirty shower heads or the temperature may be too high.

There is sediment at the bottom of the cup → the machine could have dirty spouts, an overly high pump pressure or defective shower heads or filter holders.

There is a tiny amount of sediment at the bottom of the cup → the grinder-doser may have worn grinders, or there may be dirt in the machine's filters.

Water remains in the filter holder after extraction → the machine may have a broken filter or dirty shower heads.

The shower heads wear out quickly → they may be installed the wrong way round, the extraction chamber may be unsuitable, it may not be properly maintained or the filter holder clip may not be level.

Water is escaping from the steam wand → check the water level gauge and make sure there is no milk in the boiler.

Different filter holders produce different extractions → check the grinding, and if required replace both filters and shower heads for all groups simultaneously.

The grinder-doser will not switch on → the hopper may be inserted incorrectly, or the machine may have overheated. Check the electrical connection.

The grinder-doser produces irregular doses of coffee → the star washer in the doser may be dirty or out of sync.

The grinder-doser is not working → the 3 kg can adaptor is probably not fastened properly (*a plastic safety rod within the grinder-doser is released when the can is inserted, turning the grinder-doser on*).





Periodic maintenance





Thanks for your attention



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