

# Munich\_Dunkel\_20200906.xlsx

Beer Style: 8A. Munich Dunkel

Brewer: BEER-N-BBQ by Larry  
Brew Date: September 6, 2020

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Grain Bill, Adjuncts, & Sugars		
Type	Qty lb	% of Bill
Munich Malt: Dark Munich Malt (Avangard Malz)	22.50	93.8%
Melanoidin Malt: Melanoidin Malt (Weyermann)	1.00	4.2%
Caramel Malt: CARAFA Type II@ (Weyermann)	0.50	2.1%

Recipe Outputs			BJCP Guide	
	Design	Actual	Min	Max
Extract Eff.:	70.0%	72.0%		
Brewhouse Eff.:	64.5%	63.2%		
Pre-Boil SG:	1.045	1.045		
O.G.:	1.052	1.051	1.048	1.056
F.G.:	1.015	1.015	1.010	1.016
Ferm Vol:	44.0	44.0		
Batch Vol:	40.0	40.0		
App Atten:	72.0%	70.2%		
IBUs:	26	25	18	28
ABV:	4.8%	4.6%	4.5%	5.6%
SRM:	21.6	20.7	14.0	28.0

Water Information		
Chicago (Lake Michigan)		
ppm (mg/L)	Orig.	Adj.
Calcium	37	90
Magnesium	12	12
Sodium	9	9
Chloride	16	77
Sulfate	25	69
Alkalinity	102	
Cl/SO <sub>4</sub> Ratio	0.64	1.12

Brewing Process Parameters				
Name	Design	Actual	Units	
Total Water Req'd	66.62		qt	
Ambient Grain Temp	68.0		°F	
Desired Mash Temp	152.0		°F	
Strike Water Volume	36.00	34.00	qt	
Strike Water Temp	163.2	69	°F	
Estimated Mash pH	5.4	5.55		
Mash Time	90	90	min	
Sparge Water Req'd	30.62	32.60	qt	
BIAB	-	-	-	
	-	-	-	
	-	-	-	
	-	-	-	
Pre-Boil Volume	152.0	198.0	°F	
	54.62	58.00	qt	
Boil Volume	55.59	57.50	qt	
Grain Absorption Rate	0.50	0.34	qt/lb	
Preferred SG Tool	Hydrometer			
Pre-Boil SG Grains Only	Hydro.	1.045	1.043	Temp
	Corr SG		1.044	70.0
	Refracto.	11.3		° Brix
	Corr SG			
Extract Efficiency (Grains Only)	70.0%	72.0%	Hydro.	
			Refrac	
Pre-Boil SG Total	Hydro.	1.045	1.044	Temp
	Corr SG		1.045	70.0
	Refracto.	11.3		° Brix
	Corr SG			
Boil Time	90	90	min	
Post-Boil Volume with Immersion Chiller		210.6	210.6	°F
		49.49	51.60	qt
Corr Vol @210.6, No IC -->		49.60		
Boil-Off Rate	5.40	5.27	qt/hr	
Original Gravity	Hydro.	1.052	1.050	Temp
	Corr SG		1.051	69.0
	Refracto.	12.9		° Brix
	Corr SG			
Fermenter Volume		75.0	83.0	°F
		44.00	44.00	qt
Hop Absorption Rate	0.10	0.45	qt/oz	
	Hydro.	1.015	1.014	Temp

Hop Bill & Schedule					
Species	Type	Alpha (%)	Qty oz	AAU	Time (min)
Tettnanger (German)	Pellet	3.1	4.00	12.4	60
Tettnanger (German)	Pellet	3.1	1.25	3.9	30
Tettnanger (German)	Pellet	3.1	0.75	2.3	5

Water Additions (grams)		
	Mash	Sparge
Gypsum	5.0	0.0
Cal Chloride	8.0	0.0
Epson Salt	0.0	0.0
Slaked Lime	0.0	0.0
Baking Soda	0.0	0.0
Chalk	0.0	0.0

Yeast Information		
Wyeast		
Munich Lager 2308		
Ferm Temp:	48-56	°F

Forced Carbonation		
CO2 Volume	2.5	
Temperature	38.0	°F
Pressure	11.2	PSI

Other Ingredients/Additions	Amount	When
Whirlfloc Tablet	2	15 min

NOTES: Step Mash Schedule; Mash in at 131 °F (55 °C) for 10 minutes, 146 °F (63 °C) for 40 minutes, 158 °F (70 °C) for 30 minutes. Split batch in half using a different yeast in each; Wyeast 2206 Bavarian Lager (FG 1.015) and Wyeast 2308 Munich Lager (FG 1.015). Both batches were pressure fermented at room temperature.