



## Mangrove Jack's: Hop Substitution Guide

Hops are quite the contributor to the flavour and aroma of your beer, but what happens when you can't find right variety? We've put together this Hop Substitution Guide to help you find what you're looking for!

Hops are responsible for the bitter notes that balance the sweetness from your malt; as well as defining the flavour and aroma that has you coming back for more. Let's look at the difference between bittering and aroma hops and how these contribute to the overall flavour of your brew.

### - Bittering Hops -

Alpha acids are the main bittering agent in hops and are expressed as a percentage of the total weight of the hop. Bittering hops are added during the boiling step and are primarily there to produce bitter notes and balance out the malty and alcohol sweetness.

The unit of measurement for bitterness is the *International Bitterness Units* (IBU) and is based on the level of iso-alpha acids dissolved in beer. This value can be used to formulate a recipe for the beer's final bitterness.

### - Flavour & Aroma Hops -

For many craft beers a 'dry hopping' step means there is an addition of hops during or after fermentation. This produces more aromatics and flavours and also allows the lighter notes of the hops - that would otherwise be lost in the boil - to come through.

### Want to get creative?

With the evolution of the craft beer scene and the natural creativity of a brewer, there are many varieties of hops that can be used for bitterness and aroma. That's why we've also included the aroma/flavour of the hops in the chart below to inspire you get brewing based on your personal preferences.

Hop	AROMA/FLAVOUR	ALPHA	BITTERING/AROMA	SUBSTITUTES
Admiral	ORANGE • TEA • FRESH • SAP	13%-16.2%	Bittering	Chinook   Northdown   Challenger   Centennial   Cascade (US)   Amarillo   Target
African Queen	DARK FRUIT • LEMONGRASS	10%-17.0%	Dual Purpose	Amarillo   Cascade   Mosaic   Simco   Citra
Ahtanum	GRAPEFRUIT • FLORAL • CEDAR	4%-6.3%	Aroma	Cascade   Amarillo
Amarillo	GRAPEFRUIT • ORANGE • LEMON • MELON • APRICOT • PEACH	8%-11%	Aroma	Cascade (US)   Centennial   Ahtanum™   Chinook   Summer
Amethyst	EARTHY • CITRUS • SPICY	2%-6%	Aroma	Saaz   Loral
Apollo	CLEAN • GRAPEFRUIT	15%-20%	Bittering	Nugget   Columbus   Zeus
Apolon	MILD	10%-12%	Dual Purpose	Syrian Goldings   Brewers gold   Syrian Aurora
Aquila	AROMA	6.7%-8.9%	Aroma	Cluster   Galena
Aramis	GREEN • HERBAL • SPICY • CITRUS	7.9%-8.3%	Aroma	Willamette   Challenger   Ahtanum
Archer	APRICOT • PEACH • FLORAL • LIME	4%-6%	Aroma	Willamette   Challenger   Strisselspalt
Ariana	BERRY • CITRUS • WOODY	9%-13%	Dual Purpose	Mandarina Bavaria   Hallertau Blanc
Atlas (Styrian Atlas)	LIME • BLOSSOM • PINE	9%-11%	Aroma	Brewers gold   Syrian Aurora   Apolon
Azacca	MANGO • PAPAYA • ORANGE • GRAPEFRUIT • LEMON • PINE • SPICY • PINEAPPLE • GRASSY • TROPICAL FRUIT • CITRUS	14%-16%	Dual Purpose	Citra   Galaxy   Mosaic
Banner	BITTER • AROMA	8.4%-13%	Bittering	Aquila   Cluster   Galena
Belma	ORANGE • TROPICAL	9.4%-12.1%	Dual Purpose	Summer   Huell Melon
Bitter Gold	PEAR • WATERMELON • STONE FRUIT • FRESH CUT GRASS	15.4%-18.8%	Bittering	Galena   Nugget
Boadicea	FLORAL • ORCHARD BLOSSOM • RIPE FRUIT	7%-10%	Aroma	Green Bullet   Cascade   Columbus   Chinook
Bouclier	HERBAL • GRASS • SPICY	5.2%-9%	Dual Purpose	Chinook
Bramling Cross	BLACKCURRANT • LOGANBERRY • VANILLA	5%-7.8%	Dual Purpose	Whitbread Golding
Bravo	ORANGE • VANILLA	14%-17%	Bittering	Columbus   Zeus
Brewer's Gold	BLACKCURRANT • SPICY	8.1%-13.1%	Bittering	Cascade   Bullion
Brewer's Gold, UK	SPICY • BLACKCURRANT	7.1%-11.3%	Bittering	Bullion   Cascade   Galena   Northern Brewer (US)   Northdown
Bullion, UK	ZESTY • SPICY • DARK RED FRUIT	5.3%-9.5%	Bittering	Columbus   Northern Brewer   Galena   Chinook   Brewer's Gold

Bullion, USA	BLACKCURRANT • ZESTY	6.7%-12.9%	Bittering	Columbus   Northern Brewer   Galena   Chinook   Brewer's Gold
Calicross	FLORAL • FRUITY • EARTHY	5.8%-7.9%	Dual Purpose	Cluster
Calypso	FRUIT • APPLE • PEAR • CITRUS	12%-14%	Dual Purpose	Galena   Cascade   Huell Melon
Canadian Redvine	CHERRY • GRAPEFRUIT PEEL	5%-6%	Aroma	Newport   Magnum   Galena
Cascade, Cryo	GRAPEFRUIT • FLORAL • PINE	11%-13%	Dual Purpose	Centennial   Amarillo   Columbus   Ahtanum
Cascade, Hop Extract	GRAPEFRUIT • FLORAL • PINE	38.80%	Dual Purpose	Centennial   Amarillo   Columbus   Ahtanum
Cascade, USA	GRAPEFRUIT • FLORAL • PINE	4.5%-8.9%	Dual Purpose	Centennial   Amarillo   Columbus   Ahtanum
Cashmere	MELON • LEMON • LIME • SPICY	7.7%-9.1%	Dual Purpose	Cascade
Cekin	MILD	6%-8%	Aroma	Styrian Goldings   Brewers gold   Styrian Aurora
Centennial	LEMON • FLORAL • ORANGE BLOSSOM • EARTHY	9.5%-11.5%	Dual Purpose	Chinook   Galena   Nugget   Zeus   Columbus
Centennial, Hop Extract	LEMON • FLORAL • ORANGE BLOSSOM	48.80%	Dual Purpose	Chinook   Galena   Nugget   Zeus   Columbus
Centennial, Hop Hash	LEMON • FLORAL • ORANGE BLOSSOM	32%	Dual Purpose	Chinook   Galena   Nugget   Zeus   Columbus
Challenger	CEDAR • GREEN TEA • SWEET FRUIT	6.5%-9%	Dual Purpose	Perle, USA
Chelan	MILD	12%-14.5%	Bittering	Galena   Nugget
Chinook	GRAPEFRUIT • SPICY • PINE	12%-14%	Dual Purpose	Galena   Eroica   Nugget   Bullion
Chinook, Hop Extract	GRAPEFRUIT • SPICY • PINE	58.80%	Dual Purpose	Galena   Eroica   Nugget   Bullion
Chinook, NZ	GRAPEFRUIT • SPICY • PINE	12%-14%	Dual Purpose	Galena   Eroica   Nugget   Bullion
Citra	GRAPEFRUIT • MELON • LIME • GOOSEBERRY • PASSION FRUIT	10%-15%	Dual Purpose	Simcoe   Cascade   Centennial
Citra, Cryo	GRAPEFRUIT • MELON • LIME • GOOSEBERRY • PASSION FRUIT	24%-26%	Dual Purpose	Simcoe   Cascade   Centennial
Cluster	FLORAL • EARTHY • SWEET FRUIT	5.5%-9%	Dual Purpose	Eroica   Galena
Columbia	EARTHY • FRUITY	6.8%-11.5%	Dual Purpose	Fuggle   Willamette
Columbus	BLACK PEPPER • DANK • CITRUS • EARTHY • SPICY	14%-16%	Dual Purpose	Zeus   Galena   Chinook   Nugget   Centennial   Millenium
Columbus (Tomahawk, CTC), Hop Hash	BLACK PEPPER • DANK • CITRUS • EARTHY • SPICY	14%-18%	Dual Purpose	Zeus   Chinook   Northern Brewer   Nugget   Target   Warrior   Millenium   Bullion
Comet	"WILD AMERICAN" • GRASS • GRAPEFRUIT	9.4%-12.4%	Dual Purpose	Galena
Crystal	WOODY • GREEN	2.8%-4.4%	Aroma	Liberty   Mount Hood   Hallertau, GER   Ultra
Dana	FLORAL • CITRUS	11%-16%	Dual Purpose	Bobek   Celeia
Defender	AROMA	3.3%-6%	Aroma	Density
Delta	SPICY • MELON • CITRUS	5.5%-7%	Aroma	Cascade   Nelson Sauvin   Fuggle   Willamette
Denali (Exp 06277)	PINEAPPLE • PINE • CITRUS	13%-15%	Dual Purpose	Nugget   Zueus
Dr. Rudi	RESIN • PINE • LEMONGRASS	10%-12%	Dual Purpose	Green Bullet
East Kent Goldings	LAVENDER • HONEY • LEMON • THYME • ORANGE • GRAPEFRUIT	5%-6%	Aroma	Golding, UK   Whitbread Golding   Progress
Ekuanot (Equinox)	MELON • BERRY • LIME • APPLE • PAPAYA • GREEN PEPPER • MANGO • MANDARIN ORANGE	14.5%-15.5%	Aroma	Huell Melon   El Dorado
El Dorado	CHERRY • APRICOT • PEAR • CITRUS • WATERMELON • GRASS • WOOD • MINT	13%-17%	Dual Purpose	Galena   Ekuanot
El Dorado, Hop Extract	CHERRY • APRICOT • PEAR • CITRUS • WATERMELON • GRASS • WOOD • MINT	49.80%	Dual Purpose	Galena   Ekuanot
El Dorado, Hop Hash	CHERRY • APRICOT • PEAR • CITRUS • WATERMELON • GRASS • WOOD • MINT	25.70%	Dual Purpose	Galena   Ekuanot

Ella	FLORAL • NOBLE • SPICY • STAR ANISE • GRAPEFRUIT	13.4%-19.2%	Aroma	Cascade   Citra
Endeavour	BLACKCURRANT • LOGANBERRY • SPICY • GRAPEFRUIT • LIME	8%-10.5%	Dual Purpose	Brambling Cross   Pilgram
Enigma	PINOT GRIS • RASPBERRY • REDCURRANT • TROPICAL FRUIT	16.7%-19.4%	Aroma	Nelson Sauvín   Huell Melon
Epic	FRUITY • BERRY	3%-5%	Dual Purpose	Fuggie   Mandarin Bavaria
Eroica	FRUIT	7.1%-14.9%	Dual Purpose	Bullion   Brewer's Gold   Galena
Eukanot®	MELON • BERRY • LIME • APPLE • PAPAYA • SPICE	14.5%-15.5%	Aroma	Huell Melon   El Dorado
Eukanot®, Cryo	MELON • BERRY • LIME • APPLE • PAPAYA • GREEN PEPPER • MANGO • MANDARIN ORANGE	14.5%-15.5%	Aroma	Huell Melon   El Dorado
Eureka	CITRUS • PEACH • PINE	18%-19%	Dual Purpose	Columbus   Apollo
Falconer's Flight	LEMON • GRAPEFRUIT	11%-12%	Dual Purpose	Falconers Flight 7C's   Cascade   Columbus   Centennial
Falconer's Flight 7C's Blend	FRUIT • CITRUS • SPICY • EARTH	9%-10%	Dual Purpose	Falconers Flight   Cascade   Columbus   Centennial
First Gold	GERANIUM • MAGNOLIA • APRICOT • TANGERINE • ORANGE MARMALADE	5.6%-9.3%	Dual Purpose	Willamette   East Kent Golding   Styrian Golding
Flyer	SPICY • CITRUS • LIQUORICE	8.3%-14.5%	Dual Purpose	Willamette   Goldings
Fuggie, Organic	GREEN TEA • MINT • GRASS • FLORAL	3%-5.6%	Aroma	Fuggie, USA   Willamette   Styrian   Golding
Fuggie, USA	MILD • WOOD • GRASS • MINT	4%-5.5%	Aroma	Fuggie, UK   Willamette   Styrian   Golding   Tettanager (GR)
Fuggie	GREEN TEA • MINT • GRASS • FLORAL	3%-5.6%	Aroma	Fuggie, USA   Willamette   Styrian Golding   Tettanager   Newport   Wakatu
Galaxy	PASSIONFRUIT • PEACH • CLEAN CITRUS	11%-16%	Dual Purpose	Citra   Amarillo   Centennial
Galena	PEAR • PINEAPPLE • LIME • BLACKCURRANT • GRAPEFRUIT	12%-14%	Aroma	Nugget   Columbus   Zeus
Gargoyle	CITRUS • MANGO	7.50%	Aroma	Cluster   Ivanhoe
German Spalt Select	NOBLE • SPICY • FLORAL • BERRY • CITRUS	2.5%-5.5%	Aroma	Saaz
German Tradition	EARTHY • NECTAR • GRASS	5%-7%	Aroma	Hallertau Mittelfruh   Liberty   Hersbrucker
Glacier	PLUM • BLACKBERRY • WOOD	3.3%-9.7%	Dual Purpose	Willamette   Fuggie, USA   Tettanager (GR)
Goldings, NZ	EARTHY • FLORAL	4%-4.2%	Dual Purpose	East Kent Goldings
Goldings, UK	SPICY • HONEY • EARTHY	4%-7%	Aroma	Fuggie   East Kent Golding   Styrian Golding
Goldings, USA	DELICATE • SWEET FLORAL	4%-6%	Aroma	Fuggie   East Kent Golding   Styrian Golding
Goldings, B.C.	EARTHY • SPICY	4%-7%	Aroma	East Kent Golding   Golding, USA   Fuggie   Willamette
Green Bullet	SPICY • DRIED FRUIT • FLORAL	11%-15%	Dual Purpose	Dr Rudi   Liberty   Hallertauer
Hallertau, GER	FLOWERY • SPICY	3.5%-3.5%	Aroma	Hallertauer Tradition   Hallertauer Mittelfrüh   Hallertau, NZ   Crystal   Liberty   Mount Hood
Hallertau, NZ	FLORAL • LIME • CITRUS	7%-9%	Aroma	Hallertauer Tradition   Hallertauer Mittelfrüh   Hallertau, GER   Crystal   Liberty   Mount Hood
Hallertau, USA	NOBLE • SPICY • FLORAL	3.5%-5.5%	Aroma	Mount Hood   Liberty   Crystal   Hallertauer Mittelfrüh   Hallertauer Tradition
Hallertau Blanc	PASSION FRUIT • GRAPEFRUIT • PINEAPPLE • GRAPE • LEMONGRASS	9%-12%	Aroma	Nelson Sauvín
Hallertau Gold	NOBLE • SPICY	7%-10%	Aroma	Hallertauer Mittelfrüh   Tettanager   East Kent Golding
Hallertau Magnum	CLEAN • CITRUS	11%-16%	Bittering	Hallertauer Taurus   Columbus   Nugget
Hallertau Taurus	BLACKCURRANT • PEPPER • ZESTY	12.3%-17.9%	Dual Purpose	Citra   Magnum, USA   Tradition

Hallertau Tradition	GRASS • TEA • ORANGE • LAVENDER	4.6%-7%	Aroma	Hallertau Mittelfrüh   Liberty
Hallertauer Mittelfrüh	GRASS • TEA • CITRUS	3.0%-5.5%	Aroma	Liberty   Hallertau, USA
Helga (Southern Hallertau)	PLEASANT • NOBLE	5.4%-7.3%	Aroma	Mount Hood   Hallertauer Mittelfrüh
Herald	ORANGE • GRAPEFRUIT	11.9%-12.8%	Dual Purpose	Pioneer
Herkules	ROBUST • MELON	12%-17%	Dual Purpose	Chinook
Hersbrucker	FRUIT • TOBACCO • ORANGE	2%-5%	Aroma	Hallertauer Tradition   Spalter Select   Mount Hood   Strisselspalter   Hallertau   Liberty
Horizon	FLORAL BOUQUET • SPICY • CITRUS	8.8%-16.5%	Dual Purpose	Hallertauer Magnum
Huell Melon	HONEYDEW MELON • STRAWBERRY • TROPICAL FRUIT • ORANGE • VANILLA	6.9%-7.5%	Aroma	Ekuanot   Cascade
Idaho #7	PINEAPPLE • PEACH • PINE • RESIN • MANGO • BLACK TEA	13%-15%	Aroma	Mosaic   Citra
Idaho #7, Hop Hash	PINEAPPLE • PEACH • PINE • RESIN • MANGO • BLACK TEA	31.40%	Aroma	Mosaic   Citra
Ivanhoe	CITRUS • PINE	7.3%-8%	Aroma	Galena   Cluster   Northern Brewer
Jarrylo	BANANA • GRASS • PEAR • ORANGE • SPICY • FRUIT	15%-17%	Dual Purpose	Taurus   Calypso   Huell Melon
Jester	TROPICAL • GRAPEFRUIT • LYCHEE	7%-9%	Aroma	Cascade   Challenger
Junga	BLACKCURRANT • GRAPEFRUIT • SPICY	10.0%-13.0%	Dual Purpose	Nugget   Target
Kazbek	SPICY • LEMON	5%-8%	Aroma	Saaz   Premiant
Kirin II	AROMA	8%	Dual Purpose	Saaz   Loral
Kohatu	TROPICAL FRUIT	6.8%	Aroma	Citra   Motueka
Legacy	BLACKBERRY • BLACKCURRANT • ORANGE	7.8%-8.4%	Dual Purpose	Cluster   Galena   Northern Brewer
Lemondrop	LEMON • CITRUS	5%-7%	Dual Purpose	Cascade   Centennial   Mandarina Bavaria
Liberty	NOBLE • FLORAL • HERBAL • SPICY • DELICATE • LEMON	3%-6%	Aroma	Hallertau   Mount Hood   Tradition   Strisselspalter
Loral	FLORAL • PEPPER • LEMON • CITRUS • DARK FRUIT	10%-12%	Aroma	Strisselspalt   Tardif De Bourgogne   Tettngag   Nugget
Loral, Cryo	FLORAL • PEPPER • LEMON • CITRUS • DARK FRUIT	20%-24%	Aroma	Strisselspalt   Tardif De Bourgogne   Tettngag   Nugget
Lublin (Lubelski)	NOBLE	3%-5%	Aroma	Saaz   Sterling
Magnum, GER	APPLE • PEPPER • SUBTLE CITRUS • CLEAN BITTERING	12%-14%	Bittering	Hallertauer Taurus   Columbus   Nugget
Magnum, USA	LIGHT CITRUS • CLEAN BITTERING	10%-14%	Bittering	Magnum (GER)   Horizon
Mandarina Bavaria	TANGERINE • GRAPEFRUIT • LIME	8.5%-10.5%	Aroma	Columbus   Nugget
Marynka	EARTHY • HERBAL	9%-12%	Dual Purpose	Tettnganger
Mathon White	SPICY • HONEY • EARTHY	4.4%-6.7%	Aroma	Bramling   East Kent Golding   Progress   Whitbread Golding
Medusa	CITRUS • GUAVA • MELON • APRICOT	3.5%-5%	Aroma	Zappa
Melba	CLEAN • SPICY • PASSIONFRUIT • GRAPEFRUIT • CITRUS	7%-10%	Dual Purpose	Galaxy
Meridian	TROPICAL • BERRY • CITRUS	5%-6.5%	Aroma	Citra   Glacier   Centennial
Merkur	SUGAR • PINEAPPLE • MINT	12%-16.2%	Dual Purpose	Magnum (GR)
Millennium	RESIN • HERBAL • FLORAL • PEAR	14.5%-16.5%	Bittering	Columbus   Nugget   Summit
Mosaic	BLUEBERRY • TANGERINE • PAPAYA • ROSE • BLOSSOM • BUBBLE GUM	11.5%-13.5%	Dual Purpose	Simcoe   Citra   Nugget
Mosaic, Cryo	BLUEBERRY • TANGERINE • PAPAYA • ROSE • BLOSSOM • BUBBLE GUM	20%-24%	Dual Purpose	Simcoe   Citra   Nugget
Motueka	LIME • LEMON • TROPICAL FRUIT	6.5%-8.5%	Dual Purpose	Saaz   Sterling   liberty
Moutere (Brooklyn)	CITRUS • FRUIT • PINE	15.5%-18%	Dual Purpose	Citra   Simcoe
Mt. Hood	PUNGENT • NOBLE	4%-8%	Aroma	Crystal   Strisselspalter   Hersbrucker
Mt. Rainier	NOBLE • LICORICE • FLORAL	5%-8.1%	Dual Purpose	Hallertauer   Fuggle
MultiHead	FLORAL • SWEET FRUIT • CITRUS	3.5%-5.5%	Dual Purpose	Medusa

Nelson Sauvignon	WHITE WINE • GOOSEBERRY • GRAPE • SAUVIGNON BLANC	12%-13%	Dual Purpose	Pacific Jade   Pacifica
Neo1	LEMON • CITRUS	7%-9%	Dual Purpose	lemon drop
Newport	WINE • BALSAMIC	13.5%-17%	Bittering	Galena
Northdown	FLORAL • PINE • CEDAR • BERRY	7%-10%	Dual Purpose	Challenger
Northern Brewer, GER	MINT • PINE • GRASS	7%-10%	Bittering	Perle   Northern Brewer, UK   Northern Brewer, USA   Chinook   Galena   Magnum
Northern Brewer, UK	EVERGREEN • WOOD • MINT	9.5%	Dual Purpose	Northern Brewer, USA   Northern Brewer, GER
Northern Brewer, USA	MINT • PINE • GRASS	8%-10%	Dual Purpose	Northern Brewer, GER   Northern Brewer, UK   Chinook
Nugget	GREEN • WOOD • GINGER	9.5%-14%	Dual Purpose	Galena   Columbus   Magnum
Olympic	CITRUS • SPICY	10.6%-13.8%	Dual Purpose	Galena   Nugget
Opal	SWEET SPICY • PEPPER • CLEAN CITRUS • ANISE	13%-14%	Dual Purpose	East Kent Golding   Tettngang   Syrian Goldings
Orion	SPICY	8%-9%	Dual Purpose	Perle
Outeniqua	MILD	12%-13.5%	Bittering	Southern Star
Pacific Crest	FLORAL • EARTHY • GRASS • SPICY • HERBAL	3.9%	Aroma	Saaz   Fuggle   Tettngang
Pacific Gem	BLACKBERRY • OAK	13%-16%	Dual Purpose	Galena   Pacific Jade
Pacific Jade	FRESH CITRUS • BLACK PEPPER	12%-14%	Aroma	Galena   Pacific gem
Pacific Sunrise	PINE	12.5%-14.5%	Bittering	Pacific Gem
Pacifica	ORANGE ZEST • MARMALADE • FLORAL	5%-6%	Aroma	Hallertau Mittelfrüh   Perle
Pahto	HERBAL • EARTHY • FLORAL	17%-20%	Bittering	East Kent Goldings
Palisade®	APRICOT • GRASS • CLEAN • FLORAL	5.5%-9.5%	Aroma	Willamette
Palisade, Cryo	APRICOT • GRASS • CLEAN • FLORAL	13%-15%	Aroma	Willamette
Pekko	CLEAN • FLORAL • MELON • PINEAPPLE • PEAR • SAAZ-LIKE • CUCUMBER • MINT • HERBAL • SAGE • LEMON	13%-16%	Dual Purpose	Heull Melon   El Dorado   Saaz
Perle	MINT • TEA • PEPPER	8%-9%	Dual Purpose	Northern Brewer, USA   Northern Brewer, GER   Magnum
Perle, USA	SPICY • FLORAL	6%-10%	Dual Purpose	Northern Brewer, USA   Northern Brewer, UK   Northern Brewer, GER   Magnum
Phoenix	SPICY • FLORAL • CHOCOLATE	8.5%-13.5%	Dual Purpose	Northdown   Challenger
Pilgrim	LEMON • GRAPEFRUIT • PEAR • BERRY	9%-13%	Dual Purpose	Target   Challenger
Pilot	MARMALADE • LEMON • SPICY	8%-11.5%	Bittering	Galena
Pioneer	LEMON • GRAPEFRUIT • CEDAR • HERBAL	8%-10%	Dual Purpose	East Kent Golding
Polaris	MINT • PINEAPPLE • MENTHOL	18%-23%	Dual Purpose	Northern Brewer, GER
Precocoe de Bourgogne	MILD	3.4%	Aroma	Tardif de Bourgogne
Premiant	PLEASANT • MILD SPICE	8%-12.5%	Aroma	Saaz   Kazbek
Pride of Ringwood	SPICY • FRUITY	7%-11%	Bittering	Galena   Cluster   Centennial
Progress	GRASS • SWEET • MINT • HONEY • BLACKCURRANT	6%-7.5%	Aroma	Fuggle, UK   East Kent Goldings
Rakau	STONE FRUIT • FIG • APRICOT • RESIN • PINE	5.8%-10.9%	Dual Purpose	Summit   Amarillo
Relax	HIBISCUS • HONEYDEW • MELON	0.25%	Aroma	Heull Melon
Riwaka	GRAPEFRUIT • CITRUS	4.5%-6.5%	Aroma	Saaz
Rubin	EARTHY • SPICY	10%-14%	Dual Purpose	Saaz   Strisselspalt
Saaz, Czech	PLEASANT • MILD • HERBAL • NOBLE	2.5%-4.5%	Aroma	Premiant   Kazbek   Sterling   Lubin   Saaz, USA
Saaz, U.S.A	EARTHY • SPICY • HERBAL	3%-4.5%	Aroma	Saaz
Santiam	BLACK PEPPER • SPICY • FLORAL • HERBAL	5%-8%	Aroma	Spalt   Tettngang
Saphir	SPICY • FLORAL • SWEET CITRUS	2%-4.5%	Aroma	Hallertau Mittelfrüh
Savinjski Golding	NOBLE	2.8%-6%	Aroma	Saaz   Tettngang

Simcoe®	PASSION FRUIT • BERRY • PINE • EARTH • CITRUS • BUBBLE GUM	12.0%-14.0%	Dual Purpose	Summit   Citra   Mosaic
Simcoe, Cryo	PASSION FRUIT • BERRY • PINE • EARTH • CITRUS • BUBBLE GUM	20%-24%	Aroma	Summit   Citra   Mosaic
Sladek	PEACH • GRAPEFRUIT • PASSION FRUIT	4.5%-8%	Aroma	Saaz
Smaragd	ANISE • TOBACCO • CLOVE • EARTHY	4%-6%	Dual Purpose	Hallertau Gold
Sonnet Golding	EARTHY • GRASS • OAK • HONEY	2.6%-6%	Aroma	Saaz   East Kent Golding   Crystal   Strisselspalt   Hersbrucker
Sorachi Ace	LEMON • ORANGE • DILL	11.5%-16%	Dual Purpose	Liberty   Lemondrop
Southern Brewer	BITTER • AROMA	5.6%-12%	Bittering	Southern Promise
Southern Cross	LEMON PEEL • LIME • TROPICAL FRUIT • PINE	13%-14%	Dual Purpose	Simcoe
Southern Dawn	SPICY • LEMONGRASS • CHAMOMILE TEA	10%-12%	Dual Purpose	Southern Brewer   Southern Promis
Southern Promise	EARTHY • WOODY • SMOOTH	9.5%-11.5%	Dual Purpose	Southern Brewer   Southern Promis
Southern Star	EARTHY • SPICY	12%-14%	Bittering	Outeniqua
Sovereign	FLORAL • GRASS • HERBAL • MINT • PEAR	4.5%-6.5%	Bittering	Fuggie
Spalt	NOBLE • EARTHY • SPICY	2.5%-5.7%	Aroma	Saaz   Tettngang   Santiam   Liberty   Hallertau
Spalt Spalter	NOBLE • EARTHY • SPICY	2.5%-5.7%	Aroma	Saaz   Tettnganger   Santiam   Liberty   Hallertau
Spalter Select	NOBLE • AROMA	3%-6.5%	Aroma	Saaz   Tettnganger   Spalt   Hersbrucker   Perle   Hallertau Tradition
Sterling, USA	NOBLE • HERBAL • SPICY • FLORAL	4.5%-9%	Dual Purpose	Saaz   Mt Hood
Sticklebract	PINE • CITRUS	13%-14.2%	Dual Purpose	Northern Brewer, GER
Strisselspalt	HERBAL • GRASS • SPICY • GRAPEFRUIT • FLORAL	1.8%-5.7%	Aroma	Mount Hood   Crystal   Hersbrucker
Styrian Aurora	SPICY	7.2%-12.6%	Dual Purpose	Styrian Golding   Northern Brewer
Styrian Bobek	NOBLE • PINE	3.5-9.3%	Dual Purpose	Fuggie   Willamette   Styrian Golding
Styrian Celeia	NOBLE • FLORAL	3%-6%	Dual Purpose	Saaz   Bobek   Styrian Golding
Styrian Goldings, NZ	MILD	4.5%-7.5%	Aroma	Fuggie, USA
Summer	APRICOT • MELON • PEACH • GRASS	5.6%-6.4%	Aroma	Belma   Palisade
Summit™	PEPPER • INCENSE • ANISE • ORANGE • PINK GRAPEFRUIT • TANGERINE	16%-18%	Bittering	Columbus   Simcoe   Millennium   Warrior
Summit, Hop Extract	PEPPER • INCENSE • ANISE • ORANGE • PINK GRAPEFRUIT • TANGERINE	56.2%	Bittering	Columbus   Simcoe   Millennium   Warrior
Sun	HERBACEOUS	12%-16%	Bittering	Magnum   Galena   Zeus
Super Galena	FRUITY • AROMA	13%-16%	Bittering	Nugget   Columbus   Zeus   Chinook   Pride of Ringwood   Eroica   Newport   Cluster   Brewers Gold
Super Pride	RESIN • FRUIT	13.5%-15%	Bittering	Pride of Ringwood
Sussex	EARTHY • GRASS • MINT • CITRUS • VANILLA	4.3%-5.8%	Aroma	Progress   Whitbread Golding   Fuggie
Sybilla	FLOWERY • NOBLE • SPICY	6%-8%	Dual Purpose	Bobek   Lubelski   Saaz   Fuggie
Sylva	FLORAL • HERBAL • NOBLE	5.6%-7.3%	Aroma	Hallertau Mittelfrüh   Helga   Saaz
Tahoma	LEMON • GRAPEFRUIT • CEDAR • PINE • GREEN MELON • FLORAL • PEPPER	7.2%-8.2%	Aroma	Mandarina Bavaria   Lemondrop
Taiheke	GRAPEFRUIT • LIME	6%-8%	Dual Purpose	Hallertau   Goldings
Tardif de Bourgogne	MILD	7.2%-8.2%	Aroma	Precoce de Bourgogne
Target	SAGE • PEPPER • CITRUS MARMALADE TANGERINE	8%-12.5%	Dual Purpose	Willamette   Fuggie
Teamaker	TEA • AROMA	0.6%-1.8%	Aroma	Crystal   Fuggie
Tettngang	SPICY • PEPPER • BLACK TEA	3%-5.8%	Dual Purpose	Spalt   Hersbrucker   Saaz
Tettngang, USA	NOBLE	4%-5%	Dual Purpose	Fuggie   Santiam   Spalt
Tillicum	STONE FRUIT • CITRUS	13.5%-15.5%	Bittering	Galena   Chelan
Tomahawk	PUNGENT • BLACK PEPPER • LICORICE • CURRY	14%-18%	Dual Purpose	Columbus   Zeus

Topaz	RESIN • GRASS • LYCHEE	13.7%-17.7%	Dual Purpose	Summit   Apollo
Triple Pearl	MELON • ORANGE • RESIN • SPICY • PEPPER	9%-11%	Dual Purpose	Mandarina Bavaria   Huell Melon
Triskel	FLORAL • HERBAL • CITRUS • SPICY	8%-9%	Aroma	Strisselspalt   Ahtanum   Centennial   Chinook   Simcoe
Ultra	MILD • FLORAL BOUQUET	3%-5%	Aroma	Tettnanger, GER   Saaz
Vanguard	WOOD	4.40%-6%	Aroma	Liberty   Mount Hood
Vic Secret	PINE • EARTH • PASSIONFRUIT • PINEAPPLE	14%-17%	Dual Purpose	Galaxy
Viking	PLEASANTLY HOPPY	8%-10%	Aroma	Saxon
Vital	SPICY	14%-17%	Dual Purpose	Chinook
Vojvodina	NOBLE	6.1%-10.5%	Dual Purpose	Northern Brewer   Goldings
Wai-iti	PEACH • APRICOT • SPICY • LIME • TROPICAL FRUIT	2.5%-3.5%	Aroma	Kahatu
Waimea	CITRUS • PINE • HERBAL	16%-19%	Dual Purpose	Pacific Jade   Pacific gem   Columbus
Wakatu	LIME ZEST • FLORAL	6.5%-8.5%	Dual Purpose	Hallertauer Mittelfrüh
Warrior®	MILD • RESINOUS • CITRUS • PINE	14.5%-18%	Bittering	Nugget
Whitbread Golding (WGV)	FRESH EARTH • FLORAL • SWEET FRUIT	5%-7.5%	Dual Purpose	East Kent Goldings   Progress
Willamette	FLORAL • INCENSE • ELDERBERRY	4%-6%	Aroma	Fuggle   Styrian Golding   Tettnanger   Glacier   Styrian Golding
Willamette, NZ	MILD • SPICY	4%-6%	Aroma	Fuggle   Styrian Golding   Tettnanger, USA   Glacier   Styrian Golding
Wye Challenger	SPICY • CEDAR • GREEN TEA	5%-9%	Dual Purpose	Perle, USA   Northern Brewer   Admiral
Yakima Gold	GRAPEFRUIT • LEMON ZEST	8.8%-10.5%	Dual Purpose	Cluster   Chinook
Zeus	PUNGENT • BLACK PEPPER • LICORICE • CURRY	13%-17.5%	Bittering	Columbus
Zlatan	MILD • NOBLE	5.2%	Aroma	Saaz   Hallertau
Zyθος®	CITRUS • TROPICAL FRUIT	10%-12.5%	Dual Purpose	Citra   Simcoe   Amarillo