

*A ProMash Brewing Session Printout*


Recipe: Munich Dark  
 Brewing Date: Friday November 05, 2010  
 Head Brewer: Александр Муравьев  
 Asst Brewer:

**BJCP Style and Style Guidelines**

04-B Dark Lager, Munich Dunkel

Min OG: 1.048	Max OG: 1.056	
Min IBU: 18	Max IBU: 28	
Min Clr: 14	Max Clr: 28	Color in SRM, Lovibond

**Recipe Specifics**

Batch Size (L): 29.00	Wort Size (L): 29.00
Total Grain (kg): 5.95	
Anticipated OG: 1.055	Plato: 13.48
Anticipated SRM: 17.3	
Anticipated IBU: 25.4	
Brewhouse Efficiency: 90 %	
Wort Boil Time: 60	Minutes

Actual OG: 1.050	Plato: 12.50
Actual FG: 1.014	Plato: 3.51

% Alc by Weight: 3.78	by Volume: 4.84	From Measured Gravities.
% ADF: 72.0	% RDF: 60.0	Apparent & Real Degree of Fermentation

(% Alcohol, %ADF and % RDF calculated from Hydrometer Readings)

Actual Mash System Efficiency: 84 %
Anticipated Points From Mash: 54.62
Actual Points From Mash: 50.86

**Pre-Boil Amounts**

Evaporation Rate: 7.00 % Per Hour

Raw Pre-Boil Targets - only targeted volume/gravity and evaporation rate taken into account:

Raw Pre-Boil Wort Size: 31.18 L
Raw Pre-Boil Gravity: 1.051 SG 12.58 Plato

With sparge water, mash water, additional infusions, vessel losses, top-up water and evaporation rate recorded in the Water Needed Calculator:

Water Needed Pre-Boil Wort Size: 32.09 L
Water Needed Pre-Boil Gravity: 1.049 SG 12.23 Plato

**Formulas Used**

Brewhouse Efficiency and Predicted Gravity based on Method #1, Potential Used.  
 Final Gravity Calculation Based on Points.  
 Hard Value of Sucrose applied. Value for recipe: 46.2100 ppppg  
 % Yield Type used in Gravity Prediction: Fine Grind Dry Basis.

Color Formula Used: Morey  
 Hop IBU Formula Used: Rager

Additional Utilization Used For Plug Hops: 2 %  
 Additional Utilization Used For Pellet Hops: 10 %

**Grain/Extract/Sugar**

%	Amount	Name	Origin	Potential	Color - SRM
44.5%	2.65 kg	PILSNER MALT	Germany	1.036	2
38.9%	2.32 kg	MUNICH TYPE I	Germany	1.036	6
14.7%	0.88 kg	CARAMUNICH TYPE III	Germany	1.033	57
1.8%	0.11 kg	Chocolate Malt	America	1.030	500

Potential represented as SG per pound per gallon.

**Hops**

Amount	Name	Form	Alpha	IBU	Boil Time
7.03 g.	Perle	Pellet	7.80	6.1	60 min.
14.48 g.	Perle	Pellet	7.80	12.5	60 min.
14.48 g.	Perle	Whole	7.80	5.8	30 min.
10.34 g.	Hallertauer Tradition	Whole	6.00	1.0	1 min.

**Yeast**

White Labs WLP820 Octoberfest - Marzen

**Recipe Water Profile**

Profile:

Profile known for:

Calcium (Ca):	0.0 ppm
Magnesium (Mg):	0.0 ppm
Sodium (Na):	0.0 ppm
Sulfate (SO4):	0.0 ppm
Chloride (Cl):	0.0 ppm
biCarbonate (HCO3):	0.0 ppm

pH: 0.00

**Mash Schedule**

Mash Type: Multi Step

Heat Type: Infusion

Grain kg:	5.95	
Water Qts:	25.15	- Before Additional Infusions
Water L:	23.80	- Before Additional Infusions

L Water Per kg Grain: 4.00 - Before Additional Infusions

Tun Thermal Mass:	0.00
Grain Temp:	26 C

Dough In Temp:	63	Time:	0
Acid Rest Temp:	60	Time:	10
Protein Rest Temp:	60	Time:	20
Intermediate Rest Temp:	61	Time:	30
Saccharification Rest Temp:	72	Time:	60
Mash-out Rest Temp:	75	Time:	5
Sparge Temp:	0	Time:	0

Runnings Stopped At: 1.010 SG 2.56 Plato

Total Mash Volume L: 27.77 - After Additional Infusions

All temperature measurements are degrees Celsius.

### Water Needed For Brewing Session

Sparge Amount:	16.50	Sparge Deadspace:	0.00	Total Into Mash:	16.50
Total Grain kg:	5.95	L Per kg:	4.00	Total From Mash:	17.84
		Mash Liters:	23.80		
		Grain Absorption:	5.96		
		Amount Lost in Lauter Tun Deadspace, Grant and Misc. to Kettle:		2.25	
		Top Up Water Added to Kettle:			0.00
		Amount into Kettle:		32.09	
		Boil Time (min):	60.00	Evaporation Rate:	7.00%
		Amount after Boil:		29.85	
		Left in Kettle Deadspace:		1.00	
		Left in Hopback:		0.00	
		Left in Counterflow Chiller:		0.50	
		Left in Other Equipment / Other Absorption:		0.00	
		Amount to Chillers:		28.35	
		Amount After Cooling (4%):		27.21	

Grain absorption rate is: 1.01 (L Per kg)

Evaporation rate is % per Hour

This formulation will yield 27.21 liters of fermentable wort.

You will need 40.30 liters of water for the complete brewing session.

### Efficiency Specifics

Recipe Efficiency Setting: 90 %

With sparge water, mash water, additional infusions, vessel losses, top-up water and evaporation rate recorded in the Water Needed Calculator:

Target Volume (L):	32.09	Plato:	12.23
Estimated OG:	1.049		

Raw Pre-Boil Targets - only targeted volume/gravity and evaporation rate taken into account:

Target Volume (L):	31.18	Plato:	12.58
Estimated OG:	1.051		

Post-Boil Targets:

Target Volume (L):	29.00	Plato:	13.48
Estimated OG:	1.055		

Recorded Actuals - Measurement Taken In Kettle:

Recorded Volume (L):	29.50	Plato:	12.39
Recorded OG:	1.050		

At 100 % extraction from the maximum mash potential:

Total Points:	60.69
Points From Mash:	60.69
Points From Extract/Sugar:	0.00

With the recipe efficiency setting, you should have achieved:

Total Points:	54.62
Points From Mash:	54.62
Points From Extract/Sugar:	0.00

Actuals achieved were:

Actual Points From Mash:	50.86
Actual Mash System Efficiency:	84 %

### Fermentation Specifics

Pitched From:	Starter
Amount Pitched:	1600 mL
Lag Time:	6.00 hours

Primary Fermenter:	Stainless Steel
Primary Type:	Closed
Days In Primary:	0
Primary Temperature:	13 degrees C

**Bottling/Kegging Specifics**

Bottling Date: Wednesday November 17, 2010  
 Desired Carbonation Level: 2.30 Volumes CO2  
 Fermentation Temperature: 13 C

Amount Kegged: 29.00 Liters  
 Days Conditioned: 0  
 Carbonation Method: Forced  
 Carbonation Temperature: 3 C  
 Pressure Used: 0.00 kPa

**Inventory Analysis**

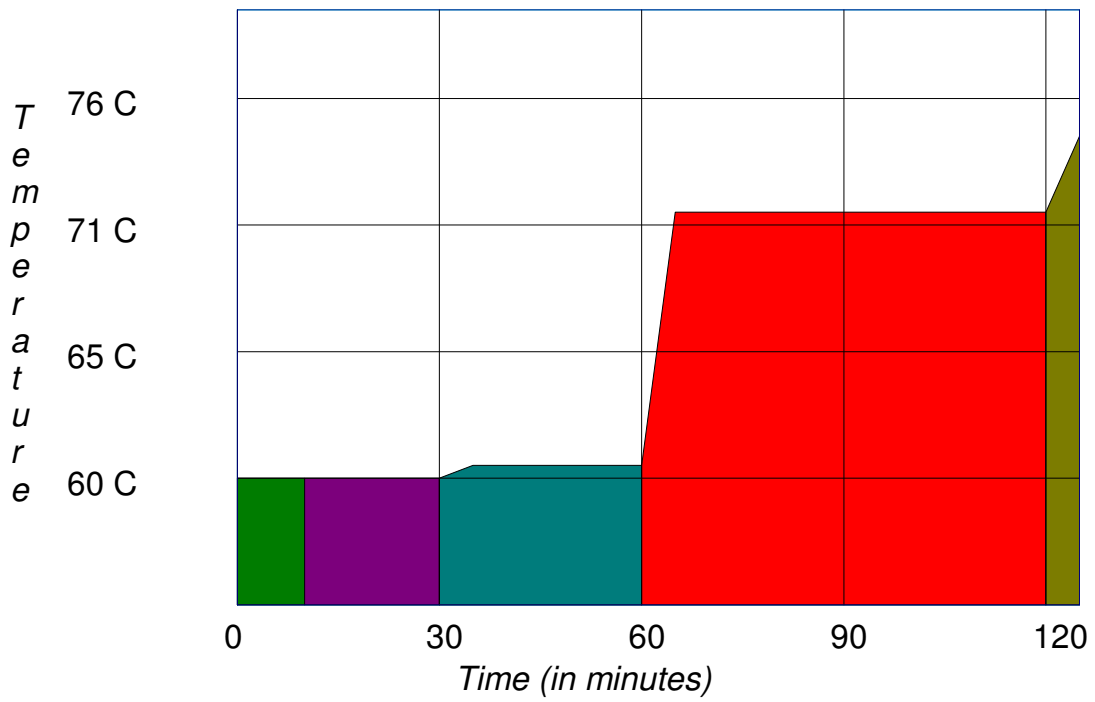
<i>Grain/Malt/Extract/Sugar</i>	<i>Recipe kg</i>	<i>kg In Stock</i>	<i>kg Needed</i>
PILSNER MALT - Germany	2.65	50.00	0.00
MUNICH TYPE I - Germany	2.32	48.00	0.00
CARAMUNICH TYPE III - Germany	0.88	25.00	0.00
Chocolate Malt - America	0.11	0.00	0.11

<i>Hop</i>	<i>Recipe Gr</i>	<i>Gr In Stock</i>	<i>Gr Needed</i>
Perle - Germany - Pellet	7.03	2600.00	0.00
Perle - Germany - Pellet	14.48	2592.97	0.00
Perle - Germany - Whole	14.48	0.00	14.48
Hallertauer Tradition - Germany - Whole	10.34	0.00	10.34

<i>Extras</i>	<i>Recipe</i>	<i>In Stock</i>	<i>Needed</i>
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<i>Yeast</i>	<i>Recipe</i>	<i>In Stock</i>	<i>Needed</i>
Octoberfest - Marzen (White Labs WLP820)	1.00	0.00	1.00

Munich Dark - ProMash Mash Schedule Chart



- - Acid Rest
- - Protein Rest
- - Intermediate Rest
- - Saccharification Rest
- - Mash Out