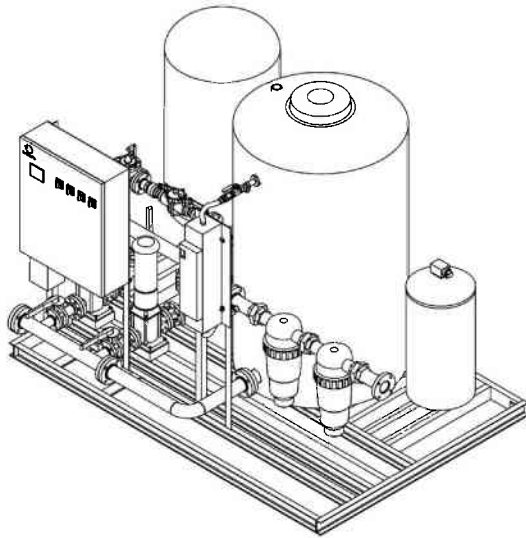


# Sizing and Selecting EnviroHeart Rainwater Treatment and Pumping Package For Toilet Flushing and Cooling Tower Makeup



An important difference between this application and other water treatment applications is the availability of treated water, *under pressure*, in the building. Also, flushing toilets is a priority, regardless of the availability of rainwater. With these considerations in mind, SyncroFlo offers the following design recommendations.

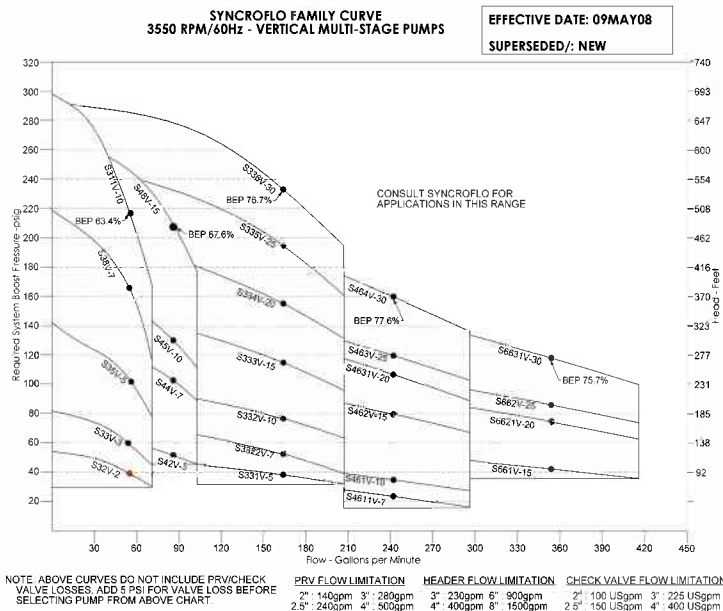
1) Size building pump as you would any domestic water booster system. Recommended minimum flow for flush valves is 50 gpm. Simplex pumping is recommended for flows less than 120 GPM. Utilize the main domestic water booster, or city water, as redundant capacity.

Recommended minimum pressure at the fixture is 30 psi for most flush valves. Confirm this pressure requirement with all approved flush valve manufacturers, prior to scheduling your pumps.

2) In most cases, a vertical multistage pump is a better choice than end suction. While end suction costs less initially, vertical multistage is significantly more efficient when boosting more than 30 psi.

3) VFD and constant speed are both viable options. PRV's are not required for constant speed systems, due to the constant supply pressure.

4) SyncroFlo recommends utilizing a HydroCumulator tank, for maximum energy savings and water efficiency. Standard sizes are 130 gallon ASME 125 psig (recommended), 180 gallon ASME 200 psig, and 19 gallon 125 psig non-code.



# Filtration Recommendations

- 5) What type of filtration do you need?
- SyncroFlo recommends UV for most plumbing applications.
  - In order for UV to work, add sediment filtration as required. Typically 5 micron.
  - In order to minimize the maintenance requirements, SyncroFlo recommends self-cleaning UV and automatic backflushing sediment filtration.
- 6) UV filters are the most expensive item on the skid. To reduce cost, SyncroFlo recommends utilizing a day tank, and downsizing the UV filter.
- Size the day tank based on expected occupancy x 3 gallons/person for office or dormitory buildings. If size of the day tank is a consideration, this can be as low as 1 gallon/person



Tank Size	Dimensions (diameter x height)
100 gallons	23" x 64"
200 gallons	31" x 72"
300 gallons	35" x 81"
500 gallons	46" x 76"
650 gallons	56" x 70"
1000 gallons	64" x 80"
1350 gallons	71" x 88"
1700 gallons	86" x 74"
2200 gallons	86" x 96"

- Size the UV filter based on a 1 – 2 hour fill time. 100 minute fill time makes the conversion simple: 500 gallon day tank requires minimum 5 gpm UV.



Filter Capacity	Dimensions (W x D x H)
8 GPM	12" x 12" x 28"
12 GPM	12" x 12" x 36"
30 GPM	15" x 15" x 48"

- UV filters require sediment filtration prior to treatment. Coordinate filtration level with the UV manufacturer

Filter Capacity	Dimensions (diameter x height)
8 GPM	12" x 52"
12 GPM	14" x 47"
30 GPM	



- SyncroFlo recommends a chemical feed tank and pump for adding chlorine or dye to the water.

- 7) Using a day tank requires a transfer pump. Size the transfer pump based on UV filter size. Depending on collection tank location, the transfer pump should be located either in the tank, or possibly located on the treatment skid. If located on the treatment skid, calculate the suction lift required and select a capable pump. Close-coupled end suction or self-priming pumps work for lifting water. Use a multistage submersible pump if locating it in the collection tank. Specify a floating intake hose and a rail mounting system with this type of pump. Typical sump and sewage pumps are designed to pull water from the bottom of the tank, and will therefore draw any sediment that has settled. Therefore, SyncroFlo does not recommend this type of pump, unless it can be fitted with a floating intake hose.

Nominal Flow	Boost	Pump Model	Horsepower
8 GPM	150' TDH	50B	½ HP
12 GPM	100' TDH	50C	1 HP
30 GPM	80' TDH	50F	2 HP
50 GPM	100' TDH	50G	5 HP
75 GPM	100' TDH	50J	5 HP
100 GPM	160' TDH	50K	7 ½ HP
150 GPM	160' TDH	50M	10 HP

- 8) The standby water connection consists of a RPZ backflow preventor and a PRV. Size these based on total max flow. Use a direct-acting PRV for system flows less than 100 gpm, to minimize pressure fluctuations. This connection must be properly integrated into the operation of the filtration and pumping system. It should be the only connection to the potable water. Some codes require the use of an air gap fitting instead of a RPZ backflow preventor. If this is the case, SyncroFlo recommends duplex pumps instead of simplex.

Max Flow	Branch Size	PRV Type
20 GPM	1"	Direct-Acting
30 GPM	1¼"	Direct-Acting
40 GPM	1 ½"	Direct-Acting
50 GPM	2"	Direct-Acting
120 GPM	2"	Pilot-Operated
240 GPM	2 ½"	Pilot-Operated
280 GPM	3"	Pilot-Operated
500 GPM	4"	Pilot-Operated

- 9) All skid-mounted components are piped and tested in SyncroFlo's factory. Standard construction is 304 stainless steel for the pressurized pipe, and PVC for drainage. Other options are available.
- 10) The control panel monitors all filtration, tank levels, and communicates status to the BAS. Some standard features of the control panel and instrumentation include:
- a) All skid-mounted components are wired and tested prior to shipment.
  - b) 5.7" color touchscreen displays available information in a easily understood format
    - i) Collection Tank Level
    - ii) Tank level display, programmable in gallons
    - iii) "Clean Sediment Filter" Alarm/Notice
    - iv) "Replace UV Bulbs" Alarm/Notice
    - v) Hand-off-auto selector switches
  - c) Software
    - i) Pressure, Horsepower, Differential Pressure, and VFD speed pump sequencing
    - ii) Monitor sediment filtration pressure drop and notify when to clean
    - iii) Control sediment filter backwash function, if equipped
    - iv) Monitor UV light usage and notify when to change bulbs
  - d) Optional flow sensor to measure total system consumption.
  - e) Standard BAS connection is contacts and analog flow signal. Recommended optional connections are Modbus, BACNet TCP/IP, or BACNet Serial.