

Monday, October 24, 2022

Sump and Sewage Pump Flow Rate & Minimum Run Time

Monday Morning Minutes | by Norm Hall, October 24, 2022

The minimum run time in a sump, effluent, or sewage pump is determined by the flow rate and the volume of water in the basin between the lead pump on float and the pumps off float. The minimum run time for these constant speed pumps will affect the basin depth and/or diameter required. What is the Bell & Gossett recommendation for minimum run time in these applications?



Sump Basin and Float Spacing Minimums

Floor space in mechanical equipment rooms of buildings is always critical. The sump basin diameter with the cover can occupy a large amount of space. The engineer will want to make the diameter of the basin as small as possible. The R. L. Deppmann Monday Morning Minutes blog [Pump Guide Rail Assemblies and Sump Diameter](#) defines suggested minimum basin diameters. In another blog, [Sump & Sewage Applications: Choosing 3-Float vs. 4-Float Control](#) we suggest the minimum spacing of floats to avoid entanglement. There is also information on our website at, [Sump & Sewage](#). Knowing the minimums is important but the flow rate of the pump and the minimum run time will determine the maximum depth or basin diameter.

Minimum Run Times for Non-Explosion Proof Pumps

Explosion proof pumps have a separate set of concerns. The minimum run time for explosion proof pumps will be listed in the literature or available from the manufacturer. For the standard non-explosion proof pumps B&G recommends the following minimum run times.

MINIMUM RUN TIME FOR B&G STANDARD SUMP AND SEWAGE PUMPS. (not explosion proof)

HP	TIME
1 HP OR LESS	1 MINUTE*
1-1/2 HP OR MORE	2 MINUTES*

We know the time we want the pump to run, and we know the pump flow rate. The only thing left is the volume of water required between the floats. Here is a simple chart from our website, [Sump & Sewage](#).

FIBERGLASS SUMP BASINS

DIAMETER	MINIMUM DEPTH	GALLONS	GALLONS PER INCH - GREATER DEPTH*
24"	36"	65	1.70
30"	36"	110	3.00
36"	36"	159	4.30
42"	48"	274	5.70
48"	48"	361	7.50
60"	78"	955	12.20
72"	78"	1375	17.60

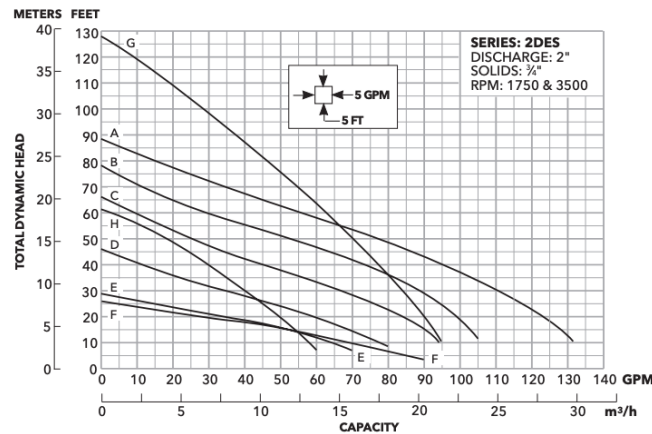
* Approximate gallons per inch. See Manufacturer's literature for exact volume.

Here is a quick example: Assume you are designing a storm water sump pump system and you have determined you need to pump 50 GPM against 20 feet of head. You select a B&G 2DES series effluent pump with a ½ HP motor, since you only expect ¾" solids and want the advantage of dual seals, with moisture sensing, between the two seals. Your head selection

is based on 3" pipe size, which is just above the minimum velocity of 2 FPS (see MMM [Sump and Sewage Pumps – Discharge Line Size](#) or our website). You could have also chosen 2" pipe with a 4.5 FPS velocity.

2DES

SUBMERSIBLE EFFLUENT PUMP Performance Curves



FEATURES

Impeller: Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Cast iron volute type for maximum efficiency. 2" NPT discharge.

Dual Mechanical Seals

- Lower: SILICON CARBIDE VS. SILICON CARBIDE sealing faces. Stainless steel metal parts, BUNA-N elastomers.
- Upper: CARBON VS. CERAMIC sealing faces. Stainless steel metal parts, BUNA-N elastomers.

Seal Sensor Probe: Located in oil-filled chamber. If pumpage should begin to leak past lower seal it indicates to pump control panel a fault has occurred. **Requires optional Seal Fail Circuit in the control panel.**

Shaft: Corrosion resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

Designed for continuous operation when fully submerged.

You want pump guide rails and based on the Monday Morning Minutes mentioned above or our website, you select the 48" diameter sump. The pump is 1/2 HP, so the minimum run time is 1 minute. From the chart above there is about 7-1/2 gallons per inch. 50/7.5 will round to a minimum of 7" between the lead pump on and the off floats.