



## Advantages/Disadvantages for Kettle Heating Options

### Indirect Fire

#### Advantages

- Initial cost for the equipment (Burner) is less expensive than a boiler, to buy, install (calibrate)
- Less space required than the addition of a boiler
- More energy efficient than electric (applies to smaller barrel)
- Less down time in case of burner failure
- you have the option to run with Natural Gas or Propane. If you are interested in a smaller brewhouse (3.5-5bbl), and do not have access to Natural Gas, compare propane costs per brew to that of electricity.

#### Disadvantages

- More heating time to boil
- possibility of more caramelization of sugars in the wort (can be a good or desired thing)
- Burner failure can occur, causing down time (have a second burner on hand)
- Additional penetration in the ceiling/roof (exhaust), or complication thereof
- Colder environments or long flu runs can complicate the initial calibration/function (draw issues)
- Some building codes may require fire suppression systems to be installed. Forgeworks manufactures an indirect fire system, in an enclosed fire box. This is to be distinguished from that of an open flame heating source (a true direct fire), featured on some smaller brewhouses that you an open flame much like a stove top.

**Other Notes: The most popular choice for brewhouses ranging from 5bb-15bbl**

### Steam Fired

#### Advantages:

- Heats the fastest, you will boil faster after your knock out
- Heats more evenly
- Can be easier to clean (risk of dry fire related to direct fire kettles )
- Efficient up to 40% more than direct fire

- One less penetration (exhaust vent) in ceiling/roof
- More diversity and ease of temp control
- Almost no caramelization of the sugars in the wort (sometimes the brewer wants some caramelization)

**Disadvantages:**

- Boilers equipment for steam heating adds significant upfront expense
- Boilers require additional space, potentially an isolated room
- Boilers require permitting, continual maintenance and annual inspection
- Down time due to boiler failure could be longer than down time due to a gas burner failure
- Installation of the steam piping adds to your upfront costs
- Steam brewhouses cost more

**Other Notes:** If you are purchasing a steam fired Kettle, consider also having the mash tun be jacketed for steam, giving you more options on beer styles. Steam heating your 20bbl & up size brewhouses is the only option.

## Electric

**Advantages:**

- You don't need exhaust venting, so this saves on the cost of a penetration in your ceiling/roof and the Class A Stainless Chimney
- May not require fire suppression measures enforced by your local codes.
- Very efficient, nearly all energy is transferred to the wort.
- A reasonable option up to 3.5bbl
- Less to worry about in terms of potential hazards/safety pre-cautions (gas leaks, boiler maintenance, make up air, Carbon Monoxide (CO)).
- Easy to control
- Almost no caramelization of the sugars in the wort (sometimes the brewer wants some caramelization)

**Disadvantages:**

- Three phase is almost a must in most applications. Installation of three phase into your building, if not already available, can carry a large price tag and you can't take it with you if you move.
- Cost per brew. Electricity is usually more expensive by far than natural gas (in-direct fire).
- Electric Immersion Elements can be expensive, and you will require having a back-up in case one fails. If accidentally dry-fired, it will ruin the immersion element.

**Other Notes:** Its reasonably easy to determine the Kilowatts per brew, and obtain costs per kilowatt from your electricity provider. If Natural Gas is not available at your brewery location, it's a good idea to compare Electrical costs with Propane costs (in-direct fire burners will run on Natural Gas or Propane) Ask us for a chart of Kilowatts required for each size brewhouse that is applicable.

## **Heating Options for HLT**

Heating options for your Hot Liquor tank include Steam, Direct Fire, and electric. There are multiple options for the usage of your Hot Liquor Tank, for more details, see the document on our site about Hot Liquor Tanks.

It is common to have a direct fire kettle, but a HLT heated with a single Electric Immersion Element or multiple elements. It is possible to heat a Hot Liquor tank with Single Phase Power, depending on your specific usage.