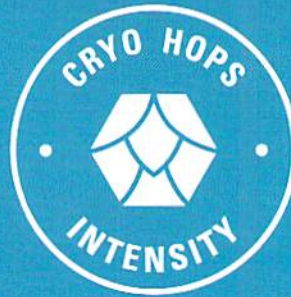


CRYO HOPS®

FREQUENTLY ASKED QUESTIONS



HOW ARE CRYO HOPS® BRAND PELLETS PROCESSED?

Cryo Hops® Brand pellets are produced from whole leaf hops using a proprietary, patented, cryogenic separation process that preserves all components of each fraction. Liquid nitrogen is introduced at the beginning of the Cryo Hops® process, which results in extremely low temperatures, low oxygen and a nitrogen-rich environment. This allows the concentrated lupulin and low-alpha bract materials to easily separate. The whole leaf hops are only sifted once with a single screen pass through a mechanical sieve, removing the vegetative matter and leaving a lupulin-rich powder. The concentrated lupulin is cold pelleted through a pellet die used strictly for Cryo Hops® production.

HOW ARE GENERIC CONCENTRATED LUPULIN PELLETS PROCESSED?

Generic concentrated lupulin pellets follow a very similar process to standard T-90 pellets. The vegetative matter is removed using cold-temperatures and multiple passes through a mechanical sieve, leaving a lupulin-rich powder. Some of the vegetative matter may be mixed back in for consistency and the material is then pressed through the die to form a hop pellet. If plant matter is mixed back in, then the resulting pellet will be greater than 45% of the Raw Hop Equivalent (RHE).

SO, WHAT IS THE DIFFERENCE IN PRODUCTION?

The differences in production between Cryo Hops® Brand pellets and generic concentrated lupulin pellets include:

- In generic concentrated lupulin pellet production processes, the lupulin and bract fractions are allowed to warm to room temperature prior to pelleting. They typically spend long periods of time and/or go through lengthy transfers in a warm oxygen environment. Some processes have large holding bins allowing both fractions to stew prior to blending the bract back in to dilute the concentration.
- Generic concentrated lupulin pellets are pelleted in an oxygen-rich environment at higher temperatures, commonly above 125 °F (52 °C). This makes the lupulin stickier, and oxidizes the hops, which degrades quality.
- The Cryo Hops® production process uses liquid nitrogen to generate extremely cold temperatures and a very low oxygen environment, which is ideal for preventing oxidation.
- The Cryo Hops® production process maintains the nitrogen-rich cold chain environment throughout the entire process, all the way to the pellet mill. This patented technology allows YCH to pellet Cryo Hops® Brand pellets below 80 °F (27 °C). Generic concentrated lupulin pellets use mechanical refrigeration in an oxygen-rich environment.
- The Cryo Hops® production process uses only one pass through the mechanical sieve. This minimalistic handling allows for greater preservation of the hop components, resulting in higher quality aromas and no exposure to heat or oxygen.

WHAT IS A UTILITY PATENT, AND WHY DOES THIS MAKE CRYO HOPS® BRAND PELLETS DIFFERENT?

A utility patent is used to define inventions, processes, methods, machines, or articles of manufacture as new, useful and non-obvious. As a fully patented process, this means that key features of YCH's proprietary process and methods used to produce Cryo Hops® brand hop products were identified by the United States Patent and Trademark Office as being a new and novel way to process hops. It was determined to be a uniquely invented process that is exclusive to Yakima Chief Hops, Inc. and a significant and measurable improvement from any other hop production processes.



HOW DO CRYO HOPS® BRAND PELLETS AND GENERIC CONCENTRATED LUPULIN PELLETS COMPARE IN THE BREWING PROCESS AND BEER?

- The use of liquid nitrogen in the Cryo Hops® production process creates the optimal environment for limiting oxidation. Less oxidation means higher quality hop aromas in beer.
- The minimalistic handling used in the Cryo Hops® production process also results in higher quality hop aromas that have a positive impact on finished beers.
- Cryo Hops® Brand pellets commonly hold a higher concentration of oils and alpha acids than standardized concentrated lupulin pellets, meaning greater efficiency in the brewing process.
- Cryo Hops® Brand pellets have a higher concentration of lupulin than any other concentrated pellet, requiring less volume, less packaging, less storage requirements and less shipping costs. It also leads to better overall beer yields due to less trub matter in the kettle.
- The higher concentration of lupulin content in Cryo Hops® Brand pellets helps to reduce hop creep during dry hopping caused by monosaccharides and enzymes found in bract.

HOW DO CRYO HOPS® BRAND PELLETS AND GENERIC CONCENTRATED LUPULIN PELLETS COMPARE IN PRICING?

Generic concentrated lupulin pellets require more volume in comparison to Cryo Hops® Brand pellets due to a lower concentration of alpha acids. For example, some generic concentrated lupulin pellets are designed to be used at a replacement rate of 70% relative to standard T90 pellets. In other words, if a recipe would normally call for 1 lb. per barrel of T90 hop pellets, 0.7 lbs. of generic concentrated lupulin pellets would be needed, while only 0.5 lbs. of Cryo Hops® Brand pellets would be needed.

Here is an example of that price breakdown:

- 10lbs of T90 pellets @ \$13.50 per pound = \$135.00
- 7lbs of generic concentrated lupulin pellets @ \$22.50 per pound = \$157.50
- 5lbs of Cryo Hops® pellets @ \$31.50 per pound = \$157.50