MASTERING THE ART OF HOP-FU!

Tips, tricks, and best practices for brewing award-winning India Pale Ales

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OBJECTIVES

- Brewing credentials & philosophies
- BJCP style guidelines for American IPA & Imperial IPA
- Discuss Hop-Fu! recipe and brewing procedures
- Packaging and shipping for competition

Disclaimer

These are simply the methods that I use and not necessarily the absolute best methods.

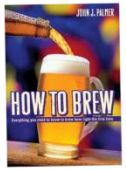
There is always more to learn and new things to try.

Who is Kelsey McNair?

- Former video game developer
- Father & Husband
- Beer Geek
- Pragmatic Hophead Homebrewer
- Founder of upcoming North Park Beer Co.

2004

2005



2006

2007 Hop-Fu! version 1 - 2

2008

Hop-Fu! version 3

2009 Hop-Fu! version 4 - 5

2010

2011

2012

2013

2014

2015

Awards for India Pale Ales

Hop-Fu! - American IPA/Imperial IPA

2014 NHC Final Round – 1st Place
2014 NHC West Division – 1st Place
2014 NHC West Division – 2nd Place
2014 America's Finest City Competition –
1st Place & Runner up BoS
2013 US Open Beer Championship (Pro-Am) – 3rd Place
2013 NHC Final Round – 2nd Place
2013 NHC West Division – 1st Place
2013 NHC West Division - 2nd Place
2012 NHC Final Round – 1st Place
2012 NHC West Division – 2nd Place
2011 Stone Brewing March Madness Homebrew Competition –
Runner Up Best of Show
2010 NHC Final Round – 1st Place
2009 SoCal Regional Homebrew Championship – 3rd Place
2009 NHC West Division – 1st Place
2008 America's Finest City Competition – 2nd Place

Apricot-Fu! - Fruit IPA

2014 NHC West Division – 2nd Place

Habanero-Fu! - Fruit IPA

2014 NHC West Division – 2nd Place

Other Imperial IPAs

2011 Pizza Port Homebrew Competition – 1st Place
2009 SoCal Regional Homebrew Championship – 3rd Place
2008 NHC West Division – 1st Place
2007 NHC West Division – 2nd Place
2006 NHC West Division – 3rd Place

West Coast Bitter, Session IPA

2010 Stone Brewing March Madness Homebrew Competition –
Best of Show
2010 San Diego County Fair – 1st Place
2010 NHC West Division – 3rd Place*

BREWHOUSE

Blichmann Engineering
Hop Rocket & Therminator

Beer, Beer & More Beer
2050 Sculpture

CELLAR

Blichmann Engineering
14 Gallon Conical Fermentor

SABCO Yeast Brink
as Brite Beer Tank

Philosophy: Brew Like a Pro, Think Like a Chef

***Pro*:**

- **Batch to batch consistency**
- **Clean transfers, avoid dissolved O2**
- **Clean yeast handling**

Chef:

- **Timing to "service" (competitions)**
- **Classic recipes are often simple ratios**

What is “Hop-Fu!” ??

- West Coast style IPA featuring 6-7 hop varieties that clocks in at 7.5% ABV
- Consistently wins medals as both American IPA and Imperial IPA (BJCP cat 14b & 14c)
- The only beer to earn multiple final round medals at NHC (3 gold, 1 silver)

BJCP Style Guidelines

14B. American IPA

Aroma: A prominent to intense hop aroma with a citrusy, floral, perfume-like, resinous, piney, and/or fruity character derived from American hops. Many versions are dry hopped and can have an additional grassy aroma, although this is not required. Some clean malty sweetness may be found in the background, but should be at a lower level than in English examples. Fruitiness, either from esters or hops, may also be detected in some versions, although a neutral fermentation character is also acceptable. Some alcohol may be noted.
Appearance: Color ranges from medium gold to medium reddish copper; some versions can have an orange-ish tint. Should be clear, although unfiltered dry-hopped versions may be a bit hazy. Good head stand with white to off-white color should persist.
Flavor: Hop flavor is medium to high, and should reflect an American hop character with citrusy, floral, resinous, piney or fruity aspects. Medium-high to very high hop bitterness, although the malt backbone will support the strong hop character and provide the best balance. Malt flavor should be low to medium, and is generally clean and malty sweet although some caramel or toasty flavors are acceptable at low levels. No diacetyl. Low fruitiness is acceptable but not required. The bitterness may linger into the aftertaste but should not be harsh. Medium-dry to dry finish. Some clean alcohol flavor can be noted in stronger versions. Oak is inappropriate in this style. May be slightly sulfury, but most examples do not exhibit this character.
Mouthfeel: Smooth, medium-light to medium-bodied mouthfeel without hop-derived astringency, although moderate to medium-high carbonation can combine to render an overall dry sensation in the presence of malt sweetness. Some smooth alcohol warming can and should be sensed in stronger (but not all) versions. Body is generally less than in English counterparts.
Overall Impression: A decidedly hoppy and bitter, moderately strong American pale ale.
Ingredients: Pale ale malt (well-modified and suitable for single-temperature infusion mashing); American hops; American yeast that can give a clean or slightly fruity profile. Generally all-malt, but mashed at lower temperatures for high attenuation. Water character varies from soft to moderately sulfate. Versions with a noticeable Rye character ("RyePA") should be entered in the Specialty category.
Vital Statistics: OG: 1.056 – 1.075 / IBUs: 40 – 70 / FG: 1.010 – 1.018 / SRM: 6 – 15 / ABV: 5.5 – 7.5%

BJCP Style Guidelines

14C. Imperial IPA

Aroma: A prominent to intense hop aroma that can be derived from American, English and/or noble varieties (although a citrusy hop character is almost always present). Most versions are dry hopped and can have an additional resinous or grassy aroma, although this is not absolutely required. Some clean malty sweetness may be found in the background. Fruitiness, either from esters or hops, may also be detected in some versions, although a neutral fermentation character is typical. Some alcohol can usually be noted, but it should not have a "hot" character.
Appearance: Color ranges from golden amber to medium reddish copper; some versions can have an orange-ish tint. Should be clear, although unfiltered dry-hopped versions may be a bit hazy. Good head stand with off-white color should persist.
Flavor: Hop flavor is strong and complex, and can reflect the use of American, English and/or noble hop varieties. High to absurdly high hop bitterness, although the malt backbone will generally support the strong hop character and provide the best balance. Malt flavor should be low to medium, and is generally clean and malty although some caramel or toasty flavors are acceptable at low levels. No diacetyl. Low fruitiness is acceptable but not required. A long, lingering bitterness is usually present in the aftertaste but should not be harsh. Medium-dry to dry finish. A clean, smooth alcohol flavor is usually present. Oak is inappropriate in this style. May be slightly sulfury, but most examples do not exhibit this character.
Mouthfeel: Smooth, medium-light to medium body. No harsh hop-derived astringency, although moderate to medium-high carbonation can combine to render an overall dry sensation in the presence of malt sweetness. Smooth alcohol warming.
Overall Impression: An intensely hoppy, very strong pale ale without the big maltiness and/or deeper malt flavors of an American barleywine. Strongly hopped, but clean, lacking harshness, and a tribute to historical IPAs. Drinkability is an important characteristic; this should not be a heavy, sipping beer. It should also not have much residual sweetness or a heavy character grain profile.
Ingredients: Pale ale malt (well-modified and suitable for single-temperature infusion mashing); can use a complex variety of hops (English, American, noble). American yeast that can give a clean or slightly fruity profile. Generally all-malt, but mashed at lower temperatures for high attenuation. Water character varies from soft to moderately sulfate.
Vital Statistics: OG: 1.070 – 1.090 / IBUs: 60 – 120 / FG: 1.010 – 1.020 / SRM: 8 – 15 / ABV: 7.5 – 10%

Recipe: Hop-Fu! IPA

***Batch size*: 14 Gallons**
***Boil Time*: 90 Minutes**
***Efficiency*: 78%**
OG: 1.067 - FG: 1.010 / 7.5% ABV

***Grain*:**
94.5% Great Western 2-Row Pale Malt - 31.5 lbs
4% Briess Cara-Pils Dextrine Malt - 1.31 lbs
1.5% Crisp Crystal Malt 45L - .53 lbs

***Water*:**
Reverse Osmosis plus Gypsum & Calcium Chloride

***Yeast*:**
White Labs WLP001 California Ale Yeast

***Hops*: 123 (Theoretical) IBUs**
First Wort - Chinook (28g pellets)
60 min - Warrior (amount varies pellets)
30 min - Columbus (56g pellets)
10 min - Amarillo & Simcoe (56g pellets ea.)
Whirlpool - Citra, Amarillo, Simcoe, Columbus, Centennial (56g pellets ea.)
Hop Back - Citra, Amarillo, Simcoe (28g whole flowers ea.)
Dry Hops - Citra, Amarillo, Simcoe, Columbus, Centennial (56g pellets ea.)

***Extras*:**
15 min - Whirlfloc (3 tablets), Yeast Nutrient (1tsp)
Keg/Brite Tank - Gelatin

Vital Stats: Hop-Fu! IPA

	American IPA	Hop-Fu!	Imperial IPA
Original Gravity	1.056 - 1.075	1.067	1.070 - 1.090
Final Gravity	1.010 - 10.18	1.010	1.010 - 1.020
IBUs	40 - 70	123	60 - 120
SRM	6 - 15	5	8 - 15
ABV	5.5 - 7.5%	7.5%	7.5 - 10%

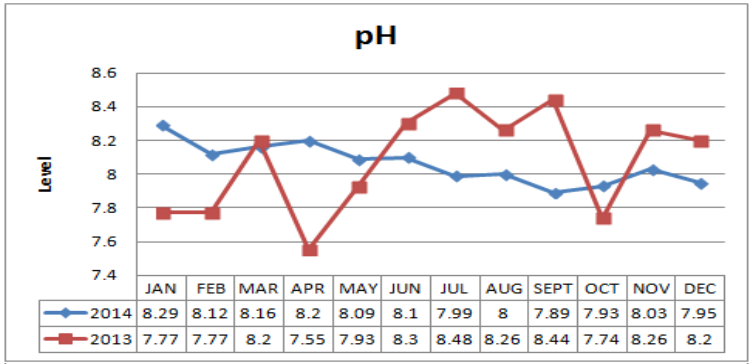
Brewing Ingredient: Water

“What are you doing with your water?? It makes up more than 90% of your beer... ” - Peter Zien, AleSmith

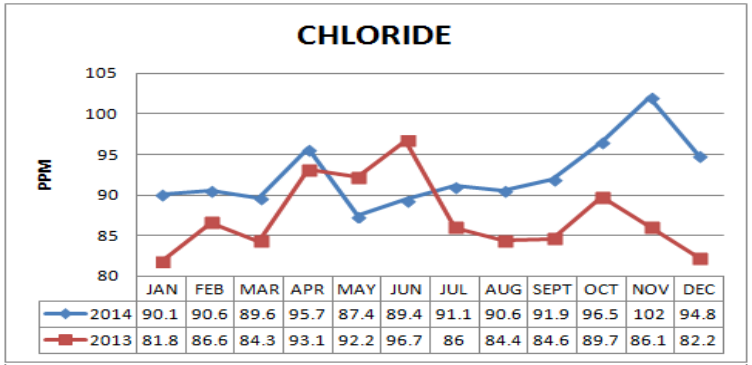
***Objective*: Create a water profile that is ideal for consistently brewing excellent hoppy pale colored beers.**

***Problem*: Brewing with San Diego tap water is absolutely unpredictable...**

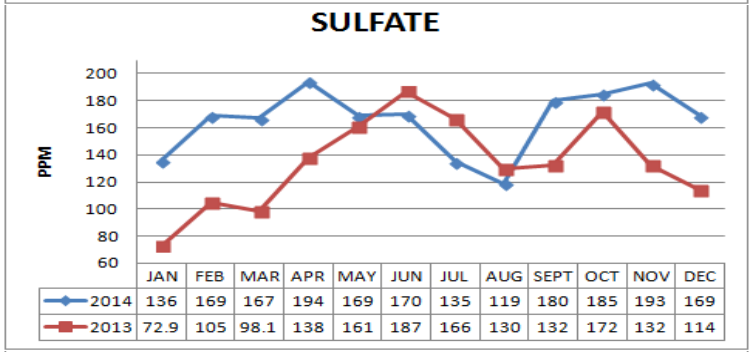
San Diego Water Quality 2013 & 2014 (Alvarado Effluent)



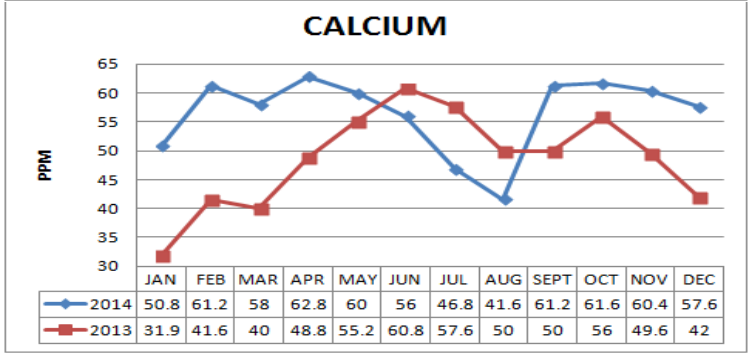
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2014	8.29	8.12	8.16	8.2	8.09	8.1	7.99	8	7.89	7.93	8.03	7.95
2013	7.77	7.77	8.2	7.55	7.93	8.3	8.48	8.26	8.44	7.74	8.26	8.2



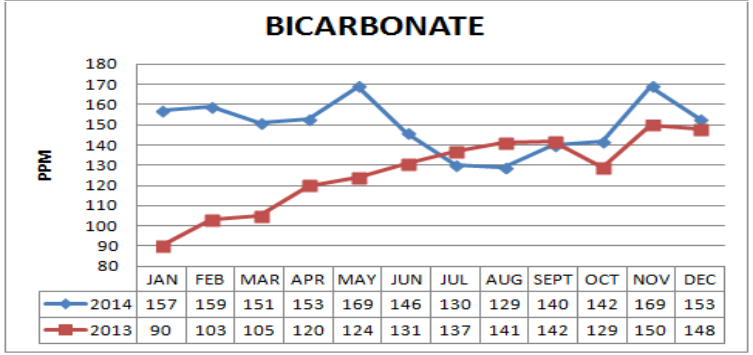
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2014	90.1	90.6	89.6	95.7	87.4	89.4	91.1	90.6	91.9	96.5	102	94.8
2013	81.8	86.6	84.3	93.1	92.2	96.7	86	84.4	84.6	89.7	86.1	82.2



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2014	136	169	167	194	169	170	135	119	180	185	193	169
2013	72.9	105	98.1	138	161	187	166	130	132	172	132	114



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2014	50.8	61.2	58	62.8	60	56	46.8	41.6	61.2	61.6	60.4	57.6
2013	31.9	41.6	40	48.8	55.2	60.8	57.6	50	50	56	49.6	42



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2014	157	159	151	153	169	146	130	129	140	142	169	153
2013	90	103	105	120	124	131	137	141	142	129	150	148

Brewing Ingredient: Water

***Solution*: Use Reverse Osmosis water plus salt additions to create a water profile that is ideal for brewing IPAs and can be reproduced consistently. Eliminate as many uncontrolled variables as possible.**

***Tools/References*:**

- **John Palmer's Water Spreadsheet from *How to Brew***
- ***Brewing Better Beer* by Gordon Strong**

Brewing Ingredient: Water

Strike Water Profile: **"Perfect Pale Ale"**

Calcium **@ 125-150ppm - Instrumental in all beer production. Promotes clarity, flavor and stability. Lowers mash pH.**

Sulfate **@ 200-250ppm - accentuates hop bitterness**

Chloride **@ 40-50ppm - punches up malt flavor/fullness**

Bicarbonate **@ sub 40ppm - high levels make hops soapy/harsh, dull, or "blah" tasting**

Magnesium **@ 10-20ppm - important for yeast in metabolizing adjunct sugars (ex: dextrose in Double/Imperial IPA)**

Brewing Ingredient: Malt

***OBJECTIVE*: Create a malt backbone that is clean and malty sweet with some background notes of caramel and toast, complementary to intense hop flavor and bitterness.**

***Tips*:**

- Buy specialty grains from a shop with heavy turnover.
- Invest in a mill. Calibrate for consistency.

Grist Evolution	2007a	2007b	2008a	2008b	2009	2010	2012
Great Western Pale 2-row	86.5%	94%	100%	93%	96%	94.5%	94.5%
Weyermann Lt. Munich Malt	8.5%	2%					
Weyermann Wheat Malt				3%			
Briess Victory Malt	1%	1%					
Briess Carapils		1%		3%	4%	4%	4%
Gambrinus Honey Malt	1%	1%					
Briess Caravienne Malt	2%						
Briess Crystal 40L	1%	1%				1.5%	
Briess Crystal 60L				1%			
Crisp Crystal 45L							1.5%
Mash Temp	154	154	154	151	152	152	152
Original Gravity	1.060	1.062	1.062	1.061	1.062	1.065	1.067
Final Gravity	1.010	1.010	1.012	1.009	1.009	1.010	1.010

Brewing Process: Mash

***Strike Water*:**
13 gallons (1.56 quarts / pound)
100% Reverse Osmosis + 25g Gypsum & 5g Calcium Chloride

***Sparge Water*: 11 gallons 100% Reverse Osmosis**

***Saccharification Rest*: Single infusion, 20 minutes @ 152 F**

***Vorlauf*: ~15 minutes**

Brewing Process: Boil

***Objective*: Isomerization of alpha acids, evaporation of undesirable volatile compounds, maillard reactions, caramelization, Pasteurization... and infuse intense hop flavor and aroma!**

***What I do*:**

- **Boil hard for 90 minutes (2 gallons per hour evaporation rate)**
- **Use DME to increase gravity if low, dilute with H2O if high**
- **BOMB the kettle with hops at end of boil!**
- **Whirlpool/steep for 30 minutes prior to knockout**

Brewing Process: Knockout

Welcome to scenic Hop Island!

Brewing Ingredient: Hops

***Objective*: Create a hop bitterness, flavor and aroma profile that is universally intense featuring citrusy, floral, perfume-like, resinous, piney, and fruity qualities derived from American hops.**

***Tips*:**

- **Buy bulk nitrogen purged bags (such as Hop Union)**
- **Vacuum seal after opening**
- **Dry Hop with newest crop year, older crop for kettle additions**

Evolution of Hop-Fu!: Hops

	2007-09	2010	2011-13	2014	2015
Warrior	60	60	60	60	60
Amarillo	FW, 20, 10, 0, HB, Dry	10, 0, HB, Dry	10, 0, Dry	10, 0, HB, Dry	10, 0, HB, Dry
Simcoe	FW, 20, 10, 0, HB, Dry	10, 0, HB, Dry	10, 0, Dry	10, 0, HB, Dry	10, 0, HB, Dry
Columbus	20, 10, 0, HB	30, 0, Dry	30, 0, Dry	30, 0, Dry	30, 0, Dry
Centennial	20, 10, 0, HB, Dry		0, Dry		
Chinook		FW	FW	FW	FW
Citra		0, HB, Dry	0, HB, Dry	0, HB, Dry	0, HB, Dry
Cascade				0, Dry	

Brewing Process: Hop Back

***Purpose*: Sealed vessel which is installed between kettle outlet and plate chiller. Infuses hop flavor and aroma by allowing hot wort to pass through whole hops and then rapidly chilling the wort before it has been exposed to the atmosphere, "locking in" otherwise volatile compounds.**

***Bonus*:**
Acts as trub filter for wort

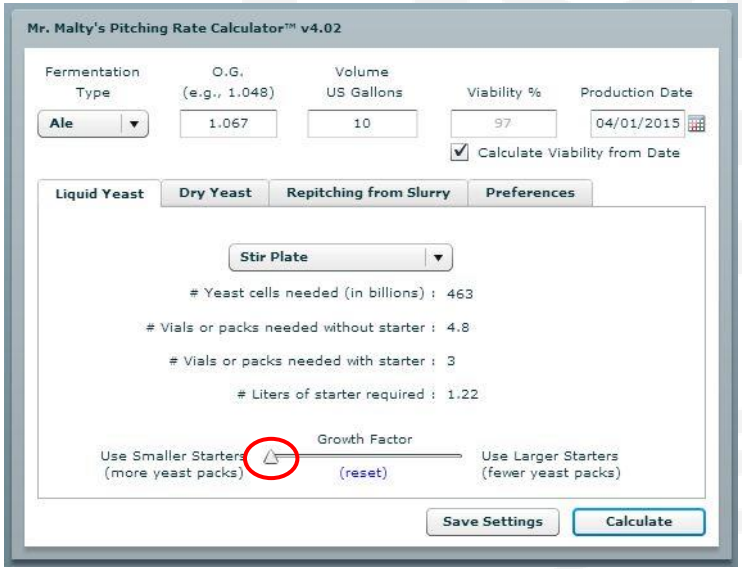
Brewing Ingredient: Yeast

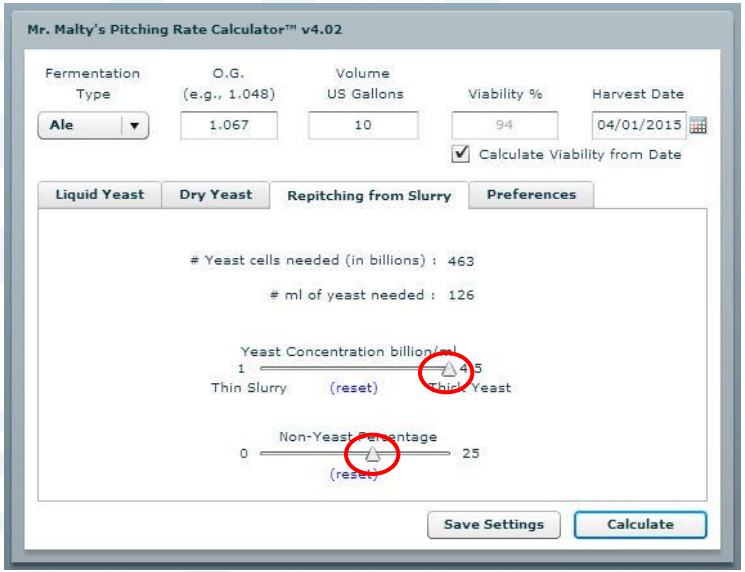
***Objective*: Clean. No diacetyl! Let the hops shine through!**

***Suggestions*:**

- **Use Jamil's calculator and overpitch slightly**
- **Pitch cool to preserve volatile aromatics**
- **Use a stir plate and Erlenmeyer flask for starters**
- **Make smaller starters with more vials/packs**
- **Pitch harvested slurry same day as harvest if possible**
- **WLP001 or WY1056 is optimal, other strains can work but not recommended due to subjective judging.**

Mr. Malty's Pitching Rate Calculator





Concept:

Let the yeast lab do the propogating

Pitch yeast, not oxidized beer wort

Brewing Process:
Fermentation & Dry Hopping*

Day 1: **Cool wort to ideal pitching temp of 67F, Aerate wort with pure O2 through diffusion stone, Pitch yeast starter or freshly harvested slurry, and Attach blow off tubing**

Day 2-7: **Maintain 67F fermentation temperature via external temp controller**

Day 8: **Remove blow off, seal fermenter (keg or conical only!!)**

Day 10: **Reduce to 60F for diacetyl rest**

Day 11: **Dump trub, harvest yeast slurry, add dry hops, return to 67F**

Day 14-16: **Begin crash cycle, cooling 10F every 12 hours until 37F**

Day 17: **Rack...**

**Thanks Vinnie!*

Brewing Process:
Fermentation
&
Dry Hopping

Racking Beer to Brite Tank

Brewing Process: Racking

***OBJECTIVE*: Rack fresh IPA with as little oxygen pickup as possible.**

***What I do*:**

- **Spray any valves or connectors with StarSan prior to use**
- **Apply pressure to Fermentation Vessel and dump 1-2 pints off racking valve**
- **Purge cleaned and sanitized brite tank with CO_2 several times to evacuate any oxygen**
- **Exhaust CO_2 from Brite Tank through racking hose prior to connecting to Fermentation Vessel**
- **Add Gelatin to Brite Tank, purge headspace with CO_2, seal @ 45PSI**

Brewing Process: Fining

***OBJECTIVE*: Incorporate fining agents such as gelatin to brighten up beer and accelerate dry hop maturation process.**

***What I do*:**

1) **Start with a full, chilled Brite Tank keg.**
2) **Boil 4 oz of water for a minute or two to sanitize.**
3) **Let cool to 180-190. This helps dissolve the gelatin well without denaturing it.**
4) **Add packet of gelatin and swirl around for a minute to bloom.**
5) **Add this solution to Brite Tank keg.**
6) **Purge head space and gently swirl entire keg to mix well.**
7) **Maintain cold temperature for at least 24 hours.**

Brewing Process: Conditioning

***OBJECTIVE*: Carbonate and clarify beer as quickly as possible without compromising head retention.**

***What I do*:**

1) **Chill brite tank to 38F**
2) **Apply CO_2 @ 45 PSI for 24 hours**
3) **Disconnect CO_2, purge headspace**
4) **Reduce CO_2 pressure to 10 PSI**
5) **Dispense 1-2 hazy pints, should now pour very brite**
6) **Enjoy brite, fresh, carbonated IPA**

Brewing Process: Bottling

***OBJECTIVE*: Package beer in bottles for competition.**

***What I do*:**

1) Set up clean bottling workstation
2) Clean and sanitize bottles
3) Clean and sanitize Beer Gun, hold in StarSan bath
4) Use Oxygen barrier caps, note: do not clean or sanitize them
5) Purge bottles liberally with CO_2
6) Fill bottles “high”
7) Cap on foam
8) Return Beer Gun to StarSan bath and repeat from step 5
9) When done bottling, store bottles cold

Clean Bottling Workstation

Good fill!!

Meh fill...

Competition Brewing Ideas

1) If you are brewing to win, count back from entry deadline and brew your IPA that day so it is as fresh as possible for judging.
2) Always bottle at the very last minute, even if that means multiple bottling sessions for multiple competitions.
3) If shipping, ship your entries in insulated containers, packed with ice packs, for the shortest transit time you can afford.
4) If you have the slightest question about the hop aroma quality of your raw hops, get new hops.
5) If you want to master a style, brew it every 3rd batch (or 44% of the time…)
6) Leverage your award-winning beer in other categories (fruit, etc.)

Thank you!

Any questions?

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