Sustainable Brewery Certification SOP's

The SOP's provided are an overview of the theory's at hand and are not intended to be a self-training mechanism. These are solely intended to present ways to approach sustainable practices in the brewery, not tell you how to do your craft.

For all practices covered we recommend starting with:

- Contacting your chemical provider to ensure everyone is up to date on recommended chemical concentrations, temperatures and testing methods.

- Contact all providers of vessels in the brewery to get recommended water levels for CIP and pressure supply requirements for CIP devices (spray balls, jets, etc.

1. **Brite tank acid washing**

Brite tank acid washing allows you to keep your brite tank sealed up and full of CO2 while only having to purge the vessel of the small amount of oxygen added during this cleaning process.

- After emptying your brite beer tank (BBT) of beer leave it under pressure and filled with CO2.
    - Turn glycol off
- Give the vessel a couple rinses with hot water to warm up the jackets a bit and remove any sediment.
- Fill BBT with the appropriate water volume aiming for a temp of 120-140*F.
- Recirc tank for a few minutes to get temp to stabilize and then add appropriate acid amount. Most commonly this will be a Nitric/Phosphoric blend, consult your chemical provider for recommendations.
- Run CIP cycle for preferred time (recommended 15+ minutes)
- Drain acid
- Burst rinse tank (a neutral pH will not be required here due to CO2 uptake of the rinse water).
    - Using a flow meter and titration kit you can check samples of the rinse water to get a baseline for water amounts required to rinse out the chemical.
- Once rinsed fill to spec water level and add no rinse sanitizer of choice.
- Run for preferred time.
- Drain tank down to 1psi and repressurize to 15psi.
    - this will typically get you a DO level below 20ppb.
    - Continue purging if necessary to reach your preferred tank DO level.

If you are having water pressure issues with rinsing it will be beneficial to lower the pressure on your tank before starting this process.

Creating a baseline:

- Using your normal procedures for cleaning hook up a flow meter to your water source during cleaning and record total water used from start to finish.
- Record total chemical amounts used during cleaning
- Using the best methods available calculate your CO2 usage to purge your brite tank

Resources:

- https://www.birkocorp.com/wpcontent/uploads/2017/08/Birko_ReducingDissolvedOxygen_WhitePaper.pdf

2. CIP

- Drain vessel
- Remove CO2 from vessel
  - Prolonged venting or evacuation system (shop vac, leaf blower, etc).
  - CO2 and caustic mixing can create a vacuum and collapse a tank (rare).
  - Caustic and CO2 mixing forms sodium carbonate and sodium bicarbonate
  - Greatly reduces cleaning performance
- Fill tank to spec water level and run a dilute chemical cycle for ~10 minutes.
  - ~15% of recommended cleaner concentration.
    - This step is most useful on fermenters and can most often be skipped on any vessel with low soil load.
      - To further the sustainability, this prerinse can come from “spent cleaner” that has been transferred over or stored from prior cleanings.
- After cycle completes hit the tank with a couple high pressure rinses to help knock off the loosened soil and then fill to spec water level/temp and add standard strength chemical dose.
- Run cycle for preferred time (recommended 30+ minutes).
- Once cycle is complete rinse tank to a neutral pH.

Creating a baseline:

- Using your normal procedures for cleaning hook up a flow meter to your water source during cleaning and record total water used from start to finish.
- Record total chemical amounts used during cleaning
- Record chemical concentrations achieved
- Record rinse water pH achieved

Resources:

- https://conical-fermenter.com/blog/cleaning-and-sanitizing-your-brewhouse/?srsltid=AfmBOopYrbtUJIwRcH0Df5aBk-ZKYUVRzxx_nEeTsaIFQkHEpCzqUNVd

3. Transferring/Filtering/Centrifuging

Using a pump to move beer from tank to tank while using a balance line to balance the sending and receiving tank will greatly reduce the total CO2 used vs. pushing beer from a FV to BBT by using CO2 head pressure and venting at the BBT.

- Ensure brite tank is purged to preferred level of DO
- Sanitize and purge your balance line before connecting the two vessels (connect this via CIP or blow off valves on vessels)
- Using a sanitized and purged pump/filter/fuge set up connecting the inlet of your pump to the racking arm or transfer port of your sending vessel.
- Connect the outlet side of the pump/filter/fuge to the bottom of your receiving tank
- Ensure the balance lines are open and pressure is settled then pump your beer from sending to receiving tank.
- Ensuring your pump seals are in good condition and leak free is very important with this process. It is recommended to run a DO meter at the inlet to the brite tank to monitor any pickup of oxygen that can be occurring.

Creating a baseline:

- With the best methods available record CO2 used using previous procedures

4. Milling/Mashing/Sparging

- Regularly check your mill to ensure your crush is not drifting
- See attached documents on brewhouse efficiencies.
  - Coarse grind and low stirring = better extract and faster lauter times
- Perform an iodine test to ensure your mash has fully converted.
  - Common factors of pour conversion include: low Diastatic Power, high adjunct percentage, water profile, temperature, pH.
- Monitor first and last runnings gravity to optimize extract.
  - Reducing mash water (thicker mash) and increasing sparge water will help to optimize extract collected.
  - This should be done in small steps to monitor any changes that may occur to the finished product.

- Monitor the amount of water/wort that is getting sent to the drain after kettle full has been reached.

  Creating a baseline per brand:

  - Record starting grain weights
  - Records starting sieve results
  - Record total water usage volumes
  - Record average OG
  - Record average volume yield into kettle
  - Record average time of lauter

  Resources:

  - https://www.craftbrewersconference.com/wpcontent/uploads/ImprovingBrewhouseEfficiency-Havig.pdf

5. Low and Slow Carbing

A low and slow carb will increase the percentage of CO_2 going into solution and reduce wasted CO_2 usage.

- Low and slow carbing will not only save CO_2 but will help to improve aroma and head retention as well.
- This process usually takes about 24hrs to complete
- I find it helpful to start with the brite tank to no higher than 7psi
  - Keeping the starting headspace pressure consistent makes this process more easily repeatable each time.
- See link for in-depth details on how to perform the low and slow carb.

  Creating a baseline:

  - With the best methods available record CO_2 used using previous procedures

  Resources:

  - **https://www.glaciertanks.com/carbonation.html**

6. Miscellaneous areas to increase sustainability

- Work with a local farmer to use spent grain as feed
- Use spent dry hops for bittering in the hot side
- Side stream excess yeast to be used in other applications
    - Mix into spent grain feed? Dog treats? Soap makers?
- Ensure all equipment is well maintained to operate at peak efficiencies
    - Grease, oil, clean, replace bearings, seals, top up fluids, etc.
- Check electrical connections to ensure they are tight
- Week night and end of week check list to ensure unnecessary equipment isn't left running when not needed.
- Recapture CO_2 from fermentation vessels
- Wear reusable gloves whenever possible vs. single use
- Purchase local to reduce shipping footprint
- Join forces with other local brewers to optimize on shipping when ordering products from the same providers
- Nitrogen accumulator vs. single use tanks for gas blenders
- Try flowable hop products
    - Reduced shipping footprint and improved yields
- For heating up tanks you can move over 20-30gal. of water and recirculate in the tank for a few minutes to get better heat transfer
    - Repeat until tank is at desired temp
- Same applies for rinsing post cleaner.