



RADIAL UNIFORMITY OF ESPRESSO EXTRACTIONS

STÉPHANE RIBES – MARCH 2020

RADIAL UNIFORMITY OF ESPRESSO EXTRACTIONS TEST PROTOCOL



EY puck
outside

EY puck
middle

EY puck
centre



EY
espresso

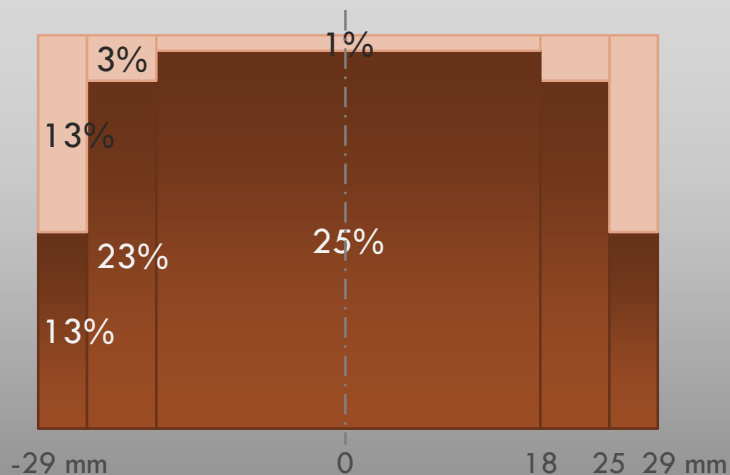
*Extraction Yield (EY) values
determined with TDS measurements*

V60 PAPER FILTER BELOW THE ESPRESSO PUCK

No paper filter



Extraction yield radial distribution

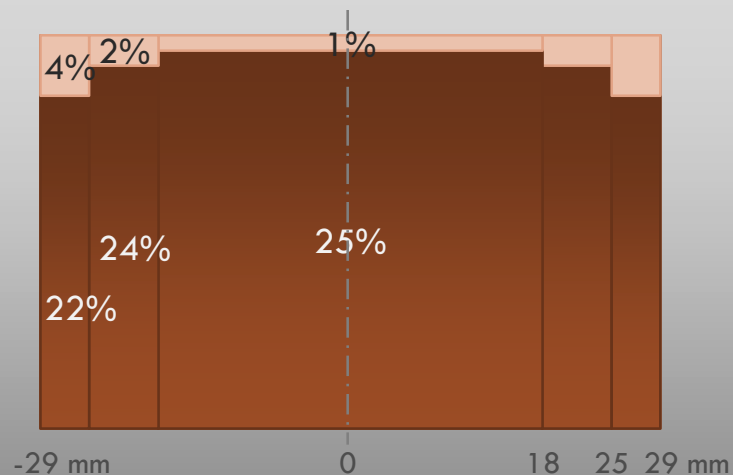


EY espresso
21%

V60 paper filter below the puck



Extraction yield radial distribution



EY espresso
24%

- During a standard espresso shot (no paper filter), the extraction of the outer grinds of the puck (1/4 of the total dose weight) is **only half the extraction of the center grinds**
- With a paper filter below the puck the **extraction is much more uniform**
- This results in a **considerably increased average extraction yield (21% → 24%)**

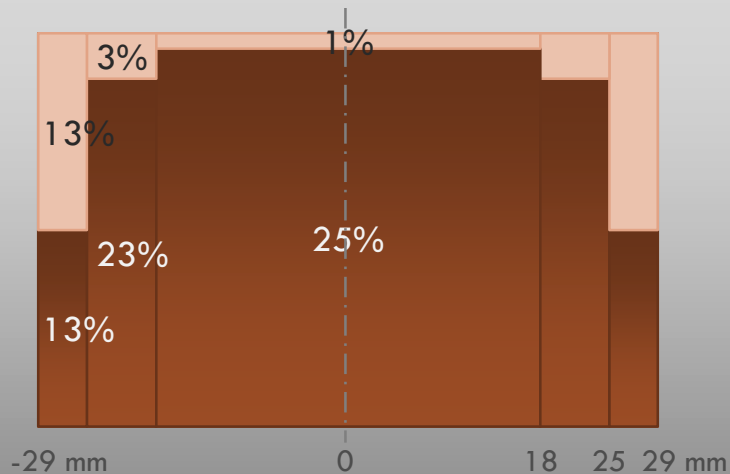
*Same grind setting for all shots (EK1.6)
12 grams dose in a 15g VST basket
The Force Tamper, Flat base, 58.5 mm
1:2.5 brew ratio*

CONVEX TAMPER BASE

Flat tamper base



Extraction yield radial distribution

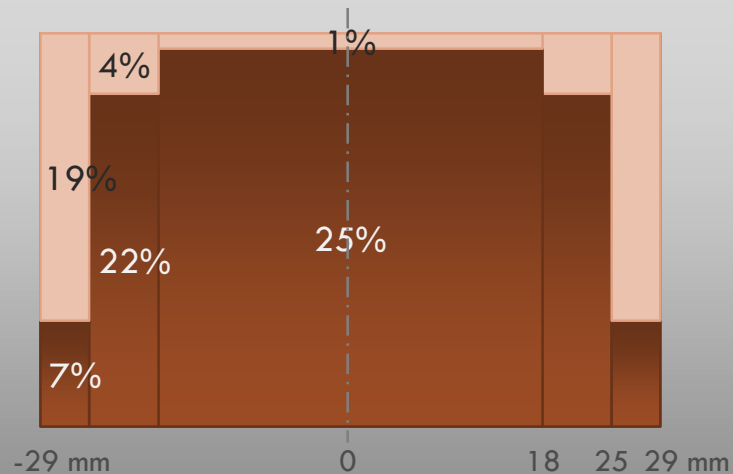


EY espresso
21%

Convex tamper base (US curve)



Extraction yield radial distribution



EY espresso
20%

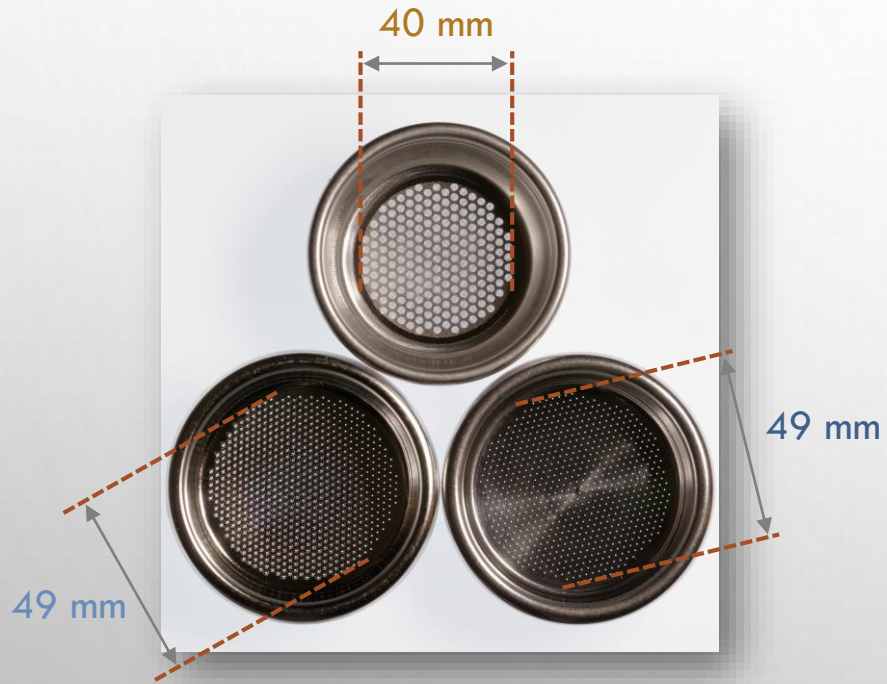
- A convex tamper base increases the flow in the center of the puck
- The **radial uniformity** of the espresso extraction is **further deteriorated and the average extraction is lower**

Same grind setting for all shots (EK1.6)
12 grams dose in a 15g VST basket
The Force Tamper, smooth bases, 58.5 mm
1:2.5 brew ratio

RADIAL UNIFORMITY OF ESPRESSO EXTRACTIONS

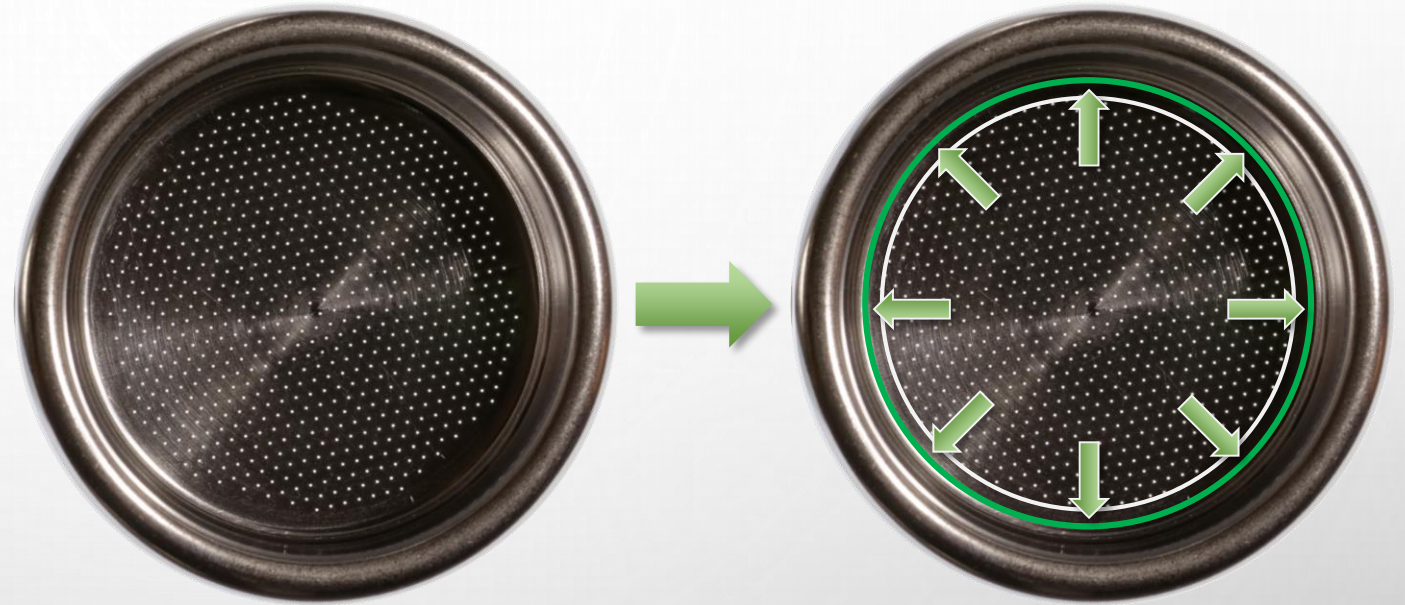
NEXT STEPS TO IMPROVE EXTRACTION UNIFORMITY

Reneka Micro-Sieve filter basket



IMS
B702TFh22NT

VST 15g
precision basket



- With a diameter of 40 mm, the perforated surface area of the Reneka basket is **33% smaller than** that of the Decent, VST or IMS baskets (49 mm diameter)
- Assuming that this could be the cause of the **typical loss of Extraction Yield of 3 points** with this basket, it is reasonable to believe that **an expansion of the perforated area of precision baskets could improve the radial uniformity of the extraction!** (49 mm to 53 mm → + 17% in the perforated surface area)

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TEST PROTOCOL DETAILS

- **Decent Espresso Machine DE1PRO v1.1** with a (red) Cafelat 8.0 mm silicone gasket
- IMS SI 200 IM screen (no spacer)
- Mahlkönig EK43 S grinder – SSP burrs “High Uniformity” with Silver Knight coating
- Montille water (Le Mont Dore, France) – **adjusted to 50 ppm eq. CaCO₃ alkalinity and 125 ppm eq. CaCO₃ total hardness**, with sodium carbonate and Epsom salts
- Complete drying of the basket and shower screen before each shot, with a clean tissue
- Single dosing of frozen beans ground in a double walled stainless steel cup
- 12g of ground coffee in a VST 15g ridgeless filter basket
- **WDT in the basket with a Londinium tool** (and a Decent funnel) – no vertical tapping – gentle raking of the coffee grounds with a hog tool, to obtain a uniform surface
- **The Force Tamper with 58.5 mm smooth bases – flat base or US curved – used twice in a row**
- TDS measurements: Atago PAL zeroed with adjusted Montille water – no filtering of the coffee samples – all samples measured at room temperature after vigorous stirring
1 data point = average of 3 to 5 measurements of each coffee sample



ETHIOPIA SEMEON ABAY

Semeon Abay. A name that is famous in the specialty coffee world for one crazy tasting coffee. So complex and so intense that Lex dares to say it's his all time favourite coffee ever. Big words.

Semeons' coffee was first made famous during his time at 90+ some years ago. We managed to get our hands on a few kilos, which blew our minds and that was that it was gone forever!

He now works at Nordic Approach, and just like LCD Soundsystem suddenly it was back and they decided to replicate his experimental process on a larger scale!

They call it “in-bag fermentation” and in a nutshell it goes like this... The cherries are picked, sorted and put in large sacks and these sacks are stacked in piles of 2. The sacks are then rotated every 12 hours for 5 days so the sack on the bottom goes on top and round it goes. After that the cherries are spread on drying beds for around 15 - 20 days to stop the fermentation process from going too far. Why do all of this? Because pineapple and mango, peach, strawberry, dark chocolate and cacao nibs! Thats why!

HYBRID “LEVER-BLOOMING” PROFILE

2.5 ML/S EXTRACTION

0 PRESETS ADVANCED MACHINE APP

Steps

1. lock portafilter!
2. preinfusion
3. low pressure bloom
4. flow rise *
5. hold flow *

1: Temperature

goal 90°C sensor coffee

2: Pump

flow - pressure 0.0 bar transition fast

3: Duration

time 5 seconds

4: Move on if...

pressure is over pressure is under flow is over flow is under

Insert a step

lock portafilter!

Steps Limits Cancel Ok

1 PRESETS ADVANCED MACHINE APP

Steps

1. lock portafilter!
2. preinfusion
3. low pressure bloom
4. flow rise *
5. hold flow *

1: Temperature

goal 90°C sensor coffee

2: Pump

flow 6.0 mL/s pressure - transition fast

3: Duration

time 20 seconds

4: Move on if...

2.5 bar

pressure is over pressure is under flow is over flow is under

Insert a step

preinfusion

Steps Limits Cancel Ok

2 PRESETS ADVANCED MACHINE APP

Steps

1. lock portafilter!
2. preinfusion
3. low pressure bloom
4. flow rise *
5. hold flow *

1: Temperature

goal 90°C sensor coffee

2: Pump

flow - pressure 3.0 bar transition fast

3: Duration

time 6 seconds

4: Move on if...

pressure is over pressure is under flow is over flow is under

Insert a step

low pressure bloom *

Steps Limits Cancel Ok

3 PRESETS ADVANCED MACHINE APP

Steps

1. lock portafilter!
2. preinfusion
3. low pressure bloom
4. flow rise *
5. hold flow *

1: Temperature

goal 90°C sensor coffee

2: Pump

flow 2.5 mL/s pressure - transition smooth

3: Duration

time 10 seconds

4: Move on if...

pressure is over pressure is under flow is over flow is under

Insert a step

flow rise *

Steps Limits Cancel Ok

4 PRESETS ADVANCED MACHINE APP

Steps

1. lock portafilter!
2. preinfusion
3. low pressure bloom
4. flow rise *
5. hold flow *

1: Temperature

goal 90°C sensor coffee

2: Pump

flow 2.5 mL/s pressure - transition fast

3: Duration

time 45 seconds

4: Move on if...

pressure is over pressure is under flow is over flow is under

Insert a step

hold flow *

Steps Limits Cancel Ok

- Combination of the Londinium and blooming profiles
- The initial step “lock portafilter!” is optional: it prevents exposure of the coffee puck to the hot machine environment during the final warm-up of the brew water