All Grain Partial Boil

By Chris Ash

NBA
NORDEAST BREWERS ALLIANCE

Partial Boil

What is it?

In a nutshell, It’s a no-sparge mash using only the amount of water that your brew kettle will hold (plus grain absorption). And then you dilute with plain water to reach your target volume (and/or OG) in the fermenter.

Why would I do this?

I normally brew outside, usually after the kids go to bed.
Its dark, cold, and I have no water source outside.
Partial boil allows me to brew inside on a stove, but still use all-grain recipes.

Plus…I am too cheap to brew with extract.
About $6.00 for 10 pounds of base malt
Vs
About $24.00 for 7.5 pounds of extract

There is a big cost savings, but obviously a lot more time is involved in all-grain.

Recipe Design - Malt

Since you are doing a no-sparge mash, not rinsing the grains, and using less water, you will take a significant hit in efficiency.

I typically get 70% efficiency batch sparging, but with Partial Boil, I drop to about 50% efficiency.
I have hit the mid 50's and even 60% a few times, but my normal is about 50%.
To account for the hit in efficiency, add a few more pounds of base malt ($2.25)

14.97 pounds

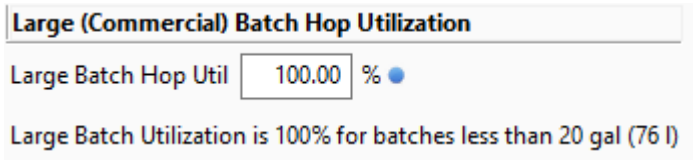
Amt	Name
9 lbs 12.0 oz	Pale Malt, 2-Row (Rahr) (1.8 SRM)
3 lbs	Munich II (Weyermann) (8.5 SRM)
9.0 oz	Caramel Malt - 30L (Briess) (30.0 SRM)
8.7 oz	Caramunich I (Weyermann) (51.0 SRM)
8.4 oz	Crystal 90 Patagonia (90.0 SRM)
8.0 oz	Aromatic Malt (Dingemans) (19.0 SRM)
1.4 oz	Caramel/Crystal Malt - 80L (80.0 SRM)

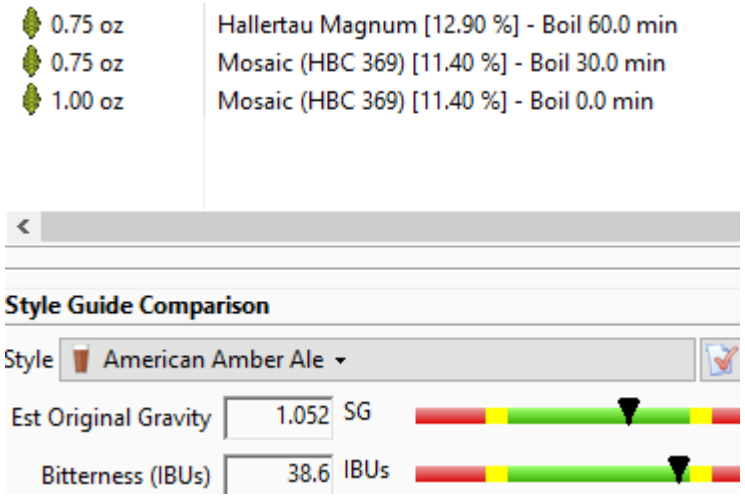
11.22 pounds

Amt	Name
6 lbs	Pale Malt, 2-Row (Rahr) (1.8 SRM)
3 lbs	Munich II (Weyermann) (8.5 SRM)
9.0 oz	Caramel Malt - 30L (Briess) (30.0 SRM)
8.7 oz	Caramunich I (Weyermann) (51.0 SRM)
8.4 oz	Crystal 90 Patagonia (90.0 SRM)
8.0 oz	Aromatic Malt (Dingemans) (19.0 SRM)
1.4 oz	Caramel/Crystal Malt - 80L (80.0 SRM)

Recipe Design - Hops

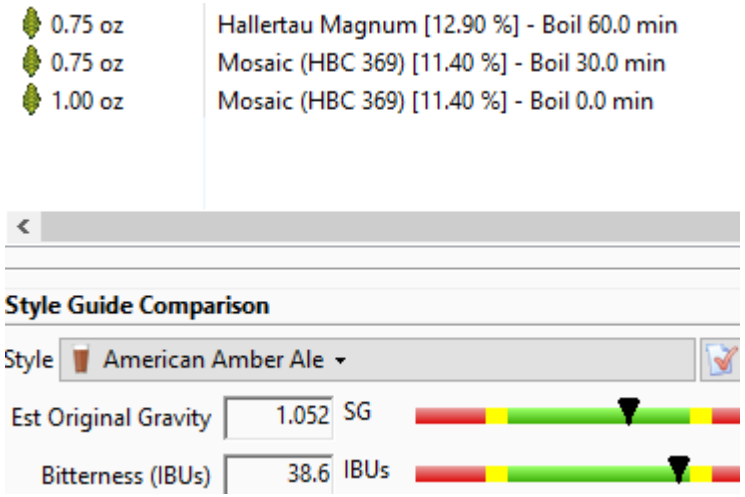
Since your pre-boil volume is only about 3 gallons and your pre-boil wort is a lot higher in SG, you may find that your beer isn't as bitter as you thought it might be.
In the equipment profile of Beersmith, you can adjust the hop utilization down for a better calculation, or just aim for the higher end of the IBU range.

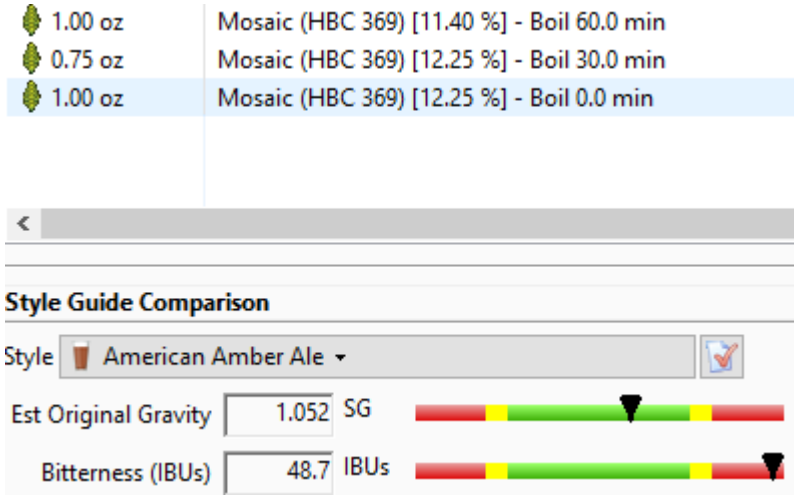




Oh $#!t

My recipe called for 1/2 oz of Magnum 12.9%, but I grabbed the wrong cup and instead used 1oz of Mosaic 11.4% for the 60 minute addition.
39 IBU's vs 49 IBU's

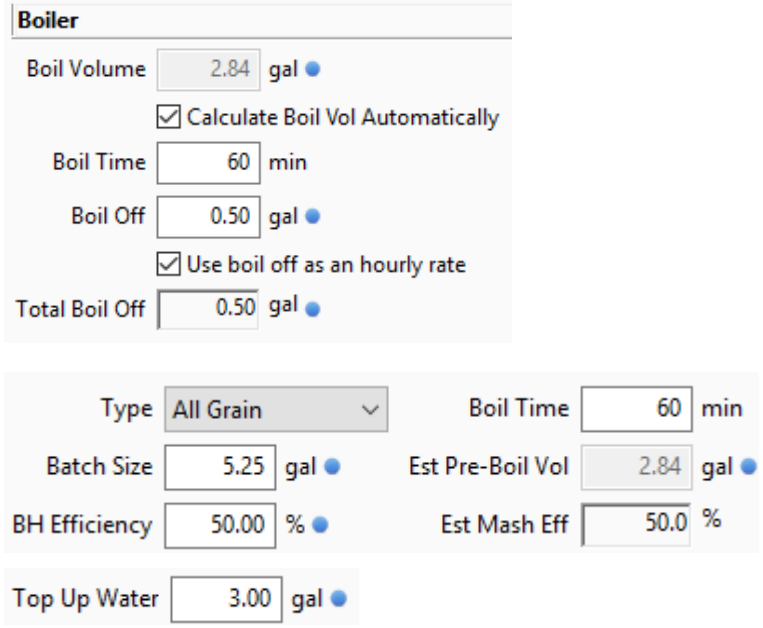




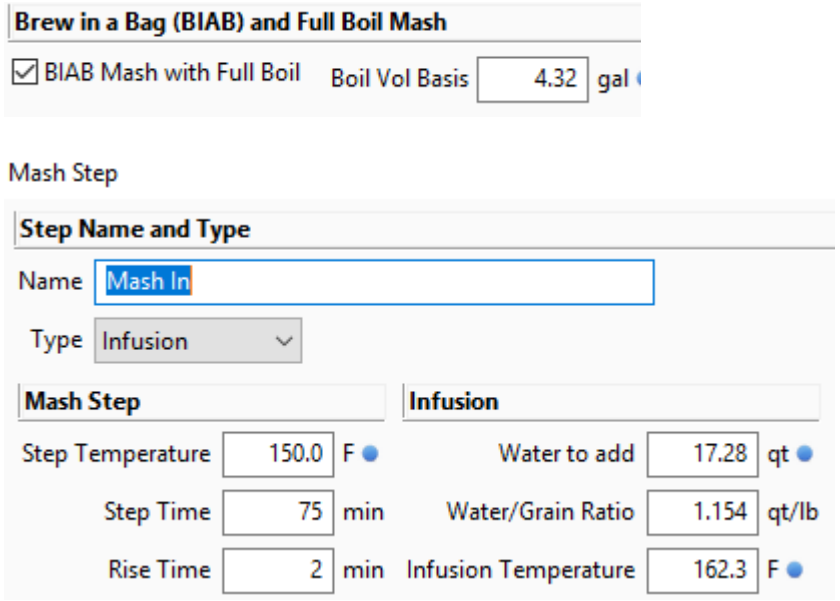
Recipe Design - Water

In Beersmith, setup and equipment and mash profile to calculate the water amounts.
And then adjust the Batch Size, Pre-boil Vol, and Top-up water settings as needed.

Equipment profile for brew kettle



Mash Profile



Recipe Design – Water Additions

Treat your strike water by adding salts and acid the same you would normally treat it. Treat your dilution water the same as you would your sparge water. Prior Lake has horrible brewing water. For light, delicate, and competition recipes, I build up from 100% RO water, or a portion of RO and faucet water. For this recipe, I used 100% Prior Lake water. In addition to the below, I added ½ Campden tablet to the Mash water, and ½ Campden tablet to the dilution water.

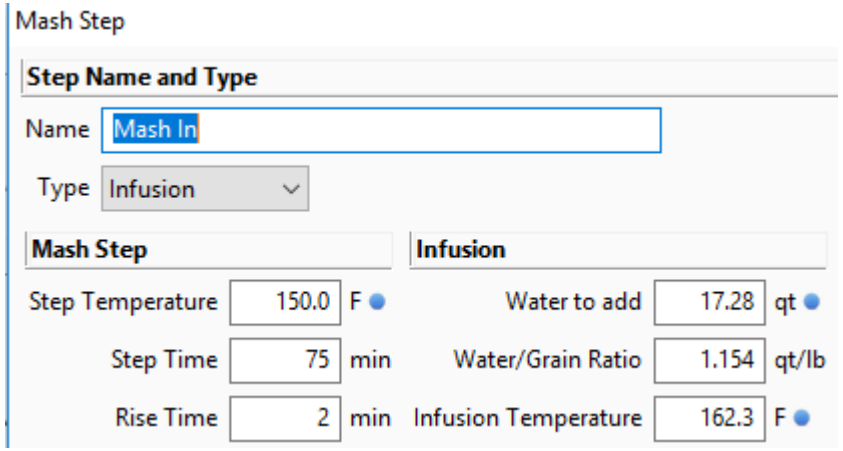
Desired Water Profile	Calcium (ppm)	Magnesium (ppm)	Sodium (ppm)	Sulfate (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Amber Balanced	50	10	15	75	63	40
Existing Water Profile	83	37	10	21	11	458
Mashing Water Profile	134	37	10	65	68	162
Overall Finished Water Profile	134	37	10	65	68	NA

Estimated Mash pH	5.45	This pH value is NOT VALID until the grain information is properly entered for the beer on the **Grain Bill Input** sheet.						Total Water Additions: Mash		Total Water Additions: Sparge		Total Batch Volume	
Water Additions								Water Volume (gal)	4.88	Water Volume (gal)	3.00	Water Volume (gal)	5.50
Minerals	Addition (gram/gal)	Calcium (ppm)	Magnesium (ppm)	Sodium (ppm)	Sulfate (ppm)	Chloride (ppm)	Bicarbonate (ppm)	Total Mineral Additions (grams)		Total Mineral Additions (grams)			
Gypsum ($CaSO_4 \times 2H_2O$)	0.30	18.5			44.2			1.46		0.90			
Calcium Chloride ($CaCl_2$)	0.45	32.4				57.3		2.19		1.35		Dihydrate	What form c
Epsom Salt ($MgSO_4 \times 7H_2O$)	0.00		0.0		0.0			0.00		0.00		10.0	Liquid $CaCl_2$

Acids	Addition				(ppm)	(ppm)	(ppm)		
Mash	(mL/gal)	**Mash** Acid Strength parameters are entered **below**						Total Acid Addition (ml)	
Lactic	1.60	Strength	88.0	%	0.0	0.0	-295.5	7.80	
	(mL/gal)							Total Acid Addition (ml)	
Phosphoric	0.00	Strength	10.0	%	0.0	0.0	0.0	0.00	
Sparge	**Sparge** Acid Strength parameters are entered on the **Sparge Acidication** sheet								Total Acid Addition (ml)
Lactic		Strength	88.0	%	0.0	0.0			5.14

Process

Since the target pre-boil volume is 2.84 gallons, BS suggests a strike water volume of 17.28 quarts.
Perform a normal mash and vorlouf as you normally would.
I recirculate during the last 15 minutes with a pump.



Process

Drain into your brew kettle. Bring to a boil and brew normally.

Dilution Water

Boiling isn’t necessary, but wont hurt.

Sanitize your fermenter before the dilution water goes in. It seems obvious, but can be forgotten.

Put your fermenter outside or in your chamber set for freezing.
The colder the water, the closer to pitching temp.

At the end of the boil, you are basically emulating an extract brew.
Dump the brew kettle contents into the fermenter, trub and all.

Chill to pitching temp.

Comparison to Extract / Full Boil

Advantages

Cheaper than extract
Time advantage over sparging and chilling
Brew indoors/apartment brewing

- Water source nearby
- Warm, light
- Spend time with the family

No equipment to buy – if you have a stock pot (4-5 gal).

- No need for a chiller, burner(s), HLT, etc.

Easier gateway to full boil

- Mash tun, false bottom or bag are re-usable

Disadvantages

Hit in efficiency adds additional cost

You brew indoors

- Easy to make a mess
- Crabby wife hates the smell.

Need a 4 gallon or so stock pot.
Wort can only chill to about 80, need to wait to pitch yeast

Thank You

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