Targets 5.5% ABV -- 5 Gallons -- 12.5 OG

1.05 - x * 131.25 = 5.5%
1.055 - x = .0419
1.008 = x = Target FG = 2

Grain
Two-row Pale - 90%
Caramel | 60°L - 10%

Hops
Amarillo - 8oz

Yeast
WLP001 California Ale Yeast

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Calculations
5 gallons x 5 GU = 250 GU of total gravity

Grain Bill

Two-row Pale - .9 * 250 = 225
Caramel | 60°L - .1 * 250 = 25

Ingredient gravity/(mash efficiency x maximum extract)

Two-row Pale = 37
Caramel | 60°L = 35

Two-row Pale = 225/(.70*37) = **9 lbs**
Caramel | 60°L = 25/(.70*35) = **1 lbs**

Hop Bill
AAU = Weight (oz) x % Alpha Acids (whole number)

IBU = AAU x U x 75 / Vrecipe **(36)**
Amarillo (FW) .5 * 10 * .215 * 75/5 = **18**
Amarillo (10 min) 1 * 10 *.114 * 75/5 = **13**
Amarillo (3 min) 1 * 10 *.114 * 75/5 = **5**
Amarillo (WP) 4 oz

**Note: Utilization determined based on a full 60 minute boil -*
http://howtobrew.com/book/section-1/hops/hop-bittering-calculations

Water Calculations
Strike water volume = weight of grain * desired mash thickness
10* 1.3 = 13 quarts = 3.25 gallons

Sparge water volume = weight of grain * 2
10 * 2 = 20 quarts = 5 gallons

Water chemistry targets -
https://drive.google.com/file/d/1aByjOwJ-V0V7hGjGJgSkQ9erFMjKy8aU/view?usp=sharing

Efficiency Calculations - TBD
Potential gravity points = (grain gravity points * weight) / volume
Brewhouse efficiency = actual gravity points / potential gravity points

37 * 9 lbs + 35 * 1 lb = 368

5x = 368
x= 73.6
57/73.6 = **77%**

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