

# Small Scale Glycol Systems

David Wonder



# About Me

- David Wonder
  - Sales Director at MoreBeer! Pro
  - 15 years at MoreBeer! Pro
  - Helped 100's of customers build glycol systems.
- MoreBeer! Pro
  - We sell ingredients and supplies to professional breweries through our brand MoreBeer! Pro.
  - Largest selection of fermentation supplies in the world with over 9,000 products.
  - Over 4,000 active business customers.





## Basics

- Temperature control is essential for successful fermentation and quality beer.
- Glycol chilling and heating is standard in the brewing industry for temperature control. You walk into any brewery, and they typically have a glycol chiller that is piped to each fermentation/holding vessel.
- This can be done on any size from 5 gallons to 120+ bbls.
- Requires a glycol chiller, glycol, vessel with ability to circulate glycol (glycol jacket, plate, snake) and necessary piping/lines/fittings.

# Glycol system uses

Temperature control for fermentation, heating or cooling

Temperature control for storage

Temperature control for packaging

Air condintioner

Barrel rooms

Cold box

# Where to start

- Ideally you would have or create a brewery plan.
- I always recommend to plan out the next year at minimum but ideally, I would have a 5 year plan.
- Within your plan you should know the amount of beer you want to produce at one time. This will guide you on how many fermenters you will need and other equipment.
- Determining how much volume of beer you are going to be working with at any one time is what we will need to calculate the right size chiller for you.
- Then you need to decide on how you are going to lay out your facility and specifically the whole glycol system with loops.
  - If your system is a 1 bbl unitank then this can be a very simple system. If you have ten 30 bbl unitanks that all have varring temperatures and distances, it will typically be more complex.



# Calculating the right chiller

- Calculating your immediate chilling requirements means seeing how much cooling power you will need at any one time in your worst-case scenario.
  - Let's say you have 10 vessels. Most of the time you will just be maintaining fermentation temperature which does not put a lot of load on the chiller. The key is knowing the potential max load you are going to put on the chiller. If you were planning on cold crashing 8 of the vessels at once, then that would be a very different calculation if you were only ever cold crashing 2 vessels at one time. Then if you were planning on using the chiller for anything else we would want to calculate that up front to make sure you can handle everything you are trying to do at any one single time.
- Our team can calculate this for you once we ask a series of questions regarding the volume and vessels you are using to cool along with the ambient temperature and target temperatures.
- I think the main thing we have seen over the years is that many customers end up undersizing their first chiller to save on costs.
  - Then you have to buy a whole new chiller which ends up being very expensive because you typically need a larger one than you have currently. Where if we would know the 5-year plan and planned for your growth it might only be a couple thousand more to get the chiller you need up front.
  - Typically, the amount of tonnage or cooling power costs less as you go up. Good example is a 3 ton Cold Shot chiller is \$12k where a 5 ton is only \$14.5k
- Understand your true cost with freight now and later. If its only 10% more to upgrade your chiller so that you have room to grow in the next 5 years it might be worth it.

# Layout your system

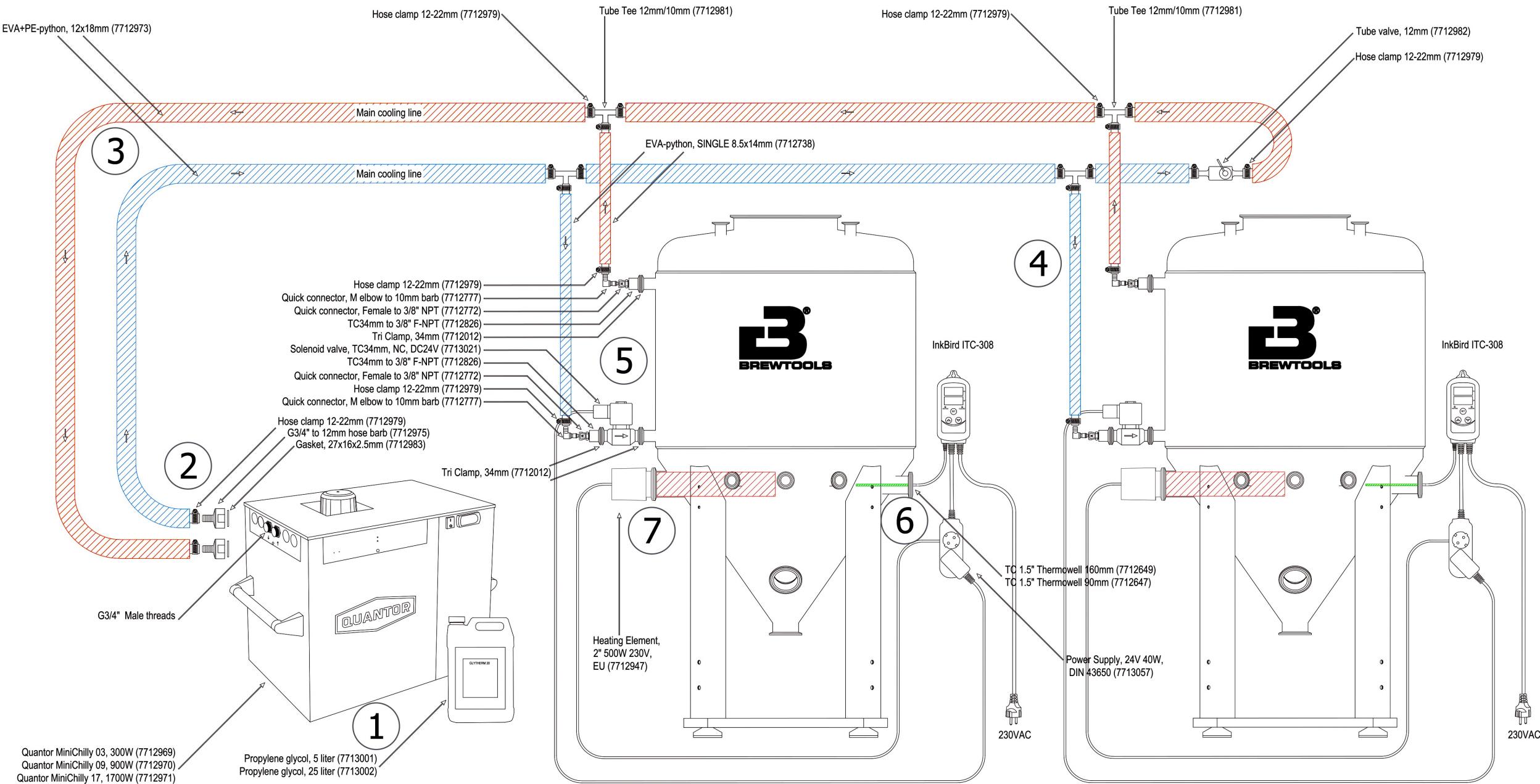
- Glycol units will have a way to control the temperature of the glycol bath.
- Then you will need a separate way to control the temperature of each fermentation.
- Most units have integrated pumps and certain units have controllers built in like the one in the picture on the next slide.
- Typically, on the larger scale you will have a solenoid and controller at the fermenter which is shown on one of the next slides.
- Most breweries I have worked with will use PVC for the glycol lines, but you can also use reinforced tubing.

# Layout your system con.

- There are typically two styles of glycol systems/loops
  - Single loop
    - Example to the right in the picture.
    - This is where you have a line out from your chiller that goes directly to the glycol jacket and then a line going out of that same glycol jacket right back into the chiller.
  - Multiple loops with solenoids
    - Examples on the next two slides and for systems with multiple fermenters.
    - You would split the line going to your 1st fermenter with a tee so that you could use that same line to go to your 2<sup>nd</sup> fermenter and so on depending on how many fermenters you have.
    - Then you ideally would set it up with “first in, last out” with typically with a bypass valve at the end of the loop where it goes from inlet line to outlet line. This is typically on the more advanced or larger systems.







# Expectations

- It is always difficult to determine exactly how many tanks can be chilled at one time as it depends on what is happening in each tank, if the tank is insulated, and what the ambient temperature is. So I highly recommend to have someone from our company, or another quality supplier do your calculation for you. At least to see what they produce for you; you don't have to buy.
- Cold crashing always requires the most energy and requires tank insulation depending on your surface area/style of vessel.
- We have experimented with capacities on certain chillers smaller chillers and can provide a general guide based on a 75°F ambient and neoprene insulation. Neoprene provides a modest amount of insulation so you would obtain better results using Armaflex or a higher R rated insulation. On the larger scale it is very hard to predict, and we will just calculate your exact scenario.
- Especially on the larger scale but in general be careful of the pressure in your system. Specifically, you will want to know how powerful your glycol chiller is and what your glycol jackets are rated for. In certain systems we have worked on you need to reduce the pressure in the system so that you don't have issues. On the smaller scale this is typically not a problem at all.

# Styles and brands

- Brewbuilt chillers
  - Small scale power units made for high end homebrewers at a low price point. Integrated pumps and controllers right on the glycol unit.
- MB chillers
  - Mid range chillers made in Germany for nano breweries. High end components and powerful for the price.
- Kreyer chillers
  - Small scale to really high end chillers made in Germany. We are one of the few US distributors of this brand. Really high end components and extremely powerful for the price. We have been selling and working with this company for over 20 years.
- Cold Shot chillers
  - Mid range to high end chillers made in the US. They supported by a 24-hour technical support center and nationwide network of service providers. We have been working with this manufacturer for years and then have been in business for over 40 years.
- G&D chillers
  - Small scale to high end chillers built in the US. One of the larger chiller manufacturers and in over 2,400 breweries.

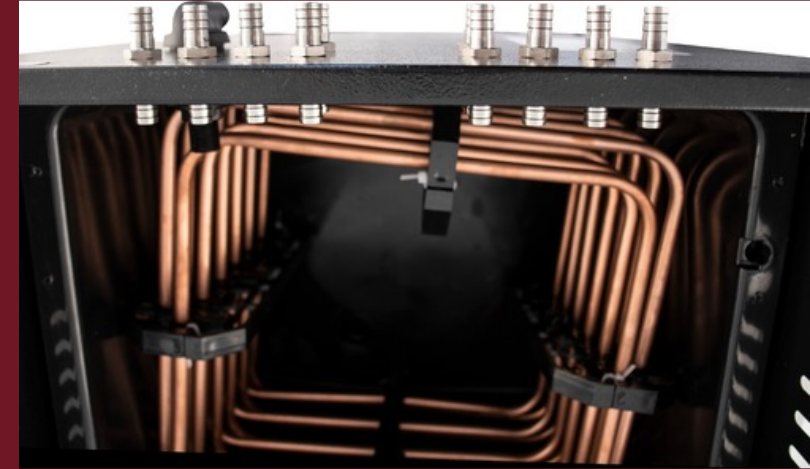
# BrewBuilt™ chillers

- Icemaster Max 2
  - \$699.99
  - 1700 BTU's
    - 500 Watt/1700btu/0.14 tons Cooling Capacity. 3/8 HP compressor
  - Controls up to 2 fermenters
  - 2 built in pumps and fermentation controllers.
  - At 75°F ambient temperature with neoprene insulation, the Max 2 can cold crash one 1 BBL BrewBuilt Jacketed Uni or two Jacketed Unis up to 15 gallons in size at one time to 38°F.



# BrewBuilt chillers con.

- BrewBuilt Icemaster 100
  - \$799.99
  - 2600 BTU's
    - 780 Watt/2600btu/0.26 ton cooling capacity. 3/8 HP compressor.
  - Controls up to 5 fermenters
  - No integrated pump or fermentation controller.
- BrewBuilt Icemaster Max 4
  - \$999.99
  - 2600 BTU's
    - 780 Watt/2600btu/0.26 ton cooling capacity. 3/8 HP compressor.
  - Controls up to 4 fermenters
  - 4 built in pumps and fermentation controllers
- Cooling capacity for both units
  - Calculated at cold crashing to 38°F at 75°F ambient with neoprene insulation (double for fermentation temperature control):
    - 2 - 1BBL (31 Gallon) Jacketed Tank
    - 2 - 1/2BBL (15-20 Gallon) Tanks
    - 3 - 10-14 Gallon Tanks
    - 4 - 5-7 Gallon Tanks



# X2UNI

**Now Available With Glycol Cooling Jacket**

**Shop Now**



# MB MiniChilly chillers

- MB MiniChilly 2/3 HP
  - \$1999.99
  - Compressor Power: 2/3hp / 0.5 kw
    - Cooling Capacity at 32°F glycol temp and 90°F Ambient Temp: 0.38 KW/380 Watts (60Hz 110V)
    - Cooling Capacity at 60°F glycol temp and 90°F Ambient Temp: 0.65 KW/650 Watts (60Hz 110V)
  - No integrated pumps or controllers (\$100-\$130 per pump/controller)
  - Cooling Capacity Example:
    - Up to 5 1bbl (31 Gallon) tanks fermenting at 68°F in 80°F ambient temperature. For every fermenter you want to cold crash remove 4 fermenting fermenters from the capacity. Note there is only hooks ups for 4 fermenters.
- MB MiniChilly 1.2 HP
  - \$3,499.99
  - Compressor Power: 1.2hp/900watts
    - Cooling Capacity at 32°F glycol temp and 90°F Ambient Temp: 1.05 KW/1050 Watts (60Hz 110V)
    - Cooling Capacity at 60°F glycol temp and 90°F Ambient Temp: 1.92 KW/1920 Watts (60Hz 110V)
  - No integrated pumps or controllers (\$100-\$130 per pump/controller)
  - Cooling Capacity Example:
    - Up to 10 1BBL (31 Gallon) well-insulated tanks fermenting at 68°F in 80°F ambient temperature. For every fermenter you want to cold crash remove 4 fermenting fermenters from the capacity.



# Kreyer Chillers

- Chilly 45
  - \$7,199.99
  - 1.28 tons (15,000 btu) of cooling power. 220v single phase.
  - Integrated pumps and pressure switch
- Chilly max 50
  - \$9,899.99 = 230v 3 phase
  - \$10,799.99 = 230v single phase
  - 1.8 Tons (21,840btu) of cooling power and .85 Tons of heating power
  - Can cool glycol/water bath down to -10C/14F or up to 42C/107F
  - Built in pressure switch shuts down recirculation pump when not needed
- Chilly max 90
  - \$10,799.99 = 230v 3 phase
  - \$11,699.99 = 230v single phase
  - 3 Tons (36,000btu) of cooling power and .85 Tons of heating power
  - Can cool glycol/water bath down to -10C/14F or up to 42C/107F
  - Built in pressure switch shuts down recirculation pump when not needed
- larger Chilly Max's are available for special order



# Cold Shot



- From 2 ton to 20 ton chillers and many options available to add on.
- 5 Ton Single Phase chiller - one of our best sellers:
  - \$14,500
  - 60,000 BTU/hr
  - This Low Temp Model has a leaving fluid temperature range of 20 - 70° F.
  - Rated to 0°F ambient temperature\*
  - Outdoor rated - install the unit outside your facility if desired
- Cold shot chillers are some of the most dependable and economical chillers on the market.
- We have been working with this manufacturer for many years now.
- Supported by 24/7 network of techs in the US

# G&D chillers

- From 14,200 to 228,386 BTU's
- G&D manufacturers many different types of chillers in all sizes and many different configurations depending on your needs.
- The unit on the bottom right corner is a dual stage 99,930 btu chiller with multiple compressors and the redundancy of multi-stage refrigeration circuits to ensure that your process and production will never stop. Retail price of \$27,900
- The unit on the top right is a Fire and Ice portable chiller with 20,500 btu's and ideally for 4 fermenters. Retail price of \$11,520
- The unit on the top left is a modular series glycol chiller. The concept is that you have an oversized pump and glycol reservoirs with auxiliary ports for future chiller modules to be added. Thus, adding chilling capacity as you grow. 96,495 btu modular chiller is \$26,817.
- Their single stage starts at 14,200 btu's for \$8,728 and a 61,824 btu chiller retails for \$18,510. Not pictured here but on our website.



# Tips and our feedback

- Again, don't undersize your chiller! Bare minimum leave a little extra room but ideally leave room for growth if you know that you want to expand. When we calculate your system, we always leave room for error.
- Make sure to do basic care and maintenance. Check with the supplier/manufacturer that you bought it from first. Typically, you will want to check the amount of glycol and the glycol concentration with a refractometer. Then basic cleaning of the compressor and fans aka dusting off.
- Make sure you have proper air flow around your chiller! This is critical and I have worked with customers that have damaged their units or had issues with performance due to improper airflow.
- Before you start your chiller make sure to check everything and make sure the wires look like they are in place. Seems silly but over the years I have been really frustrated trying to figure out why a chiller would not work to find out its just a simple wire that was loose. So just open the unit up and make sure everything looks in place and if not just ask your supplier before doing anything.
- Add a Bypass valve or non-return if your chiller is lower than your fermenter because once the chiller turns off the liquid will try to go back down the return line and then overflow your reservoir.
- Add ball valves on the ins and out of your fermenter jackets so that you can isolate any of your tanks to address any potential issues or swap around tanks if you expand.



Thank you!

Any questions?

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Morebeerpro.com

We have a team waiting to help!

Cheers!

