CLAYTON HOPS™

claytonhops.co.nz

CLAYTON HOPS

Amplifire™

CONCENTRATED LUPULIN PELLETS

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 CLEAN AND
MORE INTENSE HOP
FLAVOUR WITH LOWER
GREEN, GRASSY AND
ASTRINGENT FLAVOURS?
WANT LESS BEER LOSS?
THEN TRY OUR CRYOGENICALLY
ENRICHED AMPLIFIRE™ PELLETS.

WHAT ARE THEY?

Amplifire™ Pellets have elevated levels of lupulin – resins (bitterness) and oils (flavour and aroma) – in them compared to T90 hop pellets. Up to twice as intense.

They have been designed to boost flavour and aroma; reduce green, grassy and astringent flavours; and increase beer yields.

HOW ARE THEY MADE?

Clayton Hops is the proud operator of the first and currently only cryogenic concentrated lupulin pellet processing facility in the Southern Hemisphere.

Our unique patent-pending process separates whole hop cones into lupulin and plant material at extremely low temperature in a nitrogen-rich/low oxygen environment, which limits oxidation to enhance quality.

The lupulin, which contains the sought-after acids and oils, is then pelletised to produce a concentrated lupulin pellet.

1	**HARVEST**	Hop cones picked off hop plant in Tasman, New Zealand.
2	**DRYING**	Hop cones dried in kilns on-farm.
3	**BALING**	Dried hop cones baled and driven a short distance to the pelletising and packaging facility.
4	**FREEZING**	Dried hop cones are frozen.
5	**BREAKING**	Frozen hop cones are broken up into fractions.
6	**SEPARATING**	Lupulin is separated from the plant material.
7	**PELLETING**	Lupulin (plus some plant material) is then made into pellets (Amplifire™ Pellets) in a pellet mill.
8	**PACKAGING**	Pellets are put into nitrogen flushed (oxygen purged) foil bags and then packed in boxes/cartons.
9	**STORAGE**	Hops ideally stored between 0–5° Celsius.
10	**SHIPMENT**	Hops shipped to customers around the world.

HOPS SELECTED FOR PRODUCT CONSISTENCY

Our quality assurance team selects hops each harvest for processing into Amplifire™ Pellets, with an eye for year–on–year product consistency (noting that no two harvests are alike).

'TRUE–TO–VARIETY' EXPRESSION

Amplifire™ Pellets bring '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 Sauvin™	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

NEW ZEALAND.COM
Licence No.100937

The New Zealand government has certified the New Zealand grown and made provenance of Amplifire™ Pellets 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.

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

Not recommended

Can be used

Most effective use

KETTLE

Amplifire™ Pellets can be used in the late kettle in the same way T90 hop pellets are used. We do not recommend using as an early kettle addition as this could result in a loss of aroma characteristics.

Due to the cryogenic enrichment process, Amplifire™ Pellets have higher levels of alpha acids compared to T90 hop pellets. This means that less Amplifire™ Pellets are required compared to T90 hop pellets which reduces wort loses (due to absorption) and increases brewing efficiencies.

WHIRLPOOL

Amplifire™ Pellets can be used in the whirlpool in the same way T90 hop pellets are used.

As for the kettle, less Amplifire™ Pellets are required compared to T90 hop pellets which can reduce costs, boost beer yields (less trub loss) and brewing efficiencies while maximising flavour impact.

To minimise IBU pick–up and maximise flavour, we recommend, if possible, chilling the whirlpool wort to <85°C prior to adding Amplifire™ Pellets.

DRY HOP, ACTIVE AND POST FERMENTATION

Amplifire™ Pellets are well suited to use as a fermentation vessel addition. Amplify flavour and aroma while reducing beer loses and cutting down on costs. A win–win for brewers!

BRITE TANK

Amplifire™ Pellets should not be used in the brite tank (note that Amplifire™ Fresh Hop Oil is well suited for use in the brite tank).

TYPICAL BREWING VALUES

The following values are for guidance only.
Actual alpha, beta and total oil values will vary from harvest to harvest.

VARIETY	ALPHA ACIDS %	BETA ACIDS %	TOTAL OIL (ML/100G)
CIP014	*	*	*
CIP076	*	*	*
Green Bullet™	19.0–22.0	8.0–11.0	1.80–2.3
Motueka™	11.0–14.0	6.5–10.0	1.7–2.0
Nelson Sauvin™	17.0–20.0	8.0–10.0	2.0–2.3
NZ Cascade™	13.0–18.0	8.5–11.0	1.8–2.1
Pacific Sunrise™	*	*	*
Pacifica™	8.0–11.0	8.0–11.0	1.7–2.0
Rakau™	17.0–20.0	7.0–10.0	2.2–2.7
Riwaka™	9.0–12.0	6.5–9.0	1.6–2.3
Southern Cross™	18.0–23.0	7.0–10.0	1.6–2.0

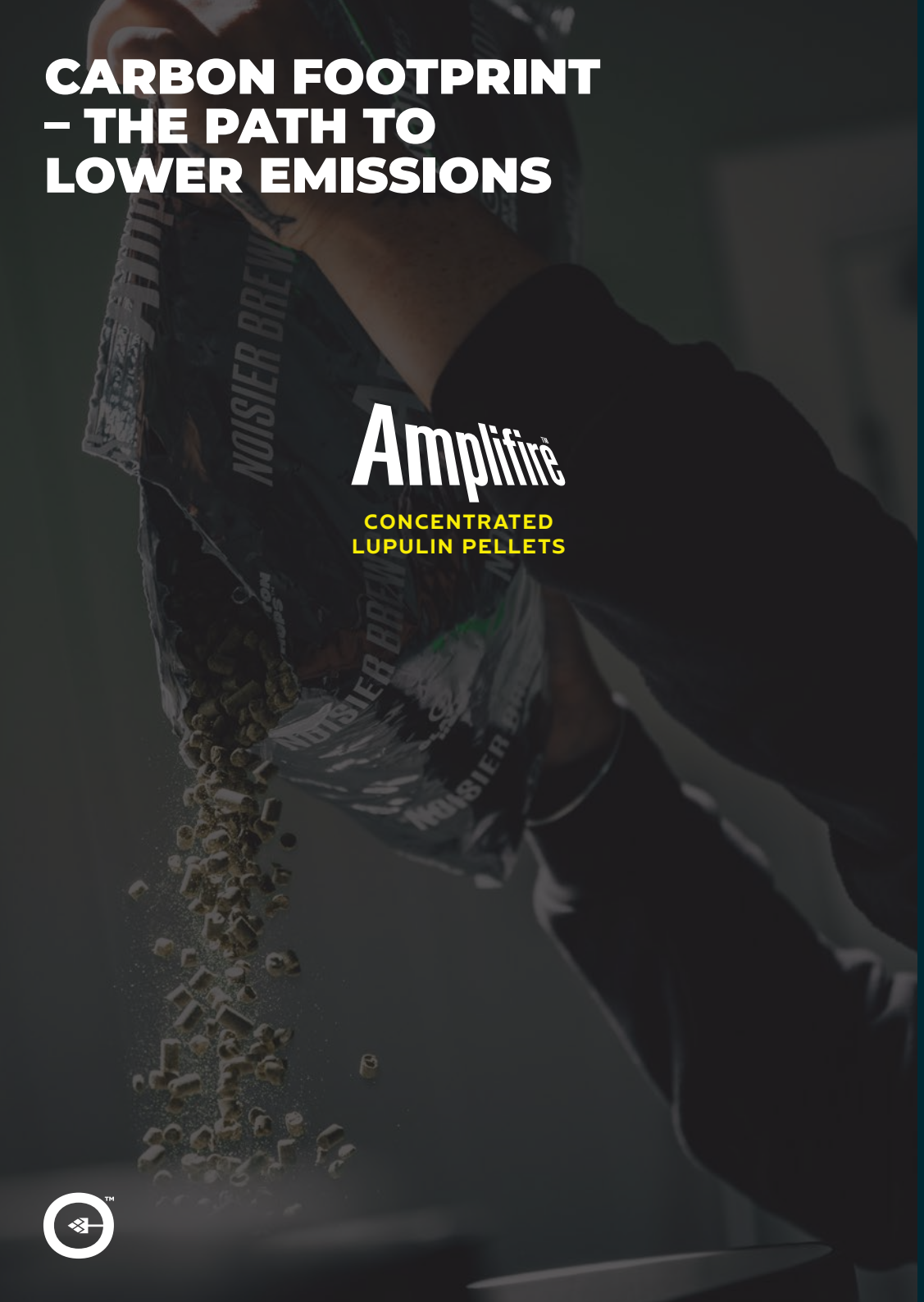
* Values for these varieties will be populated in due course.

DOSE RATE

Adapt any recipe by substituting 500 – 600g of Amplifire™ Pellets for 1kg of T90 hop pellets.

Amplifire™ Pellets work very well in tandem with T90 hop pellets, giving beautiful hop character with nice body and mouthfeel.

CARBON FOOTPRINT – THE PATH TO LOWER EMISSIONS



Amplifire™

CONCENTRATED LUPULIN PELLETS

BX CARBON FOOTPRINT

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

2024

Hop harvest

3.38

kgs CO_2e per 100 L of beer *

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

2.81

kgs CO_2e per 100 L of beer *

(excluding composting)

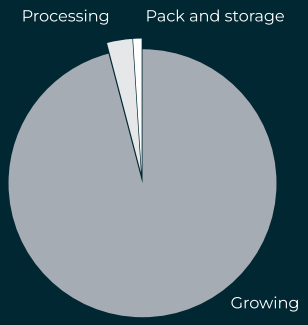
The figures assume zero emissions for land use change pending further investigation.

* Reported as a weighted average across hop varieties.

BX STUDY RESULTS

Our Amplifire™ Pellets — as independently measured by BX of London — have a carbon footprint of 3.38 kg CO_2e, or, for benchmarking purposes, 2.81 kg CO_2e (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 250 g of Amplifire™ Pellets, the pellets themselves have a carbon footprint of 2.81 kg CO_2e (source to packaged product including storage before despatch).



OBSERVATIONS

These emissions reflect real-world farming practices. With ongoing improvements in fertiliser efficiency and composting as our hop gardens mature, Amplifire™ Pellets will remain a powerful solution for brewers seeking a lower emission impact. For brewers aiming to reduce Scope 3 emissions (namely upstream supply chain emissions in this instance) without sacrificing quality, Amplifire™ Pellets offer a more efficient and climate-conscious choice.

The use of renewable energy for processing is helpful.

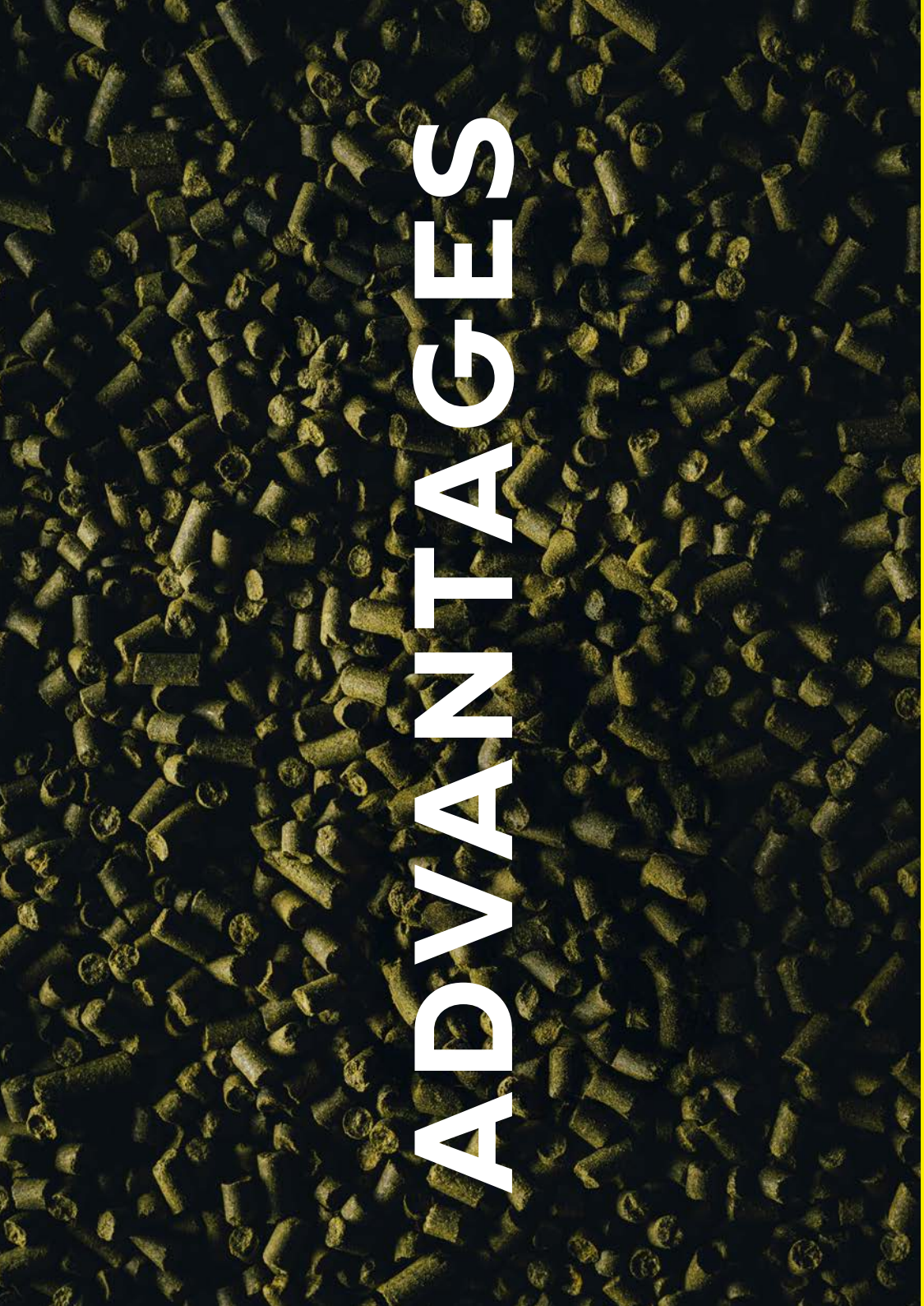
It is worthy of note that some of the measured farmland is comprised of juvenile hop plants with relatively low yields. As the plants mature their yields will increase which will have a positive impact on emissions i.e. lower emissions.

The overall carbon footprint of Amplifire™ Pellets (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™ Pellets reduces its shipping and storage footprint.



ADVANTAGES

Clean and intense flavour and aroma	✓	Cleaner and more intense hop flavour (due to higher levels of acids and oils) with lower undesirable green, grassy and astringent flavours (due to less plant material), compared to T90s
High efficiency	✓	Because of their potency, brewers can use circa. half the amount (by weight) to achieve the same level of flavour, aroma and bitterness as T90s
Increase beer yield and revenue	✓	Brewing with less plant material, compared to T90s, can increase beer yields and revenue [For every kg of T90s, you could be losing 8–10L of beer]
Better for dry hopping	✓	Reduced risk of clogging equipment due to fewer solids and less product to lug around, compared to T90s
Pairs well with other products	✓	Works well with T90s and other products, such as Amplifire™ Fresh Hop Oil, for layering complexity
'True-to-variety'	✓	'True-to-variety' flavour and aroma profile
Pure New Zealand product	✓	Both grown and made by us in New Zealand and carrying the FernMark seal of provenance from the New Zealand government
Secure and stable product supply	✓	We do not rely on third party hop supply nor third party processing, as we do it all in-house
Lower carbon footprint product	✓	Lower carbon footprint compared to T90s (as more concentrated). Made locally in New Zealand – no shipping of hop material around the world for third party processing
Less brewing waste	✓	Less plant material so less brewing waste
Shipping and storage efficiencies	✓	Occupies considerably less space than the equivalent amount of T90s, which reduces shipping and storage footprint and costs
Reduced packaging waste	✓	Higher product concentration means less is needed which results in lower packaging waste (foils and cartons)
Reduced hop creep	✓	Monosaccharides and enzymes found in hop bract contribute to hop creep, so reducing plant material (less plant material in Amplifire™ Pellets than T90s) lessens the potential for hop creep

COMPARING OUR HOP PRODUCTS

CLAYTON HOPS

FEATURE	AMPLIFIRE™ FRESH HOP OIL	AMPLIFIRE™ CONCENTRATED LUPULIN PELLETS	T90 HOP PELLETS
Form	Flowable liquid	Pellet. More lupulin (acids and oils) than T90s	Pellet. Less lupulin (acids and oils) than Amplifire™ Pellets
Plant material	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
Process	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, steam, lupulin) and compressing them
Raw material	Fresh, undried whole hop cones	Kiln-dried whole hop cones	Kiln-dried whole hop cones
Name origin	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
Processing time from harvest	Less than 24 hours	Weeks	Target of less than one week
Preservation of hop volatiles	Very high (no kilning of raw material)	Medium to low (kilning loss)	Medium to low (kilning loss)
Bitterness contribution	None	Yes (variety dependent)	Yes (variety dependent)
Flavour/aroma impact	High. Delivers cleaner, more vivid aromatics	More intense and reduced vegetal flavours compared to T90s	Moderate and increased vegetal flavours compared to Amplifire™ Pellets
Use rate (dry hop T90 replacement)	~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
Beer loss in whirlpool and dry hop (from using product)	Minimal	Low to moderate	Moderate
Solubility	Fully water and beer soluble	Requires mixing/rousing	Requires mixing/rousing
Ease of use	Simple liquid dosing. Highly flowable product at cool, room and warm temperatures	Similar handling as T90s	Standard handling
Recommended storage requirement	Cold storage (ambient is permitted)	Cold storage (ambient is not permitted)	Cold storage (ambient is not permitted)
Shelf life	2 years commercially sealed	3 years	3 years
Carbon footprint	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
Light stable	Yes	No	No
Hop creep potential	None	Low	High
'True-to-type' variety expression	Yes	Yes	Yes
Recommended applications	Dry hop, brite tank (can also use in whirlpool)	Kettle, whirlpool, dry hop	Kettle, whirlpool, dry hop