Brewmistress · Hops – cheat sheet

Updated 2026-11-23 · version 5

The hop varieties in the homebrew shops, by growing country: what they are used for, how they taste and what they can be swapped for.

What all the homebrew shops we follow sell.

Cohumulone: ○ low, under 25 % · ◐ medium · ● high, over 32 %. A high share is often thought to give a sharper bitterness.

Swap for: ●●● strong, ●● good, ● weak swap in brewers' substitution charts; without dots: the nearest in flavour profile.

USA

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Ahtanum	Aroma hop	5–8	● 30–35	0.7–1.3	Late boil, Whirlpool, Dry hopping	Floral, Citrus	Cascade ●●●, Amarillo ●●●, Willamette ●●●, Centennial ●●
Amarillo	Aroma hop	6.7–11	○ 21–24	1–2.3	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Cascade ●●●, Centennial ●●●, Simcoe ●●, Ahtanum ●
Apollo	Bittering hop	15–19	◐ 24–28	1.5–2.5	Early boil	Resin & pine, Citrus	Zeus ●●●, Bravo ●●, Hallertauer Magnum ●, Nugget ●
Azacca	Aroma hop	11–16	● 38–45	1.6–2.5	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Citra ●●●, Galaxy ●●, Amarillo ●, Mosaic ●
Belma	Aroma hop	9–12	◐ 28–35	1–2.5	Late boil, Whirlpool, Dry hopping	Berry & grape, Citrus, Tropical fruit	Huell Melon ●●●, Pacific Gem ●●, Ahtanum, Hallertau Blanc
Bravo	Bittering hop	14–18	◐ 29–34	1.6–2.5	Early boil	Resin & pine	Columbus ●●●, Hallertauer Magnum ●●●, Nugget ●●●, Apollo ●●
Bru-1	Aroma hop	12.7–15.7		1–2	Late boil, Whirlpool, Dry hopping	Tropical fruit	El Dorado ●, Galaxy ●, Vic Secret ●, Dolcita
Calypso	Dual-purpose hop	11–14	● 40–42	1.6–2.5	Early boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Galena ●●, Cascade ●●, Huell Melon ●●, Belma ●
Cascade	Aroma hop	4.5–9	● 33–40	1	Late boil, Whirlpool, Dry hopping	Citrus, Floral	Amarillo ●●●, Centennial ●●●, Ahtanum ●●●, Columbus ●●●
Cashmere	Dual-purpose hop	7–10	○ 22–24	1.2–1.4	Early boil, Late boil, Dry hopping	Citrus, Tropical fruit, Herbal & grassy	Cascade ●●, Idaho 7 ●, El Dorado ●, Warrior
Centennial	Dual-purpose hop	7–12	◐ 29–30	1.6–2.5	Early boil, Late boil, Whirlpool, Dry hopping	Citrus, Floral, Resin & pine	Cascade ●●●, Chinook ●●●, Columbus ●●●, Amarillo ●●●
Chinook	Dual-purpose hop	10.7–15	◐ 29–35	1.5–2.5	Early boil, Late boil	Resin & pine, Citrus, Spicy & earthy	Nugget ●●●, Columbus ●●●, Northern Brewer ●●●, Galena ●●
Citra	Aroma hop	11–14.3	○ 22–24	1.5–3	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Mosaic ●●●, Simcoe ●●●, Galaxy ●●●, Cascade ●
Cluster	Dual-purpose hop	6–10.2	● 37–43	0.7–1.3	Early boil	Berry & grape, Floral, Spicy & earthy	Galena ●●●, Brewers Gold ●, Chinook ●, Nugget ●
Columbus	Dual-purpose hop	13.9–20	◐ 28–32	1.5–4.5	Early boil, Dry hopping	Resin & pine, Spicy & earthy	Chinook ●●●, Nugget ●●●, Galena ●●●, Zeus ●●●
Crystal	Aroma hop	2.1–6	○ 20–26	0.8	Late boil	Floral, Herbal & grassy, Spicy & earthy	Liberty ●●●, Mount Hood ●●●, Hallertauer Mittelfrüh ●●●, Hersbrucker Spät ●●●
Dolcita	Aroma hop	10–12.2		1.3–2.2	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Bru-1, Wakatu, Talus, Krush

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Ekuanot	Aroma hop	12.9–16	● 31–36	2.5–4	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Herbal & grassy	Citra ●●, Galena ●, Chinook ●, El Dorado ●
El Dorado	Dual-purpose hop	12–17	◐ 28–33	1.8–2.8	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Nelson Sauvin ●●, Citra ●, Rakau ●, Belma ●
Eureka!	Dual-purpose hop	17–20	◐ 28–30	2.5–4.4	Early boil, Whirlpool, Dry hopping	Resin & pine, Berry & grape	Columbus ●●, Apollo ●●, Simcoe ●●, Hallertauer Merkur ●
Galena	Bittering hop	10–14.3	● 36–40	0.9–1.2	Early boil	Citrus, Berry & grape	Nugget ●●●, Columbus ●●●, Brewers Gold ●●, Chinook ●●
Idaho 7	Aroma hop	9–12	● 30–40	1–1.6	Whirlpool, Dry hopping	Tropical fruit, Citrus, Resin & pine	Citra ●●, Chinook ●●, Columbus ●●, Mosaic ●●
Idaho Gem	Aroma hop	11–14.5	● 35–45	1.8	Late boil, Whirlpool, Dry hopping	Tropical fruit, Berry & grape	Azacca ●, Citra ●, Enigma ●, Idaho 7 ●
Jarrylo	Aroma hop	15–17	● 34–37	3.6–4.3	Late boil, Whirlpool, Dry hopping	Tropical fruit, Spicy & earthy	Mosaic ●, Motueka ●, Nelson Sauvin ●, Calypso ●
KARMA	Dual-purpose hop	7–9	● 36	0.5–0.9	Late boil, Dry hopping	Citrus, Berry & grape	Ahtanum, Styrian Cardinal, Cluster, Cascade
Krush	Aroma hop	10.1–14.1		1.5–3	Whirlpool, Dry hopping	Tropical fruit, Citrus	Citra ●, Mosaic ●, Sabro ●, Pink
Lemondrop	Aroma hop	5–7	◐ 28–34	1.5–2	Late boil, Whirlpool, Dry hopping	Citrus, Herbal & grassy	Cascade ●●, Centennial ●●, Mandarina Bavaria ●●, Sorachi Ace ●●
Liberty		3–5	◐ 24–30	0.7–1.9			Hallertauer Mittelfrüh ●●●, Mount Hood ●●●, Hallertauer Tradition ●●, Crystal ●
Loral	Dual-purpose hop	9.7–15	○ 21–23	3.4	Early boil, Late boil	Floral, Herbal & grassy, Spicy & earthy	Nugget ●●●, Strisselspalt ●●, Tardif de Bourgogne ●●, Tettnanger ●●
Lotus	Aroma hop	13–17	● 33–39		Whirlpool, Dry hopping	Citrus, Tropical fruit, Berry & grape	Idaho 7, Calypso, Iunga, Nugget
Medusa	Aroma hop				Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Zappa ●●
Mosaic	Aroma hop	10–14	◐ 24–26	0.8–1.5	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus, Berry & grape	Citra ●●●, Simcoe ●●●, Galaxy ●●, Nugget ●●
Mount Hood	Aroma hop	3.9–6.5	○ 21–23	1–3	Late boil	Herbal & grassy, Spicy & earthy	Crystal ●●●, Hersbrucker Spät ●●●, Strisselspalt ●●●, Hallertauer Mittelfrüh ●●●
Nugget	Bittering hop	9–16		0.9–1.8	Early boil	Herbal & grassy, Spicy & earthy	Galena ●●●, Columbus ●●●, Warrior ●●●, Hallertauer Magnum ●●●
Palisade	Aroma hop				Late boil, Whirlpool, Dry hopping	Tropical fruit, Floral	Willamette ●●●, Chinook ●●, Savinjski Golding ●, Cascade ●
Pekko	Dual-purpose hop	14–16	◐ 27–30	2.1–2.7	Late boil, Whirlpool, Dry hopping	Floral, Herbal & grassy	Saaz ●●●, Azacca ●, El Dorado ●, Huell Melon ●
Pink	Aroma hop	11–14	○ 20–26	1.6–2	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Cashmere, Apollo, Warrior, Sorachi Ace

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Sabro	Aroma hop	11.6–17	○ 20–24		Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Talus ●●, Krush ●
Simcoe	Dual-purpose hop	11–15	○ 15–20		Late boil, Whirlpool, Dry hopping	Resin & pine, Citrus, Tropical fruit	Summit ●●●, Hallertauer Magnum ●●●, Mosaic ●●●, Amarillo ●●
Sterling	Aroma hop	5–9	◐ 22–28		Late boil	Floral, Herbal & grassy, Spicy & earthy	Saaz ●●●, Mount Hood ●●●, Lublin ●●, Aramis
Sultana	Dual-purpose hop	13–15	○ 22–26	2.5–4	Early boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Resin & pine	Nugget ●●●, Columbus ●●●, Sabro, Simcoe
Summit	Dual-purpose hop	13–17	◐ 26–33	1.5–3	Early boil	Citrus, Herbal & grassy, Spicy & earthy	Simcoe ●●●, Columbus ●●●, Warrior ●●●, Amarillo ●
Talus	Aroma hop	6.3–10	● 32–36	1–2.7	Whirlpool, Dry hopping	Citrus, Tropical fruit, Floral	Sabro ●●, Bru-1, El Dorado, Krush
Terraflux	Bittering hop	13.2–22.6		1–5.3	Early boil	Spicy & earthy, Resin & pine	Sultana, El Dorado, Pekko, Simcoe
Triumph	Dual-purpose hop	9–12	○ 22–26	0.8–1.8	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Hallertauer Mittelfrüh ●●, Nugget ●●, Pink
Vanguard							Hallertauer Mittelfrüh ●●●, Liberty ●●●, Mount Hood ●●, Hersbrucker Spät ●
Vista	Aroma hop	10–12	◐ 30	2–2.4	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Elani, Chinook, Phoenix, Aurora
Warrior	Bittering hop	13–15	○ 22–26	1–2.5	Early boil		Nugget ●●●, Columbus ●●●, Summit ●●, Hallertauer Magnum ●●
Willamette	Aroma hop	3.8–7	● 30–35	1–1.5	Late boil, Dry hopping	Spicy & earthy, Berry & grape, Floral	Fuggle ●●●, Savinjski Golding ●●●, Tettnanger ●●●, East Kent Golding ●
Zappa	Aroma hop	6–8	● 40–45	1.8–2.5	Whirlpool, Dry hopping	Tropical fruit, Citrus, Herbal & grassy	Medusa ●, Galena, Krush, Idaho Gem
Zeus		13.4–17.5					Columbus ●●●, Centennial ●●, Chinook ●●, Galena ●●

United Kingdom

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Admiral	Bittering hop	13–16	● 37–45	1–1.7	Early boil	Herbal & grassy, Resin & pine	Target ●●●, Challenger ●●●, Northdown ●●●, First Gold ●
Archer	Aroma hop	4–6	● 32–38	0.6–0.8	Late boil, Dry hopping	Floral, Citrus	Challenger ●, Golding ●, Strisselspalt ●, Willamette ●
Boadicea	Dual-purpose hop	6–10	○ 21–27	1.4–2	Early boil, Late boil	Herbal & grassy, Spicy & earthy	Green Bullet ●, Northern Brewer, Superdelic, Puławski
Bramling Cross	Aroma hop	5–8	◐ 26–31	0.7–1.7	Late boil, Dry hopping	Berry & grape, Citrus, Spicy & earthy	East Kent Golding ●●●, Progress ●●●, Whitbread Golding Variety ●●●, Sladek
Brewers Gold	Bittering hop	4.5–9	● 40–48	1.9–2.3	Early boil	Berry & grape, Citrus, Spicy & earthy	Northern Brewer ●●●, Galena ●●●, Chinook ●●, Northdown ●●
Challenger	Dual-purpose hop	5–9	○ 20–25	1–1.5	Early boil, Late boil	Spicy & earthy, Herbal & grassy	Northern Brewer ●●, Perle ●●, Northdown ●, Admiral ●

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
East Kent Golding	Aroma hop	4–8	◐ 26–32	0.4–0.8	Late boil, Dry hopping	Floral, Herbal & grassy, Spicy & earthy	Progress ●●●, Whitbread Golding Variety ●●●, First Gold ●●●, Golding ●●●
Endeavour	Dual-purpose hop	5–10.6	◐ 30–34	1.1–1.8	Late boil, Dry hopping	Berry & grape, Citrus, Spicy & earthy	Pilgrim ●, Bramling Cross ●, Elani, Taiheke
Ernest	Aroma hop	5–7	● 50–55	0.7–1.1	Late boil, Dry hopping	Citrus, Tropical fruit, Spicy & earthy	Fuggle ●, Brewers Gold, Target, Callista
First Gold	Dual-purpose hop	5.6–10	◐ 29–34	0.7–1.7	Early boil, Late boil	Citrus, Spicy & earthy	East Kent Golding ●●●, Crystal ●●, Willamette ●, Savinjski Golding ●
Fuggle	Aroma hop	3–7	◐ 29–30	0.7–1.4	Late boil	Spicy & earthy, Herbal & grassy	Willamette ●●●, Savinjski Golding ●●●, Progress ●●, East Kent Golding ●●
Godiva	Aroma hop	6–9	◐ 25–29	0.4–0.8	Late boil, Dry hopping	Citrus, Berry & grape	Hallertau Blanc ●, Jester ●, Wai-iti ●, Boadicea
Golding	Aroma hop	4–8	◐ 26–32	0.4–1.3	Late boil, Dry hopping	Floral, Spicy & earthy	East Kent Golding ●●●, Fuggle ●●●, Progress ●●, Whitbread Golding Variety ●●
Harlequin	Dual-purpose hop	9.5–12	◐ 27–31	1–1.6	Late boil, Whirlpool, Dry hopping	Tropical fruit	Godiva ●, Mosaic ●, Huell Melon, Styrian Dragon
Jester	Aroma hop	7–9	◐ 23–28	0.6–1.2	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Berry & grape	Cascade ●, Challenger ●, Olicana ●, Motueka
Mystic	Dual-purpose hop	4–7	● 35–38	0.8–1.2	Late boil, Whirlpool	Berry & grape, Citrus	Barbe Rouge ●, Huell Melon ●, Styrian Dragon ●
Northdown	Dual-purpose hop	6–9	◐ 24–29	1.2–2.2	Early boil, Late boil	Spicy & earthy, Resin & pine	Northern Brewer ●●, Phoenix ●●, Challenger ●, Admiral ●
Northern Brewer	Dual-purpose hop	5–9	◐ 27–32	1.3–2.1	Early boil	Resin & pine, Herbal & grassy, Spicy & earthy	Perle ●●●, Chinook ●●, Challenger ●●, Aurora ●●
Olicana	Aroma hop	7–9	◐ 28–32	0.5	Late boil, Dry hopping	Citrus, Tropical fruit	Jester ●, Most ●, Endeavour, Taiheke
Opus	Aroma hop	5–7	● 32–36	0.8–1.2	Late boil, Whirlpool	Herbal & grassy, Citrus	First Gold, Mystic, Bramling Cross, Archer
Phoenix	Dual-purpose hop	9–12	◐ 24–28	1.2–2.5	Early boil, Late boil	Spicy & earthy	Challenger ●●, East Kent Golding ●●, Northdown ●●, Chinook
Pilgrim	Dual-purpose hop	9–13	● 36–38	1–2.4	Early boil	Herbal & grassy, Spicy & earthy	Challenger ●●●, Target ●●, Endeavour, Opus
Progress	Aroma hop	5–8	◐ 27–36	0.8–1	Late boil	Herbal & grassy, Spicy & earthy	East Kent Golding ●●●, Fuggle ●●●, Golding, Northern Brewer
Sussex	Aroma hop	4.3–5.8	◐ 29–32	0.4–0.6	Late boil, Dry hopping	Herbal & grassy, Spicy & earthy	Fuggle ●, Progress ●, Whitbread Golding Variety ●, Bramling Cross
Target	Bittering hop	8.5–13.5	● 35–40	1.2–1.8	Early boil	Spicy & earthy, Herbal & grassy	Admiral ●●●, Fuggle ●●, Willamette ●●, Pilgrim ●●
Whitbread Golding Variety	Dual-purpose hop	5–8	● 32–43	0.8–1.2	Late boil	Tropical fruit, Herbal & grassy, Spicy & earthy	East Kent Golding ●●●, Progress ●●●, Fuggle ●●, Savinjski Golding ●

Germany

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Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Ariana	Aroma hop	8–14.5	● 40–42	1.1–2.1	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Berry & grape	Hallertau Blanc ●, Mandarina Bavaria ●, Idaho Gem, Calypso
Callista	Aroma hop	2.3–5		0.5–1.6	Late boil, Whirlpool, Dry hopping	Berry & grape, Citrus, Tropical fruit	Mandarina Bavaria, Saphir, Spalter Select, Hallertau Blanc
Comet	Dual-purpose hop	9–12.4	● 40–45	1.2–2	Early boil	Citrus, Floral, Herbal & grassy	Galena ●●●, Summit ●●, Azacca, Mandarina Bavaria
Diamant	Aroma hop	3–7			Late boil	Floral, Citrus, Herbal & grassy	Spalt ●●●, Saaz ●
Hallertau Blanc	Aroma hop	8–12.9	○ 22–26	0.8–1.9	Late boil, Whirlpool, Dry hopping	Berry & grape, Citrus	Nelson Sauvin ●, Ariana ●, Mandarina Bavaria ●, Belma
Hallertauer Magnum	Bittering hop	9–18.2	◐ 21–29	1.5–3.9	Early boil		Columbus ●●, Hallertauer Merkur ●●, Hallertauer Taurus ●●, Nugget ●●
Hallertauer Merkur							Hallertauer Magnum ●●●, Hallertauer Taurus ●, Hallertauer Tradition ●
Hallertauer Mittelfrüh	Aroma hop	2.3–6.6	○ 18–28	1	Late boil	Floral, Herbal & grassy	Liberty ●●●, Hallertauer Tradition ●●●, Crystal ●●●, Mount Hood ●●●
Hallertauer Taurus	Bittering hop	11.1–21.3		1.2–3.7	Early boil	Spicy & earthy	Hallertauer Magnum ●●, Hallertauer Merkur ●, Herkules ●
Hallertauer Tradition	Aroma hop	3.6–9.1	◐ 24–30	0.4–1.3	Late boil	Herbal & grassy	Hallertauer Mittelfrüh ●●●, Liberty ●●●, Hersbrucker Spät ●●, Crystal ●
Herkules	Bittering hop	12.4–22.9	● 32–38	1.4–2.9	Early boil	Herbal & grassy, Spicy & earthy	Hallertauer Magnum ●, Hallertauer Taurus ●, Hallertauer Merkur ●, Perle
Hersbrucker Spät	Aroma hop	1.3–5.9	○ 17–25	0.7–1.3	Late boil	Floral, Herbal & grassy	Mount Hood ●●●, Strisselspalt ●●●, Hallertauer Tradition ●●, Hallertauer Mittelfrüh ●●
Huell Melon	Aroma hop	4.9–9.5	◐ 25–28	0.7–2.1	Late boil, Whirlpool, Dry hopping	Tropical fruit, Berry & grape	Cascade ●, Ekuanot ●, Jarrylo ●, Mandarina Bavaria ●
Mandarina Bavaria	Aroma hop	8.5–12.1	● 33	2	Late boil, Whirlpool, Dry hopping	Citrus	Cascade ●●, Hallertau Blanc ●, Huell Melon ●, Lemondrop ●
Opal	Dual-purpose hop	5–10.5		0.8–2.4	Early boil, Late boil	Spicy & earthy	East Kent Golding ●●, Savinjski Golding ●●, Tettnanger ●●
Perle	Dual-purpose hop	3–11	◐ 29–35	0.7–2	Early boil, Late boil	Spicy & earthy, Floral, Herbal & grassy	Northern Brewer ●●●, Hallertauer Mittelfrüh ●●, Aurora ●, Hallertauer Tradition ●
Polaris	Bittering hop	14.7–24.4	◐ 22–28	4–5	Early boil	Herbal & grassy	Eureka!, Jarrylo, Sultana, Simcoe
Saphir	Aroma hop	1.7–5.5	○ 12–17	0.5–2.3	Late boil, Whirlpool	Citrus, Floral, Herbal & grassy	Hallertauer Mittelfrüh ●●●, Hallertauer Tradition ●, Spalter Select ●, Hersbrucker Spät
Smaragd	Aroma hop	3–7.6	○ 13–18	0.4–0.8	Late boil	Spicy & earthy, Herbal & grassy	Hallertauer Mittelfrüh ●, Hersbrucker Spät, Hallertauer Tradition, Saphir
Spalt	Aroma hop	6.2			Late boil	Spicy & earthy, Herbal & grassy	Saaz ●●●, Tettnanger ●●●, Spalter Select ●●, Liberty ●
Spalter Select	Aroma hop	2–7.6	○ 21–27	0.5–1.2	Late boil, Whirlpool	Herbal & grassy, Spicy & earthy	Spalt ●●●, Saaz ●●●, Tettnanger ●●●, Hersbrucker Spät ●●

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Tango	Aroma hop	7.5–12.5	○ 19–25	2.4–4	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Cascade ●, Hallertauer Magnum, Huell Melon, Callista
Tettnanger	Aroma hop	1.9–7	◐ 22–28	0.5–1	Late boil	Floral, Herbal & grassy, Spicy & earthy	Saaz ●●●, Spalt ●●●, Spalter Select ●●, Lublin ●●

New Zealand

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Dr. Rudi	Dual-purpose hop	11–14	● 36–39	1.3	Early boil, Late boil	Resin & pine, Citrus, Herbal & grassy	Green Bullet ●●, Citra ●, Wakatu, Ella
Green Bullet	Bittering hop	10–13	● 41–43	1.2–1.9	Early boil	Resin & pine, Spicy & earthy	Liberty ●●●, Hallertauer Mittelfrüh ●●●, Mount Hood ●●, Crystal ●●
Kohatu	Dual-purpose hop	5–7	○ 18–23	1	Late boil, Whirlpool, Dry hopping	Tropical fruit, Resin & pine	Motueka ●●, Wai-iti ●●, Citra ●, Hallertauer Tradition
Motueka	Aroma hop	5–8	◐ 25–35	0.8	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Herbal & grassy	Saaz ●●●, Sterling ●●●, Nelson Sauvin ●●, Riwaka ●●
Moutere	Dual-purpose hop	15–20	◐ 24–28	1.7	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Citra ●, Galaxy ●, Simcoe ●, Bru-1
Nectaron	Aroma hop	10–14	◐ 26–28	1.6–1.9	Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus	Citra ●●, Mosaic ●, Waimea ●, Amarillo ●
Nelson Sauvin	Dual-purpose hop	10–13	○ 22–26	1.1	Late boil, Whirlpool, Dry hopping	Berry & grape, Citrus, Tropical fruit	Enigma ●●, Pacifica ●●, Pacific Jade ●●, Hallertau Blanc ●
Pacific Gem	Bittering hop	13–15	● 37–40	1.1–1.4	Early boil	Berry & grape, Spicy & earthy	Galena ●●●, Cluster ●, Hallertauer Magnum ●, Pacific Jade ●
Pacific Jade	Bittering hop	12–14	○ 22–26	1.4	Early boil	Spicy & earthy, Citrus, Herbal & grassy	Hallertauer Mittelfrüh ●●, Waimea ●●, Hallertauer Magnum ●●, Saaz ●●
Pacifica	Aroma hop	4–8	◐ 23–27	1	Late boil, Whirlpool	Citrus, Floral, Spicy & earthy	Hallertauer Mittelfrüh ●●●, Liberty ●, Perle ●, Hallertauer Tradition
Rakau	Dual-purpose hop	10–12	◐ 24–28	2.2	Late boil, Whirlpool, Dry hopping	Tropical fruit, Resin & pine	Amarillo ●●●, Summit ●●●, Sabro, Mosaic
Riwaka	Aroma hop	4–7	◐ 30–34	1.2–1.8	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Saaz ●●●, Motueka ●●●, Cascade ●●, Centennial ●●
Southern Cross	Dual-purpose hop	11–14	◐ 25–28	1.2	Early boil, Late boil	Citrus, Spicy & earthy, Resin & pine	Sorachi Ace ●●, Simcoe ●, Pacific Jade
Sticklebract	Dual-purpose hop	12–15	● 35–40		Early boil	Resin & pine, Citrus	Northern Brewer ●●, Sorachi Ace ●, Idaho Gem, Harlequin
Superdelic	Aroma hop	9–12	◐ 25–28	1.5–2.2	Whirlpool, Dry hopping	Tropical fruit, Berry & grape, Citrus	Puławski, Boadicea, Northern Brewer, Triumph
Taiheke	Aroma hop	5–9	● 33–40	1.1	Late boil, Whirlpool, Dry hopping	Citrus, Floral	Cascade ●●, Motueka, Ariana, Wakatu

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Wai-iti	Aroma hop	2–4	◐ 23–28	1.6	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	Kohatu ●●, Saaz ●, Motueka ●, Riwaka ●
Waimea	Dual-purpose hop	16–19	○ 22–24	2.1	Early boil, Whirlpool, Dry hopping	Citrus, Resin & pine	Pacific Jade ●●, Columbus ●●, Pacific Gem ●, Luna
Wakatu	Dual-purpose hop	7–10	◐ 28–30	1	Late boil	Floral, Citrus	Hallertauer Mittelfrüh ●●●, Nelson Sauvin ●●, Dr. Rudi, Taiheke

Poland

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Amora Preta	Aroma hop				Late boil, Whirlpool, Dry hopping	Berry & grape, Citrus, Tropical fruit	–
Iunga	Dual-purpose hop	10–13	◐ 29–34	2–2.6	Early boil	Citrus, Berry & grape, Spicy & earthy	Nugget ●, Target ●, Zula ●, Marynka
Lomik	Aroma hop				Late boil	Herbal & grassy, Spicy & earthy	–
Lublin	Aroma hop	1.6–6.7	◐ 25–28	0.5–1.2	Late boil	Herbal & grassy, Spicy & earthy	Saaz ●●●, Sterling ●●, Tettnanger ●●, Sussex
Magnat	Bittering hop	11.5–13.7	○ 21–25	1.4–2	Early boil	Spicy & earthy	Hallertauer Magnum ●, Warrior, Southern Cross, Superdelic
Marynka	Dual-purpose hop	6.2–10	◐ 26–33	1.7–2.2	Early boil, Late boil	Spicy & earthy, Herbal & grassy	Tettnanger ●, Chinook ●, Brewers Gold ●, Iunga
Nadwiślański	Aroma hop				Late boil	Floral, Herbal & grassy	–
Oktawia	Aroma hop				Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus, Berry & grape	–
Puławski	Dual-purpose hop	8–11	◐ 26–30	2.1	Early boil, Late boil	Floral, Herbal & grassy, Spicy & earthy	Marynka ●, Sybilla, Superdelic, Barbe Rouge
Sybilla	Aroma hop	5–8	◐ 26–31	1.5–2.1	Late boil, Whirlpool	Spicy & earthy, Citrus	Lublin ●●, Bobek ●, Fuggle ●, Saaz ●
Tomyski	Aroma hop				Late boil	Herbal & grassy, Spicy & earthy	–
Zula	Dual-purpose hop				Late boil	Citrus	Iunga ●

Slovenia

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Aurora	Dual-purpose hop	5–14.5	◐ 23–28		Early boil, Late boil	Floral, Citrus, Herbal & grassy	Savinjski Golding ●●●, Bobek ●●, Northern Brewer ●●, Perle
Bobek	Aroma hop	2–7.8	◐ 27–31	0.7–4	Late boil, Dry hopping	Floral, Citrus, Herbal & grassy	Fuggle ●●, Savinjski Golding ●●, Celeia ●●, Willamette ●●
Celeia	Aroma hop	1.9–6.5	◐ 26–29	0.8–3.6	Late boil	Herbal & grassy, Citrus, Floral	Savinjski Golding ●●●, Saaz ●●●, Bobek ●●, Fuggle ●
Dana	Dual-purpose hop	9–18.8	◐ 28–31	1.8–3.9	Early boil, Late boil	Herbal & grassy, Citrus, Floral	Bobek ●, Celeia ●, Fuggle ●, Hallertauer Magnum ●

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Savinjski Golding	Aroma hop	2–6.1	◐ 25–30	0.3–1.7	Late boil	Herbal & grassy, Floral, Spicy & earthy	Fuggle ●●●, Willamette ●●●, Celeia ●●●, Bobek ●●
Styrian Cardinal	Aroma hop	8–10	● 31–37		Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit	KARMA, Target, Centennial, Cascade
Styrian Dragon	Aroma hop	6–11	○ 22–24	1.5–2.1	Late boil, Whirlpool, Dry hopping	Citrus, Floral, Tropical fruit	Mystic ●, Amarillo, Huell Melon, Harlequin
Styrian Kolibri	Aroma hop	4–6	○ 21–25		Late boil, Whirlpool, Dry hopping	Berry & grape, Floral	Tettnanger, Triskel, Strisselspalt, Mount Hood
Styrian Wolf	Dual-purpose hop	10–13	○ 22–23		Late boil, Whirlpool, Dry hopping	Tropical fruit, Floral, Citrus	Hallertau Blanc, Amarillo, Nectaron, Citra

Australia

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Eclipse	Aroma hop	15.7–19.1	● 33–37		Late boil, Whirlpool, Dry hopping	Citrus, Resin & pine	Vic Secret ●, Luna, Jarrylo, Ella
Ella	Aroma hop	13.4–19.2	● 34–38		Late boil, Whirlpool, Dry hopping	Citrus, Floral, Tropical fruit	Galaxy ●●, Palisade ●, Perle ●, Enigma ●
Enigma	Aroma hop	15.6–19.5			Late boil, Whirlpool, Dry hopping	Berry & grape, Tropical fruit, Citrus	Nelson Sauvin ●●●, Hallertau Blanc ●●, El Dorado ●, Huell Melon ●
Galaxy	Aroma hop	12.3–19.8	● 32–35		Late boil, Whirlpool, Dry hopping	Tropical fruit, Citrus, Berry & grape	Citra ●●●, Vic Secret ●●●, Amarillo ●●●, Centennial ●●●
Luna	Aroma hop	13.2–15		1.9–2.5	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Berry & grape	Eclipse, Ella, Sticklebract, Krush
Topaz	Dual-purpose hop	13–20.6			Early boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Berry & grape	Galaxy ●, Apollo ●, Summit ●, Vic Secret ●
Vic Secret	Dual-purpose hop	14–21.8	● 51–56		Late boil, Whirlpool, Dry hopping	Tropical fruit, Resin & pine, Citrus	Galaxy ●●●, Eclipse ●, Ella ●, Topaz ●

France

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Aramis	Aroma hop	6–8.5	○ 21–22	1.2–1.6	Late boil	Herbal & grassy, Spicy & earthy, Floral	Challenger ●, Strisselspalt ●, Willamette ●, Barbe Rouge
Barbe Rouge	Aroma hop	7–10	◐ 24–28	1–3	Late boil, Whirlpool, Dry hopping	Berry & grape	Mystic ●, Centennial, Aramis, Rakau
Mistral	Aroma hop	6–9	● 29–39	1–1.5	Late boil, Whirlpool, Dry hopping	Citrus, Tropical fruit, Floral	Riwaka, Ahtanum, KARMA, Belma

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Strisselspalt	Aroma hop	1.8–5	○ 20–25	0.6–0.8	Late boil, Whirlpool	Floral, Herbal & grassy	Crystal ●●●, Hersbrucker Spät ●●●, Mount Hood ●●●, Liberty ●
Tardif de Bourgogne	Aroma hop				Late boil, Whirlpool	Floral, Spicy & earthy	Loral ●
Triskel	Aroma hop	2.8–5	○ 20–23	1.5–2	Late boil, Whirlpool, Dry hopping	Herbal & grassy, Citrus, Floral	Strisselspalt ●, Styrian Kolibri, Aramis, Barbe Rouge

Czechia

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Kazbek	Aroma hop	5–8	● 35–40	0.9–1.8	Late boil, Dry hopping	Citrus, Spicy & earthy	Saaz ●●, Cascade, Cluster, Target
Most	Dual-purpose hop	7–10	◐ 25–32	1	Late boil, Dry hopping	Berry & grape, Citrus, Tropical fruit	Olicana ●
Saaz	Aroma hop	1.4–7.5	○ 23–26	0.2–1	Late boil	Herbal & grassy, Spicy & earthy	Lublin ●●●, Sterling ●●●, Tettnanger ●●●, Sladek ●●
Sladek	Dual-purpose hop	4.5–9	◐ 22–28	0.9–2	Early boil, Late boil	Berry & grape, Herbal & grassy	Saaz ●●●, Liberty

Belgium

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Groene Bel							–

Japan

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Sorachi Ace	Dual-purpose hop	10–14.5	○ 20–26	1.5–3	Late boil, Whirlpool, Dry hopping	Citrus, Herbal & grassy	Southern Cross ●●, Lemondrop ●●, Motueka ●●, Liberty ●

Unknown origin

Variety	Role	Alpha acid %	Cohumulone %	Oil ml/100 g	Best for	Flavour	Swap for
Elani		9–11	◐ 30–34	1.3–2			Mandarina Bavaria, Belma, Endeavour, Idaho 7

Rules of thumb

Bitterness and boil time	How much of the alpha acid turns into bitterness rises with boil time and falls when the wort is stronger. According to Tinseth's model, a 60-minute boil gives around 23 % utilisation in a 1.050 wort, and 15 minutes roughly half as much. Hops in the whirlpool below 80 °C give only a little bitterness.
IBU and perceived bitterness	IBU is measured in a lab and mainly reflects the iso-alpha acids in the beer, but also other hop compounds, so it does not tell you exactly how bitter the beer tastes. In heavily hopped beers, from roughly 40 IBU and up, IBU matches the perceived bitterness less well, and malt sweetness and residual sugar soften the bitterness.
Cohumulone	The cohumulone share is given as a percentage of the alpha acid. Cohumulone gets higher utilisation than the other alpha acids, since less of it is lost in the boil and fermentation, so hops with a high share can give somewhat more bitterness. The old rule of thumb is that a high share gives a sharper bitterness, but later studies have given mixed results.
Oils and aroma	Myrcene smells green and resinous and is very volatile. Humulene and caryophyllene give woody, herbal and spicy notes, and farnesene is found in larger amounts only in some varieties, such as Saaz and Tettnanger. The oils boil off easily, so late boil additions, the whirlpool and dry hopping give the most aroma.
Dry hopping and hop creep	Hops contain enzymes that can break down dextrins into fermentable sugar, so if there is yeast left, fermentation can pick up again after dry hopping and give more alcohol, a drier beer, more carbonation and sometimes diacetyl. The effect increases with the amount of hops, the temperature and the contact time; wait until the final gravity is stable before you bottle.
Storage	Oxygen, heat and time break down alpha acids and oils. Store hops vacuum-packed in the freezer and use opened bags as soon as possible. HSI (Hop Storage Index) shows how much the alpha and beta acids have broken down, and how fast hops age differs between varieties.

Sources: allaboutbeer.com, asbcnet.org, barthhaas.com, beerandbrewing.com, beersmith.com, brewersassociation.org, doi.org, members.camra.org.uk

The terms explained

Alpha acid	The hop's bittering compounds (humulones), as a percentage of weight. In the boil they are converted into iso-alpha acids, which give the beer its bitterness, and the longer the boil, the more. The alpha acid content decides how much hop is needed for a given bitterness and varies from harvest to harvest.
Beta acid	The hop's other acids (lupulones). They dissolve poorly in the wort and give hardly any bitterness in the boil, but can give a little as the hops age. They also act against bacteria.
Cohumulone	One of the three alpha acids (cohumulone, humulone and adhumulone), given as a share of the alpha acid, usually 20–40 %. A high share is often thought to give a sharper bitterness, so low cohumulone is highlighted in smooth bittering varieties.
Hop oils	The volatile compounds that give hops their aroma, in ml per 100 g. They boil off with the steam, so the aroma comes from hops added late, in the whirlpool or as a dry hop. The main ones are myrcene (resin, green, herbal) and humulene and caryophyllene (woody, spicy, herbal).
Bitterness (IBU)	International Bitterness Units, roughly milligrams of iso-alpha acid per litre of beer. A pale lager has 15–25 IBU, a pilsner 25–40 and an IPA 40–70. How bitter the beer tastes also depends on how sweet the malt is.
Bittering, aroma and dual-purpose hops	Bittering hops have high alpha acid and are added early for the bitterness. Aroma hops have lower alpha acid but fine oils and are added late. Dual-purpose hops work for both.
Hop additions	When the hops go in. An early boil addition, 45–60 minutes before the end of the boil, gives bitterness, and a late boil addition in the last 0–15 minutes gives flavour and aroma. In the whirlpool the hops steep in the hot wort after the boil, at around 70–90 °C, and give aroma with a little bitterness. Dry hopping in the fermenting or finished beer gives aroma without bitterness.
Pellets, cryo and lupulin	T90 pellets are ground and pressed hop cones and the most common form. Cryo and lupulin powder are the cone's lupulin glands without the leaves, roughly twice as strong, and give a less grassy flavour when dry hopping.
Origin	Where the variety is grown. The same variety tastes different from country to country and year to year, and varieties from the same country often share a style: American citrus and resin, European herbal and spicy noble hops, New Zealand tropical fruit.