

Hop Name	Hop Alpha Acid %	Common Beer Styles	Possible Hop Substitutions	Hop Characteristics
Admiral (U.K.)	13.5% to 16%	Ale	U.K. Target, U.K. Northdown, U.K. Challenger	Known for its bittering potential.
Ahtanum	4% to 6.3%	-	-	Floral, citrus, sharp, and piney.
Amarillo	8% to 9%	Ale, IPA	Cascade, Centennial	Citrusy, flowery.
Bramling Cross (U.K.)	5% to 7%	ESB, bitter, pale ale	U.K. Kent Golding, U.K. Progress, Whitbread Golding Variety	Quite mild, fruity currant aroma.
Brewer's Gold	7% to 8.5%	English ale	Bullion	Bittering hop with neutral aroma character.
Brewer's Gold (German)	6% to 7%	Ale, heavier German-style lagers	Northdown, Northern Brewer, Galena, Bullion	Black currant, fruity, spicy.
Bullion	6.5% to 9%	IPA, ESB, stout	Columbus, Northern Brewer, German Brewer's Gold	A rich hop primarily used for bittering. Intense blackcurrant aroma.
Cascade	4.5% to 7%	Pale ale, IPA, porter, barleywine	Centennial, Amarillo, possibly Columbus	Pleasant, flowery, spicy, and citrusy. Can have a grapefruit flavor.
Centennial	8% to 11.5%	All ale styles, has been used with	Cascade, possibly Columbus	Medium with floral and citrus tones.
Challenger (U.K.)	6.5% to 8.5%	English-style ales, porter, stout, ESB, bitter	U.S. or German Perle, Northern Brewer	Mild to moderate, quite spicy.
Chinook	10% to 14%	Pale ale, IPA, stout, porter, lager	Nugget, Columbus, Northern Brewer, U.K. Target	Mild to medium-heavy, spicy, piney, and grapefruity.
Cluster	5.5% to 8.5%	Ale and lager (good aroma for ale, good bittering for lager)	Galena	Medium and quite spicy.
Columbus	11% to 16%	IPA, pale ale, stout	Nugget, Chinook, U.K. Target, Northern Brewer	Pleasant, with pungent aroma.
Crystal	2% to 4.5%	Lager, pilsner, ESB	Mt. Hood, Hersbrucker, French Strisslespalt, Liberty, Hallertauer	Mild and pleasant, spicy and flowery.
Eroica	9% to 12%	Wheat	Galena, Nugget, Chinook	Strong but pleasant aroma.
First Gold (U.K.)	6.5% to 8.5%	Ale, ESB	U.K. Kent Golding, maybe Crystal	A little like Golding family; spicy.
Fuggle (U.S.)	4% to 5.5%	Any English-style beer or American ale	U.K. Fuggle, Willamette, Styrian Golding, U.S. Tettnanger	Mild and pleasant, earthy and fruity.

Fuggle (U.K.)	4% to 5.5%	All English-style ales, ESB, bitter, lager	U.S. Fuggle, Willamette, Styrian Golding	Mild, pleasant, hoppy, and robust.
Galena	10% to 14%	Ale, porter, stout, ESB, bitter	Nugget, Pride of Ringwood, Chinook	Medium but pleasant hoppiness, citrusy.
Golding (U.S.)	4% to 6%	Pale ale, ESB, all English-style beer	U.K. Golding, Whitbread Golding Variety, U.K. Progress, and possibly the Fuggle family	Mild, extremely pleasant, and gently hoppy.
Hallertauer (U.S.)	3.5% to 5.5%	Lager, pilsner, bock, wheat	Liberty, Ultra, Hallertauer Tradition	Very mild, pleasant, and slightly flowery, some spicy.
Hallertauer Gold	6% to 6.5%	-	Crystal, Mt. Hood	Known for its aromatic properties similar to Hallertauer.
Hallertauer Mittelfrüh	3% to 5.5%	Lager, bock, wheat, maybe pilsner	Liberty, German Tradition, Ultra	Mild and pleasant.
Hallertauer Tradition (Ger.)	3.5% to 5.5%	Mild-flavored beers	Crystal, Liberty	Known for its aromatic properties. A replacement for Hallertauer Mittelfrüh.
Hallertau Hersbr	3% to 5.5%	Lager, pilsner, bock, wheat	Mt. Hood, French Strisslespalt	Mild to semi-strong, pleasant, hoppy.
Horizon	11% to 14%	Ale, lager	Magnum or a high-alpha hop	Pleasantly hoppy.
Kent Golding (U.K.)	4% to 5.5%	All English-style ales, ESB, bitter	U.S. Golding, Whitbread Golding Variety, U.K. Progress	Gentle, fragrant, and pleasant.
Liberty	3% to 6%	Lager, pilsner, bock, wheat	Hallertauer Tradition, Hallertauer, Mt. Hood	Mild and clean aroma, slightly spicy character.
Magnum	13% to 15%	All beers, particularly lager, pilsner, stout	Northern Brewer	Known for bittering value and quality.
Mt. Hood	3% to 8%	Lager, pilsner, bock, wheat	Crystal, French Strisslespalt, Hersbrucker	Mild, pleasant, and clean, somewhat pungent and resinous.
Northdown (U.K.)	7.5% to 9.5%	All ales, porter	-	Fruity with some spiciness.
Northern Brewer (U.S.)	6% to 10%	ESB, bitter, English pale ale, porter, California (steam)	Nugget, Chinook	Medium-strong with some wild tones.
Northern Brewer (German)	7% to 10%	ESB, bitter, English pale ale, porter	Chinook, U.S. Northern Brewer	Medium-strong with some wild tones.
Northwest Golding	4% to 5%	Ale, porter, stout, ESB, bitter	-	Known for aromatic properties.
Nugget	11% to 14.5%	Light lager	Columbus, Chinook, U.K. Target, Galena	Quite heavy and herbal.

Olympic	11% to 13%	-	Chinook	Mild to medium, citrusy aroma, spicy.
Perle (U.S.)	6% to 9.5%	Pale ale, porter, German styles	Northern Brewer, Cluster, Galena, Chinook	Known for its aromatic and bittering properties, pleasant and slightly spicy.
Perle (German)	6% to 8.5%	Pale ale, porter, lager	U.S. Perle, Northern Brewer	Moderately intense, good and hoppy, fruity and a little spicy.
Phoenix (U.K.)	4.2% to 5.5%	All ales	U.K. Northdown, U.K. Kent Golding, U.K. Challenger	Similar to U.K. Challenger.
Pioneer (U.K.)	8% to 10%	Ale, ESB	U.K. Kent Golding	A mild, typical English aroma.
Polish Lublin	3% to 4.5%	Pilsner	U.S. Saaz, Czech Saaz, U.S. Tettnanger	Mild and typical of noble aroma types, spicy, herbal.
Pride of Ringwood (Australia)	7% to 10%	Australian lager	Galena, Cluster	Quite pronounced, woody, earthy, herbal.
Progress (U.K.)	5% to 7.5%	Ale, bitter, ESB, porter	U.K. Kent Golding, Fuggle	Moderately strong, good aroma.
Saaz (Czech)	3% to 4.5%	Pilsner	U.S. Saaz, Polish Lublin	Very mild with pleasant hoppy notes, earthy, spicy, and herbal.
Saaz (U.S.)	3% to 5%	Pilsner, lager, wheat	Czech Saaz, Polish Lublin	Mild and pleasant, earthy and spicy.
Santiam	5% to 7.9%	Lager, American ale, pilsner	German Tettnanger, German Spalt, German Spalt Select	Noble characteristics.
Satus	12.5% to 14%	-	Galena	Known for its bittering and aromatic properties.
Simcoe	12% to 14%	-	-	A bittering and aromatic hop.
Spalt (German)	4% to 5.5%	Lager	U.S. Saaz, U.S. Tettnanger, German Spalt Select	Mild and pleasant, slightly spicy.
Spalt Select (German)	4% to 6%	Lager, and any beer where noble aroma is wanted	U.S. Saaz, U.S. Tettnanger, German Spalt	Very fine Spalter-type aroma.
Spalt Select (U.S.)	3% to 5%	German lagers	Tettnanger, Saaz	Medium intensity and pleasant hoppy qualities. Medium-strong aroma with wild American tones.
Sterling	6% to 9%	Lager, ale, pilsner	Saaz, Polish Lublin	Herbal, spicy, pleasant aroma, hint of floral and citrus.

Strisslespalt (France)	3% to 5%	Pilsner, lager, wheat	Mt. Hood, Crystal, Hersbrucker	Medium intensity, pleasant, hoppy.
Styrian Golding (Slovenia)	4.5% to 6%	All English-style ales, ESB, bitter, lager	U.S. Fuggle, U.K. Fuggle, Willamette	Delicate, slightly spicy.
Summit	17.5% to 19.5%	IPAs, Imperial IPAs	Simcoe	Orange, tangerine, citrus notes.
Target (U.K.)	9.5% to 12.5%	All ale and lager	Fuggle, Willamette	Pleasant English hop aroma, quite intense.
Tettnanger (U.S.)	3.4% to 5.2%	German ales and lagers, American lagers, wheat	German Spalt, Czech Saaz Santiam	An aromatic hop, mild and slightly spicy.
Tettnanger (German)	3.5% to 5.5%	Lager, ale	German Spalt, German Spalt Select, U.S. Tettnanger, Saaz	Mild and pleasant, slightly spicy, herbal.
Tomahawk	15% to 17%	Ale	Columbus	Primarily a bittering hop.
Tradition (German)	5% to 7%	Lager, pilsner	Hersbrucker, Hallertauer Mittelfrüh	Very fine and similar to Hallertauer Mittelfrüh.
Ultra	2% to 4.1%	Lager, pilsner, wheat, finish hop in ales	Liberty, Hallertauer Tradition, Saaz	Very good to outstanding, some Saaz-like qualities. Aromatic properties similar to Hallertauer.
Vanguard	4% to 5.67%	-	Saaz, Hallertauer Mittelfrüh	Aroma similar to continental European types.
Warrior	15% to 17%	Ale, stout	Nugget	A bittering and aromatic hop.
WGV (Whitbread Golding Variety) (U.K.)	5% to 7%	Ale	U.K. Kent Golding, U.K. Progress	Quite pleasant and hoppy, moderately intense.
Willamette	3.5% to 6%	Pale ale, ESB, bitter, English-style ale, porter, stout	U.S. Fuggle, U.S. Tettnanger, Styrian Golding	Mild and pleasant, slightly spicy, fruity, floral, a little earthy.
Yakima Cluster	6% to 8.5%	-	-	Used as a kettle hop for bittering.
Zeus	13% to 17%	-	Columbus	Aromatic and pleasant.