

Hop Bitterness

Brewer's Worksheet
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DATA ENTRY UNITS

Brewing Liquor Volume	gals
Liquor Adjustment Salts	grams
Grain Weights	lbs
Beer Color	lovibond
Specific Gravity	sg
Hop Weights	grams

CHOICES

gals, liters
 ozs, grams
 lbs, kgs
 lovibond, ebc
 sg, plato
 ozs, grams

CO

Brewing
 Liquor /

FACTORS

Mash Time to Full Color Developm	1:30
Expected Grain Extraction Rate	83%
Pellets Alpha Acid Isomerization R	31%
Leaf Alpha Acid Isomerization Rat	26%

RECIPE

Brewing Liquor Volume **15.00** Err:508

Water Treatment

Calcium Carbonate	18.00	Err:508
Calcium Chloride		Err:508
Calcium Sulfate		Err:508
Magnesium Sulfate		Err:508
Potassium Chloride		Err:508
Sodium Chloride		Err:508

Grain Bill

Err:508	Grain
24.00	Munich
6.00	Vienna
6.00	2 row
1.50	Crystal 80

Mash Time **2:00**

Hopping

Err:508	Hops	Alpha Acid	Boil Time
175.00	Hallertauer	3.5%	1:30

Hop Bitterness

-CALCULATORS

Water Treatment Calculator

	My Water	Target Water	Difference Before
Calcium	20 ppm	80 ppm	0:00
Carbonate	25 ppm	333 ppm	0:00
Chloride	18 ppm	1 ppm	
Magnesium	6 ppm	19 ppm	0:00
Potassium	4 ppm		
Sodium	32 ppm	10 ppm	
Sulfate	21 ppm	5 ppm	

	Calcium Carbonate	Calcium Chloride	Calcium Sulfate
	Err:508	Err:508	Err:508
Calcium	Err:508	Err:508	Err:508
Carbonate	Err:508	Err:508	Err:508
Chloride	Err:508	Err:508	Err:508
Magnesium	Err:508	Err:508	Err:508
Potassium	Err:508	Err:508	Err:508
Sodium	Err:508	Err:508	Err:508
Sulfate	Err:508	Err:508	Err:508

Grain Color and Extract Calculator

Weight	Grain	Ingredient Color	Extraction
Err:508		Err:508	Err:508
0:00	Munich	Err:508	Err:508
0:00	Vienna	Err:508	Err:508
0:00	2 row	Err:508	Err:508
12:00	Crystal 80	Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
		Err:508	Err:508
			Theoretical
			Err:508
			Err:508
			Err:508
		Beer Color	Expected
		Err:508	Err:508
		Err:508	Err:508

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Hop Bitterness Calculator

Err:508
0:00

Hops
Hallertauer

Alpha Acid
0:50

Boil Time
1:30

Total International

Hop Bitterness

INVERSION UNITS——

g Liquor Volume		←Bad Value
Adjustment Salts		←Bad Value
Grain Weights		←Bad Value
Beer Color		←Bad Value
Specific Gravity		←Bad Value
Hop Weights		←Bad Value

Leaf/Pellet

pellet

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Difference After Treatment		Total PPM	
Err:508	Err:508	Calcium Carbonate	40.00%
Err:508	Err:508	Calcium Chloride	36.10%
Err:508	Err:508	Chloride	63.90%
Err:508	Err:508	Magnesium	
Err:508	Err:508	Potassium	
Err:508	Err:508	Sodium	
Err:508	Err:508	Sulfate	

Magnesium Sulfate	Potassium Chloride	Sodium Chloride
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508
Err:508	Err:508	Err:508

Extract Rate	Grain	— Applied
	Err:508	Err:508
	6 row	Err:508
	2 row	Err:508
	English Pale	Err:508
	English Mild	Err:508
	Munich	Err:508
	Vienna	Err:508
	Crystal 20	Err:508
	Crystal 40	Err:508
	Crystal 60	Err:508
	Crystal 80	Err:508
	Crystal 120	Err:508
	Cara-Pils	Err:508
	Scotch	Err:508
	Chocolate	Err:508
	Roasted Barley	Err:508
	Black Patent	Err:508
Barley	Err:508	

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Leaf/Pellet	Bitterness Units
pellet	Err:508
	Err:508
	Err:508
	Err:508
	Err:508
	Err:508
	Err:508
al Bitterness Un	Err:508

Oats	Err:508
Corn	Err:508
Rice	Err:508
Wheat	Err:508
pilsener	Err:508
flaked barley	Err:508
Other 3	Err:508
Other 4	Err:508
Other 5	Err:508
Other 6	Err:508
Other 7	Err:508
Other 8	Err:508
Other 9	Err:508
Other 10	Err:508
Other 11	Err:508
Other 12	Err:508
Other 13	Err:508
Other 14	Err:508
Other 15	Err:508
Other 16	Err:508
Other 17	Err:508
Other 18	Err:508
Other 19	Err:508
Other 20	Err:508

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N PERCENTAGES LOOKUP TABLE

Calcium Sulfate	Magnesium Sulfate	Potassium Chloride	Sodium Chloride
23.30%			
		23.80%	30.35%
	9.90%		
		52.40%	
			39.30%
55.80%	39.00%		

ALT VALUES TABLE

Values —	— Reference Values —	
Err:508	Color	100% Extract
Err:508	EBC kg/l	°Plato kg/l
Err:508	38.6	75.1
Err:508	34.1	75.1
Err:508	56.2	75.1
Err:508	82.7	75.1
Err:508	111.4	75.1
Err:508	78.3	75.1
Err:508	475.5	66.7
Err:508	938.9	66.7
Err:508	1,424.5	66.7
Err:508	1,865.8	66.7
Err:508	2,748.5	66.7
Err:508	34.1	75.1
Err:508	652.1	66.7
Err:508	8,817.3	
Err:508	8,817.3	
Err:508	11,465.5	
Err:508	34.1	75.1

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[illegible]