

**CLAYTON  
HOPS**

**CLAYTON  
HOPS™**

[claytonhops.co.nz](http://claytonhops.co.nz)

**Amplifire™**

**FRESH HOP OIL**

PRODUCT OVERVIEW

**ADVANCED HOP PRODUCTS FROM NEW ZEALAND  
BY CLAYTON HOPS**



Winner of the highly coveted Morton Coutts Award  
for Innovation at the New Zealand Beer Awards

Want to take your beer's flavour and aroma to the next level? Amplifire™ Fresh Hop Oil is your secret weapon. It's a brewer's shortcut to maximum impact and minimal waste.

This popular farm-fresh liquid hop flavour and aroma product is designed to enhance the taste of beer. It can also boost yields, is exceptionally cost-effective and offers great value for money.

It's easy to use and integrate into the brewing process and its very low carbon footprint is setting a new benchmark in the industry.



## HOP FLAVOUR AND AROMA MADE EASY

Amplifire™ Fresh Hop Oil is a hop variety specific flavour and aroma product, with no bitterness present. It adds beautiful top notes and complexity into brews. It is a highly flowable liquid – at cool, room and warm temperatures – that is beer and water soluble.



# MADE FROM FARM FRESH 'WET' NEW ZEALAND HOPS, NOT REPURPOSED HOP PELLETS.

Our growers select only the finest farm fresh hops for our Amplifire™ Fresh Hop Oil.

We extract the oil from those hops – using our patent-pending process – on the same day as they are harvested. The hops are not kilned and are instead processed 'wet' to preserve volatile aromatics.

As generational farmers we strive to deliver the best products possible from our crops and we believe that Amplifire™ Fresh Hop Oil epitomises this strong commitment, noting that the vast majority of hop aroma extracts on the market are repurposed from unsold (often old) hop pellets with less of the volatile aromatic compounds.

## PROCESS FOR MAKING AMPLIFIRE™ FRESH HOP OIL (PROCESS TAKES LESS THAN 24 HOURS)

PICK



HOPS NOT KILNED TO PRESERVE AROMATICS

MADE IN LESS THAN 24 HOURS

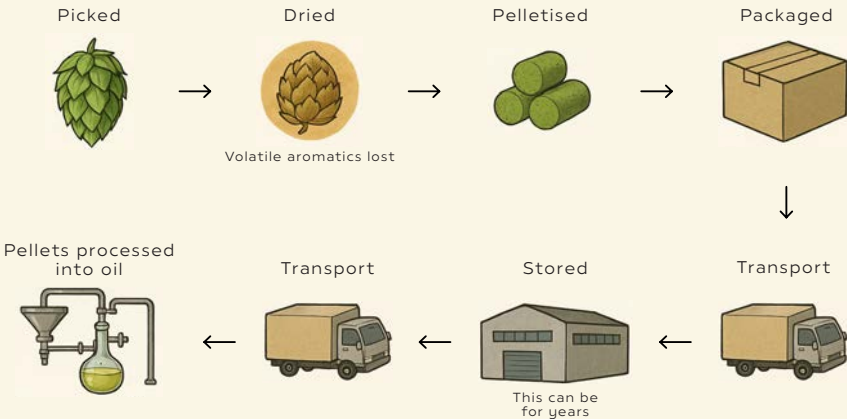


USING OUR PATENT-PENDING PROCESS

PACK



## PROCESS FOR MAKING OTHER HOP AROMA EXTRACT PRODUCTS IN THE MARKET (PROCESS CAN TAKE YEARS)



# WHY DO WE USE FARM FRESH 'WET' HOPS?

## IT'S ALL ABOUT EXPRESSION IN BEER.

For those of you who have visited a hop farm kilning operation – hops need to be dried before being pelletised – you will know that the kiln sheds are vibrant with hop aroma.

Those aromatics are essentially being lost into the atmosphere through the kilning (drying) process. By using 'wet' hops for our Amplifire™ Fresh Hop Oil those aromatics are being preserved.

Brewers might liken Amplifire™ Fresh Hop Oil to brewing with the soul of the hop.

Unlike the grassy or vegetal notes sometimes associated with seasonal

fresh hop beer, Amplifire™ Fresh Hop Oil is extracted directly from the lupulin glands of farm-fresh hop cones, contains no vegetative matter and delivers a clean, 'true-to-variety' expression of hop flavour and aroma.

While hop pellets play a key role in providing structure and background flavour to beer, they can introduce grassy or green notes and contribute to polyphenol astringency.

Here is a snapshot of key aroma differences in beer expression between Amplifire™ Fresh Hop Oil (using 'wet' hops) and hop pellets (using 'dry' hops):

FEATURE	AMPLIFIRE™ FRESH HOP OIL	HOP PELLETS
Overall aromatic profile	Bright, vibrant, fresh zest	Mellowed, sometimes earthier or spicier
Volatile aroma compounds	More volatile aroma compounds present, especially free thiols and monoterpenes, providing lively and delicate top notes	Less volatile aroma compounds present due to the hops being dried and further processed
Expression in beer	Brighter, cleaner and more vivid aromatics. Think explosive citrus, tropical fruit, pine or floral notes, depending on the hop variety	While hop pellets play a key role in providing structure and background flavour, they can also introduce some grassy or green notes and also contribute to astringency

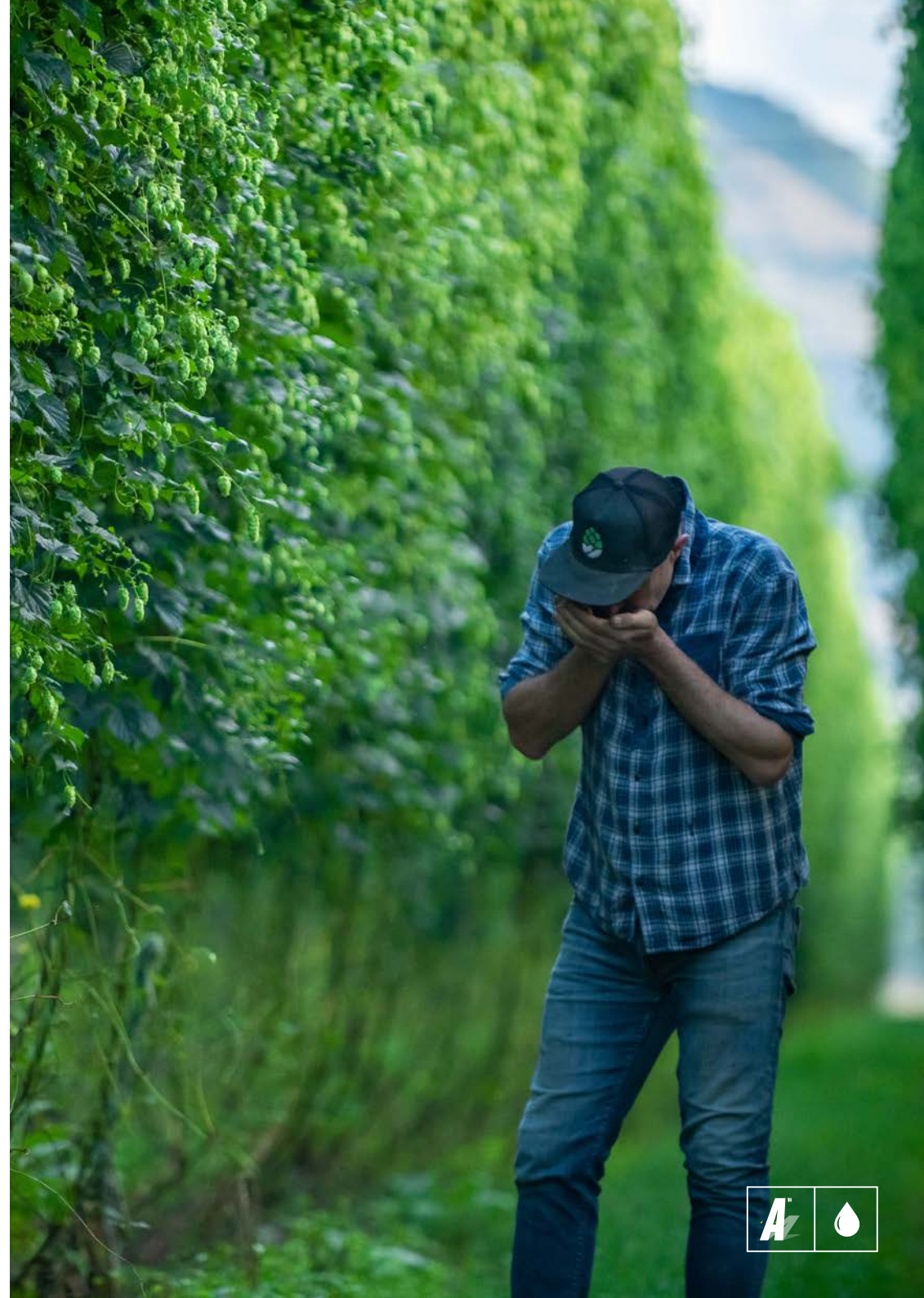
In essence, Amplifire™ Fresh Hop Oil brings unmatched 'true-to-variety' flavour and aromatic outcomes to beer.



# 'TRUE-TO-VARIETY' EXPRESSION

Amplifire™ Fresh Hop Oil brings 'true-to-variety' expression in beer:

VARIETY	AROMA PROFILE
CIP014	Passionfruit, intense tropical, pineapple, stone fruit, pink grapefruit
CIP076	Citrus, orange blossom, ripe peach, creamy vanilla, tropical
Green Bullet™	Resinous, subtle floral, crisp lemon, dark and dried fruit, slightly peppery spiciness
Motueka™	Fresh lime, lemon zest, mojito, orange spice, juicy, tropical
Nelson Sauvvin™	Gooseberry, lychee, passionfruit, sauvignon blanc, tropical, spicy
NZ Cascade™	Lime, grapefruit, peach, pineapple, passionfruit, hint of pine
Pacific Sunrise™	Orange, lemon, mango, melon, red berry, ripe and jammy apricot, subtle flower and pine
Pacifica™	Orange, tangerine, clementine, apricot, blackberry cannabis, floral, spice
Rakau™	Apricot, peach, mandarin, tangerine, pink grapefruit, pineapple, floral
Riwaka™	Passionfruit, pink grapefruit, pineapple, lime, orange, citrus, blackberry candy
Southern Cross™	Lemon, lime, hint of pine, clean spiciness



# GROWN AND MADE IN NEW ZEALAND



The New Zealand government has certified the New Zealand grown and made provenance of Amplifire™ Fresh Hop Oil by giving it the FernMark seal of approval.

Unlike other processors who use New Zealand hop materials that have been sent half-way around the world to them, Clayton Hops has a strong commitment to both growing and processing locally as this results in better quality product and is environmentally responsible.

Doing everything in-house also means a secure and stable product supply.



# HIGHLY VERSATILE

Amplifire™ Fresh Hop Oil is suited to all types of beer styles and is not limited to beer:

Lagers and lighter beer styles	✓
Pilsners	✓
Pale ales	✓
IPAs	✓
Hazy IPAs	✓
Pacific ales	✓
Summer ales	✓
Low and non-alcoholic beer	✓
Hop waters	✓
Seltzers	✓
RTDs	✓

## WHERE TO USE

Looking for flexibility in your process? Amplifire™ Fresh Hop Oil is your go-to. Use it anywhere from whirlpool to fermenter to brite tank, to deliver intense hop character with greater precision, efficiency and less waste.

Whether you're layering flavours or fine-tuning aroma, Amplifire™ Fresh Hop Oil is designed to maximise impact at nearly every stage of the brew.



# WHERE TO USE

## HOT SIDE



KETTLE - EARLY



KETTLE - LATE



WHIRLPOOL

## COLD SIDE



DRY HOP  
DAY 1



DRY HOP  
ACTIVE FERMENTATION  
DAYS 2-4



DRY HOP  
POST FERMENTATION



BRITE TANK

## KETTLE

Amplifire™ Fresh Hop Oil is not intended to be used in the kettle.

## WHIRLPOOL

Ready to rethink your whirlpool hop additions? With Amplifire™ Fresh Hop Oil brewers can replace up to 100% of hop pellets in the whirlpool, unlocking bold flavour and aroma with unmatched efficiency. We recommend a starting rate of 25–50% hop pellet replacement and adjust according to desired flavour outcome in final beer.

For maximum flavour impact, we recommend, if possible, chilling the whirlpool wort to <math><85^{\circ}\text{C}</math> prior to any oil addition (or hop pellet addition).

## DRY HOP, ACTIVE AND POST FERMENTATION, BRITE TANK

Take total control of your hop expression. Add Amplifire™ Fresh Hop Oil during active fermentation to enhance biotransformation or post-fermentation for a clean, explosive burst of aroma that leaps from the glass.

Amplifire™ Fresh Hop Oil can be used alongside hop pellets during dry hopping without sacrificing beer body and mouthfeel. We recommend a starting rate of 25–50% hop pellet replacement and adjust according to desired flavour outcome in final beer.

## CARBONATION

Amplifire™ Fresh Hop Oil should be dosed prior to carbonation to avoid any potential impact on head retention.



Not recommended



Can be used



Most effective use



# HIGHLY EFFICIENT FLAVOUR TRANSFER

Hop oil is what brewers strive to impart into their beer when using hop pellets.

The efficiency of dry hopping with hop pellets has been tested to be only around 30–40% of potential flavour absorption, with the remainder going to waste.

Amplifire™ Fresh Hop Oil is rich in highly desirable volatile aroma compounds – including desirable compounds that are absent from hop pellets due to the hop drying and pelletising process – with a far higher (circa. 100%) transfer rate into finished beer – ‘true-to-variety’ flavour and aroma that bursts from the glass.

## DOSE RATE – OUTSTANDING CONCENTRATION

Formulated for maximum impact, Amplifire™ Fresh Hop Oil is incredibly potent. It is, by our calculations, up to ten times more concentrated than other hop oil products on the market (as well as being cheaper on a per mL basis).

As a starting point, we recommend a 50:1 T90 hop pellet replacement ratio by weight – just 100mL of Amplifire™ Fresh Hop Oil delivers the same aromatic punch as 5kgs of T90 hop pellets. That’s serious hop fire–power in a fraction of the volume.

T90 HOP PELLETT AMOUNT	AMPLIFIRE™ FRESH HOP OIL EQUIVALENT AMOUNT
1lb (454g)	~9.1mL (-0.31oz)
1kg (2.2lb)	20mL (-0.68oz)
2kg (4.4lb)	40mL (-1.35oz)
3kg (6.6lb)	60mL (-2.03oz)
4kg (8.8lb)	80mL (-2.71oz)
5kg (11lb)	100mL (-3.38oz)

Of course, every beer has its own personality. Whether you’re brewing a hop-saturated DIPA or a subtle pale ale, your ideal dosage might vary. Adjust up or down to dial in the perfect intensity and expression for your style and goals. As a starting point, we suggest:

BASE STYLE	DRY HOPPING RANGE	STARTING TRIAL DOSE RATES *
Lager and lighter beer styles	0.5 – 5g/L	1 – 10mL/hL
Pilsners	2 – 10g/L	4 – 20mL/hL
Pale ales	4 – 10g/L	8 – 20mL/hL
IPAs	8 – 15g/L	15 – 30mL/hL
Hazy IPAs	10 – 25g/L	20 – 50mL/hL
Pacific ales	4 – 10g/L	8 – 20mL/hL
Summer ales	4 – 10g/L	8 – 20mL/hL
Hop water	0.5 – 5g/L	1 – 10mL/hL
Seltzers	0.5 – 5g/L	1 – 10mL/hL
RTDs	1 – 5g/L	2 – 10mL/hL

\* If the brew is being pasteurised, consider increasing the dose rate of Amplifire™ Fresh Hop Oil to attain desired flavour and aroma.

Dose Amplifire™ Fresh Hop Oil into 2 – 3L of your beverage to disperse before dosing into the tank. Alternatively, dispense in warm water first. Amplifire™ Fresh Hop Oil can also be dosed inline to the brite tank.



# EXCEPTIONAL PRICING AND VALUE FOR MONEY

Not only is Amplifire™ Fresh Hop Oil more concentrated per mL than many (if not all) other hop aroma extract products, its price on a per mL basis is exceptional.

Please do the comparisons yourself as they are highly favourable – even against those products that claim to be the most cost effective on the market.

Compared to hop pellets, Amplifire™ Fresh Hop Oil is far more cost effective in terms of how far it goes. However, hop pellets will always be an integral part in beer production for the different attributes they bring, including structure and background flavour to beer.

# ADVANTAGES



<b>Great and consistent flavour and aroma enhancer</b>	✓ Adds beautiful unique top notes and complexity into brews. Brighter, cleaner (no vegetal matter) and more consistent
<b>No bitterness</b>	✓ No bitterness imparted
<b>100% efficiency</b>	✓ High flavour and aroma transfer into finished beverage
<b>Increase beer yield and revenue</b>	✓ Substitute some hop pellets for oil at whirlpool and/or dry hopping to increase beer yields and revenue [For every kg of T90s, you could be losing 8-10L of beer]
<b>Super easy to use and incorporate</b>	✓ Highly flowable liquid (at cool, room and warm temperatures) that is beer and water soluble. No need to warm. Reduces the need to lug around hop pellets. Use it anywhere from whirlpool to fermenter to brite tank. No workflow modifications required and integrates well with hop pellets
<b>Exceptional pricing and value for money</b>	✓ Far more concentrated than many (if not all) other products and exceptionally priced
<b>'True-to-variety'</b>	✓ 'True-to-variety' flavour and aroma profile that bursts from the glass
<b>Pure New Zealand product</b>	✓ Both grown and made by us in New Zealand and carrying the FernMark seal of provenance from the New Zealand government
<b>Secure and stable product supply</b>	✓ We do not rely on third party hop supply nor third party processing, as we do it all in-house
<b>Elite low carbon footprint product</b>	✓ Top-tier climate-friendly product due to the raw ingredient – farm fresh 'wet' hop cones instead of hop pellets. And made locally in New Zealand – no shipping of hop material around the world for third party processing
<b>Extended beer shelf life</b>	✓ Anecdotal evidence of increased beer shelf life due to reduced oxidation and plant material (for instance, ease of dosing can reduce oxidation potential in comparison to dry hopping and plant material can possess compounds that may oxidise over time)
<b>Highly versatile</b>	✓ Works with all kinds of beer styles (including non-alcoholic), as well as hop waters, seltzers and RTDs
<b>Easy to trial</b>	✓ Easy to perform benchtop sensory trials (refer to the benchtop trial section below)
<b>Less brewing waste and mess</b>	✓ 100% absorbed into beer. Less waste water if substitute some hop pellets for oil and faster filtration. Does not stick to equipment
<b>No undesirable plant compounds</b>	✓ No plant material present. Oil extracted from the lupulin glands of the farm fresh hop cones
<b>No hop creep</b>	✓ Free of hop-creep inducing monosaccharides and enzymes
<b>Light stable</b>	✓ Does not cause light-struck off-flavours
<b>Easy to transport and store</b>	✓ Can be transported and stored at ambient (although note recommended storage below)
<b>Shipping and storage efficiencies</b>	✓ Occupies considerably less space than the equivalent amount of hop pellets, which reduces shipping and storage footprint and costs
<b>Reduced packaging waste</b>	✓ Bottles (or other receptacles) instead of the cardboard cartons and foil bags associated with hop pellet packaging



# CARBON FOOTPRINT – THE PATH TO LOWER EMISSIONS



# Amplifire™

FRESH HOP OIL



Refer to the 2025 BX Carbon Footprint Study on our website for more detail and analysis.

## 2024

Hop harvest

## 0.47

kgs CO<sub>2</sub>e  
per 100 L of beer \*

(includes upstream impacts, farm-level growing and harvesting, processing, packaging and storage in NZ prior to despatch)

## 0.35

kgs CO<sub>2</sub>e  
per 100 L of beer \*

(excluding composting)



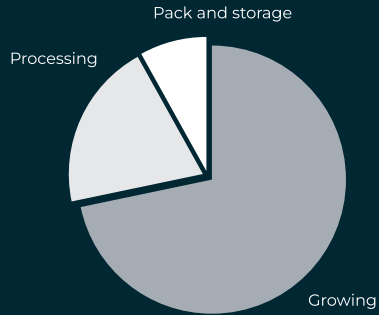
The figures assume zero emissions for land use change pending further investigation.

\* Reported as a weighted average across hop varieties.

## BX STUDY RESULTS

Our Amplifire™ Fresh Hop Oil — as independently measured by BX of London — has a carbon footprint of 0.47 kg CO<sub>2</sub>e, or, for benchmarking purposes, 0.35 kg CO<sub>2</sub>e (composting emissions are typically not mentioned in industry benchmarks).

Putting this into context and for benchmarking purposes, when producing 100 L of pale ale using 10 mL of Amplifire™ Fresh Hop Oil, the oil itself has a carbon footprint of 0.35 kg CO<sub>2</sub>e (source to packaged product including storage before despatch).



## OBSERVATIONS

Amplifire™ Fresh Hop Oil has an exceptionally low carbon footprint, even with composting included in the emissions calculation.

A key reason for this – and unlike the vast majority of other hop extract products on the market – being that the oil is extracted from ‘wet’ hop cones, instead of hop pellets that have been kiln dried and subject to further processing during pelletisation.

The low dosage requirements (it is a highly concentrated product) and the use of renewable energy for processing are also key reasons for the low footprint.

Amplifire™ Fresh Hop Oil’s footprint is multiples lower than for industry standard T90 hop pellets.

To our knowledge this makes Amplifire™ Fresh Hop Oil in the top tier of the world’s most climate-friendly hop products.

It is worthy of note that some of the measured farmland is comprised of juvenile hop plants with relatively low yields. As the plants mature their yields will increase which will have a positive impact on emissions i.e. lower emissions.

The overall carbon footprint of Amplifire™ Fresh Hop Oil (including delivered to customer) is helped by the fact that the hops are grown in New Zealand and the product is also made in New Zealand.

Unlike other processors who use semi-processed New Zealand hop materials that have been sent half-way around the world to them, Clayton Hops has a strong commitment to both growing and processing locally as this results in better quality product and is environmentally responsible.

Doing everything in-house also means a secure and stable product supply.

Further, the high concentration of Amplifire™ Fresh Hop Oil reduces its shipping and storage footprint and it can also be shipped and stored at ambient.



# RECOMMENDED STORAGE

Unopened receptacles can be stored at ambient out of direct sunlight. However, we recommend storing at a cool, stable temperature e.g. in a fridge.

For opened receptacles (where only part of the content is used), ensure oxygen is purged from the receptacle with CO<sub>2</sub> or inert gas following use and store at a cool, stable temperature e.g. in a fridge. We recommend using within 2–3 months of opening.

Do not freeze Amplifire™ Fresh Hop Oil.



# BENCHTOP TRIAL

It is very easy to perform benchtop trials with Amplifire™ Fresh Hop Oil:

- 1 Pour 150mL of beer into a tasting glass for Amplification. A beer with some existing hop presence works well.
- 2 Add 1–2 drops of your selected Amplifire™ Fresh Hop Oil variety into the beer sample, depending on desired level of hoppiness.
- 3 Mix in with a spoon, straw or other mixing implement.
- 4 Allow to sit for a couple of minutes.
- 5 Conduct sensory on the beer sample and write down your observations.
- 6 Benchtop dosing trials are best conducted with a few different beer styles and Amplifire™ Fresh Hop Oil varieties to find desired flavour profile.
- 7 Amplifire™ Fresh Hop Oil is best used in the brewing process rather than like this, but benchtop dosing trials still provide a good example of what Amplifire™ Fresh Hop Oil can do.



This method is for sensory trials only and should not replace full brewing trials.



# COMPARING OUR HOP PRODUCTS



FEATURE	AMPLIFIRE™ FRESH HOP OIL	AMPLIFIRE™ CONCENTRATED LUPULIN PELLETS	T90 HOP PELLETS
<b>Form</b>	Flowable liquid	Pellet. More lupulin (acids and oils) than T90s	Pellet. Less lupulin (acids and oils) than Amplifire™ Pellets
<b>Plant material</b>	None	Yes. Less plant material and higher levels of acids and oil compared to T90s	Yes. More plant material and lower levels of acids and oil compared to Amplifire™ Pellets
<b>Process</b>	Made through a patent-pending extraction process where the oil is extracted directly from the lupulin glands of 'wet' farm-fresh hop cones	Made through a patent-pending process by cryogenically separating the lupulin from the dried leaf and stem material of hop cones and concentrating and compressing the lupulin	Made by milling whole dried hop cones (leaf, stem, lupulin) and compressing them
<b>Raw material</b>	Fresh, undried whole hop cones	Kiln-dried whole hop cones	Kiln-dried whole hop cones
<b>Name origin</b>	Amplifire™ is Clayton Hops' advanced hop products range, aimed at boosting flavour and aroma and reducing beer loss	Amplifire™ is Clayton Hops' advanced hop products range, aimed at boosting flavour and aroma and reducing beer loss	T90 is from the principle that 90% of the original hop material is retained after pelletising
<b>Processing time from harvest</b>	Less than 24 hours	Weeks	Target of less than one week
<b>Preservation of hop volatiles</b>	Very high (no kilning of raw material)	Medium to low (kilning loss)	Medium to low (kilning loss)
<b>Bitterness contribution</b>	None	Yes (variety dependent)	Yes (variety dependent)
<b>Flavour/aroma impact</b>	High. Delivers cleaner, more vivid aromatics	More intense and reduced vegetal flavours compared to T90s	Moderate and increased vegetal flavours compared to Amplifire™ Pellets
<b>Use rate (dry hop T90 replacement)</b>	~50:1 (by weight). For instance, 100mL of Amplifire™ Fresh Hop Oil is equivalent to circa. 5kgs T90s	~2:1 (by weight). For instance, use 500-600g of Amplifire™ Pellets instead of 1kg of T90s	Baseline
<b>Beer loss in whirlpool and dry hop (from using product)</b>	Minimal	Low to moderate	Moderate
<b>Solubility</b>	Fully water and beer soluble	Requires mixing/rousing	Requires mixing/rousing
<b>Ease of use</b>	Simple liquid dosing. Highly flowable product at cool, room and warm temperatures	Similar handling as T90s	Standard handling
<b>Recommended storage requirement</b>	Cold storage (ambient is permitted)	Cold storage (ambient is not permitted)	Cold storage (ambient is not permitted)
<b>Shelf life</b>	2 years commercially sealed	3 years	3 years
<b>Carbon footprint</b>	Very low – no kilning of raw material and made in New Zealand	Low – New Zealand made and ultra-concentrated, reducing total inputs and shipping needs	Moderate – New Zealand made but less concentrated so more volume and packaging per batch compared to the other two products, but a foundational brewing input
<b>Light stable</b>	Yes	No	No
<b>Hop creep potential</b>	None	Low	High
<b>'True-to-type' variety expression</b>	Yes	Yes	Yes
<b>Recommended applications</b>	Dry hop, brite tank (can also use in whirlpool)	Kettle, whirlpool, dry hop	Kettle, whirlpool, dry hop