

Small malt plant technology & first results - Set up and operations of a craft malthouse

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Abstract

As small brewers are part of the local economy in their communities. However, nearly all source their malts not local but global due to a lack of regional options.

Providing this option for brewers lead to the decision to build a malthouse with a batch size of approx. 10 mt – annually 750 mt.

Search and aquisition

Two year of project development resulted in the aquisition of two pilot plants for malting purposes in Germany – each line consisting of one 20 ft energy container and one 40 ft process container. The energy container is equipped with blower, air heat exchanger and control manifold to set air temperatures. The process container is stainless steel plated and constructed as a Saladin Germinating Box also suitable for steeping and kilning of 10 mt of barley. The malting plant was completed with a seed cleaner, dust control and 2 cylindroconical steeping vessels, each 5 mt suitable for vigorous steeping and aeration. Udo voted for that in order to achieve a perfect clean malt along through even germination and removal of grain dirt. Finally to complete the malt offering, a 150 kg malt roaster was purchased for specialty malt production.

Layout of malt house - Overview

Components:

- malting line 1 (20' + 40')
- malting line 2 (20' + 40')
- Small grain conveying
- seed cleaner, also suitable for malt polishing
- dust collection and air filtering devices
- bagger for up to 55lbs and big bag filling
- hot water heater and cooling device
- roasting drum, capacity 150 kg malt
- process controls with Allen Bradley SPS
- VFDs for all electric engines

Pics - Impressions



Steeping vessels

Energy container
Process container

Technology

Raw material handling:

Barley is delivered in big bags and emptied in the hopper of malting line 2 which is also used for collecting the kilned malt. Seeds are conveyed to the cleaner and continue into the steeping vessels.

Steeping:

Water is added –vessels are flooded completely in 3 minutes. Then barley is aerated for 6 hrs, the shape of central riser tube provides a perfect circulation and cleaning –water sensitivity is no problem due to the intense air supply. Next barley is pumped with some additional water to the process containers. Temperature depends on town water-normally approx. 20°C.

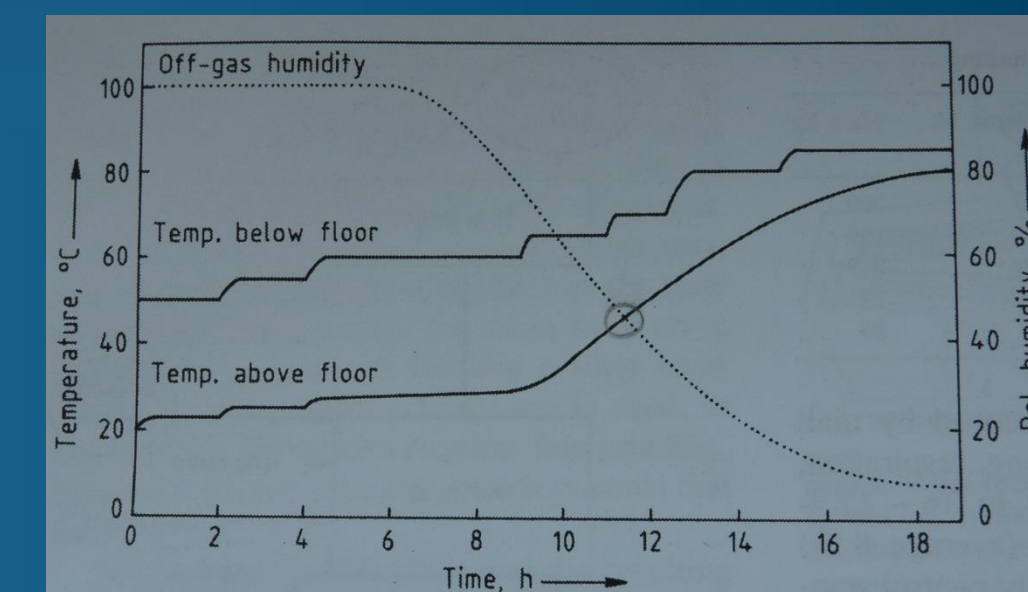
Germination:

Once in the GKB, water can drip off 14 hrs, equal to a dry steeping phase. Then barley moisture is raised from 32% to 40% - demands 4 runs with turning machine while even water spraying. After reaching 95% germination energy moisture is increased to maximum - generally approx. 45%. Temperature is isotherm 20°C, lower values would lead to too high Kolbach indexes. Airflow is in range 300-800 m³/h×mt. Germination time normally are 5 days, friability is tested as of third day – at >72 overnight kilning is triggered.

Technology

Kilning:

Withering and kilning are performed following the standard values. Airflow 3000 m³/h×mt



Results

Following chart illustrates figures of malt specifications - batches 1 and 2 were analysed at TUM, values from batch 3 were made in malt house.

batch	moisture %	extract % dm	friability %	final att. %	color EBC	Kolbachindex %
1	8,6	82,9	73,7	81,1	4,7	49,5
2	6,5	82,6	82,9	80,3	7,7	49,9
3	5,5		85,3			

Severe problems with temperature adjustments during withering induced bad values for moisture and friability of batch 1. Following batches prove that the installation is suitable for the production of high quality malts. Beers produced of 100 % Epiphany Malt were appreciated by all people which joined the opening party.

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