# Ein-Stein (AG) 23L

Created: Saturday July 15th 2023

Cell Division

Method: **All Grain** Style: **Munich Dunkel** Boil Time: **90 min** Batch Size: **23 liters** (fermentor volume) Pre Boil Size: **29.15 liters**

Post Boil Size: **25 liters** Pre Boil Gravity: **1.044** (recipe based estimate) Post Boil Gravity: **1.051** (recipe based estimate)

Efficiency: **75%** (brew house) Calories: **234 calories** (Per 500ml) Carbs: **19.5 g** (Per 500ml)

| Original Gravity: | Final Gravity: | ABV (standard): | IBU (tinseth): | SRM (morey): | Mash pH | Cost $ |
|---|---|---|---|---|---|---|
| **1.051** | **1.008** | **5.7%** | **24.6** | **25.8** | **5.3** | **n/a** |

## Fermentables

| Amount | Fermentable | Cost | PPG | °L | Bill % |
|---|---|---|---|---|---|
| 4.80 kg | Gladfield - NZ - Gladfield - Munich Malt | | 35.8 | 7.25 | 91.8% |
| 0.25 kg | Gladfield - NZ - Gladfield - Aurora Malt | | 35.88 | 23 | 4.8% |
| 0.18 kg | Gladfield - NZ - Gladfield - Eclipse Roasted Wheat | | 34 | 750 | 3.4% |

**5.23 kg / $ 0.00**

## Hops

| Amount | Variety | Cost | Type | AA | Use | Time | IBU | Bill % |
|---|---|---|---|---|---|---|---|---|
| 30 g | Hallertau Mittlefruh | | Pellet | 5 | Boil | 60 min | 17.52 | 60% |
| 20 g | Hallertau Mittlefruh | | Pellet | 5 | Boil | 20 min | 7.08 | 40% |

**50 g / $ 0.00**

## Other Ingredients

| Amount | Name | Cost | Type | Use | Time |
|---|---|---|---|---|---|
| 5 g | Calcium Chloride (dihydrate) | | Water Agt | Mash | 1 hr. |

## Yeast

### Fermentis - Saflager - German Lager Yeast W-34/70

**Amount:** 3 Each **Cost:** **Attenuation (avg):** 83% **Flocculation:** High **Optimum Temp:** 9 - 22 °C **Starter:** No

**Fermentation Temp:** - **Pitch Rate:** 0.35 *(M cells / ml / ° P)* 102 B cells required

## Priming

$CO_2$ Level: 2.44 Volumes

## Target Water Profile Munich (Dark Lager)

**$Ca^{+2}$** 52.6 **$Mg^{+2}$** 3 **$Na^{+}$** 10 **$Cl^{-}$** 80.1 **$SO_4^{-2}$** 7 **$HCO_3^{-}$** 40

## Mash Guidelines

| Amount | Description | Type | Start Temp | Target Temp | Time |
|---|---|---|---|---|---|
| 14.12 L | Startch conversion | Strike | 73 °C | 66 °C | 60 min |
| | Mash out | Sparge | 66 °C | 77 °C | 10 min |
| 20.3 L | | Sparge | 76 °C | -- | -- |

**Starting Mash Thickness: 2.7 L/kg**
**Starting Grain Temp: 20 °C**

## Quick Water Requirements

| Water | Liters |
|---|---|
| Strike water volume at mash thickness of 2.7 L/kg | 14.1 |
| Mash volume with grains | 17.6 |
| Grain absorption losses | -5.2 |
| Remaining sparge water volume | 20.3 |
| Pre boil volume | 29.2 |
| Boil off losses | -3.8 |
| Hops absorption losses (first wort, boil, aroma) | -0.4 |
| Post boil Volume | 25 |
| Kettle losses | -2 |
| Going into fermentor | 23 |
| **Total:** | **34.4** |

| Water | Liters |
| --- | --- |
| Equipment Profile Used: | G30 |

## Notes

The suggested mineral additions assume an average NZ water profile and should be fine for most NZ water sources. The target water profile in ppm is shown above.

Advanced note: a decoction mash is traditionally used in the brewing of a Munich Dunkel and will help bring out the bready malty flavours. There are a number of approaches available, some more complicated than others, but for the slightly more adventurous brewer a simple double decoction can be added to the mash schedule as follows. 15-20 minutes protein rest (50 deg C), then pull a thick mash sample (approximately 1/3 of the mash without lots of the liquor and enzymes) and heat in a separate vessel to 66 deg C (there is no need to raise the temperature of the main mash yet). Hold the decoction at 66 deg C for 20 min and then bring it to the boil. Slowly return the decoction to the main mash raising the temperature to 66 deg C (for 1 hour). Any remaining decoction volume can be left to cool some more before returning to the main mash. At the end of the main 66 deg C infusion, pull a wet mash sample (1/3 of the mash with plenty of liqour) and bring it to the boil. Carefully return the boiled mash to the main mash, raising the temperature to mash out.

1. This recipe is designed to include mineral additions in the mash. If you do not have scales, 1 flat tsp/4g of calcium chloride will be a close approximation. The mineral additions are designed to target an optimal mash pH of ~5.3. Calcium is also essential for stabilising mash enzymes and for yeast health. The mineral additions are also very important for the flavour profile of the beer. If you do not have brewing salts in your home brewery, they are available for purchase on the LoB website and will last a great many brews for a small cost.
2. If you wish (particularly if your system requires excessive sparging, below SG 1.012), add sufficient lactic acid to the sparge water to lower the pH to 5.6 prior to heating (~ 0.5 - 1.0 ml/10l lactic acid depending on water source).
3. This recipe utilises a 90 min boil. Note that no hops are required until the 60 bittering addition. We recommend you add kettle finings (whirlflock, Irish Moss) and yeast nutrient 15 min before the end of boil.
4. Cool the wort to 12 deg C and promptly transfer to a fermenter (you will likely need to finish cooling in your fermenter fridge).
5. We strongly recommend that the yeast be rehydrated in sterile warm water per the manufacturer's instructions. If not, you may lose up to 50% cell viability. Pitch into well aerated wort at 12 deg C and ferment at this temperature until complete. Expect this to take
   around 2 weeks for the beer to finish properly. It is always important not to rush the beer. While it shouldn't be necessary if the pitch rate and fermentation guidelines are followed, some brewers may choose to slowly raise the beer temperature by 2-3
   degrees towards the end of the ferment (diacetyl rest), especially if you have had any issues with an unhealthy ferment/ have
   performed a sensory test and picked up diacetly. If you do this, we recommend you give the beer plenty of time (6-7 days rest)
   at these cooler temperatures.
6. When the primary ferment is complete, lager at 2 deg C for 4-6 weeks for a smooth lager finish. A keg is perfect for this.
7. When ready, rack the beer to a CO2 purged keg (finings can be added if needed) and force carbonate to around 2.4 vols CO2.