



# BIAC

## User Manual

# BREWHA BIAC User Manual

Dear Customer,

We are delighted that you have chosen a BREWHA BIAC for your brewing system! We trust that it will bring you many fun-filled hours of brewing and, of course, many times spent enjoying the fruit of your craft with your friends, family and/or customers.

This manual provides information on installation and setup, and its intent is to have you enjoying brewing with your BIAC as quickly, safely and confidently as possible—please take the time to read it carefully. Keep in mind that it is intended to help brewers with a wide range of knowledge and experience; we have tried to strike the right balance between providing enough information without overwhelming readers. If you have suggestions for improving content, please let us know.

The manual is organized into sections (the first four only in the printed copies but all six in the online copies), identified by the numbered (and colored) tab on the edge of the page to help you find information easily:

1. The red section discusses **safety**.
2. The orange section discusses **installation**.
3. The yellow section discusses **brewing**.
4. The green section has **recipes**.
5. The blue section is for **warranty and returns**.
6. The indigo section discusses **privacy and terms of service**.

In addition to the information in this manual, the 'Learn' section of the website contains lots of videos and up-to-date information organized into categories at the top of the page, and each website page contains a search bar that can help you find what you are looking for quickly.

And if unanswered questions remain, don't hesitate to contact us at [brewing@brewha.com](mailto:brewing@brewha.com).

Sincerely,  
Nathan Janz  
BREWHA Equipment Co

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## WARNING!!

While BREWHA designs its systems with safety as a primary concern, always keep the following in mind:

- 1. Pressure.** These vessels are not designed to withstand more than 3psi pressure in the Homebrewery 3-in-1 fermenter (14.9psi in the Microbrewery 4-in-1 fermenter) and 5psi in the Homebrewery 3-in-1 fermenter jacket (7psi in the Microbrewery 4-in-1 jacket). Since tap water is often supplied at over 60psi, care needs to be taken when using tap water to not allow the pressure to exceed the design allowance. BREWHA will not be held responsible for deformation to the vessels due to pressure or vacuum (do not let a vacuum occur).
- 2. Pumps.** The magnetic drive centrifugal pumps we supply are not designed to be ran empty and should only be ran full of liquid; in addition, the exit should never be fully closed while running or the pump may overheat and be damaged. Damage due to improper operation is not covered by warranty.
- 3. Heating Elements.** Immersion heating elements should only be plugged in when power is off (to avoid arcing) and are not designed to be heated without water or they will overheat and could be ruined. During mash, the pump outflow (returning wort from the bottom of the fermenter to the top of the Mash Colander) will very likely need to be throttled/slowed with a valve (on either the exit port of the pump or the return port on the Mash Colander), so that the pump does not remove water from around the heating elements faster than it is replenished from the Colander above (see recirculation rate recommendations in the 'Brewing' section of this manual).
- 4. Electrical Parts.** Electrical devices (including the power controller, heating elements, sensors, solenoid, pump, etc.) can be extremely dangerous, and electrical systems need to be handled with extreme care. Always completely disconnect (open breaker) the devices any time maintenance is required or the system is not in use and do NOT connect power cords/extensions when the power is turned on as arcing may occur. Wait one minute before servicing after disconnect to ensure power is discharged. Some devices may have multiple power sources; all sources should be disconnected before servicing. For added safety, a GFCI/GFI (Ground Fault Circuit Interrupter) can be installed on the source power for the brewing equipment and an electrician consulted for all electrical installations.
- 5. Handling with Care.** Contents of brewing vessels and hoses may be hot and/or under pressure, so use extreme caution. Users operate at their own risk.
- 6. Moving the Vessels.** To reduce any risk of damage or harm, the vessels should only be moved when empty or secured against tipping; always move them with caution and only on smooth, level, concrete floors.
- 7. The Hoist.** Lifting the Mash Colander out can be dangerous, so ensure there is a properly engineered lifting device installed. Never operate beneath the Colander when it is suspended.
- 8. Further Information.** Check our suppliers' manuals for further safety information.

## Safety

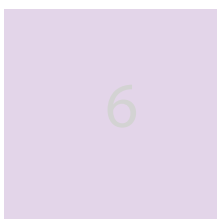
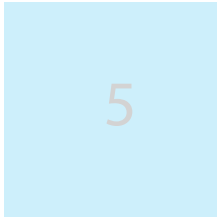
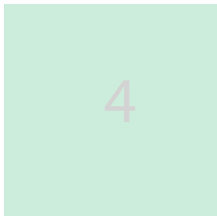
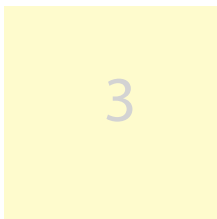
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Please Note:

1. If you have any questions about how to reduce the risk of harm, do not hesitate to contact us by email at [brewing@brewha.com](mailto:brewing@brewha.com).
2. For additional information on safety, consult manufacturer’s manuals, as well as the ‘Safety’ category at the top of the ‘Learn’ page on the website:  
<https://brewhaequipment.com/blogs/how-to-brew-beer/tagged/safety>.

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## Installing a Ground Fault Interrupter

BREWHA recommends that brewers (especially home brewers — see the note at the bottom for commercial installations) consider having a GFCI/GFI (Ground Fault Circuit Interrupter; Figure 1) installed on their power supply.

While most electrical panels will have fuses or breakers, they do not often have a GFI. Breaker boxes (the electrical panel often found in laundry rooms) will prevent too much overdraw, but a GFI will respond much faster than a breaker or fuse to any deviation in electrical current.

A GFI can be installed in an existing breaker box (if not already there), or one can be added on the line that services your brewing setup. For home brewing systems, GFI panels that service outdoor spas/hot tubs (240V/40A) are available at Home Depot, Amazon or other electrical or hardware stores and are relatively inexpensive.

Note 1: Some portable GFIs that are installed in between the Power Controller and a heating element do not work with the BREWHA Power Controller at <100% power output, as the power output reduction causes the GFI to trip. It is recommended to use a wall-mounted GFI installed prior to the Power Controller.

Note 2: For commercial installations, consult a qualified electrician for their recommendation on whether a GFI is practical or necessary.



Figure 1: GFI



## Using Electric Heating Elements

Ensure the power is off before connecting a heater, or electrical arcing can occur. Immersion water heating elements must always be completely immersed in water when operated to ensure that heat is quickly dissipated. If the element is not fully immersed, it could overheat and melt. Melting a heating element by 'dry-firing' is not a fun experience. It could also ruin the batch. When they fail, elements sometimes have complete external failure (shown in Figure 2) or just fail internally as is often evidenced by a heat discoloration on the element (shown in Figure 3). Heater resistance (ohms) can be tested to determine if the heater is still functioning properly (see instructions on the heater product page of website). Having a backup replacement element will come in handy if your element ever fails, but following are a few suggestions on how to help avoid failure in the first place.

The most common period of failure is while recirculating during mashing and/or vorlauf. In the BIAC, wort from the Mash Colander drains into the fermenter, and the pump pulls this wort out of the bottom of the fermenter and returns it above the grain in the Mash Colander. This is useful for vorlauf and for regulating mash temperature because the wort can be heated as it exits the Mash Colander, passes the heating element, and returns to the top of the grain bed. It is possible, however, if the pump is operating too fast, to get ahead of the grain bed flow rate and pump all the wort out of the area under the Mash Colander where the heating element is situated. This could remove all the water from around the element and, if the element is fired at that point, lead to 'dry firing' of the element and burn out. This is most likely to happen if there is a 'stuck mash' where wort does not freely flow down through the grain. A stuck mash could happen at any time during the mash, but is most likely to occur in an early stage of the mash, especially if the grain crush is particularly fine. There are a few things that can be done to help prevent a stuck mash.

First, increase the crush size for your grain by adjusting your roller width (or have your

**WARNING: Heating elements must always be completely immersed in water, and ensure the power is turned off before connecting heaters.**



Figure 2: Complete heater failure



Figure 3: Internal heater failure

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supplier do it for you). A general width guideline is 0.04–0.048"/1–1.2mm. If you still have a problem, go slightly wider. If you are experimenting with gelatinous or gummy cereals (e.g., oats or rye), you can include rice hulls to help counteract the 'gummy' effect and keep the bed fluid. Also, using a good grain mill to crush your grain evenly is important. For homebrewers we recommend the Crankandstein 328G (fully geared 3-roller mill) and have found the factory setting (0.045") to provide a good size for fluidity and conversion. For commercial mills suggestions search for the 'What else is needed' page on the website. To learn more about preventing a stuck mash, search for 'stuck mash' on the website.

Second, when doing a single-step mash, if the strike temperature is properly calculated (ie. several degrees above the mash temperature to allow for cooling caused by the grain as it is introduced), it is not critical to pump the wort during mash and it can be simpler not to. With the Mash Colander inserted in the fermenter, it is effectively surrounded by a water bath that will help maintain the temperature. The element keeps the water bath at the target temperature for mashing and warms the Colander, which warms the mash. When mashing is almost complete, the pump can be operated to move the water under the Colander to the top of the grain bed for vorlauf. While care still needs to be taken, during vorlauf it is less likely that your mash will stick or that you will run out of water in the cone portion of the fermenter where the element is, especially if

**WARNING: A 'squealing' sound in the pump often indicates a cavity, in which case the pump should be turned off immediately. See more information under 'Installation.'**

the next (third) step is followed.

Third, if circulating during the mash or during vorlauf, if the water level starts to rise in the Colander, it means wort is being pumped out of the bottom of the fermenter faster than it is being replenished from above, and the pump outflow should be slowed. In time, if the flow is not slowed, the element will be exposed and could be damaged. To prevent the pump from moving wort too quickly, a valve must be installed on the downstream side of the pump (either on the pump outlet or on the Mash Colander port), and it must be partially closed to slow the amount of wort being circulated. (Don't close or restrict a valve BEFORE the pump in any way, as this 'starves' the pump and can damage it.) If grain that has fallen through the Colander plugs the pump line, momentarily open the valve wide to move the grain into the Mash Colander, or attach the pump intake line to the cone side-racking port, rather than to the bottom port of the fermenter (although if possible, it is better for uniform flow through the Colander to keep the pump line connected to the bottom port).

Fourth, with the Power Controller, power output can be set to around 20–30% during mash, which is typically more than enough to maintain mash temperature while minimizing the chance that the element will be ruined if temporarily exposed.

Note 1: Throttling the pump (by partially closing a downstream valve) is also the best way to prevent pump cavitation. Cavitation occurs when the pump is pushing liquid out faster than it can draw it in. This creates a vacuum, which causes a 'cavity' to form, which prevents efficient operating of the pump (a screeching sound from the pump is most often caused by cavitation). When the flow is throttled back on the exit side by partially closing a valve, it prevents liquid from being pushed out faster than it can be drawn in, preventing the cavity from forming.

Note 2: When brewing low-volume batches, it is also important to be careful that the element is not exposed during the boil. To ensure that the water level will not drop to the point where the element is exposed, during filling you need to first observe/calculate the volume at which the element is fully covered (approximately 20% of the total volume of the fermenter). Then add 10–20% volume as a safety buffer, and have this as your minimum water/wort level in the vessel. Then check all of your recipes and ensure that at no point during heating will the volume level ever be below this. And it is always best practice to never be too far from your equipment on brew day. There have been reports of customers leaving during the boil to run a few errands and returning to find their element dry-fired and ruined.

Note 3: The same rules apply during fermentation as during mash and boil—keep the element covered with water at all times. When using the element to keep the beer warm during fermentation, it is important to keep the power output on the Power Controller set to less than 3% to ensure that yeast that sticks to the element does not scorch. This will also likely prevent dry-firing the element, as at such low power output the heat can dissipate. One should, however, still ensure the element is fully covered at all times.

Note 4: To get the most longevity out of your elements, be sure to clean them thoroughly after each brew. Once the beer is out of the fermenter, remove the elements and clean them well with a stainless safe scrubber that will not etch or mark the steel in any way. If solids (even microscopic) are trapped in cracks on the steel, scorching is much more likely. A flat scrub pad can be fed around the element and moved up and down the element to ensure all sides of the element are thoroughly cleaned. Cleaning right away, before yeast has a chance to dry on the element, is certainly easiest, and removing all yeast/soil from the element is the best thing you can do to ensure your element won't scorch on the next brew. To read more, search for 'cleaning' on the website.

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## Using a Pressure and Vacuum Relief Valve to Prevent Pressure Build Up

A vacuum breaker and pressure relief valve installed on a fermenter lid port is a necessary accessory to help insure against damage to a fermenter (and possible injury) caused by pressure or vacuum. A vacuum, caused by a cooling of liquid or gas inside the fermenter, can pull the sides in, and pressure building up from expansion or gas produced during fermentation can push the walls out. In either situation, the fermenter can be damaged, possibly beyond repair. The BREWHA Vacuum Breaker and Pressure Relief Valve serves to protect your investment by opening when either 25mmHg of vacuum or 3psig of pressure occurs in the 3-in-1 fermenter (14.9psig in the 4-in-1 fermenters).

When a vacuum builds up, it pulls down on the valve, opening the valve and letting air into the fermenter. When pressure builds up, the relief valve is pushed open, letting gas escape. It is important to note that a safety relief valve should always be used IN ADDITION to a blow-off hose or air lock, and should never be used as the primary means for release of gas; the reason is that in the event where a fermenter is overfilled (and/or fermentation is too vigorous) krausen (foam) could enter the opening mechanism and prevent the valve from operating properly, and this is more likely to occur if used for primary gas relief. All pressure relief valves should also be inspected and tested regularly to ensure correct functioning, especially adjustable valves. Testing of pressure relief accuracy can be completed using a sanitary tee with an accurate pressure guage on one end (guages can easily change so should be cross-referenced frequently), the relief on another, and inserting gas such as CO<sub>2</sub> from the third.



Figure 4: Pressure relief valve

**WARNING: Never use the pressure relief valve as the primary means of gas relief; always use a large diameter blow-off hose for gas release and the relief valve as a safety backup. To avoid potentially catastrophic failure, regularly inspect the pressure relief valve to ensure it is operating correctly.**

## Preventing Damage to Vessel Jackets

Every hose and tank is designed with a maximum allowable working pressure (MAWP), which if exceeded, will cause damage and pose a safety hazard. The BREWHA tank jackets have been designed to hold up to 5psi of pressure (7psi in the Microbrewery 4-in-1 fermenters), which is more than enough to allow adequate flow rates for chilling wort and maintaining temperature during fermentation.

In many regions, tap water is a cost-effective source of chillant. Ground, river or lake water is often delivered at temperatures below what is necessary for pitching yeast, so it provides a much less costly source of chilled water than an electric chiller is able to provide. (Where tap water temperature is higher than what is necessary for yeast, or to conserve water, a combination of using tap water—to perform the lion's share of the cooling—and then switching to electrically chilled water can be a cost-effective way to chill.) Tap water, however, is often supplied at pressures well above the design tolerance of the BREWHA vessels, so if it is fed directly into the jacket of a vessel, it could cause pressure inside the jacket to quickly rise above the maximum limit, damaging the vessel. To ensure that pressure doesn't rise above the allowable limit when using tap water (brewery pumps can provide high-pressure water too, so caution is needed with them as well), NEVER throttle or restrict the exit flow from the jacket in any way, and a water pressure regulator should be installed on the feed line, prior to the vessel. The ¼" Watts 560 (which supplies approx 10L[2.5USG]/min) or a similar regulator

**WARNING: When installing a Water Pressure Regulator, ensure that the arrow on the regulator points in the direction of flow, or it will not operate correctly and may cause damage or injury. Inspect frequently to ensure the regulator is operating correctly and replace it if it is not.**

can be used when maintaining fermentation temperature or for chilling post-boil in the smaller tanks. For chilling where a higher volume of chilling water is needed for more rapid chilling, such as when chilling wort post-boil in the 5 and 7BBL 4-in-1s, a ½" or ¾" regulator on the brewery water lines can be sourced from a local plumber, and/or a small plate chiller can be used in addition to the jacket to assist with chilling (a pump can be used to circulate wort out of a side port, through the plate chiller, and back into the fermenter; run boiling wort through for a few minutes to sanitize the plate chiller, pump and hoses, and clean thoroughly immediately after use). When installing any regulator, it is almost always necessary to ensure that the flow of water through the regulator is in the same direction as indicated by the arrow on the side (Figure 5), and test them regularly to ensure proper functioning (see more information on the product page on the website).

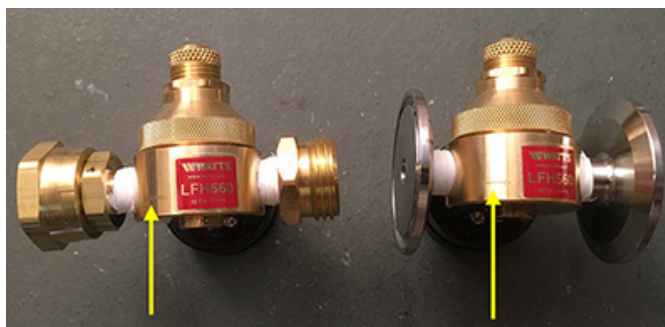


Figure 5: Water flow direction arrow

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## Securing Sanitary Clamps against Accidental Loosening

Caution needs to be taken when loosening the sanitary clamps (Figure 6) to ensure that the correct clamp is being loosened. Otherwise, instead of removing a hose fitting, one might remove the entire valve and suddenly have contents spilling out of the fermenter. It is bad enough if this occurs at the end of fermentation and some beer is wasted, but it can be very dangerous if this occurs during the boil.

If one is concerned that this may happen to them, the simplest way to ensure an important clamp is not removed is by replacing the wing nut (which is easy to remove quickly



Figure 6: Sanitary clamp

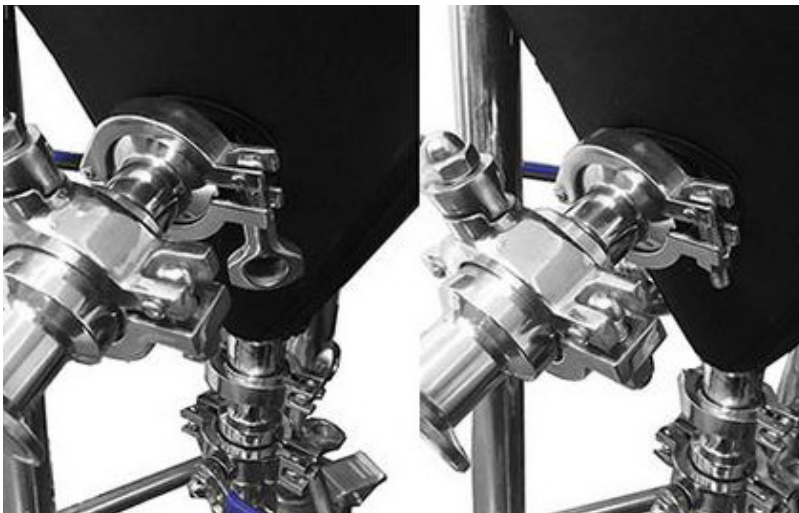


Figure 7: Hex nut installed on a sanitary clamp

by hand) with a standard hex nut as shown in Figure 7 (which requires a tool). Most nuts on BREWHA clamps are 5/16" and can be purchased from hardware stores, but bring one with you to ensure it fits before purchase. If all the clamps that should not be loosened until brewing is completed have a hex nut, and only the clamps that can be safely loosened without consequence have a wing nut, the risk of loosening the wrong clamp is greatly decreased.

# Installation

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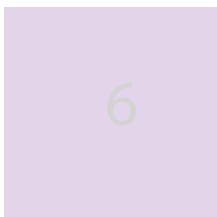
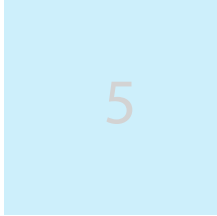
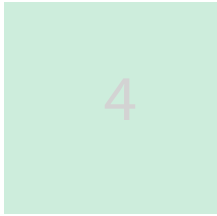
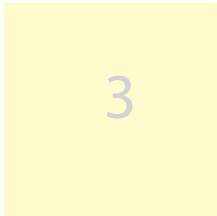
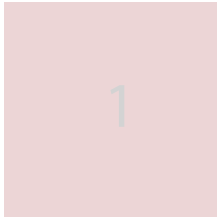
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Please Note:

1. For product manuals or for specific instructions for a particular product, refer to that product page on the website, or select the 'Instruction Manuals' or 'Installation' category at the top of the 'Learn' page on the website: <https://brewhaequipment.com/blogs/how-to-brew-beer/tagged/instruction-manuals>.

2. For information on what other items are needed for your brewery, refer to this page: <https://brewhaequipment.com/pages/what-else-is-needed-for-my-brewery>.

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## Cleaning and Sanitizing Stainless Brewing Equipment and Preventing Rust

One of the very useful features of the BREWHA BIAC is that the fermenter is boiled in, which makes perfect sanitation much easier to achieve—the heat of the boil will sanitize the fermenter so that chemically sanitizing the vessel is not necessary. All that is needed is to clean the fermenter out well with water and a soft cloth after the beer is removed, disassemble and clean out the valves and ports, and clean the elements well, and it will be ready to go for the next batch.

However, when having just purchased a new BREWHA vessel (including the 3-in-1 and 4-in-1) or if beer stone builds up after several brews, deeper cleaning might be necessary. With a new vessel, it is important to remember that the vessel comes direct to you from the shop where it is hand-made. This means that there could be a small amount of oil or welding stains on the vessel and there could be welding material or polish inside the jacket, so a thorough cleaning of your vessel and flushing out of your jacket should be completed before starting to brew. (It is especially important to clean out your jacket well if you will be using it for providing sparge water during mashing.)

A typical chemical cleaning cycle for fermenters involves first a pre-rinse cycle followed by an alkaline clean using caustic or a cleaner like PBW (Powdered Brewers Wash) which is added at recommended concentration, heated to 65°C/150°F (not higher) and circulated out the bottom of the fermenter and back up into the fermenter through the CIP inserted in one of the lid ports for about 30-60 minutes (ensure PBW is dissolved BEFORE turning the pump on or it might damage the pump). This is followed by a rinse, then a 30 minute acid wash (phosphoric or nitric acid are most commonly used but a 10% citric acid solution at 65°C/150°F circulated in the same manner as the alkaline wash works pretty well and is easier to use) followed by a rinse. Safety note: chemicals should always be used according to manufacturers instructions.

For keeping your equipment clean, we strongly recommend cleaning immediately after brewing (or with the fermenter, as soon as you transfer beer out), as residue will be much easier to remove before it dries. Use a soft cloth or stainless steel safe scrubber such as a 'Euro Scrubby', and don't use steel wool to scrub the vessel, as this will scratch the mirror polish finish. A non-abrasive scrubber such as a 100% copper scrub brush can be helpful to clean scorched or caramelized sugar off of the heating element. **Always clean the elements well after each brew to ensure they don't scorch.** It is also recommended to disassemble the valves when cleaning and wipe out any visible sediment (heat from the boil will take care of the rest), and take care not to stretch the silicone lid or valve gaskets as they may deform.

The best sanitizer is heat. Since the lid is generally off during boil, it is beneficial to put the lid on the fermenter for the last few minutes of boil to let the steam heat it up (be careful to allow steam to escape and make sure that foaming over does not occur). You should also run a little boiling wort through the valves/racking arm and/or spray a little Star San on the lid and ports and hoses. Where chemical sanitation is necessary or preferred, we recommend STAR SAN (see Figure 8). Note: chemicals only sanitize surfaces, so it is important to have items clean before applying sanitizer.



Figure 8: Star San



*Technical note on stainless steel: It is important to note that 'stainless' steel is a bit misleading, as it doesn't mean it will never stain or rust. It should actually be called 'harder-to-stain' steel. The following is an excerpt from General Electric (geappliances.com):*

*The largest single component of stainless steel is steel. Steel will rust. The chromium in stainless steel when exposed to oxygen in the atmosphere forms a thin invisible layer called chromium oxide. This invisible layer covering the entire surface gives stainless steel its ability to resist stains and rust. If this layer is damaged, rust is formed on the surface at the point of that damage. The good news is, with a little cleaning and care the chromium oxide layer is self-healing. . . .*

*Stainless steel and the chromium oxide layer actually thrive on proper cleaning. For everyday cleaning of nonoxidized soils, dust, dirt and fingerprints, a mild soap/detergent (dish detergent) and warm water solution should be used. Use the solution to remove the soil, rinsing with fresh water and a clean cloth, and dry completely.*



Figure 9: Bar Keeper's Friend

*To clean spots (cosmetic) from the stainless steel, we recommend using Bar Keeper's Friend (see Figure 9), which also works well to remove rust spots and to 'heal' areas that might be open to rust. A periodic full vessel cleaning with an acid such as citric acid or with Bar Keeper's Friend can also help preserve the entire fermentor and is recommended for getting greatest longevity from your stainless steel.*

*While stainless is fairly durable, it needs to be treated with care. Some chemical cleaners can actually attack and degrade stainless steel. John Palmer in his book *How to Brew* provides the following summary:*

*For general cleaning, mild detergents or percarbonate-based cleaners are best for steel and aluminum. Bleach should be avoided because the high pH of a bleach solution can cause corrosion of aluminum and to a lesser degree of stainless steel. . . . The corrosion inhibitor in stainless steel is the passive oxide layer that protects the surface. The 300-series alloys (a.k.a. 18-8 alloys) commonly used in the brewing industry are very corrosion-resistant to most chemicals. Unfortunately, chlorine is one of the few chemicals to which these steels are not resistant. The chlorine in bleach acts to destabilize the passive oxide layer on steel, creating corrosion pits. This type of attack is accelerated by localization and is generally known as crevice or pitting corrosion.*

*Many brewers have noticed pinholes develop in stainless-steel vessels that have been filled with a bleach-water solution and left to soak for several days. On a microscopic scale, a scratch or*

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crevice from a gasket can present a localized area where the surface oxide can be destabilized by the chlorine. The chlorides can combine with the oxygen, both in the water and on the steel surface, to form chlorite ions, depleting that local area of protection. If the water is not circulating, the crevice becomes a tiny, highly active site relative to the more passive stainless steel around it and corrodes. The same thing can happen at the liquid surface if the pot is only half full of bleach solution. A dry stable area above, a less stable but very large area below, and the crevice corrosion occurs at the waterline. Usually this type of corrosion will manifest as pitting or pinholes because of the accelerating effect of localization.

A third way chlorides can corrode stainless steel is by concentration. This mode is very similar to the crevice mode described above. By allowing chlorinated water to evaporate and dry on a steel surface, those chlorides become concentrated and destabilize the surface oxides at that site. The next time the surface is wetted, the oxides will quickly dissolve, creating a shallow pit. When the pot is allowed to dry, that pit probably will be one of the last sites to evaporate, causing chloride concentration again. At some point in the cleaning life of the pot, that site will become deep enough for crevice corrosion to take over and the pit to corrode through.



Figure 10: Powdered Brewer's Wash

It is best to not use bleach to clean stainless steel and other metal. There are other cleaners available that work just as well without danger of corrosion. The percarbonate-based cleaners like PBW [Figure 10] are the best choice for general cleaning (pre-dissolve before turning pump on or the pump could be damaged, and heat to, not above, 65°C/150°F).

If you have a particularly tough stain, liked burned malt extract, then you may need something stronger. There are oxalic acid based kitchen cleansers available at the grocery store that are very effective for cleaning stains and deposits from stainless. They also work well for copper. One example is Revere Ware Copper and Stainless Cleanser, another is Bar Keeper's Friend, and another is Kleen King Stainless Steel Cleanser. Use according to the manufacturer's directions and rinse thoroughly with water afterwards.

For passivating a larger area, or in areas that are hard to reach (such as between wedge wire or in jackets) circulating for 30–60 minutes with a 10% citric acid solution (other acids can be used, but citric acid is food safe and readily available) at 65C/150F and letting the area fully air dry for 12 hours before rinsing is generally all that is needed to mend any damaged areas to help preserve the fermentor and get the greatest longevity from your stainless steel. Five Star's Acid Cleaner #5 is also effective for passivating stainless as well as removing stubborn stains and deposits (it is available at most brewing supply stores).

For more information, search for 'cleaning' on the BREWHA website.

A detailed discussion on care of stainless is the Nickel Development Institute's 'Cleaning and Descaling of Stainless Steel': [https://cdn.shopify.com/s/files/1/0232/2699/files/Nickel\\_Institute\\_CleaningandDescalingStainlessSteel\\_9001.pdf?392515099154450323](https://cdn.shopify.com/s/files/1/0232/2699/files/Nickel_Institute_CleaningandDescalingStainlessSteel_9001.pdf?392515099154450323).

## Assembling the BREWHA BIAC

(A video of this section of the manual is available on the BREWHA website.)

Assembly of the BIAC is relatively intuitive and straightforward; you can be ready to brew in just a few hours (or couple days with large commercial setups). A brewer may want to substitute or alter a few parts, which is entirely acceptable, but this description explains how to assemble it in a typical manner. The BIAC shown in most images here is the Small size; larger models are almost identical. The Microbrewery 4-in-1 (MB) is almost identical to the Homebrewery 3-in-1 (HB) for almost all aspects of the install (special note will be made where they differ).

1. Packaging: The BIAC will arrive in two wooden crates, the fermenter (3-in-1 fermenter with Homebrewery systems and 4-in-1 fermenter with Microbrewery systems) in one crate and the Mash Colander in the other (Figure 11). Remove the screws and open the crates. The fittings and accessories are packaged inside bags inside the vessels or in separate boxes. Before emptying the fittings out of the bags, look at the packing list inside the bag, as it may help you identify where the fittings from that bag should be installed.

2. Hoist: The Small system doesn't require a hoist but it can be used. A hoist is recommended for the Medium and Large systems (inexpensive manual or electric ones can be purchased from Hardware stores and securely attached to floor joists or trusses). For the 1.5-7BBL systems, install a gantry (an I beam with 'legs') and mount the trolley and hoist on the beam. Especially with the 7BBL, which requires a 4000lb gantry, this is a two or more person job, and a forklift or suitable lift should be used to position the equipment while it is being secured. Once the gantry and hoist are installed, the lift beam (or Lifting Cable for the Small, Medium and Large), included with the complete accessories package, can be used to help remove the vessels



Figure 11: Vessel crates



Figure 12: Mash Colander tipping cable



# BIAC User Manual

**WARNING:** For greatest stability, store the fermenters (Small, Medium, and Large) with the casters splayed outward and **always** move the fermenters with a single wheel leading.

from the crates (the larger vessels have lift lugs on the lid or inside for this purpose). Ensure your hoist or lifting mechanism is securely installed according to the manufacturer's instructions, and at no time operate underneath the vessel in a way that could cause bodily harm if the hoist fails. At this point the Colander Tipping Cable (with 1.5-7BBL) that will be used to dump the mash



Figure 13: Locking swivel casters

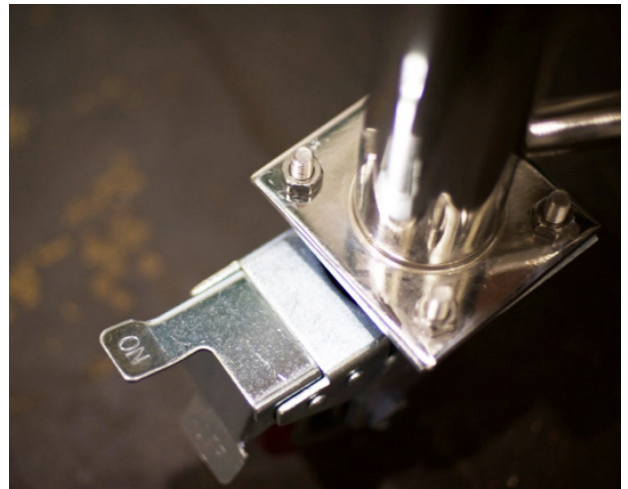


Figure 14: Locking swivel casters

can be installed. It comes with the upper end already finished with an hourglass sleeve and thimble (an extra thimble, quick link and cable clamp are supplied for the unfinished end); connect the finished end around the trolley bar or neck connecting the hoist. Adjust the cable to the length you need so that when the Colander is tipped, the bottom will be above your grain disposal receptacle. This way the spent grain can be easily unloaded. Then cut the cable and securely fasten the cable clamps once the thimble is in place.

3. Casters: The fermenter is shipped without the casters installed to prevent damage in transit. To install the casters for the smaller fermenters, first lock the wheel, which will allow the caster/bolt to be screwed in manually (Figure 13) then wrench tighten. The casters on the 1.5-7BBL models attach with four M8 bolts, and there are two swivel casters and two fixed casters for each fermenter. The fixed casters should be installed on the side opposite of the fermenter push bar. The bolts should be installed through the caster plate and fermenter leg plate with the nut side up, so the bolt does not impede movement of the swivel caster (Figure 14). Only use the fermenters on a flat, smooth surface, and use wheel chocks to prevent rolling. To minimize risk of accidental tipping, fermenters should not be moved when full, or if moved, moved with extreme care. Inspect bolts frequently and replace when worn.

4. Ports on Cone and Cylinder: Attach the first of the four sanitary valves (five with the 1.5-7BBL) to the bottom port of the fermenter by placing a gasket between the vessel and the valve and attaching



Figure 15: Bottom (dump) valve

a clamp; use a 1.5" butterfly or a large ball valve (1-3/8" fullport ball valve) here with the Small, Medium and Large BIACs, or the 2" butterfly valve with the larger (1.5–7BBL) tanks. The valve can be installed in either direction and it will not affect performance. (With the large dump valve and the Small fermenter, the handle may need to turn up to fully open the valve. Tighten the ball valve clamp manually until it is snug. Overtightening (e.g., with a tool) could damage the silicone gasket. (It is good to fill the fermenter with water to check for leaks before each brew day. If a valve is leaking, wiggling the handle while tightening may help, or the valve may need to be reassembled to ensure the gaskets are properly seated.) *Brewing tip: During fermentation, the brewer can dump yeast/trub out the bottom port when fermentation is ending (after about 4–5 days with ales) to prevent the yeast cake from getting too hard (be sure to rinse the port thoroughly with water and sanitizer after every use so that microbial growth doesn't occur).* There are two sizes (1.5" and 2" or 1.5" and 3") of tri-clamp (TC) ferrules/ports on the cone portion of the fermenter. The 2" TC ports (3" on 7BBL only) are for heating elements—one each on the Small, Medium and Large fermenters, two on the 1.5BBL, four on the 3BBL, six on the 5BBL and five (3") on 7BBL



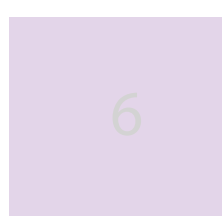
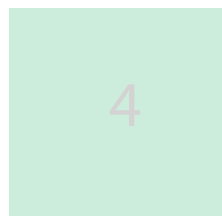
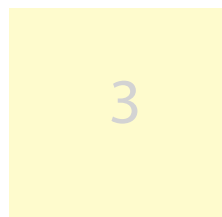
Figure 16: Side racking valve



Figure 17: Racking port with serving hose



Figure 18: Fermenter connections





# BIAC User Manual

4-in-1 fermenters. The uppermost 1.5" port on the side of the cone is for the temperature sensor. The middle 1.5" port on the side of the cone is for a racking/transfer valve (since it sits above the level that trub/yeast normally settles during fermentation, it can be used to transfer/rack beer to kegs—other ports can be used as well for racking if desired). A racking arm can be inserted here before the racking valve; when using such a fitting, a teflon gasket will rotate more easily than silicone but is harder to seal. The lower 1.5" port on the cone that only opens into the jacket (it doesn't open into the fermenter) is for chilling water to enter the jacket (see step 5). The Microbrewery 3–7BBL models have a fourth 1.5" port on the cone, just above the bottom of the cone to which a valve can be attached for connecting a serving or racking hose (once yeast is removed), as well as a port on the lower side of the cylindrical portion of the vessel to which a sampling valve or sight glass can be attached.

5. Water Jacket: If using tap water for temperature regulation, attach the Temperature Control Valve (TCV) to the 1.5" port on the side of the cone that opens only into the jacket of the fermenter, or, it might be easier to first attach a valve to the jacket port and then the TCV, since the TCV can then be removed without emptying the jacket. This might be the case when switching from tap water (after cooling the boil) to Chiller water (during fermentation). (Use only clean water with the TCV at temperatures between 2°C/36°F and 40°C/104°F.) The TCV is used to shut off chilling tap water going into the jacket to cool the wort after boiling and during fermentation, so it doesn't need to be installed until after the boil is completed (especially with the 120V Small BIAC, it is best to leave the jacket empty during boil to reduce heat loss). The power cord on the TCV should be plugged into the 'C' or 'blue snowflake' receptacle on the Electronic Temperature Controller (ETC) (see section on 'Programming and Operating the BREWHA Electronic Temperature Controller' for more information) or the Chiller cord on the Touchscreen Controllers. If using warm water (don't exceed 40°C/104°F) to warm the fermenter, connect the TCV to the 'H' or 'red flame' receptacle on the ETC. The Water Pressure Regulator (WPR) should be installed either before or after the TCV to ensure that water pressure does not exceed the design limit of the jacket. The water pressure regulator should be installed with the arrow (etched on the back) pointing in the direction of water flow. During fermentation, if using the Chiller to maintain fermentation temperature, the TCV should be removed and the Chiller pump (or the main Chiller power) plugged into the ETC instead of the TCV and the Chiller pump hose connected to the jacket inlet, and the jacket exit hose returning to the Chiller water reservoir (it should be



Figure 19: Temperature Control Valve



Figure 20: Inserting heaters

submerged and secured so it doesn't move). When the fermenter needs chilling, the ETC will power the Chiller pump (or Chiller itself) instead of the TCV to let cool water circulate through the jacket. (The Chiller cart is installed according to instructions inside the cart box, and the 3/8" hose barb fittings and clamp to connect the hoses are installed by removing the shark bite connectors.) If you are using tap water in the jacket for chilling, connect a hose to the upper jacket port on the side of the tank and run to a drain. It is strongly recommended to never close or impede flow out of the fermenter jacket in any way, and to attach a high-quality, high-temperature kink-resistant hose with larger diameter than the input hose to the jacket exit port, so that back-pressure does not build up in the jacket and damage the vessel.



Figure 21: Inserting the sensor

6. Heaters: Install the heating element and gasket on the larger 2" port(s) on the side of the cone (3" for the 7BBL). Install the element with the slot on the outer cap of the guard facing down (so it will drain if there is an internal leak).

7. Water Chiller: For closed-loop chillant circulation (e.g., with a BREWHA Chiller during fermentation) connect your Chiller return hose to the jacket exit port and run it back into the Chiller water reservoir. The return hose should be fully immersed and secured in the water bath, or air will enter the jacket through the hose and the jacket will siphon empty, possibly flooding the Chiller and your floor. All flow out of the jacket port should be unimpeded (e.g., no valve) in order to prevent any pressure buildup; the jacket is designed to withstand no more than 5psi pressure (7psi in the 4-in-1). Especially with tap water, the Water Pressure Regulator should be installed on the water line going into the jacket. The regulator has an arrow etched on the side, showing the direction of flow—install it with the arrow pointing toward the fermenter jacket. More can be learned about preventing damage to the vessel in the 'Safety' section of the manual.



Figure 22: Attaching blow-off hose or gas in connection



# BIAC User Manual

8. Lid and Lid Ports: Attach the Pressure and Vacuum Safety Valve to one of the 1.5" lid ports (see Figure 22). Always keep this valve installed on the fermenter lid and test it regularly to ensure it is operating as designed. The larger center port (if present) is for the CIP assembly (otherwise the CIP can be inserted through one of the two 1.5" lid ports), adding hops or installing a distillation column; install the large gasket, cap and clamp to that port. For using CO<sub>2</sub> to rack beer to kegs (using just gravity is possible but inefficient and will introduce oxygen into the fermenter), a valve (or the Stainless Side Blow-off Assembly) can be attached to a port on the lid to seal it (see Figure 23). Then using the Fermenter Gas In Post and a regulator, maintain 1–2psi (up to 14.9psi in 4-in-1 fermenters) of gas when racking your beer (it is safest to always have the pressure relief valve connected directly to the vessel, NOT to a valve, so put the valve only on the second lid port). Ensure the valve stays open during fermentation to avoid any buildup in pressure in the vessel, which is designed to hold less than 3psi (14.9psi in the MB models). If there is any risk of someone accidentally closing the valve during fermentation, remove the handle once in the open position. If carbonating in the 4-in-1 install the Stainless Side Blow-off Assembly or a tee can be used to add a pressure gauge (see Figure 24). To ensure a tight seal, the 4-in-1 fermenter lid clamps should be tightened in a star pattern first by hand (gradually tightening to ensure lid sits evenly), then by using a tool (the 1500–5500W element wrench can be used to good effect). Regularly apply food-grade, anti-sieze compound to the bolt threads to ensure they don't gall/seize. If not using CO<sub>2</sub> to carbonate or rack, the hose barb can be attached directly to the port, or if using CO<sub>2</sub>, attach it to the valve. A blow-off tube (section of 1/2" tube) should be attached to the hose barb and the other/distal end placed in a bucket (with a little Star San if desired) to allow gas produced during fermentation to escape. The longer pump hose (if purchased) can be repurposed, but be sure to sanitize it first (rinse it well and place it for 5 minutes in a pot of boiling water). With the distal end of the hose in water, it forms a trap to prevent flies or microbes from entering the fermenter. Figure 22 shows the end of the hose in a glass on the fermenter, but where practical, it is recommended to use a longer hose and place the bucket, jar or glass on the floor so that if a small vacuum is created during fermentation (as water cools it contracts creating a vacuum), the water will not be sucked back into the fermenter. When crash cooling or otherwise cooling more than a degree or two, be sure to remove the hose from the water (or add 1–2psi of CO<sub>2</sub> to the top of the fermenter) or the water could be sucked up into the fermenter.

9. ETC: Connect the temperature sensor to the ETC or Touchscreen Controller with the sensor cable by aligning the slot and pushing it on (see Figure 25). When attaching, hold the cable cord grip and turn in **clockwise** direction while very gently pushing in until the ridge and groove align. Failure to align the cable and controller/sensor will likely result in damage and failure to operate correctly. The cable can be removed by pulling down on the collar as shown in the picture on the far right. Never pull on the cable directly,



Figure 23: Valve on the lid



Figure 24: Pressure gauge

Ridge on ETC and notch on sensor cable must be aligned when connecting. Same is true for the sensor cable and sensor.



Pull the spring loaded collar to remove the sensor cable

Figure 25: Connecting sensor cable

and check the cord grip on the connector frequently to ensure it is gripping the cable securely. The ETC can be placed on the fermenter or hung from a wall or vessel. See more ETC installation instructions under 'Programming and Operating the BREWHA Electronic Temperature Controller (ETC)' in the 'Installation' section of the manual, and there is a link to an error code guide on the ETC product page of the BREWHA website.

10. Water Level Ruler: To determine volume when filling the fermenter, hang the stainless water level ruler over the side of the fermenter when mashing and boiling (Figure 26). Remove the ruler before sealing the fermenter lid during fermentation.

11. Pump: If using a March 815 Pump Assembly (model 815 comes with the Small, Medium and Large systems, and the model 7S comes with the 1.5-7BBLs systems), wrap the pump NPT male threads with teflon plumber's tape and attach the tri-clamp fitting (some food-grade Teflon paste can be applied to the thread prior to the tape if



Figure 26: Water level ruler

it is difficult to form a seal). The 7S pump comes with tri-clamp fittings welded on but will need a power cord attached for 208–240V power; the plug for the pump is connected to the pump cord on the 1.5-7BBL Programmable Touchscreen Power Controller and if connecting to the Controller, have an electrician properly connect the cord according to the 208–240V ('Hi Voltage') diagram on the pump. The larger diameter, braided, food-grade, high-temp silicone hose can then be connected from the bottom valve on the fermenter to the inlet port of the pump (3/4" hose on the March 815 pump and 1" hose on the March 7S pump). Connecting to the bottom port is generally best and will generally yield better wort clarity. If you find that grain plugs the pump, you are probably mixing the mash too vigorously or too near the bottom of the Colander, or your crush size is too fine; this will also increase the risk of grain scorching on the element and ruining the flavor of the beer. If the line is frequently

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Figure 27: Adding sealing tape to threads

plugging due to too much grain entering, it can be connected to a side port on the cone and the grain that falls through the Colander false bottom can be removed from the bottom of the fermenter and brought to the top of the Colander manually. (To minimize plugging due to grain, only connect the recirculation hose to the bottom of the fermenter after grain bed agitation is completed and the bottom cone is cleared of grain that may have settled there.) The long, narrower hose (1/2" ID) should be connected from the exit/top port of the pump (or to a valve attached to the exit port on the pump; see step 12) and the other end to the inlet port of the Mash Colander (or sanitary valve attached to this port if that is preferred; see step 12). The pump cart should be assembled according to Diagram 1. The Water Level Sensor (with 1.5-7BBL BIAC) can be hung off the side of the Mash Colander with the tips in the water in the fermenter and connected to the Power Controller. When the pump is on 'Auto', if these tips become exposed, the pump will shut off, helping prevent heater dry-fire and stuck mash. (Use a valve, not the Level Sensor, to control flow rate.)

12. Mash Colander: Install the Mash Colander 90° hose barb to the inside port on the Mash Colander (Figure 28) and attach a short hose (60–90cm/2–3') to direct the wort back into the top of the Mash Colander. Slip the hose float over the end of the hose to keep it from sinking down into the mash (a hose clamp can be used to keep the hose float in place). When recirculating wort (out the bottom of the fermenter and into the top of the Colander), it is important to throttle (partially close) the

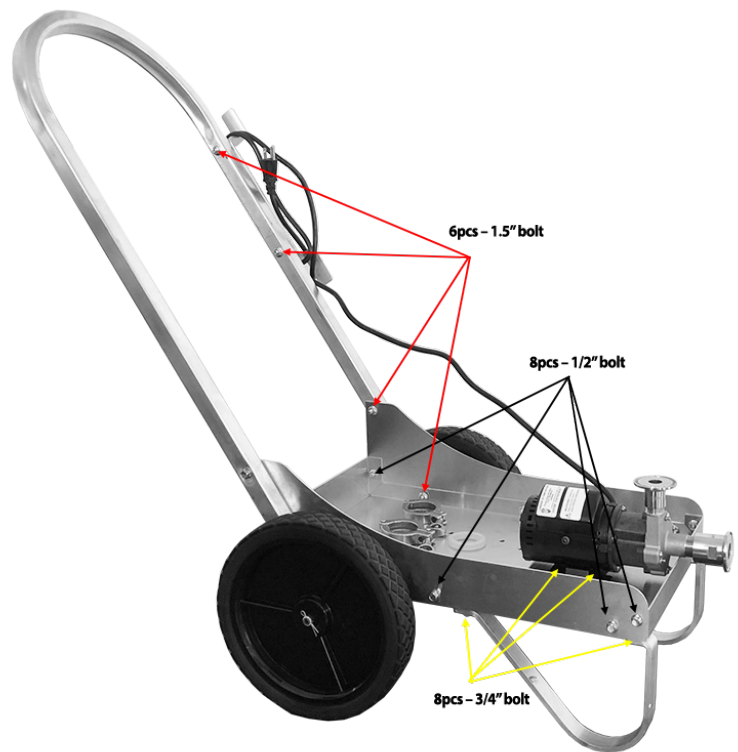


Diagram 1: Assembling the pump cart



valve on the Mash Colander so the pump doesn't withdraw wort too quickly (never throttle on the inlet side of the pump, as this can wreck the pump by causing it to cavitate/overheat). If the pump withdraws wort too quickly, three things can happen: first, it creates a pressure differential which pushes the grain down inside the Colander, plugging the false bottom, leading to a 'stuck mash' where the wort cannot flow at all. Second, the wort level in the fermenter surrounding the Colander and immersing the heating element(s) will drop so low that the elements are exposed, which could melt or damage them. Third, the pump will be damaged if it is ran dry.



Figure 28: Valve attached to inlet port on Mash Colander

The wort level should stay almost constant throughout the mash period—if it starts to rise, the pump is moving wort too fast, so close the downstream valve further. If wort is not passing through the Colander at all, the mash might be stuck and need to be stirred up again and the filter bed reformed. The pump can move liquid much faster than recommended, so the recirculation rate should be throttled back considerably during mash and vorlauf. Always keep the pump below the fermenter in order to provide sufficient pressure into the pump, and if the pump starts 'screeching,' turn it off immediately or it may be damaged. More information and tips can be found by searching for 'stuck mash' on the BREWHA website.

More installation instructions for the BREWHA controller, heaters and chillers can be seen in other sections in this manual. Instructions for other accessories can be seen on their product pages on the BREWHA website, and a list of brewery items not supplied by BREWHA (such as a grain mill) can be seen on the website by searching for 'what else is needed'.

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## Assembling the BREWHA Sanitary Ball Valve

Disassembling a valve to remove any sediment that is trapped inside is an essential technique for a brewery for maintaining sanitary conditions.

The BREWHA Sanitary Ball Valve is the simplest and easiest valve you'll ever reassemble. Aside from the very first time (when a wrench may be needed to loosen the nut on the handle), no tools other than your fingers are required to disassemble and reassemble the valve. Disassembly, cleaning and reassembly can all happen inside a minute.

To disassemble and reassemble the valve, follow these simple steps:

1. The only tool you'll ever need is a small wrench to loosen the factory tightened nut on the valve stem. Loosen the nut with a wrench and remove with your fingers. (From here on, when loosening or tightening this nut, only finger-tightening is necessary.) If necessary, wiggle the handle up and down until it can come off. (Sometimes the factory sets it tight, but tapping on the underside of the handle near the stem with a wrench will knock it loose, and once loosened, it will come off easily in the future.)

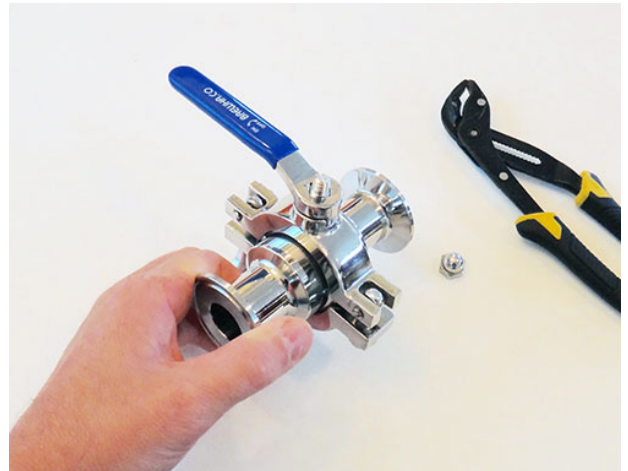


Figure 29: Removing the valve handle nut



Figure 30: Removing the sanitary clamp

2. Remove the handle and loosen the wing nut on the clamp. Open the bottom half of the clamp and lift the clamp off of the valve. Once the clamp is removed, the valve opens completely up.

3. Remove the stem from the ball by angling the stem slightly downward, and remove the gasket from the stem by gently wiggling it out. The first time can be a little tricky, but after a time or two it becomes very simple and quick. Reassemble the valve with the

above instructions in reverse order. Ensure the gaskets are seated properly when reassembling. It can be helpful to gently wiggle the valve handle a little as it is tightening to help the ball seat properly. The wing nut goes on the longer of the two valve bolts.



Figure 31: Removing the ball stem

## Installing the BREWHA Water Heating Element

**WARNING:** When connecting extension cords, always ensure the power is turned off or arcing (electrical sparks) may occur inside the connectors that damage them and/or cause a short. Inspect electrical connections frequently to ensure they are secure. Hot cables around connection points can indicate loose connections that should be inspected.

To remove and replace an element:

1. Ensure the element is unplugged.
2. Open the guard by removing the clamp.
3. Remove the two wires (or three with the 3 Phase 10kW elements) attached to the element with a screwdriver (they are typically black and white; the green wire is the ground wire and is attached to the cap with a cap screw).

4. Loosen and remove the element with an appropriately sized socket and replace with a new element repeating steps 2 and 3 in reverse order. The element should be firmly hand-tightened in place; do not over-tighten so that the gasket squishes out the side. (Inspect the element to ensure the gasket is in place; the BREWHA element guards have a special lip to hold the gasket in place, so it is not likely the gasket should slip out. If it does, loosen, and try again.)

5. Install the guard cap with the slot in the cap pointing down (see Figure 32); the slot down ensures that if water leaks through, it runs out the bottom of the guard.

6. Install the element assembly in the vessel port. A little food grade lubricant on the threads can help it turn in more easily.

7. Check for leaks with



Figure 32: Water release slot facing down

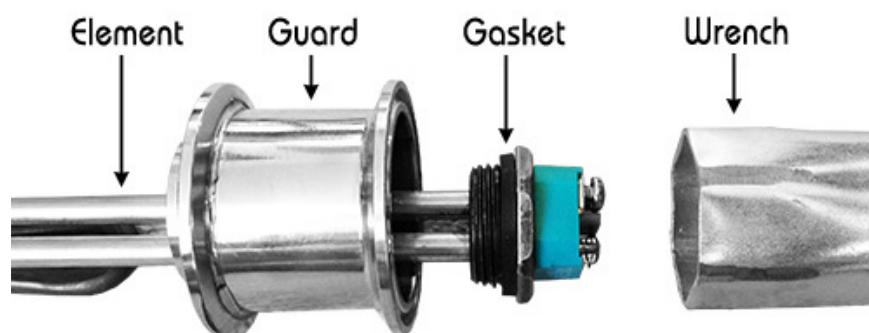


Figure 33: Installing replacement heaters

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the heating element unplugged by filling the vessel full to the top with water; it is important to fill to the top so the pressure acting on the valve will be the same as during brewing. It is even a good idea to pressurize the vessel with CO<sub>2</sub> to the maximum allowable pressure to ensure it is leak free, so it doesn't become a problem when it is full of beer.

8. Once pressurized, take the cap off the element guard by loosening the clamp where the black cord enters the guard. Use a flashlight to look inside for leaks.

9. If there is any moisture appearing behind the seal, hand tighten using an element wrench or socket. Tighten firmly (hand tightening is generally all that is needed), but don't over-tighten or the gasket could be damaged (see Figure 33).

**10. For longest use of your element, and reducing risk of scorching (ruining the flavor of the beer), it is important to clean all sides of the element heating rods very well after each use.** Cleaning immediately after the fermenter is emptied is important, as once yeast/soil dries, it will be much harder to clean. An element can often be easily wiped clean with a soft cloth, but for cleaning any residual debris or cleaning after element scorching or cleaning other persistent stains, stainless-steel compatible cleaners such as a 'Euro Scrubby' or non-scratching abrasive cloth/brush (100% copper or stainless safe pad) can be used. A thin pad is ideal, as you can wrap the pad right around the element rod and slide the pad up and down to ensure the rod is cleaned on all sides, not just the outside). For hard to reach areas, a chemical clean may be needed (see more information on cleaning stainless steel in the above section titled 'Cleaning and Sanitizing Stainless Brewing Equipment and Preventing Rust'). Ensure the cleaning pad does NOT mark the steel in any way. Even microscopic scratches can harbor solids that will lead to scorching.



## Installing the BREWHA Brewing Power Controller

**WARNING: The Touchscreen Power Controller MUST be hung from a wall (not placed flat on a table) or the touchscreen could be damaged.**

The BREWHA Power Controllers (Tabletop and wall-mounted Programmable Touchscreen) are designed to give safe and easy control for heating water with 208–240V/high amperage power. Both the 240V/30A Tabletop Power Controllers that are optional with the 240V BIACs under 100L/25USG capacity and the larger, splash-down, wall-mounted Programmable

Touchscreen Power Controllers use the same general principles for setup and operation.

To install the controller, follow these steps (**it is recommended to use a certified electrician for electrical installation work**):

1. For the Tabletop and small Programmable Touchscreen Power Controllers, turn all switches off, and plug the large plug into a 'NEMA 14-30' receptacle on a 240V/30A circuit.

For most homes in North America, this is the same

four-wire receptacle that is found behind an electric clothes drier. (If you want to connect to a stove receptacle (NEMA 14-50), an adapter can be purchased online.) The 1.5BBL–7BBL Programmable Touchscreen Power Controller needs to be hard-wired in to the main power source by an electrician. Your electrician will drill a hole through the box to run the main power cable. They will likely drill the hole near the 'power distribution block' inside the Power Controller. The systems are supplied with either 208V or 240V power—ensure when ordering that you request the correct configuration. (Some 208V three phase systems have a 'high leg' that is 240V; let us know before you order if this is your power supply, as you will need 240V elements.)

2. For the Tabletop Controller, to control power to the element with an Electronic Temperature Controller (ETC)—for example, during mashing in order to control the temperature of the mash, or during fermentation to heat the wort/beer—connect the small/14AWG 'contactor'



Figure 34: NEMA 14-30 plug

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Figure 35: Connecting the contactor cord to the ETC

cord at the back of the Tabletop Controller to the heating socket (marked with a red flame) on the ETC, and plug the ETC into a wall receptacle (the image shows the older white ETC model; the new model is black). The small cord opens or closes a 'contactor' or relay inside the Tabletop Controller, which allows a complete 240V loop through to the heating element. Since the contactor acts as a safety 'gate,' it is best to ensure the contactor is not energized anytime you are not brewing (i.e., unplug the contactor cord). The ETC is very useful for controlling the temperature during mashing, but not as helpful to control your boil (see step 5 for that). If power will not be controlled with an ETC (e.g., during the boil), plug the 'contactor' cord directly into one of the receptacles on the Tabletop Controller or into a wall receptacle. This will close the contactor and allow power through to the element. During the boil, the power level can still be controlled manually; see step 5.

**WARNING: When not using the element, both the smaller contactor cord and the heating element should be left unplugged. This will eliminate any risk of unintentional heating.**

3. With the Programmable Touchscreen Controller, use the sensor extension cable to connect the sensor to the sensor port on the controller.

4. Connect the heating element(s) to the box (note: always ensure power is off when connecting, or arcing may occur and cause damage).

5. Reducing the amount of power to the element is especially useful during boil, when you may want to limit the boil during hot break, or if you want to control the amount of water that evaporates—a high boil increases evaporation; a low boil decreases evaporation. Reducing the amount of power to the element is also



Figure 36: Connecting heater extension to box

**Safety Tip:** For additional safety at home, consider installing a GFI on your breaker box, or install a GFI inbetween the breaker and the controller. A GFI will respond quicker to an electrical fault than a fuse/breaker will.



Figure 37: Knob controls percentage of power output

element; turn the dial to 100% and the element will output full wattage; rotate it to 50% and the element will only effectively produce half the wattage.

6. The Programmable Touchscreen Power Controller (Image A) includes three additional cords at the bottom (for systems smaller than 100L/25USG the Controller has only two additional cords). One cord is to connect the pump (for the March 7S pumps, an electrician should install a power cable and cord grip to the pump for 208–240V power according to the 'High Voltage' wiring instructions provided with the pump—if the pump is pumping in the wrong direction, the wires are incorrectly installed); the second cord is to connect a Chiller/chilling source; and the third is to connect a Water Level Sensor (single element systems, e.g., below 100L/25USG in size, do not have the Water Level Sensor). The Water

very useful for heating the fermenter during fermentation, whereas the full power will scorch the yeast on the element. During fermentation it is recommended to set the power output to less than 3%. With the Programmable Touchscreen Controller, power output is entered into the program and can be adjusted during the brew. With the Tabletop Controller, to manually control power to the heating element after plugging the small power cord directly into a socket, rotate the dial/knob on the front of the box (see Figure 37). (Pushing the dial in can also turn power on and off.) The dial is a digital controller that can precisely regulate the percentage of power to the



Image A: Touchscreen Power Controller

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Level Sensor is a safety device that will shut the pump off if the water/wort level drops dangerously low in the Mash Colander. The sensor hangs off the outside of the Mash Colander (it must securely contact the top rim of the Colander, as this serves as the ground for it to operate correctly) and has two probes that hang down in between the Mash Colander and the 4-in-1 Fermenter. When the pump switch on the Touchscreen Power Controller is set to 'Auto,' as long as the two probes are in water/wort, they close a relay that permits



Figure 39: Water Level Sensor



Figure 38: Additional outputs on the bottom of the controller

power through to the pump. If they are out of the water, the relay is open and power cannot get through to the pump. The 'Manual' setting turns the pump on without the sensor.

The length of the Chiller and Pump cords can be adjusted simply by loosening the cord grip, adjusting the cord to the desired length, and then retightening the cord grip.

For instructions on programming the controller, refer to the following video on the website: <https://brewhaequipment.com/blogs/how-to-brew-beer/brewery-touch-screen-power-controller>.

**Troubleshooting tip:** If the Power Controller is blowing fuses, first check for leaks in the heater element housing by removing the tri-clamp holding the cap on, and ensure that all wire connections in the element housing and the Power Controller are securely attached. Then confirm that the voltage into the Power Controller is according to the specifications (particularly with 3 phase power, sometimes one leg can be higher voltage). Then check to see if the box is warm (internal box temperature should stay below 40°C/104°F); if it is, check the dust filters inside the splash guard (if installed) to see if they are impeding air flow (the larger

Controllers have fans to assist with air flow; ensure they are working properly). If the dust filters are installed and are dirty, clean them by blowing them out. If that doesn't reduce the temperature, the fabric dust guards can be completely removed to permit the maximum amount of air to circulate (in most brewery situations, the dust filter is not necessary; if you are in a high dust area, you may need them and they need to be checked and cleaned frequently). In most situations, keeping the door closed while heating helps the fans more effectively vent heat, as air moves through the box rather than escaping out the front. The smaller controllers without fans should have their doors kept open during heating to facilitate cooling.

Regularly clean out any dust inside the Power Controller, especially from the relays and fuse blocks, to ensure that heat can easily dissipate from the relays. If operating in a warm environment, a second cooling fan can be added to increase air flow; contact us for details.

**Tip:** The Power Controller cooling fans will operate most efficiently in removing internal heat if the lid is kept closed. Since air can escape around the front panel, keeping the door closed ensures that air moves through the box and hot air is removed. The Small Controller (without a fan) should have the door left open during heating.

**Tip:** If connectors are getting warm to the touch, it could be caused by a loose connection inside. De-energize and have the wire terminals inspected.

**WARNING:** When electrical devices are serviced, they should be completely disconnected first (which includes flip/open the breaker contact) and allow a one minute wait period before servicing. Use a certified industrial electrician.

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## Programming and Operating the BREWHA Electronic Temperature Controller (ETC)

### Overview

The ETC contains one temperature probe and two independent outputs. One output is for cooling and the other one is for heating. It can be used for applications such as heating during mashing or fermentation, or for cooling post-boil and during fermentation. (If using a 120V element for boiling, plug the element directly into a power source, not into the ETC; the ETC is not useful for controlling a boil.)

This controller is a plug and play controller. Both the heating and cooling control modes are simple on/off control, similar to a mechanical thermostat but with much higher precision due to an adjustable hysteresis band, a precise sensor and a digital read out. An antishort function also provides protection for a refrigerator compressor from being turned on while at high pressure, which could cause damage.

Different operation temperature ranges of the two outputs can be set separately. Once the cooling range is set, the controller program will automatically limit the heating range to prevent both heating and cooling from being turned on at the same time.

A digital silicon band gap sensor (DS1820) is used, with the advantages being that it is much more reliable in a moist environment than a thermistor sensor, it can be immersed over an extended period of time, and it has greater accuracy over an entire specified temperature range.

When the controller is plugged in and the probe is attached, it will display the measured temperature. The controller will keep running according to the saved settings. If the temperature sensor is shorted or removed, the controller will display "Err." See Figure 41 for the

Table A: Specifications

Temperature Control Range	-2 to 105°C/28 to 221°F
Resolution	0.1° (from -9.9 to 99C)
Accuracy	0.5°C/0.9°F
Control Mode	On/Off Heating and Cooling
Control Output	12A/120V
Audio Alarm	High and Low Limit
Sensor Type	Silicon Band Gap / DS18B20
Sensor Size	6mm/0.25"OD by 100mm/4"
Measuring Range	-2°C/28°F to 105°C/221°F
Ambient Temperature Range	-2°C/28°F to 50°C/122°F
Dimensions	91x140x46mm 3.5x5.5x1.75"
Input Power	12A/110-120V/60Hz
Power Cable Length	1m/3'

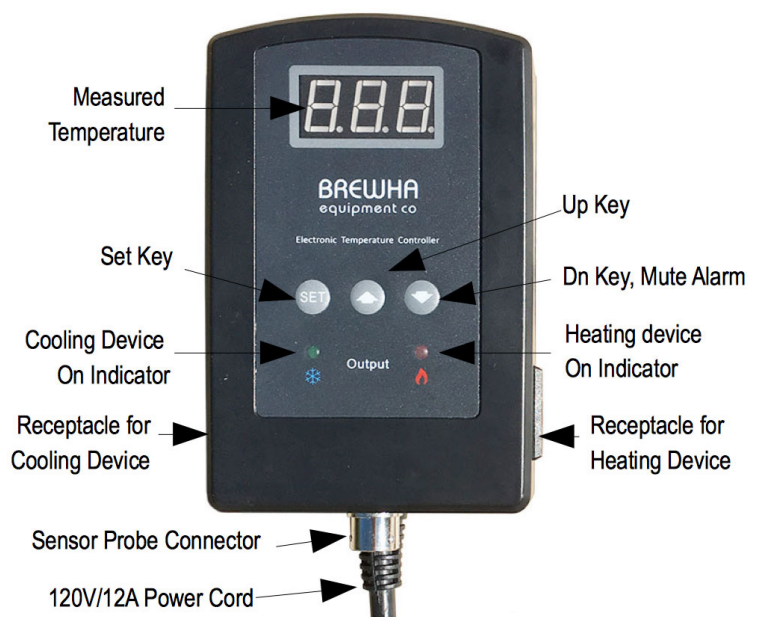


Figure 40: Front panel



flow chart to set the parameters.

## Parameter Settings

To change the temperature set point, press the SET key. The controller will show CSP (cooling set point); pressing SET again will show HSP (heating set point). When the controller shows CSP or HSP, use the up or down keys to change the value. Then press the SET key again to confirm the change.

To change the system parameters, hold the SET key down for 5 seconds, and the controller will enter the parameter set up mode. The first parameter, AH (Alarm High Limit), will show on the display. Use the up or down keys to modify the parameter value, then press the SET key to confirm the change. The display will show the parameter again. Press the SET key again to show the next parameter. The instrument will automatically exit if no key is pressed for 10 seconds. Refer to Table B on the following page for the default parameters.

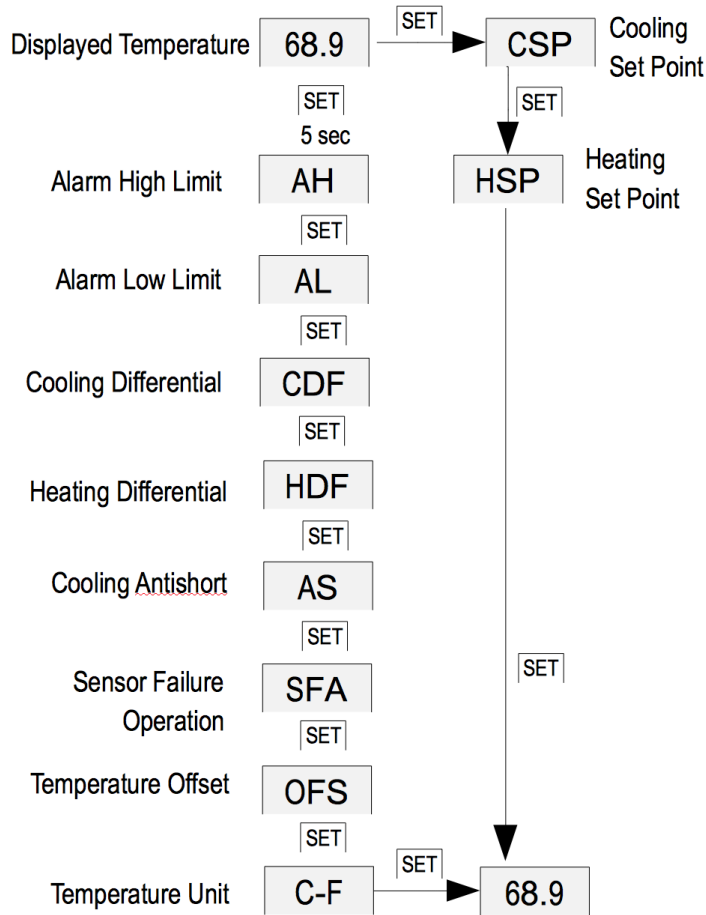


Figure 41: ETC system parameters flow chart

Note 1. For cooling (or heating), the receptacle will be off when the temperature is below (or over) the set point and will be on again when the temperature rises up (or drops down) to CSP+CDF (or HSP-HDF). This ensures that the ETC does not try to cool and heat at the same time.

The maximum value of the HSP that can be set is the current value of CSP. But CSP can be set to the value between -2–221°F or -2–105°C. When the CSP is set to a value lower than current HSP, the HSP will be adjusted to the CSP value automatically. This means that during mashing and boiling, it is convenient to fix the cooling set point above 212°F so that the heating set point can be set anywhere below 212°F.

For example, when CSP = 67°F, HSP can be set to any value between -2 and 67.0. For CSP, it can be set to any value between -2 and 221. If you set it to 55.0, the HSP will be set to 55.0 automatically.

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A small differential between heating (HDF) and cooling (CDF) set points gives tighter control, but a larger differential reduces the frequency of cycling on and off and therefore extends the life of the relay and compressor.

Note 2. When the measured temperature is higher than the AL set point, the high limit alarm will be on; when the measured temperature is lower than AL, the low limit alarm will be on.

When the alarm is on, the display will be flashing between the measured value and the alarm type. To mute the alarm when it is on, press the down key. (If the measured value moves out of the alarm zone and then returns into the alarm zone again, the alarm will sound again. To disable the alarm, set AH = AL.)

The upper value that AL can be set to is the current value of AH. But AH can be set to any value between -2–221°F (-2–105°C). When AH is set to a value lower than the current AL, the AL will be adjusted to the AH value automatically. For example, when AH = 95°F, AL can be set to any value between -2 and 95. For AH, it can be set to any value between -2 and 221. If you set it to 25, the AL will be lowered to 25 automatically as AL cannot be above AH.

Note 3. The Cooling Antishort setting is the minimum delay time in minutes for turning the cooling load back on. When the controller is used for cooling and the load is a compressor (such as a glycol chiller), it should not turn on the compressor when it is at highest pressure (e.g., just after it turned off); otherwise, it may shorten the life of the compressor. The Antishort cycle delay function, therefore, can be used to prevent the rapid cycling of the compressor. (Technical note: it does this by establishing the minimum time that NO contacts remain open—after reaching cutout—before closing again. The delay overrides any Load Demand and does not allow the NO contacts to close until the set time-delay value has elapsed. This allows time for the refrigerant to be released through the evaporator, lowering pressure. It is typically set to 4–6 minutes).

Note 4. The Sensor Failure defines what the output would be if the sensor fails. It is a safety feature. It can be set to 0-0, 0-1 or 1-0. For brewing, the best option is generally 0-0 as this will shut off any heater that is connected. Please refer to Table C for details.

Note 5. The Temperature Offset is used to set an input offset to compensate for any error produced by the sensor or input signal itself. This is useful for calibrating your ETC for precise readings. For example, for

Table B: ETC system parameters code and details

Code	Description	Setting Range	Initial	Note
CSP	Cooling Set Point (temperature at which the cooling receptacle is powered)	-2 to 105°C 28 to 221°F	19.4°C 67°F	1
HSP	Heating Set Point (temperature at which the heating receptacle is powered)	-2 to 105°C 28 to 221°F	16.6°C 62°F	1
AH	Alarm High Limit (high temperature at which alarm sounds)	-2 to 105°C -2 to 221°F	35°C 95°F	2
AL	Alarm Low Limit (low temperature at which alarm sounds)	-2°C to AH -2°F to AH	0°C 32°F	2
CdF	Cooling Differential (difference from set temperature to turn cooling on)	0 to 27°C 0 to 50°F	3	1
HdF	Heating Differential (difference from set temperature to turn heating on)	0 to 27°C 0 to 50°F	1	1
AS	Cooling Antishort (time delay between power turning off and back on again)	0-12 min	0	3
SFA	Sensor Failure Operation (if sensor fails, which receptacles are powered)	0-0, 0-1, 1-0	0-0	4
OFS	Temperature Offset (permanently adjust display temperature)	0-10	0	5
C-F	Temperature Units	C is Celsius F is Fahrenheit	F	6
The following are only for the ETC WiFi V2 and higher models				
LGC	Control Logic	NOR, R-C, R-H	NOR	7
RST	Factory Reset	No, Yes	No	8
PSD	Device Password Access			

Table C: Sensor failure operation details

SFA	Controller output when sensor fails
0-0	Cooler and heater off
1-0	Cooler on and heater off
0-1	Cooler off and heater on

temperature, if the unit displays 37°F when the actual temperature is 32°F, setting parameter to F = -5 will make the controller display 32°F.

Note 6: Displays temperature in Celsius or Fahrenheit

Note 7: Control logic parameter decides the output control mode. It can be set as NOR (Normal Control Logic), R-C (Reverse Logic, output sent to cooling socket) and R-H (Reverse logic, output sent to heating socket). By default, LGC is set to NOR. Reverse logic enables single relay output when temperature is between CSP and HSP.

Note 8. Set RST to YES will reset this controller to factory default settings.

## Attaching the Sensor to the Unit



Figure 42: Attaching the sensor cable to the ETC

The sensor connector contains a slot for correct pin connection. It also has a spring lock to prevent disconnections from accidental pulling on the cable. To attach it to the unit, grip the cable by the collar/cord grip of the connector and align the slot of the female connector on the temperature probe to the red mark of the male connector on the ETC unit (turn the cable in a clockwise direction only as turning in a counter clockwise direction may loosen the connector and put tension on the wire solder), then hold the tail and push the female connector forward. To remove the connector, pull the spring loaded collar of the female connector back and the female connector will detach. Please see Figure 42 for details. Inspect the cord grips on the connectors regularly to ensure they are securely holding the cable.

For fixing **ERR codes**, see the link on the ETC product page of the website.

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## Installing and Operating the Water, Beer and Wort Chiller

Before reading about installation and operation, please review the following warnings.



Figure 43: 3000BTU Water Chiller

**WARNING:** Water temperature inside the water reservoir must never exceed 35°C/95°F; do NOT use the chiller to directly cool boiling or very hot water.

**WARNING:** Keep pump and compressor dry; they are NOT waterproof.

**WARNING:** Respect the basic safety instructions given by the manufacturer. Take care of your personal safety. Cooling equipment is designed for flow type cooling of beverages. The supplier is not liable for damages caused by improper use.

**WARNING:** Do not use the machine for any other purpose than what it is intended for.

**WARNING:** Before connecting the main electrical supply, check that the voltage and frequency corresponds to the specifications shown on the machine.

**WARNING:** Make sure the socket to connect the cooler is equipped with a sufficient breaker.

**WARNING:** Before cleaning or maintenance, always disconnect the machine from the electricity supply. Put the main switch (thermostat) into the position "0" and pull out the plug.

**WARNING:** Never insert tools or other objects into the propeller fan.

**WARNING:** Never touch electrical components with wet or damp hands.

**WARNING:** If the supply cord is damaged, it must be replaced by the manufacturer or a qualified person.

**WARNING:** Cooler must not be placed on its side even during transportation; if this occurs accidentally, the cooler should be allowed to rest in the correct orientation for 24 hours before use.

**WARNING:** To ensure the performance of the cooling unit, never block the air inlet.

**WARNING:** All equipment must be installed by appropriately trained staff. More detailed maintenance, such as cleaning and servicing the cooling system, must be performed by authorized technicians who are familiar with cooling and electrical systems.

**WARNING:** Do not place any objects on the cooler that would block air circulation. The machine must not be placed near any heat source or in direct sunlight.

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## Placement

After unpacking, place the chiller so that the heat generated by the cooling unit can be sufficiently ventilated on all sides. The chiller **MUST** be placed on a horizontal surface out of direct sunlight and away from heat sources.

## Overview

This system is designed to cool liquids with flow type cooling. It is suitable for maintaining fermentation temperatures and serving cold beer, but not suitable for rapidly removing a large amount of heat like that contained in hot boiled wort. The machine achieves optimal performance when used in ambient temperatures from 6°C/44°F to 25°C/77°F. Do not cover or impede any of the ventilation holes.

## Equipment Description (Figure 44)

1. Recirculation pump
2. Inlet of the beverage
3. Outlet of the cooled beverage
4. Fan
5. Suction propeller
6. Fan cover
7. Condenser
8. Cover of the electro panel
9. Evaporator
10. Cooling coil
11. Plastic tank
12. Motor compressor

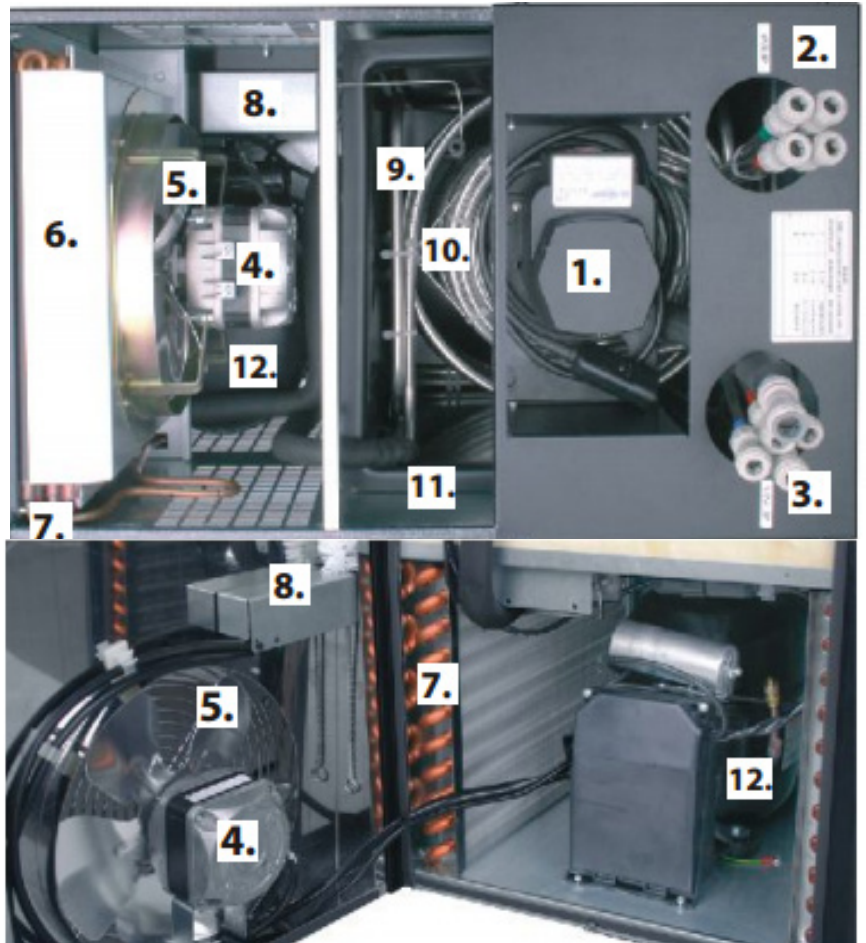


Figure 44: Water chiller components



Figure 45: Fill the water reservoir

**WARNING:** After connecting the cooling hose, the water level may drop in the plastic tank; inspect the water level and add water if necessary.

## Installation

Fill the plastic tank (No. 11 in Figure 44) with water right up to the overflow (the reservoir lid can be removed; see Figure 45).

To connect the Chiller to the fermenter jacket, remove the quick connect from the end of the large pump tube, place a hose clamp over the tube and insert the 3/8" hose barb x 1.5" tri-clamp. Tighten the clamp and connect a hose from the tri-clamp fitting to the jacket inlet port near the bottom of the fermenter. Connect a non-kinking return hose to the jacket exit port (the top port) and insert the exit end back into the water reservoir of the chiller (No. 11 in Figure 44). Secure the hose so it will not come out (see Figure 46).

Note: When connecting tubes to the coils for chilling beverages (AS110), use only fittings and clips specified by the supplier. Use a calibrated beverage tube 6.7 x 9.5 mm (3/8").

After connection, check all joints to ensure they are properly sealed.

## Temperature and Settings

Models AS110 and AS200 have an adjustable mechanical thermostat located on the front of the chiller.

As shown in Figure 47 on the following page, the temperature of the water bath is controlled by the mechanical thermostat between 1°C/33°F (position 7) and 10°C/50°F (position 1). **At the coldest setting (position 7) it is not abnormal for ice to form on the coils and it might seize up the pump impeller especially if the water is not being pumped.** If the pump ices up, let the ice thaw before operating the pump. To prevent the ice from forming, keep the thermostat off the coldest setting (e.g., position 6 or 5).

While it is up to the individual brewer, it is generally recommended to set the thermostat at position 1 when fermenting ales, and position



Figure 46: Connect the chiller to water circulation hoses



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6 when fermenting lagers. It is desirable to keep the chilling water bath not more than about 10°C/18°F cooler than the fermenting temperature to reduce 'overshoot' when the Chiller pump is turned off (the cold water remaining in the jacket will continue to chill).

## Connecting Power

The Chiller compressor has a 120V (NEMA 5-15) plug which can be plugged either into a wall receptacle or into the 'chilling' receptacle (marked by a blue snowflake) on the left side of the BREWHA ETC temperature controller or the Chiller plug on the Programmable Touchscreen Power Controller (only the ETC will be referenced from here, but the same applies for the Touchscreen Controller).

If the Chiller is plugged into the wall, when the power is switched on, it will turn on immediately and begin to chill the water bath to the temperature indicated by the mechanical thermostat. Once it reaches the temperature, the compressor will shut off and will turn on again when the temperature of the water bath rises. It will turn on and off and maintain the temperature even if the fermenter does not need it. If the Chiller is plugged into the ETC, the Chiller will only turn on when the ETC senses that the fermenter is warming up and will power the chilling receptacle on the ETC.

## Controlling Temperature in the BREWHA Fermenter

The BREWHA ETC senses the temperature starting to rise in the fermenter and allows power through to the chilling receptacle on the ETC.

Setup A (Figure 48) is recommended for the 6500BTU Chiller: if the Chiller compressor is plugged into a wall receptacle, the Chiller pump should be plugged into the chilling receptacle on the ETC using a cord adapter (the pump has an IEC 320 electronic plug and an adapter allows it to be plugged into the NEMA 5-15 receptacle on the ETC).

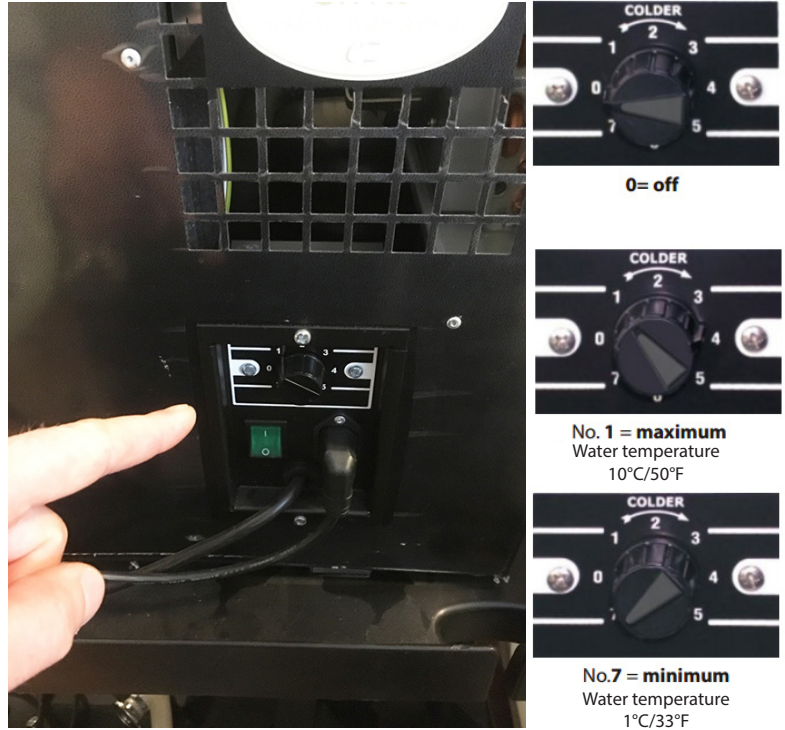


Figure 47: Controlling temperature of the water bath

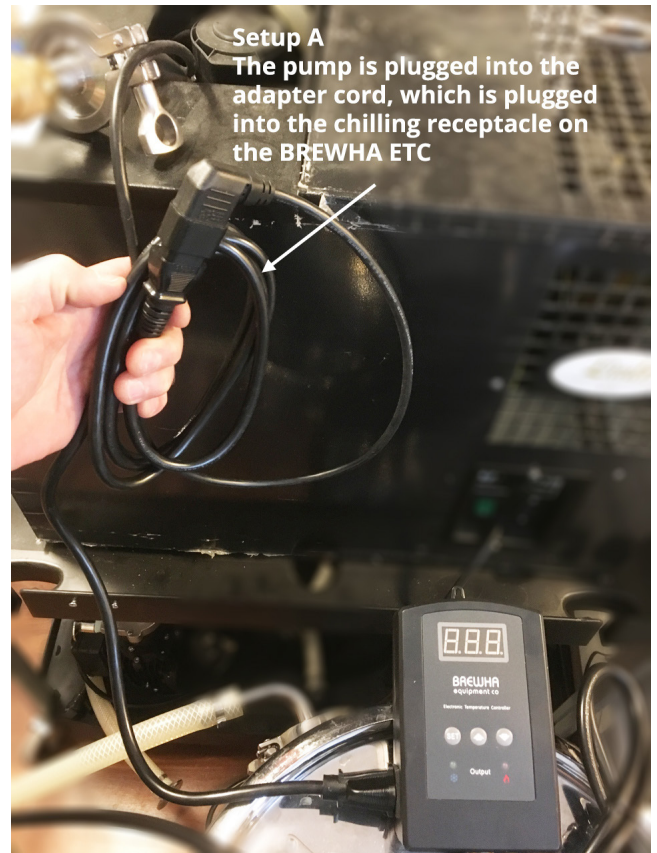


Figure 48: Water chiller Setup A



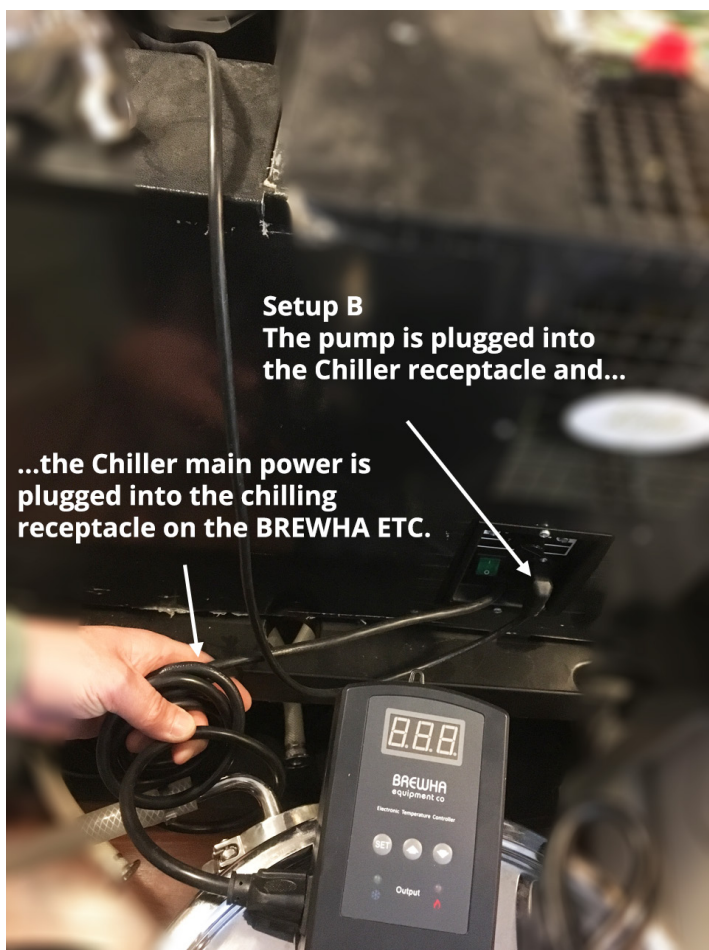


Figure 49: Water chiller Setup B

Setup B (Figure 49) is recommended for the 3000BTU Chiller: if the Chiller compressor is plugged into the ETC chilling receptacle, the Chiller pump should be plugged into the IEC 320 receptacle on the front of the Chiller (near the manual thermostat).

In most situations with the 3000BTU Chiller, Setup B is recommended, as it allows the water bath temperature to be closer to the fermentation temperature, and it will reduce electrical consumption. However, it is hard on the compressor to cycle it very frequently, so if you know the compressor will be turning on/off frequently (e.g., more than once in 5 minutes) Setup A is preferred.

## Replacing the Connectors

### Connecting

Push the tube into the fitting firmly (about 1.5cm). The tube must be cut straight to avoid any imperfect connections. If the tube can't be inserted, moisten the end and try again (see Figure 50).

### Disconnecting

Hold the grey ring toward the body of the fitting and pull out the tube (see Figure 50).



Figure 50: Removing connectors

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Tip: If the grey ring is not pressed down while pulling out the tube, the fitting will bind even more tightly to the tube making removal even harder.

**WARNING:** Ensure the tube is not under pressure when disconnecting.

## Cleaning and Maintenance

Regarding routine maintenance, the information contained in this manual is intended for a regular operating staff, which must be properly trained.

**Before any work on the machine occurs, it must be disconnected from the main electrical supply.**

Cleaning of the condenser (No. 7 in Figure 44) must be performed by a qualified person only at least 1x per month by sweeping or by CO<sub>2</sub> pressure. Perform the cleaning (sanitizing) of the stainless steel coil (No. 10 in Figure 44) professionally with the use of a cleaner such as DOPILINE or TM Desana solution, and always after a minimum of fourteen days.

To clean the condenser, the fan cover (No. 6 in Figure 44) can be removed from the metal slides by pulling upward (see Figure 51).

Remove the fan from the cover.

Remove the fastening screws from the chiller on the side where the condenser is placed (pictures 3.1 and 3.2 in Figure 52).

First, pull out the loose cover about 3cm in an upward direction (picture 4.1.), then pull to the side (picture 4.2). Loosen the other side of the cover so you can pull out the whole cover from the metal slides (see Figure 52).

Now the condenser can be cleaned by gently brushing or by use of air pressure from both sides.

For routine maintenance:

- Check that the power supply plug is firmly plugged into the socket.
- Check that the machine is not exposed to radiant heat.
- Check the level and cleanliness of the water bath in the plastic container (No. 11 in Figure 44) and after a maximum of six months of operation, replace the water bath.
- Regularly clean the condenser of the cooling unit.
- When sanitizing beer lines, do not forget to also sanitize the dispensing tap and the dispensing head. You need to disassemble them, then soak in a chemical solution and clean thoroughly to remove any residue left by the beer.

## Electrical Connection

The machine should be connected to a power supply of 110–120V/50–60Hz with a 15A fuse. Circuit wiring must comply with applicable regulations of IEC, EN and ISO standards. If the power cord (cable) is damaged, it must be replaced by the manufacturer, its service agent or a similarly qualified person in order to avoid potentially dangerous situations.

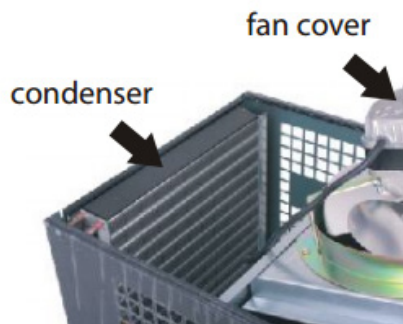
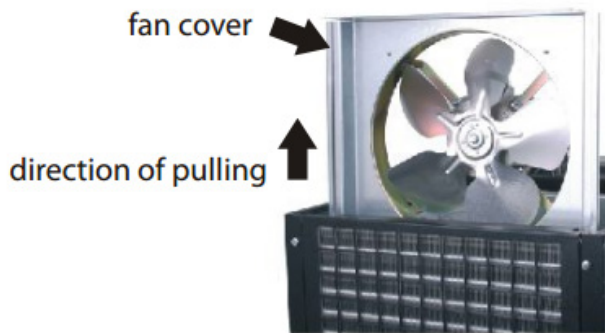


Figure 51: Removing the chiller fan

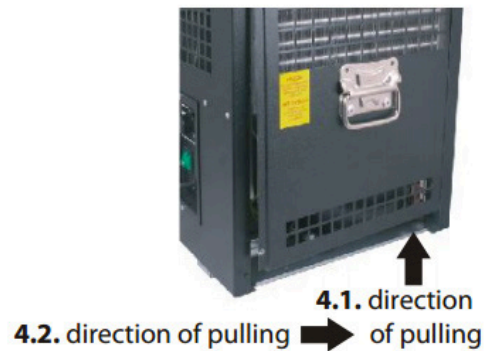


Figure 52: Removing the fan cover

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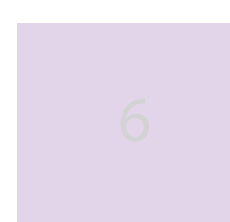
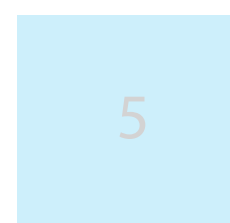




## Brewing

(A video of this section of the manual is available on the BREWHA website.)

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## Benefits of the BIAC

The BREWHA BIAC complete brewing system provides brewers with an enjoyable brewing experience by giving maximum control and superior results while simplifying the brewing process and reducing equipment requirements and expense. All of the brewing (heating, mashing, boiling, chilling, fermenting) occurs in just one vessel, the fermenter (the Mash Colander is inserted inside the fermenter for mashing). The entire brew day process with full mashing and cleaning can occur in under 5 hours. The following instructions provide a relatively simple overview of the BIAC process and instruct you on how to make your own world-class beer.

While new brewers sometimes want to produce the most difficult styles right out of the gate, we recommend picking a fairly simple recipe (like a blonde ale or an amber ale) and brew it several times until you can brew it consistently and understand the system.

*Note: Brewing software programs such as Brewfather and Beersmith can help you calculate exactly what is needed, as well as help build recipes for given styles of beer. BREWHA BIAC equipment and mash profiles for use can be downloaded, find them by searching for 'profile' on the BREWHA website.*

## How to Brew Beer in the BREWHA BIAC

### 1. Heating Water: 30–60 minutes

Water for soaking the grain (called 'strike water' or 'mash water') is added to the fermenter. Tap water can be used if it is good quality; however, if it contains a lot of minerals, metals or chlorine (anything that might contribute off-flavor), Reverse Osmosis (RO) water should be used. (Softened water should not be used, as it often contributes too much sodium. Some minerals, especially calcium, are necessary, so RO water needs to have brewing minerals/salts added ( $\text{CaCl}_2$ , Epsom/ $\text{MgSO}_4$ , Chalk/ $\text{CaCO}_3$ , and Gypsum/ $\text{CaSO}_4$  are the main ones, baking soda/ $\text{NaHCO}_3$  and non-iodinized table salt/ $\text{NaCl}$  are also sometimes used).

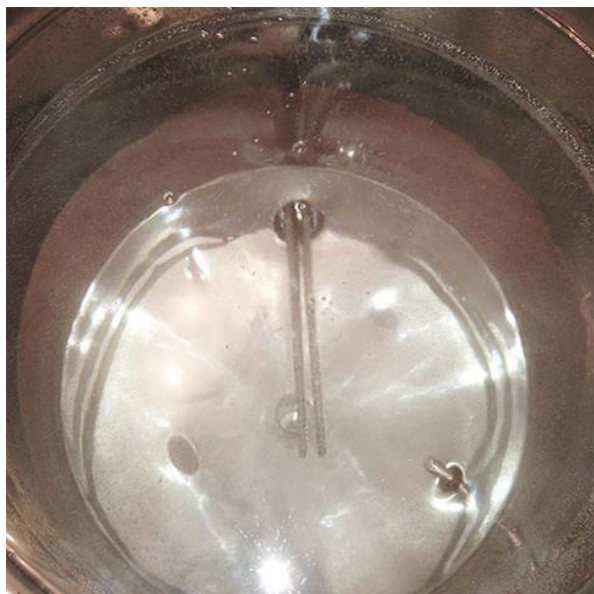


Figure 54: Heating Water

Brewing software such as Brewfather can calculate these additions. Do not heat RO or distilled water without first adding minerals as the water might attack the stainless steel heaters. *Technical note on water chemistry: For beginner brewers, as a general rule, if tap water tastes good, it can be used for brewing. More advanced brewers will want to learn more about water chemistry, as it can have a significant impact on the beer. Local municipalities normally make their water analysis reports available. Data from these can be entered into brewing software such as Brewfather and a local water profile*



Figure 53: BREWHA Large HB BIAC

created. From this, the program can make suggestions for brewing salt additions based on a style of beer and/or target water profile.

Water volume ('strike volume') can be calculated based on the full boil volume. While each recipe will differ, this volume is approximately 1.25–1.75 times the final amount of beer you are making, so for a 118L/1BBL batch of beer, the initial volume will be approx 148–200L/40–54USG (grain absorbs approximately its own weight in water, about 10% of final volume is boiled off, and 5–10% is absorbed by hops and yeast so if you want 118L/31USG of beer and start with 20kg/44lbs of grain, you need to start with approx 160L/43USG of water).

If one wants to rinse (called 'sparging') the grain as the sugar water ('wort') drains from the Mash Colander at the end of the mash period, a portion of the total water can be withheld and added as rinse or 'sparge' water as the Colander is being lifted out of the fermenter. While this step is not absolutely necessary, it can increase the recovery of sugar from the grain by a small amount. As a general guideline, the sparge volume is about 10–20% of the full boil volume (e.g., for a 118L/31USG batch, 15–20L/4–5USG could be withheld to sparge with).

The water is heated to approximately 5–8°C/10–15°F above the mashing temperature. This is called the 'strike temperature' (normally around 73°C/163°F for ales) and is higher than the mash temperature because as grain is added, it will cool the water to a typical mash temperature of around 65°C/150°F (a few degrees cooler will make a 'drier' beer and a few degrees warmer will make a 'sweeter' beer).



Figure 55: Mixing mash

## **2. Mashing: 60–90 minutes**

Once the water is at your strike temperature, the Mash Colander is lowered (if not already in place) into the water in the fermenter. The temperature on the controller is then adjusted to your mash temperature and crushed grain is added, using the following steps:

1. Have a proper sized crush — a consistent crush of 1–1.2mm/0.04–0.048" gives great grain bed fluidity (water can easily move through) and great mash efficiency.
2. Add the base malts in first (they don't tend to pulverize, whereas many specialty malts are roasted/toasted longer which leads to further crystallization and when crushed, they turn to powder). Mixing in rice hulls can also improve grain bed fluidity.
3. Sprinkle the malts in, don't dump them in—add them in such a way that they settle into

**Tip:** Before adding grain, open the bottom valve to let water into the recirculation hose (and release air bubbles) and tap the bottom of the Colander with a stir stick to release any air bubbles that might be trapped under the Colander. Air under the Colander can trap wort above it and cause a stuck mash.



# BIAC User Manual

**WARNING:** The wort recirculation rate should be throttled (by partially closing a valve downstream of the pump either on pump exit or Mash Colander) to ensure that the grain bed does not compact and that the element does not become exposed.

**WARNING:** Heaters must be immersed in water at all times or they will dry-fire and could be ruined; keeping the element output at 20–30% during the mash can help prevent scorching on the element (and burnt flavor in the beer) and/or damage due to dry-firing.

the water without clumping. This reduces the need for mixing.

4. If there is floating or clumping, use the mixer only in the top 2/3 of the Colander; after this, it is not required to mix again, but a brief, gentle stir of the top 2/3 of your mash, at the 1/3 and 2/3 point of your mash period (e.g., at 20 and 40 minutes) can improve mash efficiency by ensuring water is not channelling through the grain bed. Ensure the pump is off whenever manually mixing the grain to minimize grain being drawn out of the bottom of the Colander where it could scorch on heaters or plug the pump.
5. Let the grain sit for 10–15 minutes before starting the pump (let the grain fully absorb water).
6. Manually remove the grain that settled to the bottom of the fermenter (e.g., out of the bottom port), and then connect the pump hose. Ensure water is unrestricted in the hose before operating pump.
7. Open the pump discharge valve slowly and follow the flow recirculation rate in Table D.
8. For added safety, turn the element(s) off any time you are adding or mixing malt.
9. During the mash keep the heater output as low as possible to reduce risk of scorching (eg., 10–20%).

Confirm pH (and adjust to 5.1–5.3 if necessary—there are several ways to adjust pH, but one is to add a small amount of sodium bicarbonate/baking soda to raise the pH if it is too low, or a small amount of calcium sulfate/gypsum or acid such as lactic or phosphoric if the pH is too high; give the water time to adjust before remeasuring), and let the mashing begin! ('Mashing' is the process whereby proteins/enzymes in the grain are activated to process complex sugars/starches and make them accessible for yeast to digest.) For more information, search for 'Mash' on the website.

During the mash, recirculating the sugar water/'wort'—with the pump can yield a higher 'mash efficiency' (recovering more sugar from the grain), and circulation can also help regulate the temperature of the wort as it cycles out of the Mash Colander and passes the temperature sensor. If the pump is running during the mash, care needs to be taken not to circulate the water/wort too fast. If the wort level in the Mash Colander rises, the flow of wort from the pump should be slowed (see next step). If the wort level rises but does not drop when the pump flow is slowed, there might be a 'stuck mash' (the grain is preventing water from passing down through the grain bed), which might require stopping the pump and stirring to reduce grain compaction. (Increasing the size of the grain crush and using rice hulls are two of the best ways to avoid a stuck mash. A crush size of 1–1.2mm /0.040–0.048" is recommended.) Additional tips for preventing a

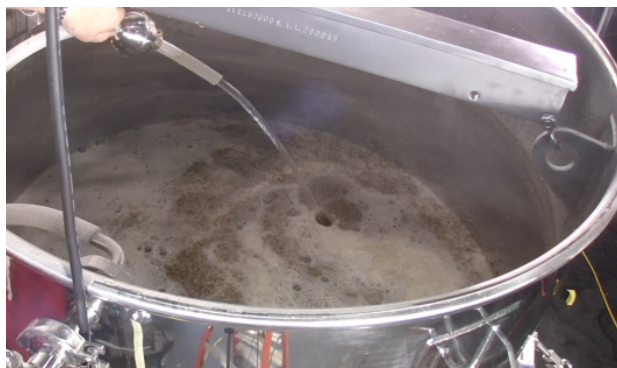


Figure 56: Wort recirculation

stuck mash can be found by searching for 'stuck mash' on the BREWHA website.

Wort recirculation will need to be throttled (by partially closing a valve downstream from the pump, either attached to the pump exit, or the Mash Colander) in order to ensure that the grain bed does not compact and that the element does not become exposed. The flow rate will depend on the 'fluidity' of your grain bed which is primarily a factor of your crush size—a small crush produces more 'fines' that plug up the bed and slow the flow rate. A general guideline for recirculation/flow rate (per minute) is shown in Table D.

Table D: Target recirculation rate

Target Recirc Rate per minute L/USG	
Small	0.5/0.15
Medium	1/0.25
Large	1.5/0.4
1.5BBL	3.5/0.9
3BBL	6/1.5
5BBL	9/2.25
7BBL	12/3.2

When recirculating, measure the temperature of the grain bed and the wort entering the Colander to confirm that it is at the target temperature (a simple pen thermometer works great). If it isn't, the temperature of the wort around the heating elements may need to be raised a few degrees above the target mash temperature. This is particularly true with the Small BIAC, as the low recirculation rate allows time for the wort to cool down while in the hose.

Table E: Approximate vessel volumes

Approximate Volumes L/USG		
	Cone	Colander
Small	7/2	19/5
Medium	12/3	38/10
Large	20/5	50/13
1.5BBL	30/8	180/47
3BBL	60/16	360/94
5BBL	100/26	575/150
7BBL	160/42	870/230

*Technical note on 'step mashing' (raising the mash temperature in stages): in order to raise the temperature of the mash more than a degree or two, as is required for procedures such as step mashing or if your grain bed is several degrees below your target temperature, it is necessary to raise the temperature of the recirculating water/wort significantly above the target temperature. The reason for this is that the temperature of a large amount of low-*

*temperature water (i.e., the mash in the Colander) cannot be changed quickly by a small volume of water (the recirculating water) at only a slightly higher temperature. It is a relatively simple relationship between the volume and temperature needing to be heated, and the volume and temperature being added; the heat will average out. So, for example, to raise a 100L/25USG mash 10°C/19°F by recirculating 25L/6USG, the 25L/6USG needs to be 40°C/76°F in order to raise the total 10°C/19°F. Calculations need to be made to determine the temperature of the recirculating water and the time to raise the temperature. (Grain is a fairly efficient insulator, so heat under the Colander will not heat the grain bed up—there needs to be circulation.)*

*To raise the temperature of the mash quickly, a technique similar to decoction mashing (where a portion of the mash is removed, heated, and then added back in) should be used, in which the pump should be turned off and the water in the cone below the Colander raised to the calculated temperature (to a maximum of 95°C/200°F). Then the pump is started again and the heated wort*

# BIAC User Manual

is circulated up into the Colander where it will raise the temperature of the mash. If the calculations for a given temperature rise require a volume greater than the cone volume (see Table E for cone volumes), two steps are needed: first, the temperature below the cone is kept at the target temperature until the volume recirculated AND the volume in the cone equals the calculated volume; then the temperature is set to the new step temperature while recirculation (to empty out the hotter wort in the cone) continues. (A maximum temperature of 95°C/200°F is recommended, as heating any higher will likely cause foaming up the sides of the Colander—if this starts to occur, lower your maximum temperature.)

Fortunately (unless you love math) programs like Brewfather and Beersmith have a decoction calculator that gives the amount of water needing to be recirculated. In the Beersmith example shown in Table F, with a temperature rise from 55C to 65C, a strike volume of 575L (100L in the cone and 475L in the Colander) and 300lb of grain, the calculator indicates that 175L are required. To achieve this, with the pump off, heat the area below the Colander to 95°C/200°F. Then start the pump and circulate for 7.5 minutes at 10L/min, keeping the wort in the cone at 95°C. At this point, one will have put 75L of 95°C water/wort into the Colander, and there will still be 100L of 95°C water below the Colander for a total of 175L of water. Then set the ETC back to a target temperature of 65°C/150°F and continue recirculating. The temperature in the cone will gradually drop as the wort from above cools it, and the temperature in the Colander will rise. After 20–30 minutes the mash should be very close to the target temperature. (As with decoction mashing, it is important to keep the mash pH at the low end of normal—close to 5.2—in order to minimize any tannin extraction.)

### 3. Vorlauf: 10–20 minutes

If water/wort wasn't recirculated during the mash, it should be at the end of the mash period. The grain inside the Mash Colander forms a filter that captures small grain particles as wort passes down through the grain bed in a process called 'vorlauf.' Minimizing the amount of grain in your boil improves the beer's flavor. Flow rates should be close to that listed in Table D of this section to help avoid the risk of a stuck mash and damage to the element. Wort should be recirculated until it clears up.

### 4. Lautering and Heatup: 30–60 minutes

When mashing is complete, the Mash Colander is lifted out (using an overhead hoist is desirable, as it is possible to raise the Colander slowly to allow for more gradual separation of grain and wort). The wort drains from the grain (out through the false bottom of the Mash Colander) in a process called 'lautering.' Sparge water can be added to rinse the grain and increase boil volume. Fresh water for sparging can be added as the wort level drops, maintaining a ~2cm/1" layer of water on top of the grain bed. It is generally recommended that sparge water be 75°C/167°F to increase the 'fluidity' of the grain and wash out the sugar more readily, however, cooler water can be used. Sparge water can be pre-heated in a separate hot liquor

Table F: Beersmith's decoction calculator

The image shows a screenshot of the 'Decoction Volume' calculator interface. The title is 'Decoction Volume' with a small icon of a pot. Below the title is the description: 'Tool to calculate the decoction volume needed to achieve a target step temperature'. The interface is divided into several sections: 'Target Step Temperature' with a value of 65.0 C; 'Starting Conditions' with fields for Starting Water Volume (575.00 l), Weight of Grain (300.00 lb), Starting Mash Temperature (55.0 C), Mash Tun Weight (800.00 lb), Tun Specific Heat (0.10 cal/gram-deg C), and Boiling Temperature (95.0 C); and 'Decoction Volume' with a result of 175.54 l and a Water/Grain Ratio of 4.226 qt/lb.

Section	Field	Value	Unit
Target Step Temperature	Target Step Temperature	65.0	C
	Starting Conditions		
Starting Conditions	Starting Water Volume	575.00	l
	Weight of Grain	300.00	lb
	Starting Mash Temperature	55.0	C
	Mash Tun Weight	800.00	lb
	Tun Specific Heat	0.10	cal/gram-deg C
	Boiling Temperature	95.0	C
Decoction Volume	Decoction Volume	175.54	l
	Water/Grain Ratio	4.226	qt/lb





Figure 57: Water Flow Meter

tank, or, sparge water can be heated by passing it through the fermenter jacket. The Flow Meter (Figure 57) can be attached to the jacket and used to measure the sparge water (for more information search for 'sparge' on the BREHWA website). Once grain is removed from the wort, the Heating Element is gradually turned up to 100% to heat the wort up to boiling. *(For brewers using a Tabletop Power Controller, during the boil the contactor whip can be unplugged from the ETC and plugged directly into a live receptacle such as a wall socket and the power to the element*

*controlled completely by the power output knob on the Tabletop Controller. For brewers using 120V power, to protect the ETC from overheating, plug the element directly into a wall socket during the boil.)* Emptying your jacket before boiling is recommended to reduce heat loss to the air.

## 5. Boiling: 60–90 minutes

Once a rolling boil is achieved, the element power output (0–100%) can be adjusted to influence the rate of evaporation and control the final volume for fermentation. Ensure steam can escape as the steam carries away some compounds that would otherwise produce off-flavors in the beer. It is a good idea to closely monitor the start of boil and turn the power down/off if necessary to prevent a boil over (especially important in the first few minutes of the boil until the foam or 'hot break' subsides). If using the steam condenser, an anti-foam agent such as the vegetable oil-based Patco 376 should be added to prevent foaming. Boiling improves the flavor and kills microbes. Hops can be added into the Hop Basket or Hop Spider once the foam subsides. Early addition or 'boil' hops provide bitterness to balance beer sweetness, and late addition or 'aroma' hops provide flavor/aroma. An additive such as Irish Moss (carrageenan) or a commercial flocculant such as Whirlfloc (added for the last 5–10 minutes of the boil) can help remove proteins and yield clearer beer; used alongside proper mashing technique, a highly 'flocculant' yeast (one that easily clumps and settles to the bottom of the fermenter



Figure 58: Heating sparge water

**WARNING: To prevent a potentially dangerous boil over of wort, do not leave the boil unattended.**

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# BIAC User Manual

**Tip:** Since cold wort might be trapped at the extremity of the racking and dump ports, to ensure proper sanitation, flush some boiling wort through the valves during the boil. (The wort can be collected and returned to the boil at the top of the fermenter.)

where it can be removed) and healthy fermentation will result in clearer beer.

For the last 10 minutes of the boil, the lid (with all valves removed and lid ports left open) can be set in place to let steam sanitize the lid (don't clamp the lid as steam needs to escape; the pressure relief valve should be tested regularly and always installed on the lid). During this period the element power should be turned down (e.g., 40–70%) to reduce the risk of boiling over. The process should be monitored during this entire period to ensure boiling over does not occur, as the wort will foam more readily when the lid is in place. If not heat sanitized either with steam or in boiling water, the lid fittings should be sanitized with chemicals.

If completing a 30-45 minute 'hop stand' (to add hop aroma and flavor into the beer with minimal bitterness), once the heaters are turned off, the empty jacket should be filled with cold tap water to cool the wort to ~75°C/170°F and the wort given a quick stir with a sterile mixer to equilibrate the temperature throughout the fermenter before adding hops.

## **6. Cooling: 30–120 minutes (depending on chilling water temperature, fermenter size and flow rate)**

Once boiling is complete, a chilling liquid (e.g., cold tap water) is sent through the fermenter jacket. It is important to keep the pressure of the chilling media in the jacket below 5psi (7psi in the 4-in-1) or the vessel could be damaged (keep main vessel body below 3psi in the 3-in-1 and 14.9psi in the 4-in-1). No restrictions should be placed on the outflow of the jacket and the exit/drain hose should be larger than the inlet hose otherwise pressure could build up in the jacket. Care should be taken that no restriction can impede flow and damage the fermenter (e.g., a hose kinking or valve accidentally closing). When using tap water in the jacket for chilling, a water pressure regulator should be installed before the jacket to help ensure pressure does not build up in the jacket. The lid should be installed to keep out airborne contaminants, but a port should be kept open to air during the cooling period, as a vacuum could form as the water cools, damaging the fermenter (or a few psi of CO<sub>2</sub> can be added and maintained into the fermenter to counteract any loss of pressure as the wort cools and contracts). A pressure and vacuum relief valve should be installed on the lid to help protect the inside of the vessel (inspect the valve frequently to ensure it is operating correctly). Don't slow the flow rate of the chilling media too much, as a good flow rate is necessary for faster chilling (the greater the temperature difference between the water leaving the jacket and the wort, the faster the chilling rate). To protect the fermenter, always use the Water Pressure Regulator when cooling with tap water. If tap water is not at least 10°C/20°F below your yeast pitching temperature, it should be used for the majority of

**WARNING:** Do not seal the fermenter lid or jacket port while boiling, chilling, or fermenting; vacuum or excess pressure will deform the vessel.

**WARNING:** If using a glycol system, install pressure control before AND AFTER the jacket to ensure pressure doesn't rise above 7psi. Due to most glycol systems being sealed, thermal expansion in the jacket and pipes can cause a pressure increase, damaging the vessel.

**Tip:** For best results, throughout the brew but especially after boil has ended, always use good sanitary techniques. Keep a bottle of diluted Star San on hand and liberally apply it to any object that may contact the wort/beer.

cooling (e.g., down to 30°C/90°F) and for Small, Medium, and Large systems the Water Chiller can be used for the rest. For the 1.5BBL-7BBL systems however, due to their much greater volume, our Cold Water/Liquor Tank should be used to bring the wort temperature from 30°C/90°F down to 20°C/70°F before connecting the fermenter to the Chiller (**never use the Chiller for cooling wort that is over 30°C/90°F**). To produce the large volume of cold water, up to two of our 6500BTU chillers can be connected to the insulated, jacketed Cold Water Tank and ran overnight. For example, if you want to pitch yeast at 20°C/70°F and your tap water is 20°C/70°F (which is too warm to bring the wort down to 20°C/70°F in a reasonable time), first run tap water through the fermenter jacket to bring the wort down from boiling temperatures to around 30°C/90°F and then connect the Cold Water Tank (which was chilled overnight) to your fermenter jacket to bring the wort the rest of the way down to 20°C/70°F. Finally connect the Water Chiller for any final small adjustments and to maintain fermentation temperature. When the wort is ready to have yeast pitched, a sample/gravity reading is taken (to measure the amount of sugar at the start of fermentation). *Though not necessary, for the larger systems (e.g., 5 and 7BBL), in addition to using the jacket for chilling, to reduce chill times, some customers will use a separate plate chiller to increase surface area and will run a closed loop of hot wort out from the fermenter, through the plate chiller, and back into the fermenter. (Passing boiling wort through the lines, pump and plate chiller for the last several minutes of boil will sanitize them; for best results, always thoroughly clean the chiller immediately after use.)*

### 7. Filtering and Resting Wort, Pitching Yeast: 10 minutes

When the wort reaches yeast-pitching temperature, the protein that has settled to the bottom is removed out of the bottom port (generally this is 2–5% of the total volume). To facilitate healthy yeast at the start of fermentation, oxygen (or filtered air) is normally added to the wort through the bottom port with the Wort Aeration Stone. The addition of oxygen in the bottom also helps equilibrate the temperature inside and break temperature stratification as the rising bubbles stir up the wort. The addition of oxygen can be precisely measured by gas flow meters (and the amount of dissolved oxygen tested by dissolved oxygen meters), but as a general rule, pure oxygen should be added for 1–5 minutes, and air (20% oxygen) for 8–10 minutes (longer for the largest tanks). The temperature is checked again to ensure it is correct for adding yeast, and if no further chilling is necessary, the yeast is pitched, the gas blow-off hose connected to a lid port (with the distil end of the hose in a bucket of water) and the lid sealed. Fermentation should start within 12–36 hours as evidenced by bubbles appearing in the air lock/bucket.

### 8. Rinsing Out Mash Colander and Pump Assembly: 15 minutes

If not rinsed out during sparge, the Colander, pump and hoses should be thoroughly rinsed out now.

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# BIAC User Manual

## **9. Fermentation: 7–14 days**

To maintain fermentation temperature, the Temperature Control Valve/TCV (if using cold tap water) or Water Chiller are used. When programmed to the desired fermentation temperature, the ETC will power the TCV or Water Chiller (or chiller pump depending on one's preferred setup; see the Chiller setup section of the manual for more details on setup) which will put chilling water into the jacket whenever the fermenter rises above the set temperature. When the fermenter is cooled back down to the set temperature the TCV or Chiller will stop the circulation of cooling water. *Technical note: most beer styles are fermented at or below room temperature so only cooling is needed during fermentation, but if needing a warm ferment (e.g., for kettle sours or saisons) the fermenter can be connected to the controller (additional small controllers can be purchased if heating multiple fermenters) for warming. Power output should only be 2–3% so that the heaters do not scorch the yeast.* After fermentation has slowed down (4–6 days for ales and 1–2 weeks for lagers), yeast can be removed out of the bottom of the fermenter (first remove the blow-off hose from water or add 1–2psi of CO<sub>2</sub> to the top of the fermenter so that water from your blow-off tank is not sucked into the fermenter). This will help ensure yeast cake does not harden and make removal/cleaning difficult.

## **10. Conditioning and Carbonation : 1–4 weeks**

The time it takes for 'conditioning' (maturing of the flavor) to occur depends on the style of beer: light, simple ales take 1-2 weeks, lagers or dark, complex beers can take up to 4 weeks or longer. Fermentation mostly completes (that is, it reaches final gravity) normally within a week or two, but it is the final 'cleanup' work yeast does that will take beer from tasting 'good' to tasting 'great'. Sample the beer to tell when it is finished.

Prior to transfer, to help clear the beer (and make transfer easier if the beer is carbonated), it is often 'crashed' to near freezing temperatures for several days. A product like Biofine can also be added at this point to assist with sedimentation. Our removable neoprene insulating jackets can be installed on our regular fermenters to help the Chiller get the beer several degrees colder than would be possible without the jacket. If cold crashing, add CO<sub>2</sub> pressure to offset any vacuum that forms as the beer cools. For more information on carbonating in bottles or naturally carbonating in the 4-in-1 fermenter, search for 'carbonate' on the BREWHA website. If carbonating in kegs, kegs can be stored in a cold room with 10-14psi of gas pressure depending on the style of beer (carbonation occurs much faster and at lower pressure if the beer is cold).

## **11. Racking/Transferring to Bottles or Kegs: 15–60 minutes**

While beer can be served directly from the 4-in-1 fermenters, most customers will transfer to kegs to free up the fermenter for the next batch of beer. For instructions search for 'clean kegs' and 'fill kegs' on the website.

## **12. Cleaning the Fermenter for the Next Brew: 10-15 minutes**

Once the beer is removed, all that is left is cleaning the fermenter out and readying it for the next batch. Any yeast remaining at the bottom can be disposed and the fermenter rinsed out. A stainless safe scrubby such as the Euro Scrubber can be used to clean off the krausen that has dried on the side. The valves should be removed, ball valves disassembled and rinsed out and the ports/ferrules should be cleaned out, the heaters removed and heating rods thoroughly cleaned off. And that's it! The fermenter can be reassembled and readied for the next brew.

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**WARNING:** These recipes are for guideline purposes only and no warranty express or implied is given as to how they will turn out. Check them over carefully to ensure they will work with your equipment, water, location, ingredients and any other variables, and make adjustments as necessary. These recipes are designed for 117L/1BBL; adjustments will need to be made for different batch sizes (easy to do inside an app like Brewfather).

**Please Note:**

1. Boil rate is calculated based on 75% element output; increase pre-boil volume if boil rate will be higher.
2. Recipes are made in Brewfather using the equipment and mash profiles provided on the BREWHA website.
3. A single yeast 'package' are used throughout with propagation through a starter being needed; see this article for more: <https://brewhaequipment.com/search?q=propagat>
4. These recipes are meant to be used as a starting point from which to create your own unique beer.
5. The BIAC comes in several sizes; we advise gaining familiarity with the system and recipes on a Small, Medium or Large size before brewing on the 1.5–7BBL systems.

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# BIAC User Manual

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**Brewfather**  
www.brewfather.app

## Amber Ale - 5.4%

### American Amber Ale

Author: Admin Brewha

Type: All Grain

IBU : 29 (Tinseth)  
BU/GU : 0.53  
Colour : 27 EBC  
Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 12.2 °P  
Original Gravity : 13.4 °P  
Final Gravity : 3.3 °P

### Fermentables (27.53 kg)

17.3 kg - Organic 2row Pale Malt 5.5 EBC (62.8%)  
4.07 kg - Organic Crystal 60 2-Row 118 EBC (1...  
4.07 kg - Organic Pilsner 3.2 EBC (14.8%)  
2.09 kg - Melanoidin 59 EBC (7.6%)

### Hops (109 g)

60 min - 49.5 g - Mosaic Cryo - 23.3% (25 IBU)  
^ Cryo

### Hop Stand

30 min hopstand @ 77 °C  
30 min - 59.5 g - Mosaic Cryo - 23.3% (4 IBU)  
^ Cryo

### Miscellaneous

Mash - 8 g - Baking Soda (NaHCO3)  
Mash - 30 g - Calcium Chloride (CaCl2)  
Mash - 15 g - Epsom Salt (MgSO4)  
Mash - 10 g - Gypsum (CaSO4)  
Mash - 11 ml - Phosphoric Acid 75% 75%  
Mash - 495.834 g - Rice Hulls  
Sparge - 3.2 g - Calcium Chloride (CaCl2)  
Sparge - 1.6 g - Epsom Salt (MgSO4)  
Sparge - 1.07 g - Gypsum (CaSO4)  
10 min - Boil - 12.534 g - Irish Moss  
Boil - 12.612 ml - Anti-foam Patco 376  
^ Add to the wort after mash, before boil beg...  
Primary - 3.305 g - Brewers Clarex  
Secondary - 23.8 ml - Biofine Clear  
^ Add to fermenter while gassing to distribut...

### Yeast

1 pkg - Escarpment Yeast Labs American Ale

### BREWHA 1.5BBL BIAC

Batch Size : 119 L  
Boil Size : 140.04 L  
Post-Boil Vol : 126.04 L  
Mash Water : 141.36 L  
Sparge Water : 15.1 L  
Boil Time : 70 min  
Total Water : 156.46 L



27 EBC

Brewhouse Efficiency: 77%  
Mash Efficiency: 78.3%

### Mash Profile

High fermentability  
69.3 °C - Strike Temp  
65 °C - 60 min - Temperature

### Fermentation Profile

Ale  
20 °C - 14 days - Primary

### Water Profile

Reverse Osmosis Water based on Victoria Treat...  
Ca 75 Mg 11 Na 14 Cl 103 SO 81

SO/Cl ratio: 0.8  
Mash pH: 5.24

### Measurements

Mash pH:

Boil Volume:

Pre-Boil Gravity:

Post-Boil Kettle Volume:

Original Gravity:

Fermenter Top-Up:

Fermenter Volume:

Final Gravity:

Bottling Volume:

### Recipe Notes

Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )





## Mosaic Pale Ale - 5.1%

American Pale Ale  
Author: Admin Brewha

Type: All Grain

IBU : 36 (Tinseth)  
BU/GU : 0.71  
Color : 8 SRM  
Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.045  
Original Gravity : 1.050  
Final Gravity : 1.011

Fermentables (24.21 kg)  
20.79 kg - Organic 2row Pale Malt 2.8 SRM (85...  
1.3 kg - Crystal 60 2-Row 60 SRM (5.4%)  
1.14 kg - Munich II 11.5 SRM (4.7%)  
980 g - Carapils 1.3 SRM (4.1%)

Hops (234.1 g)  
60 min - 58.5 g - Mosaic Cryo - 23.3% (31 IBU)  
^ Cryo

Hop Stand  
20 min hopstand @ 77 °C  
20 min - 87.8 g - Mosaic Cryo - 23.3% (5 IBU)  
^ Cryo

Dry Hops  
3 days - 87.8 g - Citra Cryo - 21.9%  
^ Cryo

Miscellaneous  
Mash - 11.733 g - Calcium Chloride (CaCl2)  
Mash - 17.31 g - Epsom Salt (MgSO4)  
Mash - 35.191 g - Gypsum (CaSO4)  
Mash - 11.7 ml - Phosphoric Acid 75% 75%  
Mash - 487.5 g - Rice Hulls  
Sparge - 3.335 g - Calcium Chloride (CaCl2)  
Sparge - 4.921 g - Epsom Salt (MgSO4)  
Sparge - 10.004 g - Gypsum (CaSO4)  
15 min - Boil - 2.6 items - Whirlfloc Tablets  
10 min - Boil - 12.4 g - Irish Moss  
Boil - 12.4 ml - Anti-foam Patco 376  
^ Add to the wort after mash, before boil beg...  
Primary - 3.9 g - Brewers Clarex  
Secondary - 23.4 ml - Biofine Clear  
^ Add to fermenter while gassing to distribut...

Yeast  
1 pkg - Escarpment Yeast Labs English Ale II

BREWHA 1.5BBL BIAC  
Batch Size : 117 L  
Boil Size : 137.96 L  
Post-Boil Vol : 123.96 L  
  
Mash Water : 129.74 L  
Sparge Water : 22.07 L  
Boil Time : 70 min  
Total Water : 151.81 L



8 SRM

Brewhouse Efficiency: 79%  
Mash Efficiency: 80.4%

Mash Profile  
High fermentability  
71.3 °C - Strike Temp  
67 °C - 60 min - Temperature

Fermentation Profile  
Ale  
19 °C - 14 days - Primary  
4 °C - 3 days - Cold Crash

Water Profile  
Reverse Osmosis Water based on Victoria Treat...  
Ca 135 Mg 20 Na 0 Cl 67 SO 313

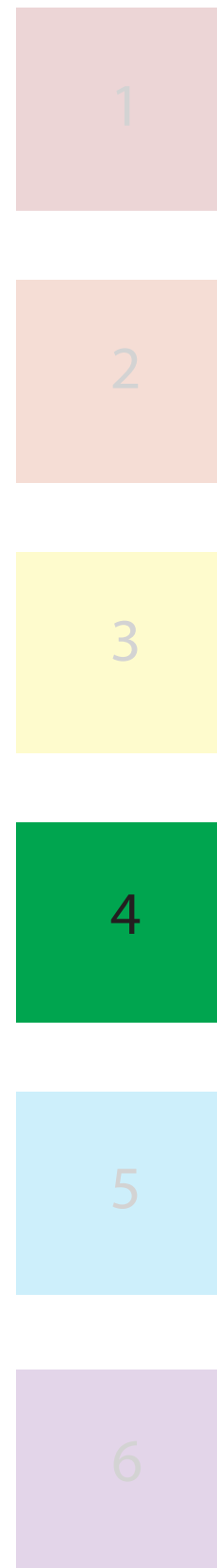
SO/Cl ratio: 4.6  
Mash pH: 5.01

### Measurements

Mash pH:  
  
Boil Volume:  
  
Pre-Boil Gravity:  
  
Post-Boil Kettle Volume:  
  
Original Gravity:  
  
Fermenter Top-Up:  
  
Fermenter Volume:  
  
Final Gravity:  
  
Bottling Volume:

### Recipe Notes

Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )



# BIAC User Manual

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## Berliner Weisse - 4.5%

Berliner-Style Weisse

Author: Admin Brewha

Type: All Grain

IBU : 4 (Tinseth)  
BU/GU : 0.09  
Color : 3 SRM  
Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.038  
Original Gravity : 1.042  
Final Gravity : 1.008

Fermentables (19.5 kg)

9.75 kg - Organic Pilsner 1.6 SRM (50%)  
9.75 kg - Organic Wheat 3 SRM (50%)

Hops (39 g)

60 min - 39 g - Tettnang T90 - 3.9% (4 IBU)

Miscellaneous

Mash - 10.244 g - Calcium Chloride (CaCl2)  
Mash - 2.587 g - Epsom Salt (MgSO4)  
Mash - 2.685 g - Gypsum (CaSO4)  
Mash - 26 ml - Phosphoric Acid 75% 75%  
Mash - 487.5 g - Rice Hulls  
Sparge - 4.29 g - Calcium Chloride (CaCl2)  
Sparge - 1.086 g - Epsom Salt (MgSO4)  
Sparge - 1.125 g - Gypsum (CaSO4)  
Sparge - 0.02 ml - Phosphoric Acid 75% 75%  
Boil - 12.4 ml - Anti-foam Patco 376  
^ Add to the wort after mash, before boil beg...

Yeast

1 pkg - Escarpment Yeast Labs Kolsch Ale  
1 pkg - Wyeast Labs Lactobacillus 5335

BREWHA 1.5BBL BIAC

Batch Size : 117 L  
Boil Size : 137.96 L  
Post-Boil Vol : 123.96 L

Mash Water : 123 L  
Sparge Water : 25.04 L  
Boil Time : 70 min  
Total Water : 148.04 L

Brewhouse Efficiency: 79%  
Mash Efficiency: 80.4%

Mash Profile

High fermentability  
66.4 °C - Strike Temp  
63 °C - 60 min - Temperature

Fermentation Profile

Ale  
22 °C - 2 days - Lactobacillus to 3.5pH  
18 °C - 12 days - Kolsch  
3 °C - 4 days - Crash with CO2 at 14psi for 4...

Water Profile

Reverse Osmosis Water based on Victoria Treat...  
Ca 43 Mg 3 Na 0 Cl 62 SO 31

SO/Cl ratio: 0.5

Mash pH: 5  
Sparge pH: 6

Measurements

Mash pH:

Boil Volume:

Pre-Boil Gravity:

Post-Boil Kettle Volume:

Original Gravity:

Fermenter Top-Up:

Fermenter Volume:

Final Gravity:

Bottling Volume:



3 SRM

### Recipe Notes

This is a kettle soured beer -- Lactobacillus is added after a short boil (without hop addition) and chill. The pH is watched until it reaches 3.5 at which point the wort is heated back up to a boil and hops are added according to normal brewing schedule. For a more tart flavor, lower the pH to 3.2 before the second boil.

Bacteria and yeast are both propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )



## Citrus ISA - 4.2%

### Session India Pale Ale

Author: Admin Brewha

Type: All Grain

IBU : 53 (Tinseth)  
 BU/GU : 1.25  
 Color : 4 SRM  
 Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.038  
 Original Gravity : 1.042  
 Final Gravity : 1.010

### Fermentables (20.35 kg)

20.35 kg - Organic 2row Pale Malt 2.8 SRM (100%)

### Hops (482 g)

60 min - 75 g - Citra - 21.9% (39 IBU)

### Hop Stand

30 min hopstand @ 77 °C

30 min - 190.8 g - Citra - 21.9% (14 IBU)

### Dry Hops

3 days - 216.2 g - Citra - 21.9%

### Miscellaneous

Mash - 19.667 g - Calcium Chloride (CaCl2)  
 Mash - 15.172 g - Epsom Salt (MgSO4)  
 Mash - 19.763 g - Gypsum (CaSO4)  
 Mash - 12.717 ml - Phosphoric Acid 75% 75%  
 Mash - 0.598 kg - Rice Hulls  
 Sparge - 8.521 g - Calcium Chloride (CaCl2)  
 Sparge - 6.575 g - Epsom Salt (MgSO4)  
 Sparge - 8.565 g - Gypsum (CaSO4)  
 10 min - Boil - 1.908 tbsp - Irish Moss  
 Boil - 12.323 ml - Anti-foam Patco 376  
 ^ Add to the wort after mash, before boil beg...  
 Primary - 4.451 g - Brewers Clarex  
 Secondary - 23.4 ml - Biofine Clear  
 ^ Add to fermenter while gassing to distribut...

### Yeast

1 pkg - Escarpment Yeast Labs Sterling Ale

### BREWHA 1.5BBL BIAC

Batch Size : 117 L  
 Boil Size : 137.96 L  
 Post-Boil Vol : 123.96 L

Mash Water : 116.23 L  
 Sparge Water : 32.49 L  
 Boil Time : 70 min  
 Total Water : 148.72 L



4 SRM

Brewhouse Efficiency: 79%  
 Mash Efficiency: 80.4%

### Mash Profile

High fermentability  
 68.9 °C - Strike Temp  
 65 °C - 60 min - Temperature

### Fermentation Profile

Ale  
 19 °C - 14 days - Primary

### Water Profile

Reverse Osmosis Water based on Victoria Treat...  
 Ca 135 Mg 20 Na 0 Cl 129 SO 229

SO/Cl ratio: 1.8

Mash pH: 4.99

### Measurements

Mash pH:

Boil Volume:

Pre-Boil Gravity:

Post-Boil Kettle Volume:

Original Gravity:

Fermenter Top-Up:

Fermenter Volume:

Final Gravity:

Bottling Volume:

### Recipe Notes

Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )

# BIAC User Manual

Generated 2023-01-03T14:31:22-08:00 - Brewfather - <https://web.brewfather.app>

**Brewfather**  
www.brewfather.app

## Coffee Stout - 6.7%

### American Stout

Author: Admin Brewha

Type: All Grain

IBU : 49 (Tinseth)  
BU/GU : 0.66  
Color : 46 SRM  
Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.066  
Original Gravity : 1.074  
Final Gravity : 1.023

### Fermentables (36.13 kg)

21.45 kg - Organic 2row Pale Malt 2.8 SRM (59...  
3.9 kg - Crystal 60 2-Row 60 SRM (10.8%)  
3.9 kg - Organic Wheat 3 SRM (10.8%)  
2.63 kg - Melanoidin 30 SRM (7.3%)  
1.95 kg - Chocolate Malt 500 SRM (5.4%)  
1.32 kg - Special B 150 SRM (3.7%)  
980 g - Midnight Wheat Malt 550 SRM (2.7%)

### Hops (175.5 g)

60 min - 175.5 g - Summit - 15% (49 IBU)

### Miscellaneous

Mash - 15.6 g - Calcium Chloride (CaCl2)  
Mash - 5.85 g - Epsom Salt (MgSO4)  
Mash - 17.55 g - Gypsum (CaSO4)  
Mash - 916.5 g - Rice Hulls  
10 min - Boil - 12.4 g - Irish Moss  
Boil - 12.4 ml - Anti-foam Patco 376  
^ Add to the wort after mash, before boil beg...

### Yeast

1 pkg - Escarpment Yeast Labs Sterling Ale

### BREWHA 1.5BBL BIAC

Batch Size : 117 L  
Boil Size : 137.96 L  
Post-Boil Vol : 123.96 L

Mash Water : 161.35 L  
Sparge Water : 0 L  
Boil Time : 70 min  
Total Water : 161.35 L

Brewhouse Efficiency: 79%  
Mash Efficiency: 80.4%

### Mash Profile

More dextrinous  
75.4 °C - Strike Temp  
70 °C - 30 min - Temperature

### Fermentation Profile

Ale  
20 °C - 7 days - Primary

### Water Profile

Reverse Osmosis Water  
Ca 54 Mg 4 Na 8 Cl 52 SO 78

SO/Cl ratio: 1.5  
Mash pH: 5.3

### Measurements

Mash pH:  
Boil Volume:  
Pre-Boil Gravity:  
Post-Boil Kettle Volume:  
Original Gravity:  
Fermenter Top-Up:  
Fermenter Volume:  
Final Gravity:  
Bottling Volume:



### Recipe Notes

Dark grains were stirred into the surface layer of the mash at the 45 minute mark  
2.5 pounds of coarsely cracked, dark roast coffee beans (added in 2 large hop cylinders post fermentation) 3 day steep.  
Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )





## German Pilsner - 5%

### German Pils

Author: Admin Brewha

Type: All Grain

IBU : 45 (Tinseth)  
 BU/GU : 0.95  
 Color : 3 SRM  
 Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.042  
 Original Gravity : 1.047  
 Final Gravity : 1.009

### Fermentables (23.17 kg)

21.52 kg - Organic Pilsner 1.6 SRM (92.9%)  
 1.18 kg - Acidulated 1.8 SRM (5.1%)  
 470 g - Honey Malt 25 SRM (2%)

### Hops (786.8 g)

60 min - 55.4 g - Loral - 20.8% (27 IBU)  
 ^ Cryo

### Hop Stand

45 min hopstand @ 77 °C  
 45 min - 190.8 g - Loral Cryo (Cryo) - 20.8%...  
 ^ Cryo  
 45 min - 190.8 g - Saaz T90 - 4.1% (3 IBU)

### Dry Hops

4 days - 190.8 g - Loral Cryo (Cryo) - 20.8%  
 ^ Cryo  
 4 days - 159 g - Saaz T90 - 4.1%

### Miscellaneous

Mash - 15.89 g - Calcium Chloride (CaCl2)  
 Mash - 12.272 g - Epsom Salt (MgSO4)  
 Mash - 12.387 g - Gypsum (CaSO4)  
 Mash - 476.902 g - Rice Hulls  
 Sparge - 3.911 g - Calcium Chloride (CaCl2)  
 Sparge - 3.02 g - Epsom Salt (MgSO4)  
 Sparge - 3.046 g - Gypsum (CaSO4)  
 10 min - Boil - 12.4 g - Irish Moss  
 Boil - 12.4 ml - Anti-foam Patco 376  
 ^ Add to the wort after mash, before boil beg...  
 Primary - 3.744 g - Brewers Clarex  
 ^ Add during aeration  
 Secondary - 23.4 ml - Biofine Clear  
 ^ Add to fermenter while gassing to distribut...

### Yeast

1 pkg - Escarpment Yeast Labs Czech Lager

### BREWHA 1.5BBL BIAC

Batch Size : 117 L  
 Boil Size : 137.96 L  
 Post-Boil Vol : 123.96 L

Mash Water : 133.05 L  
 Sparge Water : 17.93 L  
 Boil Time : 70 min  
 Total Water : 150.98 L



3 SRM

Brewhouse Efficiency: 75.8%  
 Mash Efficiency: 77.1%

### Mash Profile

High fermentability  
 69.6 °C - Strike Temp  
 66 °C - 60 min - Temperature

### Fermentation Profile

Ale  
 14 °C - 12 days - Primary  
 19 °C - 2 days - Primary  
 3 °C - 14 days - Cold Crash

### Water Profile

Reverse Osmosis Water based on Victoria Treat...  
 Ca 85 Mg 14 Na 0 Cl 91 SO 138

S0/Cl ratio: 1.5

Mash pH: 5.15

### Measurements

Mash pH:

Boil Volume:

Pre-Boil Gravity:

Post-Boil Kettle Volume:

Original Gravity:

Fermenter Top-Up:

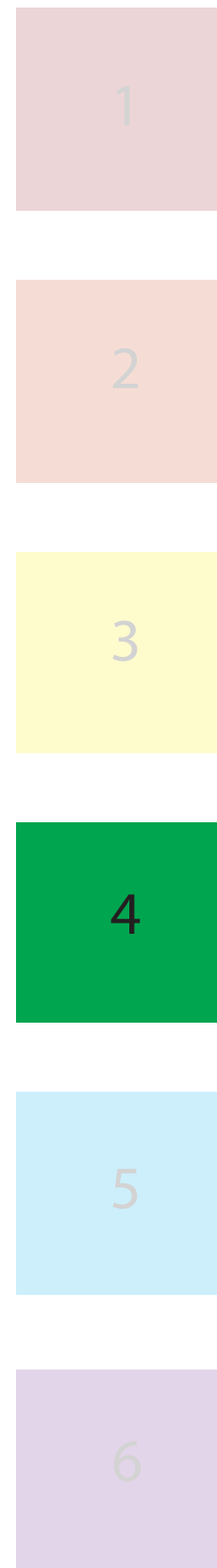
Fermenter Volume:

Final Gravity:

Bottling Volume:

### Recipe Notes

Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )



# BIAC User Manual

Generated 2023-01-03T14:15:34-08:00 - Brewfather - <https://web.brewfather.app>



## Hard Seltzer - 6%

Dry Mead

Author: Admin Brewha

Type: Extract

IBU : 0 (Tinseth)  
BU/GU : 0  
Color : 0 SRM  
Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.037  
Original Gravity : 1.038  
Final Gravity : 0.992

Fermentables (11.7 kg)  
11.7 kg - Corn Sugar (Dextrose) 0 SRM (100%)

Miscellaneous  
15 min - Boil - 5 pkg - Yeast Nutrient Proppe...

Yeast  
1 pkg - Omega Lutra Kveik OYL-071

BREWHA 1.5BBL BIAC

Batch Size : 117 L  
Boil Size : 126.96 L  
Post-Boil Vol : 123.96 L

Mash Water : 120 L  
Sparge Water : 1.88 L  
Boil Time : 15 min  
Total Water : 121.88 L

Brewhouse Efficiency: 79%  
Mash Efficiency: 80.4%

Mash Profile  
High fermentability  
65 °C - 60 min - Temperature

Fermentation Profile  
Ale  
20 °C - 14 days - Primary

Measurements

Mash pH:

Boil Volume:

Pre-Boil Gravity:

Post-Boil Kettle Volume:

Original Gravity:

Fermenter Top-Up:

Fermenter Volume:

Final Gravity:

Bottling Volume:

### Recipe Notes

Yeast should be propagated through single step to increase cell count. (See this link for details on how to do this: <https://brewhaequipment.com/search?q=propagate> )  
Dissolve the yeast nutrient into hot 'sparge' water and then add combined liquid to 4-in-1 fermenter at the end of boil.

## Classic Westcoast IPA - 6.3%

### American IPA

Author: Admin Brewha

Type: All Grain

IBU : 73 (Tinseth)  
 BU/GU : 1.27  
 Color : 9 SRM  
 Carbonation : 2.4 CO2-vol

Pre-Boil Gravity : 1.052  
 Original Gravity : 1.057  
 Final Gravity : 1.009

### Fermentables (29.7 kg)

23.53 kg - Organic 2row Pale Malt 2.8 SRM (79...  
 1.27 kg - Barley, Flaked 1.7 SRM (4.3%)  
 1.27 kg - Carapils 1.3 SRM (4.3%)  
 1.27 kg - Melanoidin 30 SRM (4.3%)  
 1.27 kg - Munich II 11.5 SRM (4.3%)  
 640 g - Acidulated 1.8 SRM (2.2%)  
 450 g - Chateau Special B 150 SRM (1.5%)

### Hops (1036.1 g)

60 min - 171.9 g - Summit T90 - 16% (58 IBU)

### Hop Stand

60 min hopstand @ 77 °C  
 60 min - 216.2 g - Centennial T90 - 8.8% (4 IBU)  
 60 min - 216.2 g - Chinook T90 - 11.5% (5 IBU)  
 60 min - 143.7 g - Simcoe Cryo - 20.4% (6 IBU)

### Dry Hops

3 days - 108.1 g - Centennial T90 - 7.9%  
 3 days - 108.1 g - Chinook - 13%  
 3 days - 71.9 g - Simcoe - 13%

### Miscellaneous

Mash - 13.086 g - Calcium Chloride (CaCl2)  
 Mash - 20.539 g - Epsom Salt (MgSO4)  
 Mash - 49.839 g - Gypsum (CaSO4)  
 Mash - 635.87 g - Rice Hulls  
 Sparge - 3.332 g - Calcium Chloride (CaCl2)  
 Sparge - 5.233 g - Epsom Salt (MgSO4)  
 Sparge - 12.698 g - Gypsum (CaSO4)  
 Sparge - 0.013 ml - Phosphoric Acid 75% 75%  
 10 min - Boil - 12.4 g - Irish Moss  
 Boil - 12.4 ml - Anti-foam Patco 376  
 ^ Add to the wort after mash, before boil beg...  
 Primary - 5 g - Brewers Clarex  
 ^ Add during aeration  
 Secondary - 80 ml - Biofine Clear  
 ^ Add to fermenter while gassing to distribut...

### Yeast

1 pkg - Escarpment Yeast Labs Cali Ale

### BREWHA 1.5BBL BIAC

Batch Size : 117 L  
 Boil Size : 137.96 L  
 Post-Boil Vol : 123.96 L

Mash Water : 148.95 L  
 Sparge Water : 7.25 L  
 Boil Time : 70 min  
 Total Water : 156.2 L



9 SRM

Brewhouse Efficiency: 74%  
 Mash Efficiency: 75.3%

### Mash Profile

Medium fermentability  
 71.5 °C - Strike Temp  
 67 °C - 45 min - Temperature

### Fermentation Profile

Ale  
 20 °C - 14 days - Primary

### Water Profile

Reverse Osmosis Water based on Victoria Treat...  
 Ca 160 Mg 21 Na 0 Cl 67 SO 378

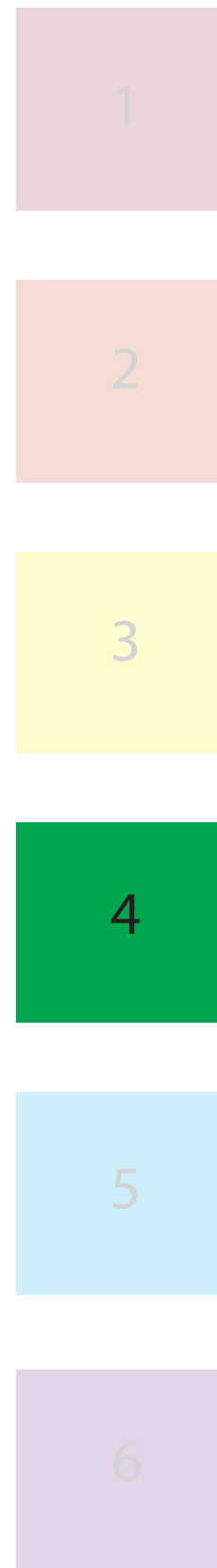
SO/Cl ratio: 5.6

Mash pH: 5.11  
 Sparge pH: 6

### Measurements

Mash pH:  
 Boil Volume:  
 Pre-Boil Gravity:  
 Post-Boil Kettle Volume:  
 Original Gravity:  
 Fermenter Top-Up:  
 Fermenter Volume:  
 Final Gravity:  
 Bottling Volume:

### Recipe Notes



# BIAC User Manual

For Warranty and Returns, Shipping, Terms of Service and all other policies, go to the BREWHA website.



## Warranty and Returns

Please Note: Policies are occasionally updated. See the BREWHA website for all of our latest policies.

We want you to be as excited with your purchase as we are to provide it for you. We have employed every means to provide you with the most affordable and enjoyable brewing and distilling experience with equipment of the highest quality to ensure that you are able to produce the best beverages possible.

### Warranty

Warranty and support are for original owners only. Electrical products (pumps, controllers, etc.) are warrantied according to the vendor policy, which in most cases is 6 months (details can be seen on their respective websites). The stainless equipment is guaranteed for 36 months from date of receiving the equipment when operated according to normal procedures, under normal operating conditions, and maintained (see <https://brewhaequipment.com/blogs/how-to-brew-beer/10993669-the-best-way-to-clean-and-sanitize-your-brewing-equipment>). It does not include failure due to improper use of the equipment. If the equipment is faulty, we will either repair it or replace it at our discretion and expense. All expenses are limited to equipment repair/replacement costs (e.g., brewer's labor, supplies, ingredients and all other expenses are not included). For more information, see section below for 'DISCLAIMER OF WARRANTIES; LIMITATION OF LIABILITY.'

### Returns

Please note that ALL SALES ARE FINAL. If you are uncertain and want to just check the equipment out, arrange to attend one of the workshops hosted by a BREWHA customer (search in the 'Learn' section for workshop). In exceptional circumstance (such as ordering the wrong size part) we might authorize a return for exchange or credit. A restocking fee of 10% (50% for any unused custom cut hoses and cords) will be charged to your account. Any/all returns must be authorized through us first. To be eligible for a return, you must be the original owner and your item must be in the same condition that you received it and it must be returned in the original packaging. All tanks must be shipped back in their crate, and secured to a shipping pallet, same as they were shipped to you. This ensures it will arrive back with us safely. If you think you might need to return a part, don't dispose of the original packaging until you are certain it is not going back. Once the item is ready to ship, send us a picture of the ship-

# BIAC User Manual

ment ready to ship, along with its dimensions (length x width x height) and weight. We will then provide you with a return shipping label and provide shipping instructions. All shipping expense is the customer's responsibility.

## **Cancellations**

All cancelled orders are subject to a 10% restocking charge.

## **Refunds (if applicable)**

Once your return is received and inspected, we will send you an email to notify you that we have received your returned item. We will also notify you of the approval or rejection of your refund. If the product is not returned in the same condition you received it, we reserve the right to charge for the cost of repair and/or replacement. Your refund will be processed, and a credit will be automatically applied to your credit card or original method of payment, within 30 days of receipt.

If you are waiting for a refund and it seems to be taking too long, first check your bank account again. Then contact your credit card company, as it may take some time before your refund is officially posted. Next, contact your bank. There is often some processing time before a refund is posted. If you've done all of this and you still have not received your refund, please contact us at [brewing@brewha.com](mailto:brewing@brewha.com).

## Privacy and Terms of Service

### PRIVACY STATEMENT

#### SECTION 1 - WHAT DO WE DO WITH YOUR INFORMATION?

When you purchase something from our store, as part of the buying and selling process, we collect the personal information you give us such as your name, address and email address. When you browse our store, we also automatically receive your computer's internet protocol (IP) address in order to provide us with information that helps us learn about your browser and operating system.

Email marketing (if applicable): With your permission, we may send you emails about our store, new products and other updates.

#### SECTION 2 - CONSENT

How do you get my consent?

When you provide us with personal information to complete a transaction, verify your credit card, place an order, arrange for a delivery or return a purchase, we assume that you consent to our collecting it and using it for that specific reason only.

If we ask for your personal information for a secondary reason, like marketing, we will either ask you directly for your expressed consent, or provide you with an opportunity to say no.

How do I withdraw my consent?

If, after you opt-in, you change your mind, you may withdraw your consent for us to contact you, for the continued collection, use or disclosure of your information, at anytime, by contacting us at [brewing@brewha.com](mailto:brewing@brewha.com).

#### SECTION 3 - DISCLOSURE

We may disclose your personal information if we are required by law to do so or if you violate our Terms of Service.

#### SECTION 4 - SHOPIFY

Our store is hosted on Shopify Inc. They provide us with the online e-commerce platform that allows us to sell our products and services to you.

Your data is stored through Shopify's data storage, databases and the general Shopify application. They store your data on a secure server behind a firewall.

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# BIAC User Manual

## Payment

If you choose a direct payment gateway to complete your purchase, then Shopify stores your credit card data. It is encrypted through the Payment Card Industry Data Security Standard (PCI-DSS). Your purchase transaction data is stored only as long as is necessary to complete your purchase transaction. After that is complete, your purchase transaction information is deleted.

All direct payment gateways adhere to the standards set by PCI-DSS as managed by the PCI Security Standards Council, which is a joint effort of brands like Visa, MasterCard, American Express and Discover. PCI-DSS requirements help ensure the secure handling of credit card information by our store and its service providers. For more information, you may also want to read Shopify's Terms of Service [here](#) or Privacy Statement [here](#).

## **SECTION 5 - THIRD-PARTY SERVICES**

In general, the third-party providers used by us will only collect, use and disclose your information to the extent necessary to allow them to perform the services they provide to us.

However, certain third-party service providers, such as payment gateways and other payment transaction processors, have their own privacy policies in respect to the information we are required to provide to them for your purchase-related transactions. For these providers, we recommend that you read their privacy policies so you can understand the manner in which your personal information will be handled by these providers.

In particular, remember that certain providers may be located in or have facilities that are located in a different jurisdiction than either you or us. So if you elect to proceed with a transaction that involves the services of a third-party service provider, then your information may become subject to the laws of the jurisdiction(s) in which that service provider or its facilities are located.

As an example, if you are located in Canada and your transaction is processed by a payment gateway located in the United States, then your personal information used in completing that transaction may be subject to disclosure under United States legislation, including the Patriot Act.

Once you leave our store's website or are redirected to a third-party website or application, you are no longer governed by this Privacy Policy or the website's Terms of Service.

## Links

When you click on links on our store, they may direct you away from our site. We are not responsible for the privacy practices of other sites and encourage you to read their privacy statements.

## Google Analytics

Our store uses Google Analytics to help us learn about who visits our site and what pages are being looked at.



## SECTION 6 - SECURITY

To protect your personal information, we take reasonable precautions and follow industry best practices to make sure it is not inappropriately lost, misused, accessed, disclosed, altered or destroyed.

If you provide us with your credit card information, the information is encrypted using secure socket layer technology (SSL) and stored with a AES-256 encryption. Although no method of transmission over the Internet or electronic storage is 100% secure, we follow all PCI-DSS requirements and implement additional generally accepted industry standards.

## SECTION 7 - COOKIES

Here is a list of cookies that we use. We've listed them here so you that you can choose if you want to opt-out of cookies or not.

\_session\_id, unique token, sessional, Allows Shopify to store information about your session (referrer, landing page, etc).

\_shopify\_visit, no data held, Persistent for 30 minutes from the last visit, Used by the website provider's internal stats tracker to record the number of visits

\_shopify\_uniq, no data held, expires midnight (relative to the visitor) of the next day, Counts the number of visits to a store by a single customer.

cart, unique token, persistent for 2 weeks, Stores information about the contents of your cart.

\_secure\_session\_id, unique token, sessional

storefront\_digest, unique token, indefinite, If the shop has a password, this is used to determine if the current visitor has access.

PREF, persistent for a very short period, Set by Google and tracks who visits the store and from wherein

## SECTION 8 - AGE OF CONSENT

By using this site, you represent that you are at least the age of majority in your state or province of residence, or that you are the age of majority in your state or province of residence and you have given us your consent to allow any of your minor dependents to use this site.

## SECTION 9 - CHANGES TO THIS PRIVACY POLICY

We reserve the right to modify this privacy policy at any time, so please review it frequently. Changes and clarifications will take effect immediately upon their posting on the website. If we make material changes to this policy, we will notify you on the website that it has been updated, so that you are aware of what information we collect, how we use it, and under what circumstances, if any, we use and/or disclose it.

If our store is acquired or merged with another company, your information may be trans-

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ferred to the new owners so that we may continue to sell products to you.

## Questions and Contact Information

If you would like to access, correct, amend or delete any personal information we have about you, register a complaint, or if you simply want more information, contact our Privacy Compliance Officer at [brewing@brewha.com](mailto:brewing@brewha.com).

## TERMS OF SERVICE

### OVERVIEW

The website is operated by BREWHA Equipment Co (2024) Ltd. Throughout the site, the terms “we,” “us” and “our” refer to BREWHA Equipment Co (2024) Ltd. BREWHA Equipment Co (2024) Ltd. offers the website, including all information, tools and services available from the site to you, the user, conditioned upon your acceptance of all terms, conditions, policies and notices stated here.

By visiting our site and/or purchasing something from us, you engage in our “Service” and agree to be bound by the following terms and conditions (“Terms of Service,” “Terms”), including those additional terms and conditions and policies referenced herein and/or available by hyperlink. These Terms of Service apply to all users of the site, including without limitation users who are browsers, vendors, customers, merchants, and/or contributors of content.

Please read these Terms of Service carefully before accessing or using the website. By accessing or using any part of the site, you agree to be bound by these Terms of Service. If you do not agree to all the terms and conditions of this agreement, then you may not access the website or use any services. If these Terms of Service are considered an offer, acceptance is expressly limited to these Terms of Service.

Any new features or tools which are added to the current store shall also be subject to the Terms of Service. You can review the most current version of the Terms of Service at any time on this page. We reserve the right to update, change or replace any part of these Terms of Service by posting updates and/or changes to the website. It is your responsibility to check this page periodically for changes. Your continued use of or access to the website following the posting of any changes constitutes acceptance of those changes.

Our store is hosted on Shopify Inc. They provide us with the online e-commerce platform that allows us to sell our products and services to you.

### SECTION 1 - ONLINE STORE TERMS

By agreeing to these Terms of Service, you represent that you are at least the age of majority in your state or province of residence, or that you are the age of majority in your state or province of residence and you have given us your consent to allow any of your minor dependents to use this site.

You may not use our products for any illegal or unauthorized purpose nor may you, in the use of the Service, violate any laws in your jurisdiction (including but not limited to copyright laws).

You must not transmit any worms or viruses or any code of a destructive nature. A breach or violation of any of the Terms will result in an immediate termination of your Services.

## **SECTION 2 - GENERAL CONDITIONS**

We reserve the right to refuse service to anyone for any reason at any time.

You understand that your content (not including credit card information), may be transferred unencrypted and involve (a) transmissions over various networks; and (b) changes to conform and adapt to technical requirements of connecting networks or devices. Credit card information is always encrypted during transfer over networks.

You agree not to reproduce, duplicate, copy, sell, resell or exploit any portion of the Service, use of the Service, or access to the Service or any contact on the website through which the service is provided, without express written permission by us.

The headings used in this agreement are included for convenience only and will not limit or otherwise affect these Terms.

## **SECTION 3 - ACCURACY, COMPLETENESS AND TIMELINESS OF INFORMATION**

We are not responsible if information made available on this site is not accurate, complete or current. The material on this site is provided for general information only and should not be relied upon or used as the sole basis for making decisions without consulting primary, more accurate, more complete or more timely sources of information. Any reliance on the material on this site is at your own risk.

This site may contain certain historical information. Historical information, necessarily, is not current and is provided for your reference only. We reserve the right to modify the contents of this site at any time, but we have no obligation to update any information on our site. You agree that it is your responsibility to monitor changes to our site.

## **SECTION 4 - MODIFICATIONS TO THE SERVICE AND PRICES**

Prices for our products are subject to change without notice.

We reserve the right at any time to modify or discontinue the Service (or any part or content thereof) without notice at any time.

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We shall not be liable to you or to any third-party for any modification, price change, suspension or discontinuance of the Service.

## **SECTION 5 - PRODUCTS OR SERVICES (if applicable)**

Certain products or services may be available exclusively online through the website. These products or services may have limited quantities and are subject to return or exchange only according to our Return Policy.

We have made every effort to display as accurately as possible the colors and images of our products that appear at the store. We cannot guarantee that your computer monitor's display of any color will be accurate.

We reserve the right, but are not obligated, to limit the sales of our products or Services to any person, geographic region or jurisdiction. We may exercise this right on a case-by-case basis. We reserve the right to limit the quantities of any products or services that we offer. All descriptions of products or product pricing are subject to change at any time without notice, at the sole discretion of us. We reserve the right to discontinue any product at any time. Any offer for any product or service made on this site is void where prohibited.

We do not warrant that the quality of any products, services, information, or other material purchased or obtained by you will meet your expectations, or that any errors in the Service will be corrected.

## **SECTION 6 - ACCURACY OF BILLING AND ACCOUNT INFORMATION**

We reserve the right to refuse any order you place with us. We may, in our sole discretion, limit or cancel quantities purchased per person, per household or per order. These restrictions may include orders placed by or under the same customer account, the same credit card, and/or orders that use the same billing and/or shipping address. In the event that we make a change to or cancel an order, we may attempt to notify you by contacting the e-mail and/or billing address/phone number provided at the time the order was made. We reserve the right to limit or prohibit orders that, in our sole judgment, appear to be placed by dealers, resellers or distributors.

You agree to provide current, complete and accurate purchase and account information for all purchases made at our store. You agree to promptly update your account and other information, including your email address and credit card numbers and expiration dates, so that we can complete your transactions and contact you as needed.

For more detail, please review our Returns Policy.

## **SECTION 7 - OPTIONAL TOOLS**

We may provide you with access to third-party tools over which we neither monitor nor have any control nor input.



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You acknowledge and agree that we provide access to such tools “as is” and “as available” without any warranties, representations or conditions of any kind and without any endorsement. We shall have no liability whatsoever arising from or relating to your use of optional third-party tools.

Any use by you of optional tools offered through the site is entirely at your own risk and discretion and you should ensure that you are familiar with and approve of the terms on which tools are provided by the relevant third-party provider(s).

We may also, in the future, offer new services and/or features through the website (including, the release of new tools and resources). Such new features and/or services shall also be subject to these Terms of Service.

## SECTION 8 - THIRD-PARTY LINKS

Certain content, products and services available via our Service may include materials from third-parties.

Third-party links on this site may direct you to third-party websites that are not affiliated with us. We are not responsible for examining or evaluating the content or accuracy and we do not warrant and will not have any liability or responsibility for any third-party materials or websites, or for any other materials, products, or services of third-parties.

We are not liable for any harm or damages related to the purchase or use of goods, services, resources, content, or any other transactions made in connection with any third-party websites. Please review carefully the third-party’s policies and practices and make sure you understand them before you engage in any transaction. Complaints, claims, concerns, or questions regarding third-party products should be directed to the third-party.

## SECTION 9 - USER COMMENTS, FEEDBACK AND OTHER SUBMISSIONS

If, at our request, you send certain specific submissions (for example contest entries) or without a request from us you send creative ideas, suggestions, proposals, plans, or other materials, whether online, by email, by postal mail, or otherwise (collectively, ‘comments’), you agree that we may, at any time, without restriction, edit, copy, publish, distribute, translate and otherwise use in any medium any comments that you forward to us. We are and shall be under no obligation (1) to maintain any comments in confidence; (2) to pay compensation for any comments; or (3) to respond to any comments.

We may, but have no obligation to, monitor, edit or remove content that we determine in our sole discretion are unlawful, offensive, threatening, libelous, defamatory, pornographic, obscene or otherwise objectionable or violates any party’s intellectual property or these Terms of Service.

You agree that your comments will not violate any right of any third-party, including copyright, trademark, privacy, personality or other personal or proprietary right. You further

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agree that your comments will not contain libelous or otherwise unlawful, abusive or obscene material, or contain any computer virus or other malware that could in any way affect the operation of the Service or any related website. You may not use a false e-mail address, pretend to be someone other than yourself, or otherwise mislead us or third-parties as to the origin of any comments. You are solely responsible for any comments you make and their accuracy. We take no responsibility and assume no liability for any comments posted by you or any third-party.

## **SECTION 10 - PERSONAL INFORMATION**

Your submission of personal information through the store is governed by our Privacy Policy.

## **SECTION 11 - ERRORS, INACCURACIES AND OMISSIONS**

Occasionally there may be information on our site or in the Service that contains typographical errors, inaccuracies or omissions that may relate to product descriptions, pricing, promotions, offers, product shipping charges, transit times and availability. We reserve the right to correct any errors, inaccuracies or omissions, and to change or update information or cancel orders if any information in the Service or on any related website is inaccurate at any time without prior notice (including after you have submitted your order).

We undertake no obligation to update, amend or clarify information in the Service or on any related website, including, without limitation, pricing information, except as required by law. No specified update or refresh date applied in the Service or on any related website, should be taken to indicate that all information in the Service or on any related website has been modified or updated.

## **SECTION 12 - PROHIBITED USES**

In addition to other prohibitions as set forth in the Terms of Service, you are prohibited from using the site or its content:

(a) for any unlawful purpose; (b) to solicit others to perform or participate in any unlawful acts; (c) to violate any international, federal, provincial or state regulations, rules, laws, or local ordinances; (d) to infringe upon or violate our intellectual property rights or the intellectual property rights of others; (e) to harass, abuse, insult, harm, defame, slander, disparage, intimidate, or discriminate based on gender, sexual orientation, religion, ethnicity, race, age, national origin, or disability; (f) to submit false or misleading information; (g) to upload or transmit viruses or any other type of malicious code that will or may be used in any way that will affect the functionality or operation of the Service or of any related website, other websites, or the Internet; (h) to collect or track the personal information of others; (i) to spam, phish, pharm, pretext, spider, crawl, or scrape; (j) for any obscene or immoral purpose; or (k) to interfere with or circumvent the security features of the Service or any related website, other websites, or the Internet. We reserve the right to terminate your use of the Service or any related website for violating any of the prohibited uses.

## **SECTION 13 - DISCLAIMER OF WARRANTIES; LIMITATION OF LIABILITY**

We do not guarantee, represent or warrant that your use of our service will be uninterrupted, timely, secure or error-free.

# Privacy and Terms of Service

We do not warrant that the results that may be obtained from the use of the Service will be accurate or reliable.

You agree that from time to time we may remove the Service for indefinite periods of time or cancel the Service at any time, without notice to you.

You expressly agree that your use of, or inability to use, the Service is at your sole risk. The Service and all products and services delivered to you through the Service are (except as expressly stated by us) provided 'as is' and 'as available' for your use, without any representation, warranties or conditions of any kind, either express or implied, including all implied warranties or conditions of merchantability, merchantable quality, fitness for a particular purpose, durability, title, and non-infringement.

In no case shall BREWHA Equipment Co Ltd., our directors, officers, employees, affiliates, agents, contractors, interns, suppliers, service providers or licensors be liable for any injury, loss, claim, or any direct, indirect, incidental, punitive, special, or consequential damages of any kind, including, without limitation, lost profits, lost revenue, lost savings, loss of data, replacement costs, or any similar damages, whether based in contract, tort (including negligence), strict liability or otherwise, arising from your use of any of the service or any products procured using the service, or for any other claim related in any way to your use of the service or any product, including, but not limited to, any errors or omissions in any content, or any loss or damage of any kind incurred as a result of the use of the service or any content (or product) posted, transmitted, or otherwise made available via the service, even if advised of their possibility.

Because some states or jurisdictions do not allow the exclusion or the limitation of liability for consequential or incidental damages, in such states or jurisdictions, our liability shall be limited to the maximum extent permitted by law.

## SECTION 14 - INDEMNIFICATION

You agree to indemnify, defend and hold harmless BREWHA Equipment Co Ltd. and our parent, subsidiaries, affiliates, partners, officers, directors, agents, contractors, licensors, service providers, subcontractors, suppliers, interns and employees, harmless from any claim or demand, including reasonable attorneys' fees, made by any third-party due to or arising out of your breach of these Terms of Service or the documents they incorporate by reference, or your violation of any law or the rights of a third party.

## SECTION 15 - SEVERABILITY

In the event that any provision of these Terms of Service is determined to be unlawful, void or unenforceable, such provision shall nonetheless be enforceable to the fullest extent permitted by applicable law, and the unenforceable portion shall be deemed to be severed from these Terms of Service; such determination shall not affect the validity and enforceability of any other remaining provisions.

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## **SECTION 16 - TERMINATION**

The obligations and liabilities of the parties incurred prior to the termination date shall survive the termination of this agreement for all purposes.

These Terms of Service are effective unless and until terminated by either you or us. You may terminate these Terms of Service at any time by notifying us that you no longer wish to use our Services, or when you cease using our site.

If in our sole judgment you fail, or we suspect that you have failed, to comply with any term or provision of these Terms of Service, we also may terminate this agreement at any time without notice and you will remain liable for all amounts due up to and including the date of termination; and/or accordingly we may deny you access to our Services (or any part thereof).

## **SECTION 17 - ENTIRE AGREEMENT**

The failure of us to exercise or enforce any right or provision of these Terms of Service shall not constitute a waiver of such right or provision.

These Terms of Service and any policies or operating rules posted by us on this site or in respect to the Service constitute the entire agreement and understanding between you and us and govern your use of the Service, superseding any prior or contemporaneous agreements, communications and proposals, whether oral or written, between you and us (including, but not limited to, any prior versions of the Terms of Service).

Any ambiguities in the interpretation of these Terms of Service shall not be construed against the drafting party.

## **SECTION 18 - GOVERNING LAW**

These Terms of Service and any separate agreements whereby we provide you Services shall be governed by and construed in accordance with the laws of Victoria, BC, Canada.

## **SECTION 19 - CHANGES TO TERMS OF SERVICE**

You can review the most current version of the Terms of Service at any time at this page. We reserve the right, at our sole discretion, to update, change or replace any part of these Terms of Service by posting updates and changes to the website. It is your responsibility to check the website periodically for changes. Your continued use of or access to the website or the Service following the posting of any changes to these Terms of Service constitutes acceptance of those changes.

## **SECTION 20 - CONTACT INFORMATION**

Questions about the Terms of Service should be sent to us at [brewing@brewha.com](mailto:brewing@brewha.com).



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