

Hot Water Heater Selection

1. Overview

We 100% recommend some type of water heater.

- a. The highest performance (fastest heat-up) would be achieved with a 160 degree propane or natural gas hot water heater, either tank (min 98 gal) or tankless on demand (5gpm flow rate @ 106F rise in temperature which may require two units). We understand this can be cost prohibitive, so speak with us to make sure you are not over or under buying for your needs!
- b. As a general rule, the water heater selection is very important if you will be running full cycles in the equipment 5-7 days per week, or if you are running back-to-back cycles and want to come in at the same time every day to turn a cycle over. If this does not apply to you, a lower cost water heater could be a better fit.
- c. **WARNING (Pet Systems Only):** Water heaters cannot be set above 160F because it leads to a safety issue with the chemical.

2. Some considerations to keep in mind:

- a. You can do a tank or on-demand (tankless)
- b. You can do standard (max temp 140F) or commercial (max temp 170-185F, but we only use 160F)
- c. A gas unit is recommended if location is subject to "peak usage" rates for electric (certain times of day where electric rates are substantially higher). If electric, the PET-400 machine and the water heater (when refilling) will both be pulling during peak rate times.
- d. We desire 5gpm incoming so the unit fills in 20 min or less (a full/high level cycle fills with ~100 gal; a half/low level cycle fills with ~60 gallons). Many of our customers use two tankless Rinnai units that each flow at 2.5gpm.
- e. The unit fills with about 100 gallons of water for a full cycle (60 gallons for a half cycle).
- f. Debating 135F vs 160F?
 - Going with a 160F unit vs a 135F unit removes **1 hour** from heat-up time.
- g. Debating 75 gal tank vs a tankless or 100 gal tank unit?
 - Going with a tankless or >98 gallon tank water heater, instead of a 75 gallon unit removes **1.3-1.8** hours from the heat up time.
- h. Please consider: If the water heater is not exclusively dedicated to the PET-400 unit, what will be impacted when the pet system uses all of the hot water? Anything crucial?
- i. TALK TO YOUR PLUMBER! They are knowledgeable! Some areas with significant scaling or sediment in the supply line may not do well with a tankless on-demand unit.

3. Further Discussion

Your water heater selection can be the difference of 3 hours in a full turnaround for the PET-400.

- a. How A Full Cycle Looks:
 - i. Water Fill
 - 0.3 hours (20 min, 100 gal @ 5gpm incoming flow)
 - ii. Heat up
 - 1.9-4.5 hours depending on type and temp of water heater
 - iii. Process
 - 18 hours (holds @ 208F)
 - iv. Drain/Coflush
 - 0.3 hours (20 min)
 - v. Total cycle time:
 - 20.5-23.1 hours

Note: The optional automated rinse cycle is skipped by most users in the interest of conserving water, but if a user wants to activate this by button on the touch screen, add 1 hour (20 min fill, 20 min rinse, 20 min discharge).

After cycle is complete, user needs to manually rinse remains with the spray nozzle, collect each set and transfer for drying, and clean the machine. To start a new cycle, user needs to load machine, add alkali, and press start.

4. Impact of the Water Heater

Your machine's complete operating time will be between 20.5 and 24 hours, depending on the volume and temperature of the feed water.

- a. Commercial (160F) tankless or 100 gal tank water heater: ~20.5 hours
- b. Residential (135F) tankless or 100 gal tank hot water heater: ~21.5 hours
- c. Residential (135F) 40 gallon hot water heater: ~23.5 hours
- d. If you have anything smaller than a 100 gallon tank hot water heater, you will be adding additional heat up time. The machine typically takes ~100 gallons to fill for a full cycle, so your 40 or 75 gallons of hot water will be combining with 60 or 25 gallons (respectively) of cold tap water (50F on average) to reach the 100 gallon mark. This means you are not starting with the 135F or 160F temp that your water heater provides; you are starting with 85 or 120F water.
- e. Debating 75 gal tank vs a tankless or 100 gal tank unit?
Going with a tankless or >98 gallon tank water heater, instead of a 75 gallon unit removes **1.3-1.8** hours from the heat up time.
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5. Cost vs Benefit

The larger and hotter the water heater, the more expensive it is.

- a. For some of our customers, the 1-2.5 hours you can save with the commercial high capacity hot water heater is worth the financial investment, many it is not.

- b. If you are running cycles 6-7 days per week, or on back to back days and the operator would like to come in at the same time every day to turn a cycle over, you will want to invest in the right water heater setup. By saving a couple hours, you can get to a 20.5-21 hour turnaround time. This gives you 3 hours to comfortably unload the remains, clean the unit, reload, add alkali, and start. *Otherwise, you may find that your workflow is impacted, and running your machine 3 days in a row might look like: Cycle finishes at 10am Monday, noon Tuesday, 2pm Wednesday, etc. If that is not a big deal to you – then you can go with a more affordable water heater.*
- c. You can always upgrade your water heater down the road! If you are blessed with the problem of too much business and are having to run your machine 5-7 days a week, upgrading the hot water heater will be an easy decision.

A note on flow rate: If you're going with an on-demand tankless hot water heater – pay attention to the flow rate! We like 5gpm because it can fill our machine in 20 minutes. It would be silly to spend hundreds more on a tankless water heater with the intention of saving 1.5 hours on heat up time, but have an insufficient flow rate which would add fill time to the overall cycle. For example, a flow rate of 2.5gpm will mean that it will take 40 minutes to fill 100 gallons.

We recommend speaking with your plumber; this is what they do every day. Hot water heater specs will have a flow rate range, like 4.3-6.0gpm. The rate of flow depends on how much it has to raise the temperature (ΔT); this should also be listed in the specs. Tap water is 50F on average, so your ΔT on a 135F heater will be approx. 85 degrees (135-50), and on a 160F unit 110 degrees (160-50). If a unit has a 4.3gpm rate for $\Delta T=70F$, then your flow rate is probably going to be 3.5gpm @135F output or 2.6gpm @160F output. So you'd need two of those units to get 5gpm @160F. If 20-40 minutes isn't going to make or break you, then don't even worry about this!



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