

AMERICAN IPA

IPA is the most popular craft beer style in America. Love it or hate it, IPA is the beer style that keeps the cash registers of most brew pubs turning. Additionally, it's popularity has also been the guiding force behind much of the hop research and development over the past few years. The history of IPA goes back over a hundred years, however our focus here will be on American IPA styles which have only been around for a few decades. These can be divided into two primary categories: West Coast IPA and East Coast or New England IPA. Each of these, of course, has numerous variations some of which we will discuss as well.

West Coast IPA

West Coast style IPA is a clear, somewhat bitter, very aromatic style of beer. Most commonly it is dry hopped post fermentation with fruity or piney Northwest style hops. Cascade hops were the original, used in Anchor Liberty Ale in the mid 70s and many other early IPAs. Malt character is usually slightly sweet, but balanced by the hop bitterness. The finish is usually somewhat on the drier side allowing the hop flavor and aroma to take center stage.

Grain

The grain bill for a West Coast style IPA is usually pretty simple. A common grain bill might be 85-90% American 2-row for the base with the remainder split between Caramel malt and Cara-pils. It is not unusual to see Corn sugar added, especially in Double and Imperial IPAs. Caramel malt is very appropriate, in 5-10% quantities. We want to avoid grains such as wheat, or flaked grains which would have a tendency to encourage haziness. The grain bill for Stone IPA, released in 1997, is 93.5% Pale malt, and 6.5% C-15L. Pliny the Elder is a classic example of a Double IPA and one of the examples that sets the standard. It consists of 87.3% 2-Row, 3.9% C-45L, 3.9% CaraPils, and 4.9% Corn Sugar. I like to use a 90/5/5 mix of base malt/caramel malt/and CaraPils as a starting point, with the color of the caramel malt varying dependent on the desired final color. I also like to use a small amount (usually 4 oz.) of Acidulated malt in all of my hoppier beers. For a Double or Imperial IPA adding ½-1 pound of sugar helps to increase the ABV without overdoing the malt character of the beer. Since the sugar ferments more fully than grain, we are able achieve lower final gravity than if we had just used more grain. The important thought here is that while we do want some malt character, the hops are the star of the show. I like to mash on the cooler side (148/150 degrees) to encourage a final gravity around 1.010 give or take a couple of points. This will allow the hop character to be most dominant.

Hops

West Coast IPAs are typically a fairly bitter beer, with GU/BU (Gravity Unit/Bittering Units) ratios close to 1.0 or higher. For example, a beer with Original Gravity of 1.060, a common IBU level would be at least 60. Obviously, this varies widely, but it is a good starting point. High alpha, fairly neutral bittering hops are preferred allowing you to get maximum bittering from smaller quantities of hops. Common choices for a 60 minute addition are Columbus, Warrior, Galena, and Chinook. Modern recipes will often have only a bittering hop addition, and late kettle hop additions (5 min, 0 min, or whirlpool). However, many West Coast IPA recipes are a little older. It is not unusual to see mid-boil additions as was common at the time. Late additions and Dry Hopping post fermentation are what give IPAs their characteristic

flavors and intense aromas. Dry hopping rates can vary significantly, but a good rule of thumb would be to balance the rate of dry hopping to the ABV and IBU. Lower ABV and corresponding lower IBU would lend themselves to lower dry hopping rates. For a single IPA I might use 2 ounces of total dry hops, bigger IPAs might be appropriate with 4 or 5 ounces of total dry-hopping or more. Sometimes these very large doses of dry hops can be split into two additions a couple of days apart. When choosing hops I prefer to limit myself to 2 or 3 varieties of flavor/aroma hops, often with the same varieties used for both late kettle additions and dry hopping. There are many good examples of IPAs using only a single hop variety, however this results in a beer with little hop complexity. In most cases I prefer to feature one hop variety, and use half the amount of 1 or 2 other varieties to support the featured hop. If we start using too many different varieties for these late additions, we will likely get a muddy undefined flavor. The palate of flavor and aroma hops is ever growing, but is normally on the fruity/citrus side with occasional pine notes. Hops with more earthy, floral notes are normally avoided. I find that flameout, and whirlpool additions lend a nice resinous quality to the flavor and aroma. Dry-hopping brings out all of the intense aromas we are looking for in an IPA. It is most common to either move the beer to a secondary fermenter, or pull the yeast from the beer (if using a conical fermenter) before adding the dry hops. In this style we want to minimize any interaction between the yeast and the hops which might result in haziness. Hops are added to the fermenter for a few days before kegging or bottling. If these hops remain in contact with the beer for too long, or if the hops are old you will get unpleasing leafy or vegetal flavors. I prefer to use the freshest pellet hops I can, and aim for about 3 days of contact time. Many double or imperial IPAs use 2 stages of dry-hopping for even more aroma intensity. In this case I would put the first addition with 5 or 6 days remaining, and the second at 3 days before packaging. Some recent studies have found that many of the aromatic oils go into solution in as little as 24 hours.

Water

As with most brewing water, if it smells good and tastes good it is probably suitable for brewing West Coast IPA. That said, there are things that you can do to tailor it more specifically for this style. If you are using a city water source that has chlorine or chloramine added, removing it is foremost on the list. This can be done by aerating and allowing brewing water to sit overnight, adding a campden tablet (1 tablet will neutralize chlorine in up to 20 Gallons), or slowly passing through a charcoal filter. Water that is on the harder side is usually preferred. The two most common additives for hardening water are Calcium Sulfate (Gypsum) and Calcium Chloride. I like to use a blend of the two, but for this style I blend heavier on the gypsum side of things. Gypsum will have a tendency to brighten up the hops and allow them to shine in the overall mix. Calcium Chloride tends to accentuate the malt character in beer. The ideal way to apply this is to have your water tested so you know what your starting point is, and then add the necessary salts to reach a target profile. I use a less exact "seasoning" method, in which I am just making small adjustments to my water much like putting salt and pepper on my food. I use 1 tsp. total salts per 5 gallon batch dissolved into my strike water. In the case of West Coast IPA, I would use $\frac{3}{4}$ tsp Gypsum and $\frac{1}{4}$ tsp Calcium Chloride. This is not very much. I am just trying to push my water a little bit in a harder direction. I don't want to overdo it.

Yeast

Clean American Ale yeast is most commonly used in West Coast style IPAs, though there are some great examples that use a clean high flocculating British Strain (Stone IPA). Examples of the most common American strains would be Imperial A07 Flagship, White Labs WLP001 California Ale, and Wyeast 1056

American Ale. These all source their origin back to the Chico strain of yeast originally used at Sierra Nevada. The dry yeast US-05 is also a commonly used version of this strain. Imperial A01 House, White Labs WLP007 Dry English, and Wyeast 1098 British are examples of the commonly used British strain. As with all beer, pitching rates, nutrients and oxygen levels are extremely important. A single pack of Wyeast or White Labs yeast normally contains 100 Billion yeast cells. This is appropriate for beers with OG up to 1.045 or 1.050. If my OG is between 1.050 and 1.075 I will need more yeast. One pack of Imperial yeast with 200 billion cells, or 2 packs of Wyeast or White labs gives you a good pitching rate. Another option is to use a single 100 billion cell pack and use a yeast starter to increase the cell count. For really big beers, I am going to use 2 packs of Imperial, or a really big starter. I would always prefer to overpitch a little bit rather than take a chance on underpitching.

Process – Boil and Fermentation

Since pilsner malt is not commonly used in West Coast IPA, a 60 minute boil is normally all that is necessary. This is the length of time needed to fully isomerize the Alpha Acids in your bittering hops. However, I prefer to boil for 90 minutes for everything I brew. This allows me to be consistent with my pre-boil volume for every batch, and I like giving the boil 30 minutes to settle in before I start adding hops. I always use whirlfloc and yeast nutrient towards the end of the boil. Once my wort is in the fermenter, I oxygenate at a moderate level for 1 minute prior to pitching my yeast. If you don't have a method for adding pure oxygen, just try to do what you can to increase the oxygen level in your wort. This could be using an aquarium pump, stirring with a whisk, or even pouring back and forth between vessels. Your yeast will appreciate it! I prefer to keep my fermentation a little on the cool side (64-66 degrees) in order to keep yeast esters low. This allows the hops to be the star of the show without other flavors interfering. Towards the end of primary fermentation, I will allow the temperature to rise to around 70 degrees for a few days. This encourages the yeast to remain active, thoroughly fermenting through all of the sugars available, and cleaning up any compounds created in the early stages of fermentation.

It may seem like these form a very narrow set of guidelines, but a wide range of beers have been created that fit into this style! The most important elements are clarity, bitterness, and aromatics from dry hopping. These are what set West Coast IPA apart from other styles. Start with those fundamentals and let your creativity craft something special!

East Coast IPA/NEIPA

Rebellion is often the guiding force behind innovation. In my opinion there are 2 acts of rebellion that spawned the beginning of what is now known as East Coast IPA, New England Style IPA, or simply a Hazy. As West Coast IPA gained in popularity, brewers pushed the limits of bittering IBUs. This was not to everyone's liking, and the natural reaction was to push back the other way. The pendulum had swung as far as it could go in the bitterness direction, and it began to swing back towards the other extreme. The second act of blatant rebellion was to question the common (at the time) wisdom of separating hop additions from active yeast action. It was found that active yeast would bio-transform elements in hops creating new flavors and aromas that had not been seen previously in IPAs. This also created an unavoidable haze, that once embraced became a hallmark of the East Coast Style IPA. Once the haze became an accepted and even targeted element in these beers, grains that would have previously been avoided because of their haze inducing properties started gaining popularity.

Grain

The grain bill for an East Coast style IPA is also usually fairly simple, but significantly different from a West Coast IPA. Base malt can be either 2-row pale, or lighter colored Pilsner malt. If using pilsner malt however, I'd recommend a 90 minute boil to reduce potential DMS off flavor. It is not unusual to blend 10% or 20% of a darker base malt such as Maris Otter, Vienna, or even Munich to add a little complexity to the base. Flaked Oats and Flaked Wheat are often used in smaller amounts. They will lend a softness to the mouthfeel, and also add haze forming proteins that the hop compounds can bind to. Malted Wheat is commonly used as well. All of these combine to make a beer that is usually light in color, with a thick soft mouthfeel. Sometimes described as pillowy, this creates a nice soft hazy bed for those hop oils to rest in. As with West Coast IPA, I like to use a small amount of Acidulated malt as well. Other grains that occasionally make an appearance in this style of beer are: honey malt, malted oats, spelt malt, and cara-pils. It is uncommon to see any sort of crystal or caramel malt in a NEIPA recipe. Because of the amount of husk-less grain in this sort of recipe, adding some rice hulls is a good idea to help prevent a stuck mash.

Hops

As with all styles of IPA, hops are the dominant factor in East Coast IPA. Bittering is typically very low in comparison to other styles of IPA, usually ranging from about 10-40 IBUs. A 60-minute hop addition is unusual. If a recipe has one, it is usually very small. Most of these IBUs are usually achieved from late boil or even post boil additions. Any time the hops are in contact with wort above about 180 degrees, alpha acids will isomerize forming iso-alpha acids which create bittering. This is why hops added even after flame-out will still create IBUs, just in lower quantities. The benefit of these late additions is that very little of the hop oils that give us all of the wonderful aromas are volatilized away in the steam from boiling. Often times hops are added in a whirlpool or hop stand after the wort has been cooled to below 170 degrees. This allows the hop oils and other compounds to go into solution while creating almost no additional bittering. This is one area where homebrewers have it a lot easier than large scale brewers. We can simply put an immersion chiller in our kettle, chill it to where we want and then finish the hop additions. This is very difficult to do if you have a 200-300 gallon batch! The thing that really sets New England style IPA apart is adding a dry hop addition at high krausen, when the yeast is actively fermenting. Compounds in the hop oils are transformed by the active yeast creating the sweet fruit characteristics NEIPA is known for. These new compounds then bind themselves to proteins and other compounds in the wort, which causes the haze that we usually see in these beers. I have had the best luck with Citra hops for this high krausen addition, but there are others that will work. This is usually followed up with 1 or 2 more dry hop additions shortly before packaging in the same manner as West Coast IPA. The variety of hop options for this style of IPA is growing all the time. Most of the recently developed, and currently in development varieties are targeting the flavors brewers are looking to achieve in hazy NEIPAs. Citra is most common and appears in almost all recipes I have seen. Other commonly used hops include Amarillo, Azacca, Centennial, El Dorado, Galaxy, Ekuanot, and Mosaic. We are targeting hops with more fruity and citrus qualities. Varieties with more piney, grassy and earthy flavors are usually avoided in this style of beer.

Yeast

Yeast choice for this style of beer is critical. It has to be a yeast that has the ability to create the bio-transformation with the hops during fermentation. There are several strains of British origin that are

most commonly used. Initially the Conan strain from The Alchemist in Vermont (makers of Heady Topper) was the strain most used by Homebrewers. Imperial yeast carries this as A04 Barbarian. More recently the Boddington's strain has gained popularity. This would be the Imperial A38 Juice, White Labs WLP066, or Wyeast WY1318. Other options, if you are looking for something a little different would be Imperial A24 Dry Hop (a blend of A04 Barbarian and A20 Citrus) or White Labs WLP067 Coastal Haze Blend. As with all beers, having a proper sized, healthy pitch of yeast is extremely important. Oxygen and Nutrients will help ensure that you have a good healthy fermentation. All of these yeast strains are fairly active. Be sure you have plenty of headspace and/or a blow off tube to account for this. Also, anticipate additional activity for a short time after adding the high krausen dry hop. Kveik yeasts are the newest thing people have been using in hazy IPAs with good results. These varieties also have the benefit of being able to ferment at fairly warm temperatures with out any negative off flavors.

Water

Water for NEIPA is similar in some ways as to West Coast IPA, with the exception being that the balance of Calcium Chloride to Gypsum is usually skewed more towards the Calcium Chloride. This tends to complement the softer mouthfeel found in many East Coast IPAs. Many people use a ratio of 2:1 or even 3:1 (Calcium Chloride:Gypsum), but I prefer a ratio of 1:1. I feel like a beer can get flabby and indistinct if the balance is too much on the Calcium Chloride side. The gypsum helps to maintain the brightness of the hops. Notice however that this ratio is still balanced more to the side of Calcium Chloride than I would use with a West Coast style IPA. As with most brewing water, if it smells good and tastes good it is probably suitable for brewing. The most important thing you can do, even if you do nothing else is to take steps to remove the chlorine and/or chloramine from your water. A campden tablet, charcoal filter, or just a long sit uncovered overnight can usually accomplish this.

Process – Boil and Fermentation

For an East Coast IPA, I like to mash in the area of 152-154 degrees. Sometimes even 156. This encourages a higher finishing gravity. The end result is a slightly sweeter beer, which both increases the mouthfeel, and also pushes the balance away from hop bitterness. If using pilsner malt, I'd recommend a 90-minute boil. Personally, I do this with every brew. It helps reduce the possibility of DMS in the final beer, and gives me consistency from batch to batch no matter what I am brewing. Most of the rest of my brew-day process is the same as I would do for a West Coast IPA. Whirlfloc, yeast nutrient, and oxygenating wort prior to pitching yeast are all important steps in the process. I like to ferment NEIPA in the range of 66-68 degrees. Some people will ferment a few degrees warmer than that to encourage more yeast esters. As primary fermentation slows down I usually allow the temperature to rise a few degrees to encourage the yeast to fully clean up after itself. Because of the very low IBU levels, and high protein levels, this style of beer is more prone to damage from oxygen contact during the later stages of the process. If this happens, the nice bright hazy appearance of your beer can start to turn to a less attractive tan or brown, and eventually the flavor can deteriorate as well. Any steps that you can take to reduce the amount of oxygen contacting the beer during dry hopping, and packaging are more important than with other beer styles. This is not to say that I think you must run out and purchase a purgeable dry hop vessel right now! Just take care, and think about how what you are doing affects the oxygen contact of the beer. When dry hopping I usually just pull the stopper on the fermentation vessel, use a funnel if it is a small opening, add the hops, and get it closed back up as quickly as I can. If cold crashing your beer, it's wise to try to set up a system that will allow CO2 to pull back into the vessel

rather than oxygen as the pressure changes. At the end of fermentation, if it is possible to do a closed transfer into a purged keg, this is a good place to do it. If bottle conditioning, the yeast should scrub any oxygen from the headspace of the bottle during the carbonating process. If bottling from kegs, this is one style that you will definitely want to be able to purge your bottles with CO2 prior to filling. The important thing here is to do what you can, and don't stress about what you can't.

Relax, Don't Worry, Have a HomeBrew is always the best mantra for all things HomeBrew (thanks Charlie Papazian!). Enjoy the process, and enjoy the results. Share with your friends. Try to get a little better and learn a little more with each batch. You are making the world a better place, one homebrew at a time!

Jon's Homebrew
and **Wine Supply**

1430 East Main Ave #1430-C, Puyallup WA • 253-286-7607