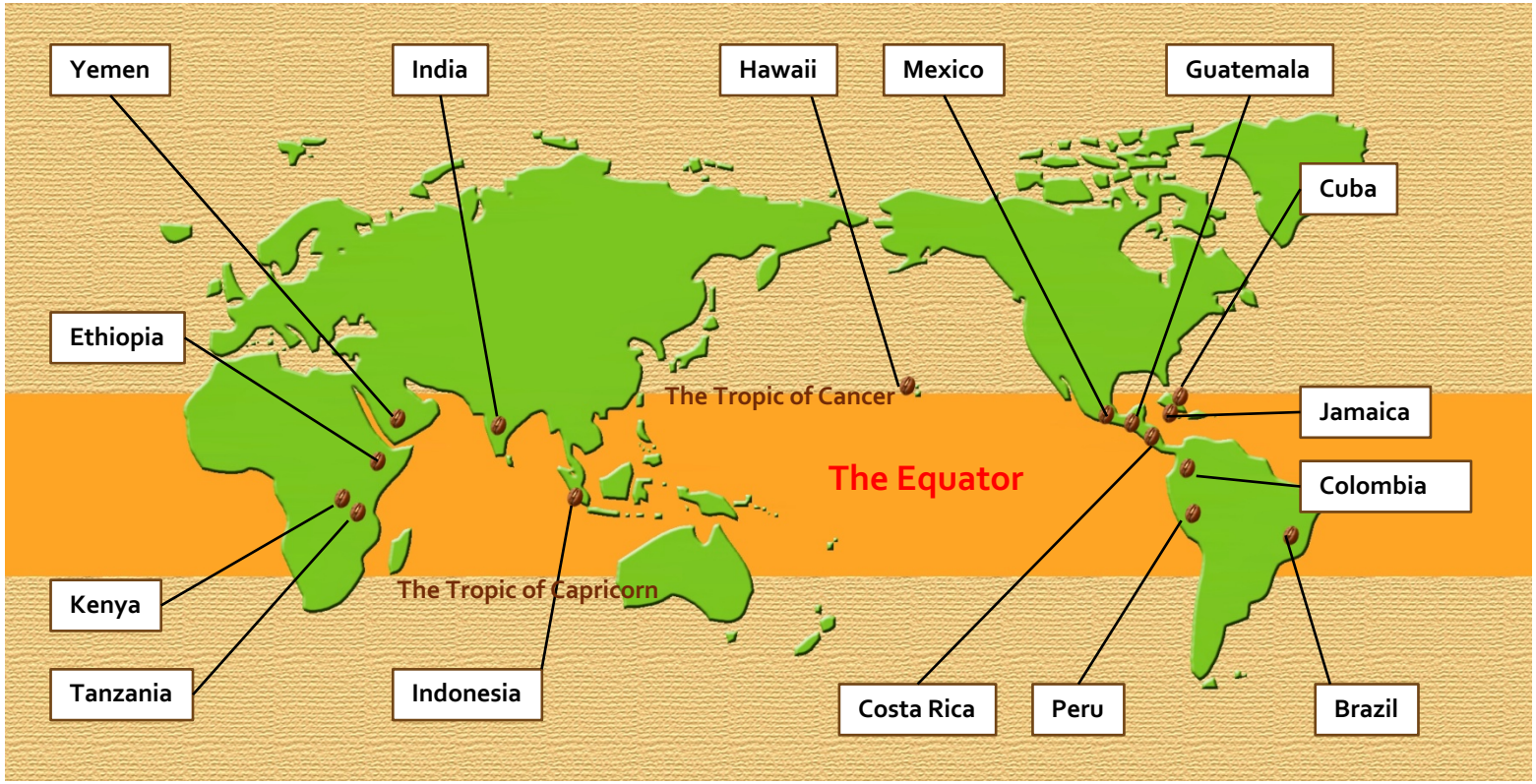
Coffee Seminar

Sanyo Sangyo Co., Ltd.

Coffee Belt



【Coffee Belt】

Coffee plantation is very difficult as it can be grown only in places where it would meet the 4 growth conditions of rain, sunshine, proper temperature and proper soil.

The only place where it meets the above 4 conditions is called “Coffee Belt” , which is the equatorial area.

FROM SEED TO CUP

Trend of Coffee Culture

【First Wave】

It is the era of “Mass Production and Mass Consumption”.

Thanks to the increase in circulation of products, the price of coffee beans became cheaper and coffee was recognized and established as a popular beverage.

【Second Wave】

In the 1970s, the Seattle-type coffee boom emerged in the US. Thanks to this, the era of “Coffee brewing with high-quality and dark roasted coffee beans” was started.

In Japan, the second wave becomes popular around 1996.

Arranged coffee like café au lait and café latte won popularity.

【Third Wave】

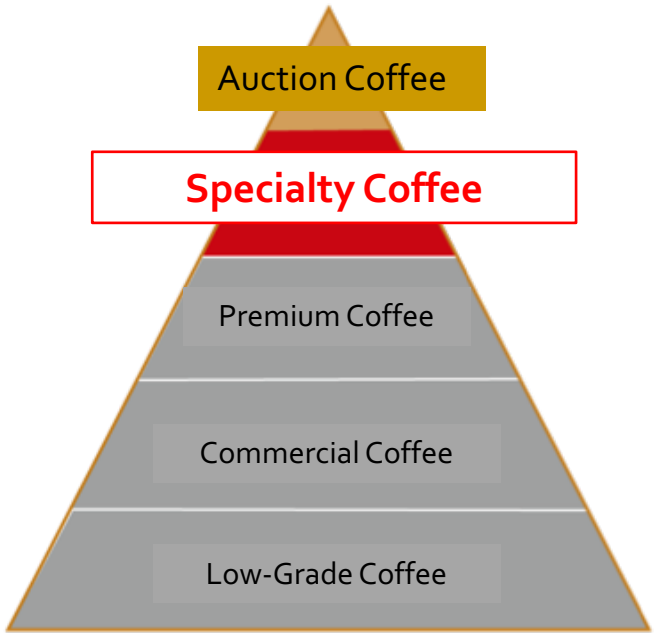
In this Third Wave era, coffee origin and quality of coffee became important with high-quality “Specialty coffee” receiving worldwide attention. What we call specialty coffee is a coffee whose “Traceability” from seed to cup can easily be realized. The number of cafés that are particular about the coffee bean and brewing method has increased in this era.

In the US, you could see the sign of popularity in the first half of the 2000s. On the other hand, it started to become popular around 2013 in Japan and it still continues. The “Hand-Drip” brewing became established all over the world.

【Fourth Wave】

It is said that the fourth wave will arrive soon. As for the fourth wave, there are many kinds of views, but most people expect a diversifying era that each coffee lover will enjoy coffee in their own way.

What Specialty Coffee is?



The Specialty Coffee should be the one of which taste and flavor are excellent, and the one with which the consumer (coffee drinker) is satisfied and think highly of.

【Requirements for Specialty Coffee 】

- **Cleanness of cup quality**
- **Sweetness**
- **Quality of Acidity**
- **Texture**
- **Aftertaste**
- **Balance**
- **Profile of Flavor**

The coffee beans which meet the above requirements can be called Specialty Coffee.

Roasting

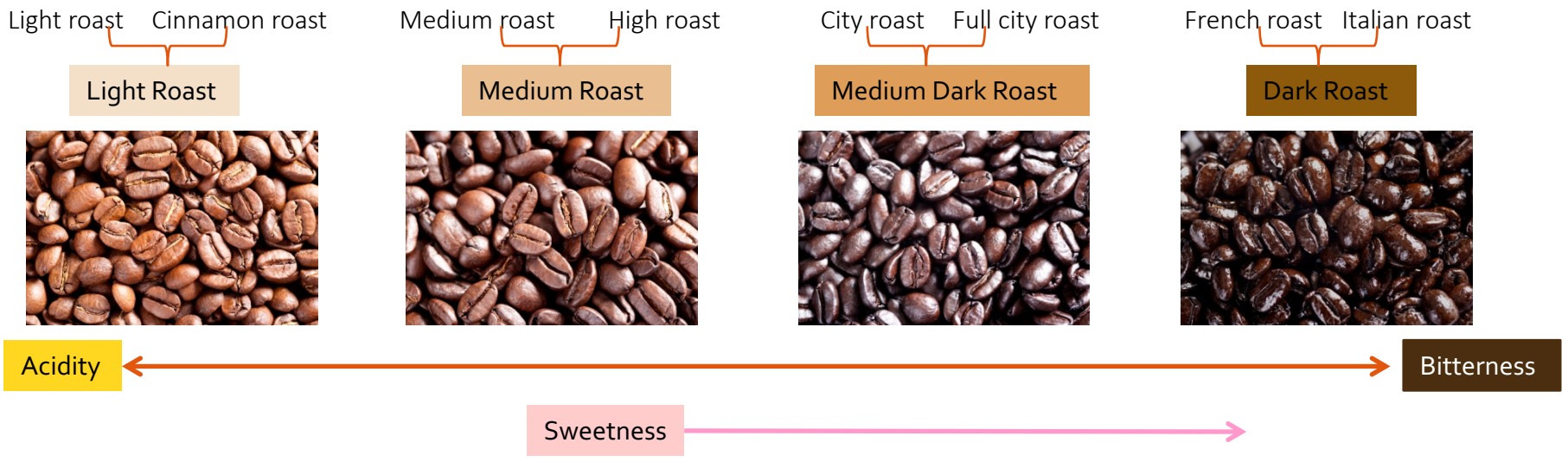
【What is Roasting】

It is the process of changing green coffee beans to roasted coffee beans by heat. Any unroasted coffee beans have a smell of grass and not tasty.

Roasting brings out the aroma, and original taste of coffee (bitterness, sourness, sweetness).

It can be said that “Roasting” is the most important process to influence the taste of coffee.

【Roasting Levels】



Brewing

Brewing is the climax that ultimately determines the taste of coffee.
There are six factors that determine the taste of coffee.
They are,

① Roasting degree
② Grind size
③ Quantity of coffee powder
④ Hot water temperature
⑤ Brewing time
⑥ Extraction amount

【Grind size】

"Freshly ground" is a major premise and as well as the coffee grounds to be uniform. We can divide the size mainly into coarse, medium, and fine.

[Quantity of coffee powder] 10-12g is ideal for one cup (about 130ml - 150ml)
[Hot water temperature] 85-90 ℃ (83-85 ℃ for dark roasting)
[Extraction amount] 1 cup approx. 150 ml

Brewing – Pour Over

“Pour Over” is one of the coffee brewing methods.

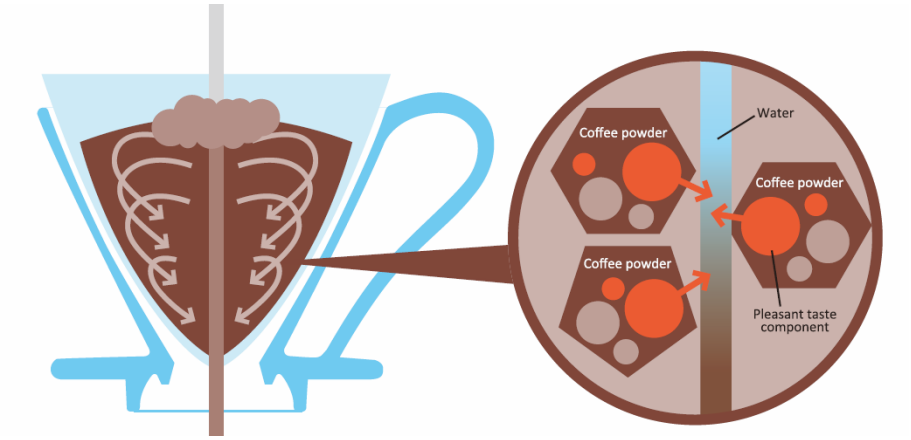
There are two kinds of pour over methods; that is, **“Osmotic-flow”** and **“Full immersion”.**

【Osmotic-flow】

“Osmotic-flow" is one of the pour over methods to **let water pass through coffee powder's filtering layer** and induce a convection flow continuously then pull out only the pleasant taste component from coffee powder by **generating osmotic pressure continuously**.

The point of Osmotic-flow is to let water pass through the filtering layer, then generate a concentration difference between coffee essence and water, and the pleasant taste of coffee is brought out fully into coffee liquid by osmotic pressure. “Once water passes through the filtering layer completely, osmotic pressure becomes zero. At this point, pour water again to generate another osmotic pressure”; pleasant taste component can be extracted fully by repeating this series of operations.

As you know, water always passes through the filtering layer, so water never stays in the dripper.



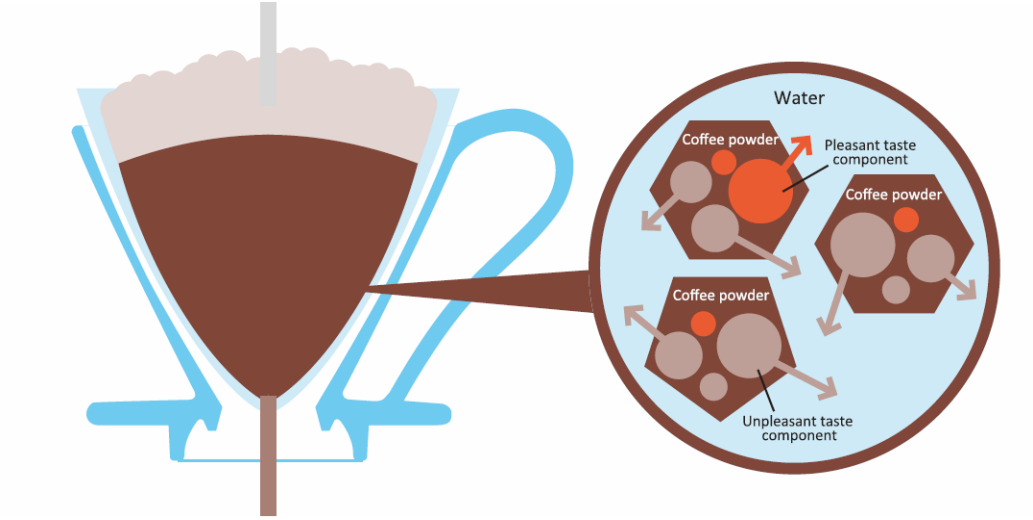
Brewing – Pour Over

【Full Immersion】

“Full immersion" is one of the hand-drip brewing methods to **soak coffee powder in water** for a while; not induce a convection flow, when the time comes, separate coffee powder and coffee liquid.
In this case, all components of coffee powder, the pleasant taste and unpleasant taste component come out into the coffee liquid.

Coffee itself can be brewed because of the concentration difference occurring between water and coffee essence by this full-immersion method but a filtering layer cannot be formed.

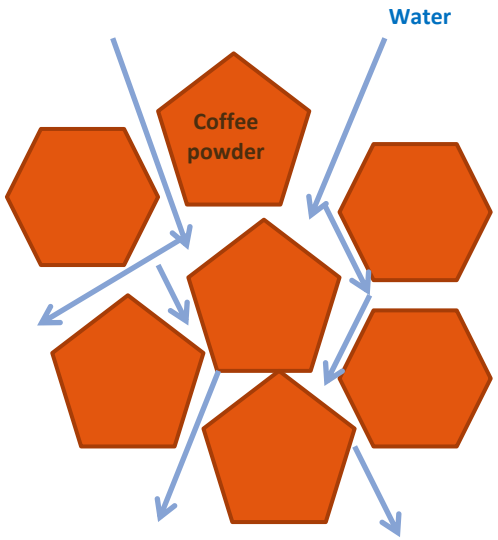
The biggest difference from Osmotic-flow is that full immersion soaks the coffee powder in water by letting water stay in the dripper, by contrast, Osmotic-flow never lets water stay in.

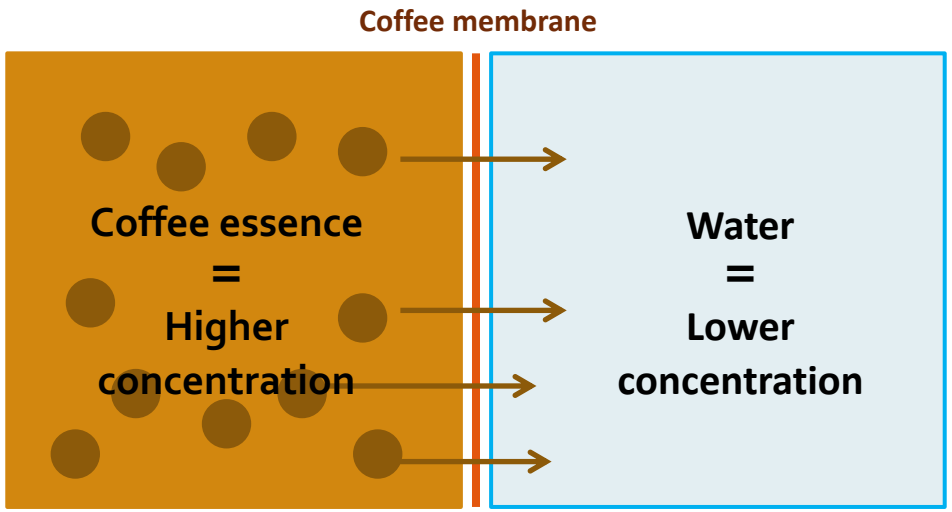


What is Osmotic Pressure?

Osmotic Pressure occurs when two solutions, containing **different concentrations** of solute, are separated by a semipermeable membrane. Solvent molecules pass preferentially through the membrane from the low-concentration solution to the solution with a higher concentration. The transfer of solvent molecules will continue **until equilibrium is attained**.

☞**In case of brewing coffee, when different concentration is occurred between coffee essence and water, coffee essence with higher concentration transfer in water with lower concentration by osmotic pressure, then coffee liquid containing coffee essence comes out.**



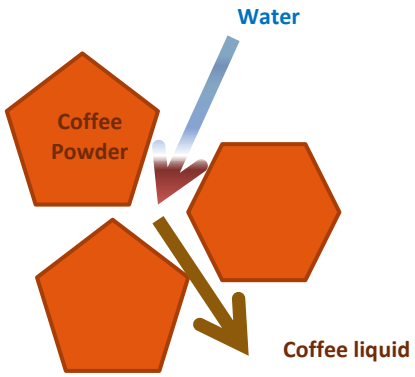


Hand-drip Brewing by Osmotic-Flow method

【Blooming = To Extract Coffee Essence】

"Blooming" is the process **to gather coffee essence in spaces** between coffee powder by pouring water on coffee grounds. Prior to pouring water, spaces are filled with gas, hence by pouring water the gas is pushed out. The gas is light so it comes up and then grounds are lifted up and expand fully. This time, water flows in the spaces instead of the gas.

Here, thanks to osmotic pressure, coffee essence is seeped into the water and then stay in the spaces.



By pouring water again and **passing water through the filtering layer** at the center after the blooming process, osmotic pressure occurs between water and the coffee essence kept in the spaces. Because the concentration of essence is higher than that of water, the essence is pulled into water then comes out as coffee liquid.

Once water passes through the filtering layer, no more osmotic pressure occurs. In order to create the pressure again, repeat to pour water, and then make the concentration difference. Repeat this series of operations to brew coffee until it reaches the volume you want.

In other words, if you pour water in large amounts at one time over coffee grounds, then water stays and the filtering layer is destroyed. Just at this moment, it is no more "osmotic-flow" even if you use a dripper for the osmotic-flow brewing.

Blooming

Blooming is for what?

It is for making a passageway for water.

Coffee powder has a **porous** membrane. When water can seep fully into the porous coffee powder, then it expands fully; that means the small holes on a porous membrane of coffee powder are “opened” fully then water can reach inside of the coffee powder.

“Blooming” can be said to be the preparation for brewing.

What happens if water is poured continuously?

- It causes what we call “uneven extraction”.

Water is not circulated by convection inside the dripper, then the first water path becomes the easiest path for water to flow. Because of this, many components of coffee are brought out around the first water path but less from the other coffee grounds. Therefore, continuous water pouring causes uneven extraction.

Blooming: Physical Force Balance

A
Osmosis power + Gravitation
+ Force of water pouring

>

B
Surface tension + Expansion force of
coffee powder + Pressure of rising gas

The balance of the above formula changes depending on the 4 conditions below:

① Freshness of coffee powder

If the Coffee powder is not fresh, the volume of gas is less. Then the total force of B becomes weaker.

② Grain size of coffee powder

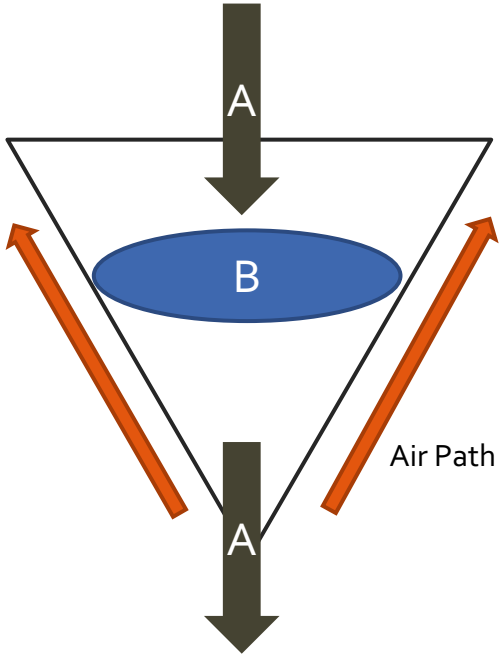
Osmotic speed of coarse grain is fast, and that of fine grain is slow.

③ Roasting level of coffee beans

A grain of dark roasted coffee powder is light and its osmotic speed is fast, so a pouring timing shall be faster. On the other hand, in the case of light roasted grain, it is opposite.

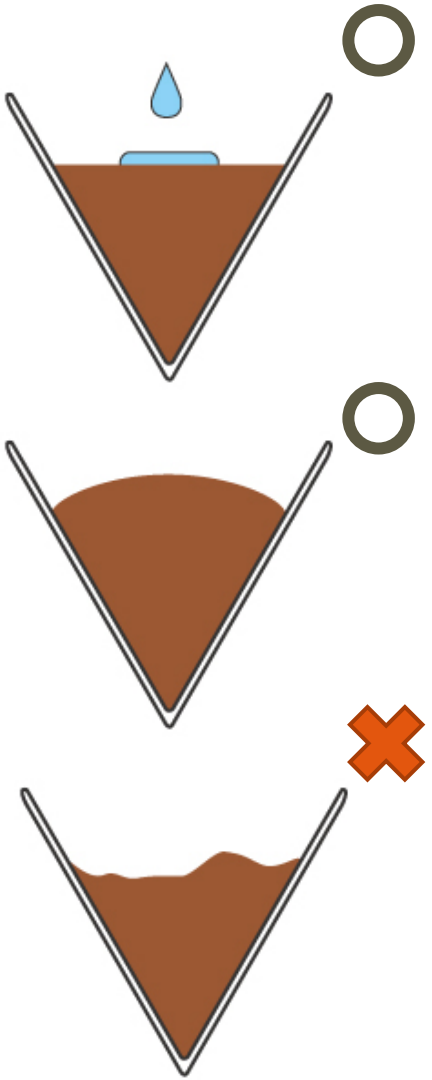
④ Variety of coffee beans

Same as the above ③,the mass of grain varies depending on the density of tissue of coffee beans.



Blooming: Important Point

Water pouring for blooming, it is better to imagine just putting water on the surface rather than pouring water. To draw a circle slowly from the center to outside; never pour water around the border.



○ Proper Blooming

Water spreads evenly over coffee grounds, and the coffee powder swells like a dome. Several drops of coffee liquid brewed out from the bottom are ideal.

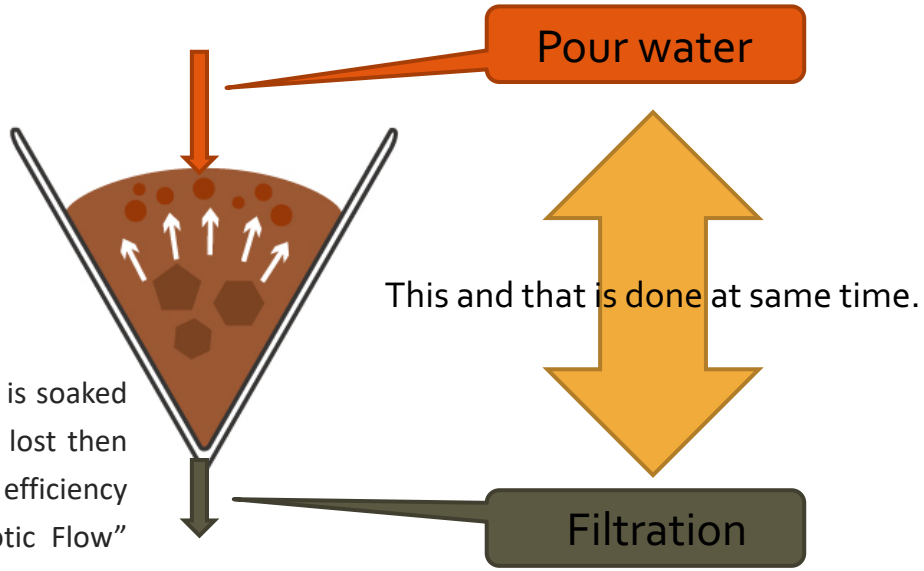
× Bad Blooming

When water is poured around the border between coffee powder and paper, water is oozed out from the side, not from the bottom. It results in uneven blooming; it can be said the same as the case of too much water pouring.

Mechanism of Osmotic Flow

When well bloomed, start to pour water again. By this operation, soluble solids included in coffee powders are brought out in the poured water; this is exudation.

The mechanism of Osmotic Flow, can also be explained as “Pouring water and filtration is done in parallel”.



So, in case pour too much water at one time then coffee powder is soaked in water (full immersion), the physical force balance in a filter is lost then the filtration speed gets faster by water pressure. The extraction efficiency of this “full immersion” method is worse than that of “Osmotic Flow” brewing.

The important points for Osmotic-Flow brewing are as below:

①Pour water from lower position, and water volume shall be small and thin.
②Water volume and speed shall be even.

How to Pour Water

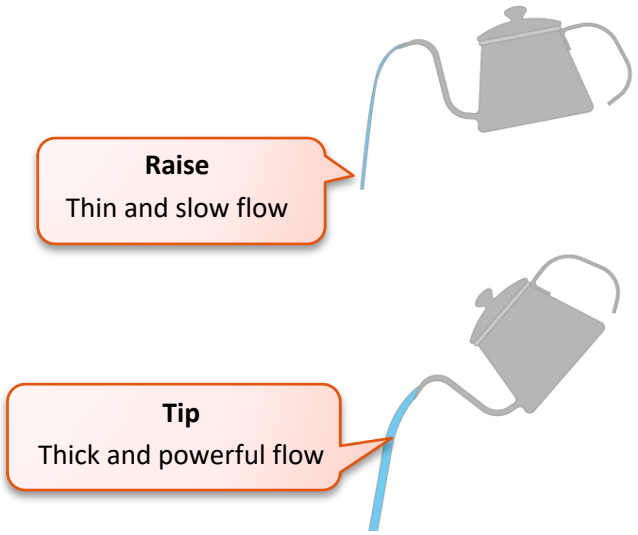
Points:

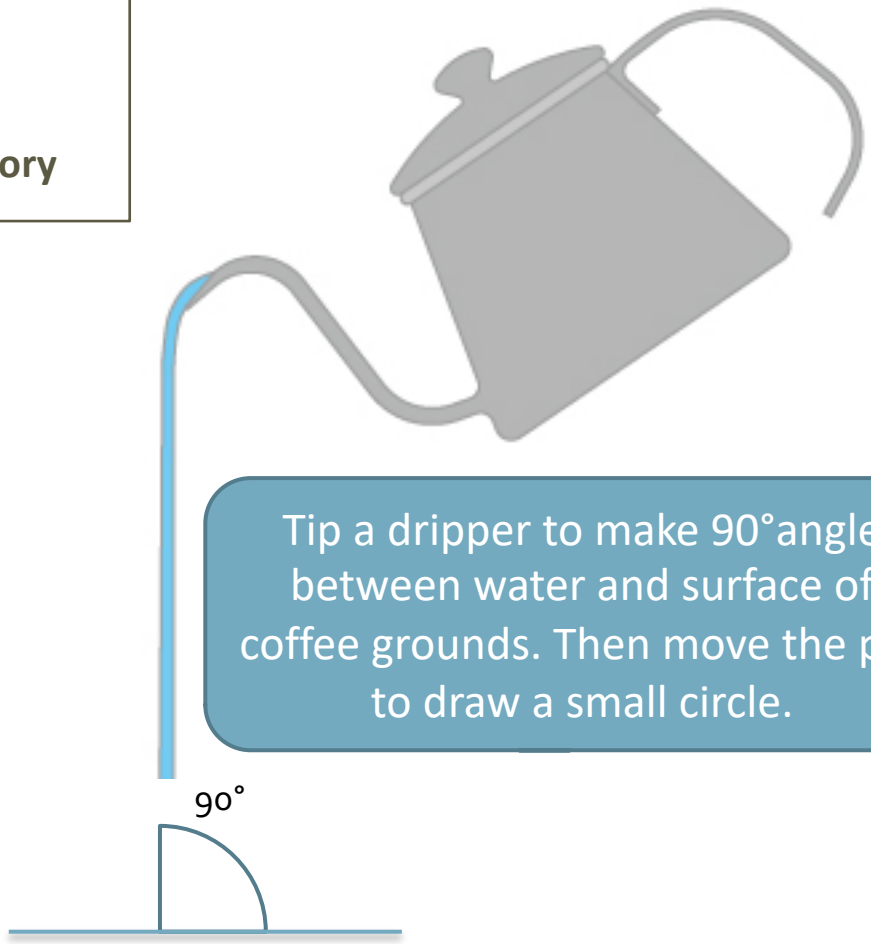
Ⅰ To know well the structure of a drip-pot

Ⅱ To think well how to pour with your pot

Ⅲ To pour water based on your pour over theory

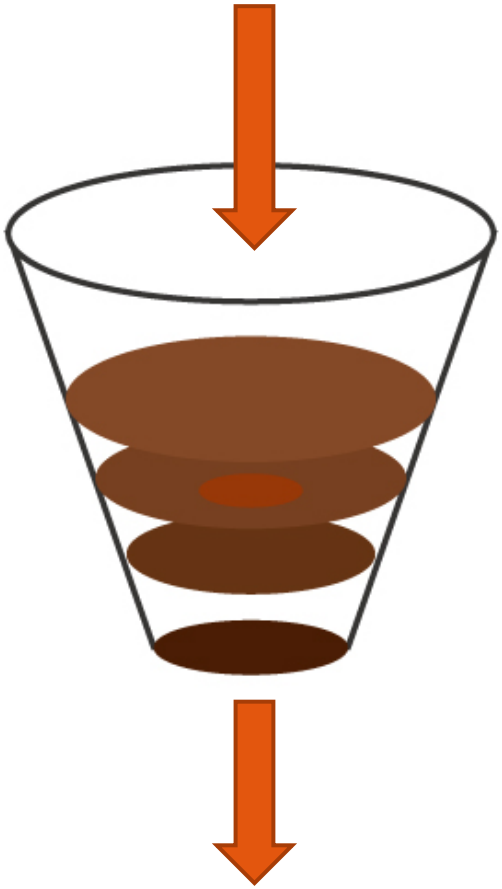
It is important to know well how to control water volume.





Tip a dripper to make 90°angle between water and surface of coffee grounds. Then move the pot to draw a small circle.

Brewing Theory



The important factor for pour over is to think about " the center of gravity for poured water".
Many people say "to pour water like drawing a circle", but let us recognize this not as one level, but as a three-dimensional plane.

The coffee powder in the filter forms a layer of coffee powder. When the water volume poured from the top and that of coffee liquid brought out from the bottom is kept the same, then the pressure in the filter reaches a state of equilibrium. So brewing can be stable.

When water is poured again after blooming, the water and coffee powder in a filter is gone down from the center by filtering operation.

It is important to **pour water continuously not to break this balance**.

Another Role of Coffee Powder

Role of coffee powders in the paper filter

The coffee powders in a paper filter play the role of filtering.

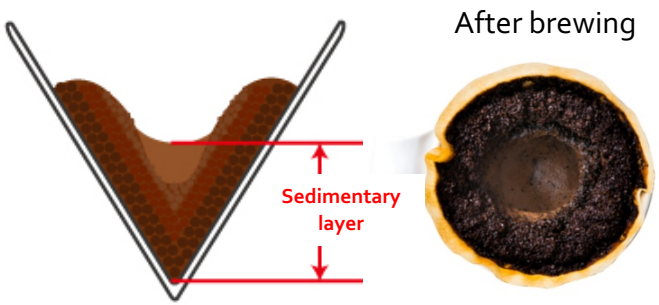
① Gas is included in coffee powders.

② To empty the gas from coffee powders evenly, pour water like drawing a circle.
(Much gas is included in big particles. When the gas is pulled out, buoyant force works so the gas is gone up.)

③ When pouring water evenly, the particles without gas go down in heavy order and then form a sedimentary layer along the filter wall and bottom.

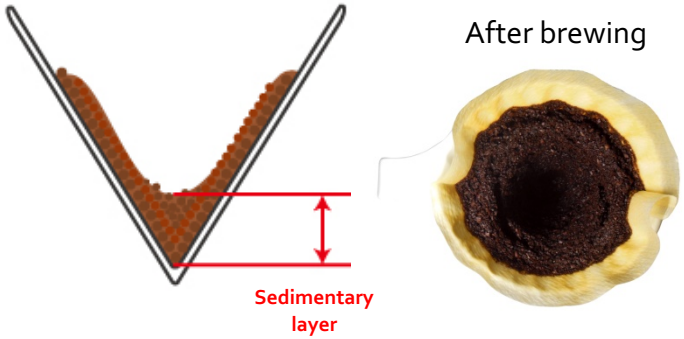
④ The sedimentary layer of coffee powders plays the role of purification, it blocks the bad taste of coffee powders including the light bubble.

Pouring in batches



When pouring water in batches, the sedimentary layer of coffee powders becomes thick. The sedimentary layer plays as a filtering layer; to block the bad taste of coffee including coffee powders.

Pouring all at once



When pouring water all at once after blooming, the sedimentary layer of coffee powders becomes thin. In this case, the coffee liquid passes through the thin layer fast, then there is the little filtering effect of the bad taste of coffee.

Temperature and Taste

Taste of food is affected by temperature.

For example, though you may feel proper taste when you drink a cooled drink with temperature 5～10℃, but once it heats up to body temperature 36～37℃, you may feel it is too sweet.

Another example, when a hot soup with about 70℃ temperature is cooled down to around 30℃, you may feel less salty.

Normally, the sensitivity of sweet taste (sucrose) is lowered around 20℃, by contrast, the sensitivity of bitter taste (quinine hydrochloride) is elevated with the rise in temperature.

It is said that hot beverages are tastier if you drink at a temperature 30℃ higher to your body temperature. And cold beverages are tastier if you drink at a temperature that is 30℃lower than your body temperature.

Regarding the flavor and taste of coffee, it is written in one report that 71℃ is the best temperature for flavor and 68℃ for taste.

	Suitable temperature to drink
Hot water	70℃
Cold water	13℃
Hot food	60 - 70℃
Cold food	5 - 11℃

Coffee Temperature

Dripper	Temperature just after brewing	Temperature when it is served	Suitable temperature for drink
Paper Filter Dripper	85～87℃	80～82℃	68～70℃
Flannel Dripper	78～80℃	75～77℃	

CAFEC Hand-drip (Pour Over)

① Put a paper filter on a dripper and put coffee powder as you need in it. (Around 10~12g coffee powder for one cup)

② Pour water by drawing a circle from center to outside slowly to spread all over the coffee powders.

③ Stop pouring and wait for around 30secs for blooming.

④ After some cracks appear on the surface, pour water again to the center some times slowly. Then pour water like drawing small circles until the coffee liquid reaches the volume you want. Then remove the dripper.

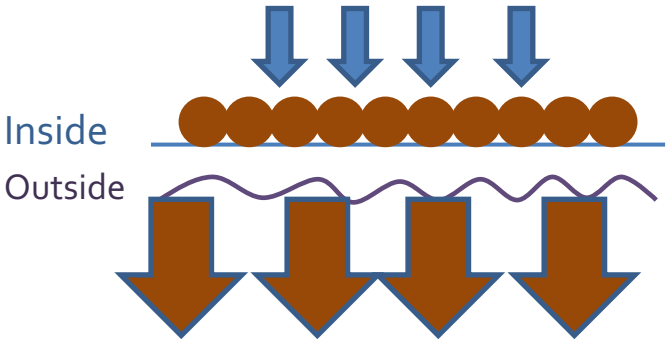
Point

The round hole at the center is the mark to show that you get a good taste of coffee!!

How to hand-drip by CAFEC method ☞

Roasting Level
Special Paper for Coffee

Light Roast Paper for Aroma & Clean Cup

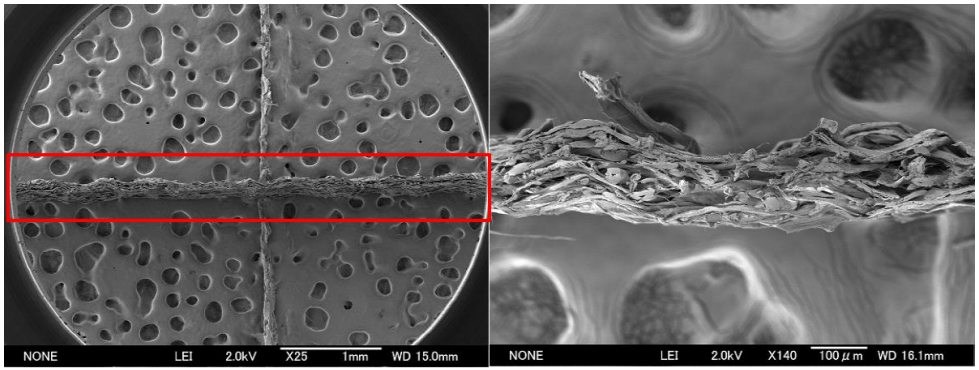


-For Aroma & Clean Cup

-Thickness-1: Thickness 0.15 mm
-Density: High
-One-Side Crepe (No crepe on inside and crepe on outside)
- Temperature: 92℃

There is NO crepe inside paper therefore the inner surface area is small. Coffee fine powders attach within this small area, so little water path is left and water builds up inside the paper filter. By building up water, **plenty of aroma** comes out. Furthermore, thanks to the outside crepe, the coffee liquid that came outside flow smoothly.
Because its paper density is high, almost all fine powder is removed perfectly. You can get a **clean cup** of coffee.

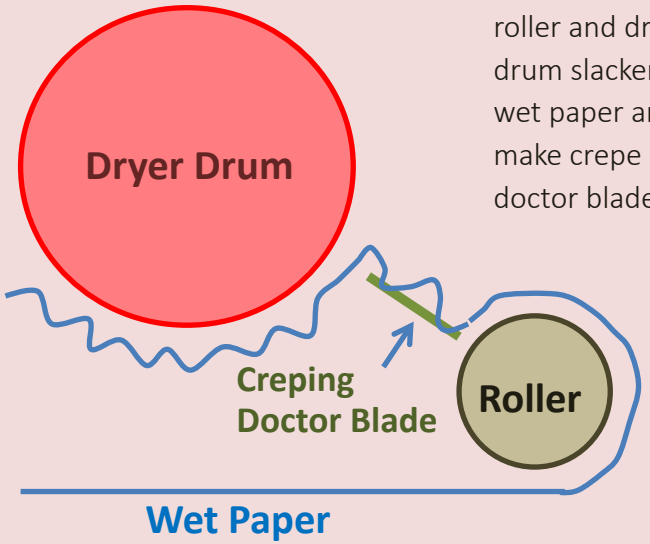
Light Roast Paper



Paper-making of Light Roast Paper Filter

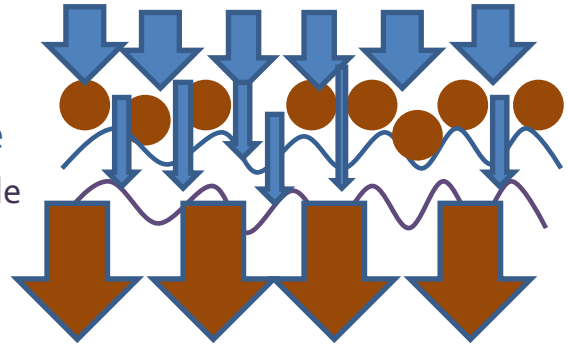
【Wet Creping Method】

The roller rotates faster than that of the Dryer drum. Thanks to the rotating speed difference (the difference is smaller than that when the dark roast paper is made), the wet paper gets loose at the doctor blade. The lower crepe is made by the speed difference but the paper with lower two-side crepe is dried on the drum, so the one-side crepe becomes little then made the paper with one-side low crepe.



The rotating-speed difference between the roller and dryer drum slacken the wet paper and make crepe at the doctor blade.

Medium-Dark Roast Paper Filter for Balance & Flavor

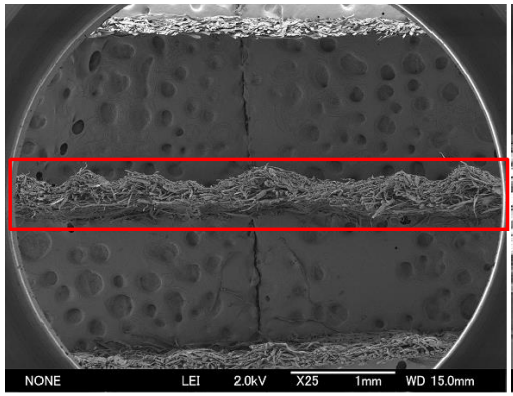


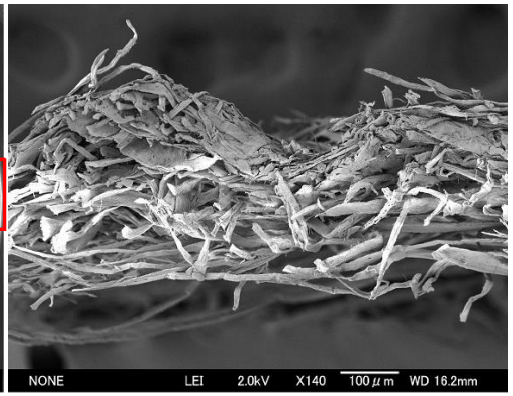
-For Balance & Flavor

-Thickness-3: Thickness 0.28 mm
-Density: Low
-Two-Side Crepe (Good balanced height)
- Temperature: 90℃

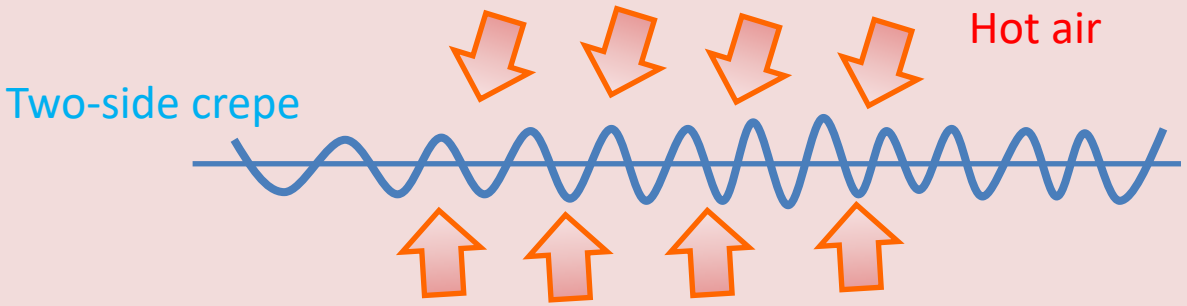
The well-balanced Two-Side Crepe let water flow smoothest. The surface area is the largest among the three papers so water path can be kept until last even if all fine powder is attached. Smooth water flow makes a cup with well-balanced rich flavor.

Medium-Dark Roast Paper Filter



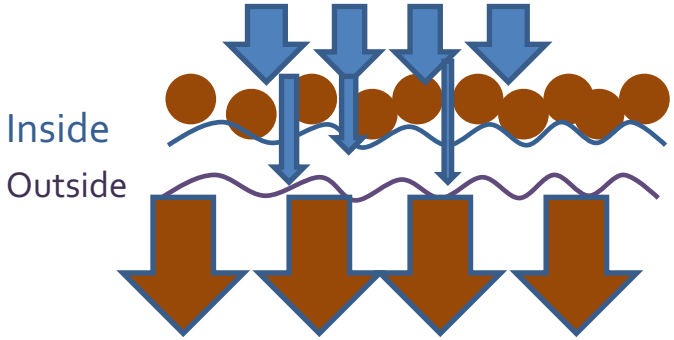


Paper-making of Medium-Dark Roast Paper Filter



【Air Through Dry】 Wet paper is dried by hot air in a flat state, so well-balanced two side crepe is kept after dried well.

Dark Roast Paper Filter for Body & Sweetness

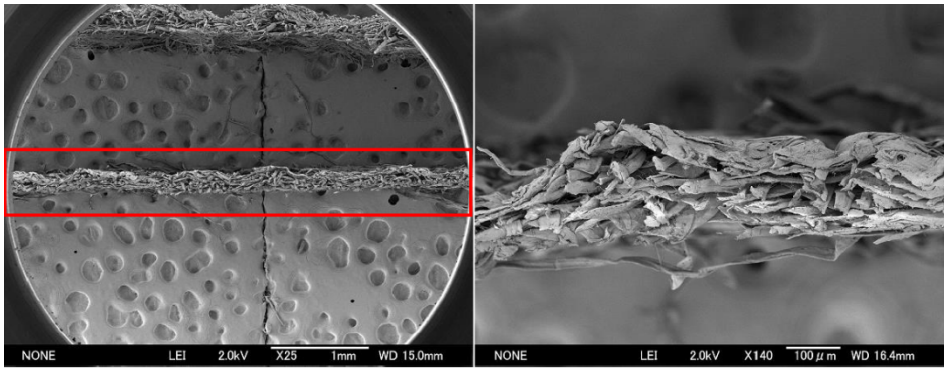


-For Body & Sweetness

-Thickness-2: Thickness 0.22mm
-Density: Middle
-Two-Side Crepe (Dense: low-height)
-Temperature: 83℃

This paper has the “Two-Side Crepe” but the height of crepe is set to be lower. The surface area is a little larger than that of One-Side Crepe, that is the adhesion area for fine powder is also larger. In the first half of brewing, because adhesion of fine powder is not so much, water can flow smoothly but in the last half, its adhesion becomes larger then it applies the brakes to water flow.
The first fast and later slow water flow finish up the coffee **with body and sweetness**.

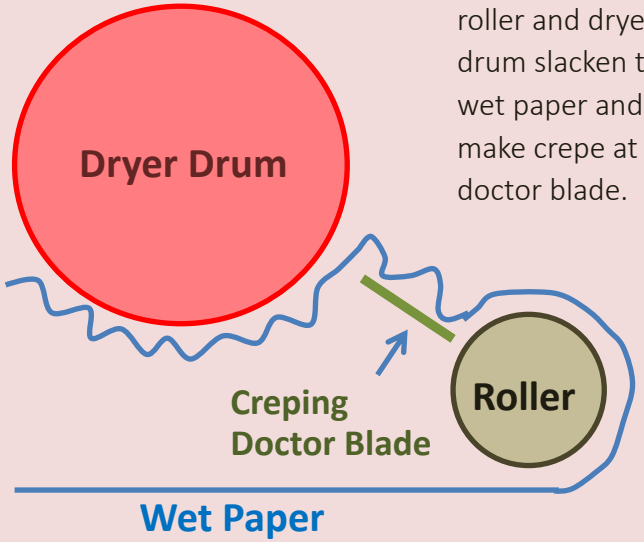
Dark Roast Paper Filter



Paper-making of Dark Roast Paper Filter

【Wet Creping Method】

The roller rotates faster than that by the Dryer drum. Thanks to the rotating speed difference (the difference is bigger than that when the light roast paper is made), the wet paper loose at the doctor blade. The two-side crepe is made by the speed difference but the paper with two-side crepe is dried on the drum, so the two-side crepe becomes lower than that made by Air Through dry.



The rotating-speed difference between the roller and dryer drum slacken the wet paper and make crepe at the doctor blade.