

## Pale Ale KegRiver Brewer for Zoran

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- Gravity **15 BLG**
- ABV **6.2 %**
- IBU **34**
- SRM **4**
- Style **American Pale Ale**

### Batch size

- Expected quantity of finished beer **25 liter(s)**
- Trub loss **5 %**
- Size with trub loss **26.3 liter(s)**
- Boil time **60 min**
- Evaporation rate **10 %/h**
- Boil size **31.7 liter(s)**

### Mash information

- Mash efficiency **80 %**
- Liquor-to-grist ratio **3 liter(s) / kg**
- Mash size **21 liter(s)**
- Total mash volume **28 liter(s)**

### Steps

- Temp **32 C**, Time **10 min**
- Temp **44 C**, Time **10 min**
- Temp **48 C**, Time **10 min**
- Temp **52 C**, Time **10 min**
- Temp **62 C**, Time **10 min**
- Temp **80 C**, Time **60 min**

### Mash step by step

- Heat up **21 liter(s)** of strike water to **34C**
- Add grains
- Keep mash **10 min** at **32C**
- Keep mash **10 min** at **44C**
- Keep mash **10 min** at **48C**
- Keep mash **10 min** at **52C**
- Keep mash **10 min** at **62C**
- Keep mash **60 min** at **80C**
- Sparge using **17.7 liter(s)** of **76C** water or to achieve **31.7 liter(s)** of wort

### Fermentables

Type	Name	Amount	Yield	EBC
Grain	2-ROW MALT (RAHR OR CANADA MALTING)	2 kg (28.6%)	78 %	4
Grain	PILSNER MALT (CANADIAN)	5 kg (71.4%)	81 %	4

### Hops

Use for	Name	Amount	Time	Alpha acid
Boil	Nugget	15 g	60 min	13 %
Boil	Nugget	15 g	30 min	13 %
Boil	Cascade	50 g	5 min	7.5 %

### Yeasts

Name	Type	Form	Amount	Laboratory
Safale US-05	Ale	Dry	11.5 g	Fermentis

## Extras

Type	Name	Amount	Use for	Time
Water Agent	Epsom Salts	8.5 g	Mash	60 min
Making YYC Hoppy Water add the following. Water agent used to modify water profile				
Water Agent	Gypsum (Calcium Sulfate)	4.5 g	Mash	60 min
Reduces PH of water for mashing and sparging. Alters water profile -- used to harden soft water.				
Water Agent	Salt	1.5 g	Mash	60 min
Table Salt (NaCl) may be used as a water mineral to adjust brewing water for mashing.				
Water Agent	Calcium Chloride	0.6 g	Mash	60 min
Alters water profile and pH of mash.				
Fining	Whirlfloc Tablet	1.5 g	Boil	15 min
One Tablet - Aids in clearing yeast and chill haze. Easy to use tablet form.				

## Notes

- For the Keg River Brewer System  
Mash rests 30 - 32 C  
Acid Rest 44 C  
Ferulic acid rest 45 - 50 C  
Beta-Glucan Rest 50 - 52 C  
Protein Rest 62 C  
Maltose Rest 72 C  
Dextrinization Rest 76 - 79 C  
Mash-Out 100C

Now to calculate the sparge water so that the volume of wort in the boiler is the same as our calculated preboil volume.

Therefore, 28 L (7.4 US Gal) is the preboil volume we want then:

Preboil Volume - Mash Water + (Grain Weight x Grain Absorption) = Sparge Volume (Daniels, 1996)

$28\text{L} - 17\text{L} + (5\text{kg} \times 0.8\text{L/kg}) = 15\text{L}$

As with the mash water, the same assumptions of measuring and heating the sparge water apply due to thermal expansion. This especially applies when measuring the preboil volume. If your sparge vessel has a dead space where the water cannot be recovered, most hot water urns can be manually emptied by tipping the remaining contents into the grain basket. But if you cannot recover the volume this volume will need to be added to the sparge volume.

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