04 SMaSH Fuggle

Step 1: Enter Starting Water							
	Profile						
	Calcium	Magnesium	Sodium	Chloride	Sulfate	Bicarbonate (HCO ₃ ppm)	
A. Profile	(Ca ppm)	(Mg ppm)	(Na ppm)	(CI ppm)	(SO ₄ ppm)	O Alkalinity (CaCC	O ₃ ppm)
Starting Water Profile:	41	9	67	0	44	178	
(ppm = mg/L)				,	†	, ,	
B. Volume	Mash Water	Sparge Water				If your water report	gives Sulfate as Sulfur
Volume (liters):	3	6,1				(SO ₄ -S) such as a	Ward Lab's report,
(gallons):	0,79	1,61				multiply by that by	3 to get SO₄
	-						
% that is Distilled or RO:	0%	0%					
Ston O. Enton Crain Info				Distilled water		avain tunna	diat water al l
Step 2: Enter Grain Info	Select Grain	Weight	Color (°L)	Mash pH	1	grain types - Select Grain -	dist water pH
		•	(Crystal Malts Only)	(from chart)	2		5,70
Crystal Malt:	Type	(kg)	(Orystal Maits Offly)	<u> </u>		Base - 6-Row	, , ,
Caramel malts, Cara Munich,	Base - Maris Otte 🔻	1		5,77			5,79
Cara Aroma, etc.	- Select Grain - 🔻	0		0,00	4	Base - Maris Otte	5,77
	- Select Grain - 🔻	0		0,00	5	Base - Munich	5,43
Roasted/Toasted Malt:	- Select Grain - 🔻	0		0,00	6	Base - Pilsner	5,75
Roasted Barley, Black Patent, Carafa, etc.	- Select Grain - ▼	0		0,00	7	Base - Wheat	6,04
,	- Select Grain - 🔻	0		0,00	8	Base - Vienna	5,56
Acidulated Malt:	- Select Grain - 🔻	0		0.00	9	Base - Other	5,70
Enter in Step 4a.	- Select Grain - ▼	0		0,00	10	Crystal Malt	calculated
	- Select Grain - 🔻	0		0.00		Roasted/Toasted	4,71
Total (Grain Weight (kg):	1		0,00			· ·
, otal C	(lbs):	2,2					calculate mash pH. maltser or other factors
	Mash Thickness:	3 l/kg					been found to be 5.56.
		1,44 qt/lb			Modify if r	necessary.	
Step 3: View Mash pH		•	./		Note: When	measuring actual n	nash pH with a meter,
•	C#ootius.		ESTIMATED	5	keep in min	d that it can take up	to 15 minutes for mash
				nH to stabilize			
	Alkalinity	Residual	Room-Temp Mash pH	Room-Temp			
	(CaCO ₃ ppm)	Alkalinity		Mash pH	There are v	arvina oninions on th	ne ontimum range here
	146	90	5,86	5.4 - 5.6		varying opinions on the optimum range here. loing your own research and/or	
•					experimenta	ation to determine w	hat's best for you.
Step 4a: Adjust Mash pH DO	WN (if needed)						
	Gypsum	Calc. Chloride	Epsom Salt	_	Acidulated Malt		
add at dough-in or prior.	CaSO₄	CaCl ₂					Lactic Acid
		2	MgSO ₄	acid content:	2,0%	acid content:	80%
Mash Water Additions (grams):	0	0,31	0,09	acid content: grams:	2,0%	acid content:	
Mash Water Additions (grams): Adjusting Sparge Water? (y/n):	0		-			ml:	80%
,		0,31	0,09	grams: <i>oz:</i>	0	ml: Typically 2.0%.	80%
Adjusting Sparge Water? (y/n):	0,0	0,31	0,09	grams: oz:	0 0,0 (0% of total wt)	ml: Typically 2.0%.	80% 0 Revise if necessary.
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams):	0,0 to sparging, or con	0,31	0,09 0,0 alts when treating	grams: oz: all water combined	0,0 (0% of total wt) prior to brewing.	ml: Typically 2.0%. Some recommend	80% 0 Revise if necessary.
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior	0,0 to sparging, or con	0,31	0,09	grams: oz: all water combined Calculations for ch acid to fully dissolv	0 0,0 (0% of total wt) prior to brewing. alk's true affect o	ml: Typically 2.0%. Some recommend n pH are very compeet uses half of cha	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior	0,0 to sparging, or con (if needed)	0,31 0,0 mbine with mash s	0,09 0,0 alts when treating	grams: oz: all water combined Calculations for ch acid to fully dissolv	0 0,0 (0% of total wt) prior to brewing. alk's true affect o	ml: Typically 2.0%. Some recommend	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP	0,0 to sparging, or coll (if needed) Slaked Lime	0,31 0,0 mbine with mash s	0,09 0,0 alts when treating Chalk	grams: oz: all water combined Calculations for ch acid to fully dissolv	0 0,0 (0% of total wt) prior to brewing. alk's true affect o	ml: Typically 2.0%. Some recommend n pH are very compeet uses half of cha	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior.	0,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃	0,09 0,0 alts when treating Chalk CaCO ₃	grams: oz: all water combined Calculations for ch acid to fully dissolv	0 0,0 (0% of total wt) prior to brewing. alk's true affect o	ml: Typically 2.0%. Some recommend n pH are very compeet uses half of cha	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams):	0,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂ 0	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0	0,09 0,0 alts when treating Chalk CaCO ₃ 0	grams: oz: all water combined Calculations for ch acid to fully dissolv	0 0,0 (0% of total wt) prior to brewing. alk's true affect o	ml: Typically 2.0%. Some recommend n pH are very compeet uses half of cha	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior	o,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cor	0,31 0,0 nbine with mash s Baking Soda NaHCO ₃ 0	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0	grams: oz: all water combined Calculations for ch acid to fully dissolv on experimental da	0 0,0 (0% of total wt) prior to brewing. alk's true affect o ve. This spreadsh ata w/o acid additi	ml: Typically 2.0%. Some recommend n pH are very compeet uses half of cha	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams):	o,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cor r Profile	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0 alts when treating	grams: OZ: all water combined Calculations for ch acid to fully dissolv on experimental da all water combined	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi	ml: Typically 2.0%. Some recommend n pH are very comp neet uses half of cha on. Results may va	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry.
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior	o,0 to sparging, or con (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or con r Profile Calcium	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0 alts when treating	grams: OZ: all water combined Calculations for ch acid to fully dissolv on experimental da all water combined Chloride	0 0,0 (0% of total wt) prior to brewing. alk's true affect o re. This spreadsh ata w/o acid additi	ml: Typically 2.0%. Some recommend n pH are very comp neet uses half of cha on. Results may va	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 5: View Resulting Water	o,0 to sparging, or con (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or con r Profile Calcium (Ca ppm)	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0 alts when treating Sodium (Na ppm)	grams: OZ: all water combined Calculations for ch acid to fully dissolv on experimental da all water combined Chloride (Cl ppm)	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi prior to brewing. Sulfate (SO ₄ ppm)	ml: Typically 2.0%. Some recommend In pH are very complete uses half of chains. Results may vain. Chloride Rat	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate io
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 5: View Resulting Water Mash Water Profile:	o,0 to sparging, or cord (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cord r Profile Calcium (Ca ppm) 69	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s Magnesium (Mg ppm)	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0 alts when treating Sodium (Na ppm) 67	grams: OZ: all water combined Calculations for chacid to fully dissolv on experimental da all water combined Chloride (Cl ppm) 49	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi prior to brewing. Sulfate (SO ₄ ppm) 56	ml: Typically 2.0%. Some recommend In pH are very complete uses half of chains. Results may vai Chloride in Rat 0,8	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate io
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 5: View Resulting Water Mash Water Profile: Mash + Sparge Water Profile:	o,0 to sparging, or cord (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cord r Profile Calcium (Ca ppm) 69 50	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s Magnesium (Mg ppm) 12 10	0,09 0,0 alts when treating Chalk CaCO ₃ 0 0,0 alts when treating Sodium (Na ppm) 67 67	grams: OZ: all water combined Calculations for chacid to fully dissolv on experimental de Chloride (CI ppm) 49 16	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi prior to brewing. Sulfate (SO ₄ ppm) 56 48	ml: Typically 2.0%. Some recommend In pH are very complete uses half of chaon. Results may vain the chloride of Rat 0,8	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate io 9
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 5: View Resulting Water Mash Water Profile: Mash + Sparge Water Profile: Palmer's Recommended Ranges:	o,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cor r Profile Calcium (Ca ppm) 69 50 50 - 150	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s Magnesium (Mg ppm) 12 10 10 - 30	0,09 O,0 alts when treating Chalk CaCO ₃ 0 O,0 alts when treating Sodium (Na ppm) 67 67 0 - 150	grams: OZ: all water combined Calculations for ch acid to fully dissolv on experimental da all water combined Chloride (CI ppm) 49 16 0 - 250	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi prior to brewing. Sulfate (SO ₄ ppm) 56 48 50 - 350	Typically 2.0%. Some recommend In pH are very complete uses half of chains. Results may value. Chloride in Ration. 0,8 0,3 Below .77, May en	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate io 9 thance bitterness
Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 4b: Adjust Mash pH UP add at dough-in or prior. Mash Water Additions (grams): Adjusting Sparge Water? (y/n): Sparge Water Additions (grams): add to boil, or to sparge water prior Step 5: View Resulting Water Mash Water Profile: Mash + Sparge Water Profile:	o,0 to sparging, or cor (if needed) Slaked Lime Ca(OH) ₂ 0 0,0 to sparging, or cor r Profile Calcium (Ca ppm) 69 50 50 - 150	0,31 0,0 mbine with mash s Baking Soda NaHCO ₃ 0 0,0 mbine with mash s Magnesium (Mg ppm) 12 10 10 - 30	0,09 O,0 alts when treating Chalk CaCO ₃ 0 O,0 alts when treating Sodium (Na ppm) 67 67 0 - 150	grams: OZ: all water combined Calculations for ch acid to fully dissolv on experimental da all water combined Chloride (CI ppm) 49 16 0 - 250	0 0,0 (0% of total wt) prior to brewing. alk's true affect o e. This spreadsh ata w/o acid additi prior to brewing. Sulfate (SO ₄ ppm) 56 48 50 - 350	Typically 2.0%. Some recommend In pH are very complete uses half of chains. Results may value. Chloride in Ration. 0,8 0,3 Below .77, May en	80% 0 Revise if necessary. keeping this under 3% lex and may require an lk's full potential based ry. Sulfate io 9 thance bitterness