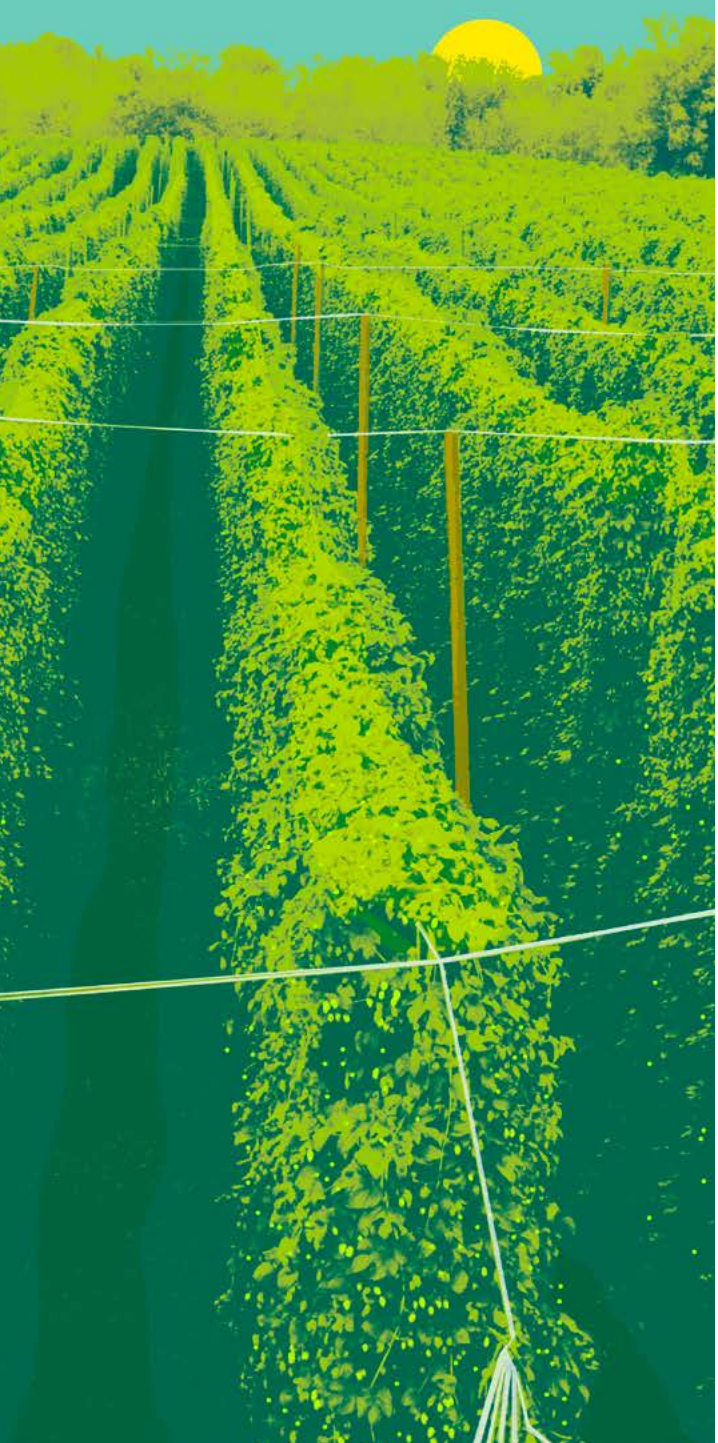
CROSBY HOPS™

THE ULTIMATE GUIDE TO HOP QUALITY

TABLE OF CONTENTS



CROSBY HOPS™

Great hops have always been key to creating exceptional beer. But with the explosion of dynamic new varieties and the recent dominance of IPAs, hops have taken center stage in the craft beer market.

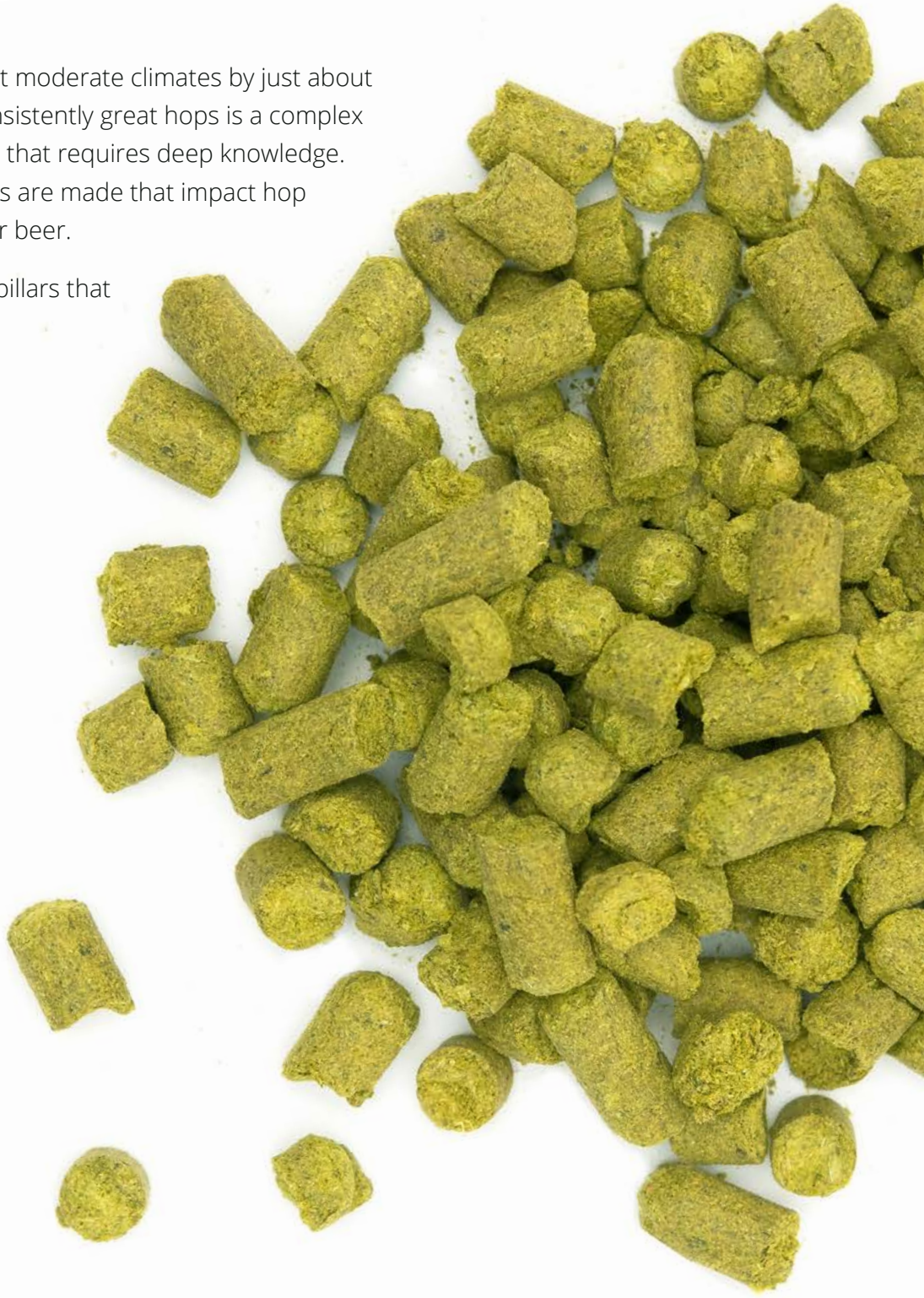
Hops have a starring role in the most popular beer styles, making hop quality more important than ever. Your ability to consistently brew beer that stands on its own and stands apart from the rest hinges on high-quality hops.

This guide will walk you through the factors that influence hop quality to help you make educated decisions about the hops you source and the suppliers you partner with.

THE 4 PILLARS OF HOP QUALITY

Hops can be grown in most moderate climates by just about anyone. But producing consistently great hops is a complex craft and nuanced process that requires deep knowledge. At each stage, key decisions are made that impact hop quality and, ultimately, your beer.

These stages fall into four pillars that determine hop quality.



CROSBY HOPS™

1 GROWER DECISIONS

Growing hops is a mix of art and science. The choices growers make throughout the growing season reflect that balance and impact the quality of their crop.

Regionality

Much like grapes, growing regions have a significant impact on hop quality. Hops can be grown all over the world. However, specific varieties flourish in particular regions, yielding consistently high-quality and desirable attributes. While it is possible to grow Cascade in a number of regions around the world, the most recognized true-to-type Cascade comes from the Pacific Northwest.

Even within ideal growing regions, the local terroir can influence hop profiles. For example, Chinook grown in Oregon is lemon lime and sweet fruit forward with a more subdued piney character, while Chinook grown in Yakima lends itself to assertive pine up front with floral and citrus playing a more supportive role.

Integrated Pest Management

Like all crops, hops are susceptible to a number of pests. Powdery and downy mildews, aphids, and mites threaten hop quality, and when not properly managed they can damage hop cones or even kill plants. A modern integrated pest management system is critical to ensuring healthy, high-quality hops.

Growers may take different approaches, with some opting to use legacy chemistries that are more harsh to the ecosystem of the hop yard. Alternatively, a number of sustainable farming methods, many of which are integrated in the Salmon-Safe program, enable a more modern approach that's less impactful on the greater environment.

As an example, some growers in the Pacific Northwest have leveraged naturally occurring beneficial predators to completely eliminate their reliance on traditional broad spectrum miticides applied late in the growing season. This contributes to hop quality by minimizing residues on harvested hops while still maintaining a natural control for mite damage.

Capacity Planning

With hops, quality and quantity are often at odds. Because the ideal window to harvest hops and capture their optimal flavor lasts just a matter of days, growers must be exacting in their capacity planning to maximize their yield without sacrificing quality.

Growers must make balanced decisions about what varieties to grow, the proximity of their fields to harvest facilities, the throughput of their harvesting equipment, the capacity of their hop kilns, their ability to bale hops quickly, and their bale storage capacity.

To ensure you only get the highest quality hops with the most desirable flavor profile, source from a farm that excels at capacity planning and focuses on pick windows rather than optimizing acreage.

Grower Choice

With the explosion of craft beer and increasing demand for hops, more growers have entered the marketplace. However, there's a steep learning curve to growing hops, and it typically takes several years, if not longer, to master the craft and bring forth a crop worthy of the best beer.

It's no coincidence many of the best-regarded hop farms are multi-generational family-owned businesses. Intimate knowledge about the terroir and the crop are passed down over decades, informing decisions and cultivating an inherent understanding of what works and what doesn't.

Third-Party Auditing

Anyone can make a claim to *quality*. Third-party auditing offers an objective measure of whether a grower is following best practices. GlobalG.A.P. provides farm-level certification that holds growers to a higher standard – about one-third of Pacific Northwest hop producers are GlobalG.A.P. certified.

Other noteworthy certifications include those for growing organically and Salmon-Safe, which links site development and land management practices with the protection of agricultural and urban watersheds.

DID YOU KNOW?

A first-year hop crop, or the baby crop, sometimes isn't harvested. When they are harvested and sold, baby crops often deliver different attributes and yields than a mature crop that has been cultivated in the same soil season after season.

2 HARVEST

Even when a crop has been successfully grown to maturity, harvesting it presents challenges, and choices, that play a significant role in the quality and consistency of the hops brewers receive.

Pick Window

The pick window is the time in which you can harvest hops and capture their optimal aroma and flavor. Pick windows are excruciatingly short; they vary from one hop variety to the next and from region to region.

These narrow windows mean that growers must perfectly time the start and finish of harvest to ensure ideal attributes of each variety. Being off by even a day can drastically change the profile of the crop. Picked at the right time, Centennial is floral, citrusy, and impactful. Taken too early, it's grassy and muted; too late, it becomes oniony and garlicky or "OG."

Evaluating field samples through sensory analysis in conjunction with relevant lab data gives growers the insight they need to dial in optimal pick windows for truly expressive hops.

Leaf, Stem, and Seed

All hops harvested in the Pacific Northwest are inspected by the USDA at the state level. Samples are taken and graded for leaf and stem and seed content. Growers can make decisions during the growing season to help reduce seed content in cones by removing rogue male hop plants from the production area each season.

Seeds don't provide any brewing value and are regarded as useless in the brewing process. Hop lots with less seed content are generally regarded as more favorable.

After hop bines are cut, they are run through hop harvesters or "pickers" that separate the cones from other plant material, such as leaf and stem. A high-quality hop-picking operation should consistently produce lots with no leaf and stem content.

Kilning

After being harvested, hops are dried in kilns to remove moisture content. Two key factors that contribute to hop quality during kilning are temperature and bed depth.

While running deep hop beds through kilns at high temperatures might allow growers to process more hops faster, it can negatively impact hop quality. High temperatures can reduce the essential oils responsible for a hop's signature aroma and flavor. Over-stacking may inhibit the drying process, resulting in portions of the lot being overdried, especially the bottom layer of the kiln bed.

Having a kiln with the right bed depth, air speed, and temperature controls all working in harmony is a nuanced and delicate balance critical to the drying process. The drying process is truly the intersection of art and science during hop harvest.

Baling Process and Bale Receiving

Kilned hops are ideally cooled for a minimum of 24 hours before being compressed into hop bales. This conditioning period allows the hop lot's moisture content to homogenize, which creates a more consistent baled hop product of higher quality.

Following conditioning, hop lots are baled and put into storage before being sent to processing facilities. To slow the natural process of degradation, hop bales should be stored frozen. Freezer space is valuable, so some growers store bales in a cool dark place or at ambient temperature, both of which may accelerate degradation and diminish quality.

When receiving hop bales, the processor should measure their temperature and moisture content, take samples for sensory analysis and lab testing, and visually inspect samples for defects like mold and excessive pest damage or issues with cone integrity. The processor will reject any hop lots or individual bales that aren't up to standard. Bales should then immediately be frozen and kept at a consistent temperature until they can be processed.

DID YOU KNOW?

Most hops need to be picked in a brief five- to seven-day window that is variety- and region-specific. For example, the ideal pick window for Centennial hops grown in Oregon is typically August 20-27.

3 HOP PROCESSING

After being harvested, most hops for the craft beer market are processed into Type 90 pellets. Sometimes the grower and processor are one in the same, potentially offering greater quality control. Other times, the processor is a third party. In both instances, proper processing is key to preserving hop quality.

Timing

Because hop varieties degrade at different rates, the processor must quickly and efficiently plan the processing schedule, prioritizing those varieties that degrade the quickest. While cold storage can buy time, it's not a cure-all.

For example, even when stored frozen, Centennial and Idaho 7® hop bales degrade at a faster rate than other varieties and must be processed quickly to maintain their quality. Conversely, some varieties like Nugget have great storage attributes and are safely processed toward the end of the pelleting season.

Temperature

Throughout processing, the temperature of the raw hops and finished pellets must be rigorously monitored and controlled. Every step in the process adds a small amount of heat.

Raw hops move through a hammermill, which serves as a size reduction step converting leaf hop into hop powder. Screen size, residence time, and temperature management all play an important role in this critical step. This process needs to be carefully monitored. If it's not managed properly, it can have a significant impact on the quality of the finished pellet.

When hop powder is forced through the pellet die to be turned into pellets, the friction in this process produces heat. Processors must ensure the hops are not exposed to critically high temperatures to prevent the loss of oils that are crucial to their expressiveness.

Hop pellets that have been exposed to high temperatures during processing can appear glassy or shiny and even have a burnt appearance. Processors should work to maintain the temperature of hop material below 125°F throughout production. A high-quality processing methodology will also reduce the amount of time the hop material in its various forms is exposed to oxygen throughout the entire process.

Pellet Consistency and Density

Even if the leaf hops used to create pellets are of exceptional quality, poorly produced pellets can negatively impact brewing. Pellet processors frequently blend multiple hop lots to produce a single pellet lot.

To produce a high-quality blend, the processor must understand and measure the attributes and sensory characteristics of the input lots. It's important that the processor has adequate blending capacity in the pelleting facility to ensure the desired homogenous result. A high-quality process includes real-time measurement of hop analytics during processing to verify consistency of the finished product.

Pellets that are higher in density will sink to the bottom of the tank, providing little contact with the beer they're meant to flavor. Low-density T-90 pellets disperse more quickly and stay in suspension longer, allowing for more flavor and aroma transfer. Pellets that are too low in density may crumble in packaging and during use can disproportionally float on top of liquid during dry hopping.

The difference can be felt. When rubbed in your hands, high-density pellets may break but remain a solid pellet. Pellets of a proper density and particle size break up into a loose grind of plant matter that enables greater hop dispersion and aroma/flavor transfer during brewing. When properly processed, all hop pellets in a lot should have a consistent density.

Hop processors should evaluate pellet samples during production to monitor density, color, and aroma for quality control and to catch inconsistencies early for proper mitigation and adjustments in processing. An additional round of sensory analysis should be completed after processing to ensure pellet quality is to proper specifications and aroma is true to type.

Packaging

Oxygen, light, and heat are the enemies of hops. To maintain hop quality after processing, the pellets should be sealed in durable light-resistant foil bags that have been flushed with nitrogen or carbon dioxide to remove oxygen from the packaging environment. The processor should have quality processes in place to frequently test package seal integrity and residual oxygen levels.

As soon as possible, they should then be returned to the freezer.

DID YOU KNOW?

The "T" in T-90 pellets is short for "Type." The 90 relates the weight of the pellet to the whole hops. One pound of whole cone hops yields about 0.9 pounds of pellets, effectively making T-90 pellets slightly more concentrated than whole cone hops.

4 STORAGE

The final piece of the quality puzzle is storage, which includes storage at the merchant, your brewery, and the trip in between. Ideally, hop pellets should be stored frozen at 28°F or less. That temperature should remain consistent and avoid fluctuations.

Merchant-Processor Storage

Your merchant is likely better equipped to store pellets than you. If possible, make use of merchant storage to ensure your hops are properly stored at an ideal temperature. Many hop contracts include a year of storage at no additional cost. Some spot hop suppliers will guarantee their pellets are stored frozen, but others (especially in international markets) may lack that capability.

In-Transit Storage

While hops can sometimes be shipped via refrigerated freight, they often aren't. Depending on the length of their journey, your hops may be exposed to ambient temperatures for extended periods of time. That's usually OK for short durations, but when working with a supplier, make sure that hops in transit for more than several days in high temperatures are kept cold.

Brewery Storage

When properly packaged and stored, hop pellets will perform as desired for three to five years, depending on variety and application. After receiving your hops, a few basic best practices can help maximize their life and maintain their quality.

If the hops will be used within six months, refrigeration in their original packaging is acceptable, but storing frozen is better. If it's going to be longer than six months, keep them frozen. Once a bag is opened, it should be used immediately or flushed with nitrogen or carbon dioxide, then resealed and stored frozen to slow down the oxidation process.

One of the most important quality checks a brewer can do is evaluate hops prior to use. This ensures aroma, density, color, and packaging are all up to quality standards before introducing hops to your brew.

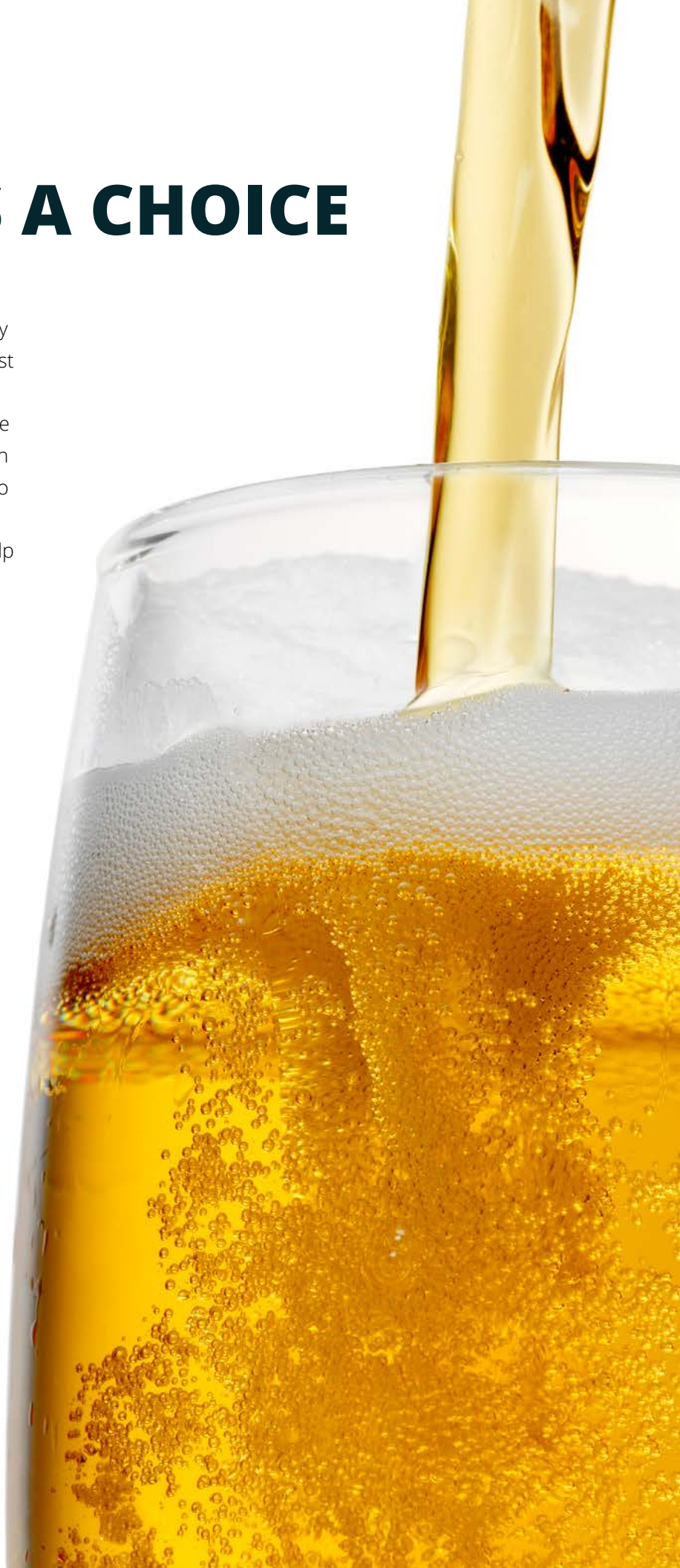
DID YOU KNOW?

Hops harvested this year aren't necessarily better than those you can buy from years past. Hop quality can vary from year to year, and an exceptional crop from two years ago that was properly harvested and stored may be more desirable than a current year lot.

QUALITY IS A CHOICE

For brewers and hop producers alike, quality is a choice. It's a purposeful decision to invest the appropriate time, effort, and resources into producing and sharing something you're passionate about. Every stage involves tough choices that determine quality. Growers who treat their crop with patience and respect usually yield consistently great hops that help bring your beer to life.

To ensure you get only the highest quality hops every time, talk to your supplier about their processes and practices and the choices they make to deliver the best possible outcome for your beer.



CROSBY HOPS™

Manage Your Hop Portfolio With One Click

Easily Place and Track Orders From Anywhere With the Brewer Portal

Log In or Register

CROSBY HOPS™

Pacific Northwest Headquarters
18564 Arbor Grove Rd NE, Woodburn, Oregon 97071

(503) 982-5166 (7:30am - 4:30pm PST)

hops@crosbyhops.com

www.crosbyhops.com