Finding the Maximum Flow Rate of an Existing System

**Preparation:**
1. Open all valves to their full open position for pool or spa circulation. (For secured systems, do not adjust valves.)
2. Remove eyeball fittings from return inlets (when removable by hand).
3. Clean skimmer and pump baskets. Turn off skimmer to isolate.
4. Backwash or clean sand filter/DE grids, or remove cartridge.

**When inspecting existing installations, the maximum possible flow rate of suction system must be determined as explained in 4.4.9.**

**Pump Method 1:** Measure flow rate with a flow meter accurate to ±10% (see Section 4.4.9).

1. Install a vacuum gauge as close to the bottom of the strainer basket as possible.
2. Install a pressure gauge as close to the pump discharge as possible.

**NOTE:** It may be necessary to use a National Pipe Thread (NPT) × barb fitting with a short section of plastic tubing connected to a gauge if gauges cannot be screwed into drain holes provided in pump.

3. Multiply vacuum reading by 1.13 and record.
4. Multiply pressure reading by 2.31 and record.
5. Add results of steps 3 and 4 together to get the approximate Total Dynamic Head (TDH) in feet of head.
6. Using the published curve for the pump, find the Total Dynamic Head calculated above on the vertical axis, and read the flow rate on the horizontal axis.
7. This will give you the maximum flow rate within approx. 10%.

**Pressure head:** gauge psi × 2.31 = feet of water
**Suction head:** gauge inches Hg + 1.13 = feet of water

**EXAMPLE:** If the pressure gauge reads 14 psi and the vacuum gauge reads 6 inches Hg, the approximate Total Dynamic Head (TDH) of the system would be 39.12 feet.

**Pump Method 2:** Calculate using pressure and vacuum gauge readings (see diagram below).

1. Install a vacuum gauge as close to the bottom of the strainer basket as possible.
2. Install a pressure gauge as close to the pump discharge as possible.

**NOTE:** It may be necessary to use a National Pipe Thread (NPT) × barb fitting with a short section of plastic tubing connected to a gauge if gauges cannot be screwed into drain holes provided in pump.

3. Multiply vacuum reading by 1.13 and record.
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**Pressure head:** gauge psi × 2.31 = feet of water
**Suction head:** gauge inches Hg + 1.13 = feet of water

**EXAMPLE:** Gravity flow through 2" IPS Schedule 40 PVC pipe with an inside diameter of 2.067" with 32.0 feet of pipe and 2 elbows of equivalent length of 6.0 feet. The top of the pipe opening into the collector tank is 8" below pool water level.

Flow (gpm) = \( \sqrt[3]{1786 \times [D \text{ (inch)}]^2 \times [H \text{ (inch)}]} \)

(Where 55 D accounts for energy loss of stream)

**Gravitational Flow Calculation**

Flow (gpm) = \( \sqrt[3]{1786 \times [2.067]^2 \times 8} \)

= 29 gpm

**Cover/Grate Audit**

<table>
<thead>
<tr>
<th>Existing Pump</th>
<th>Manufacturer</th>
<th>Model</th>
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<td>Filter</td>
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<tr>
<td>Size (In. FL)</td>
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<tr>
<td>Existing Cover</td>
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</tr>
<tr>
<td>Pressure</td>
<td>PSI</td>
<td>Inch of Hg</td>
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<tr>
<td>TDH</td>
<td>Feet of Water</td>
<td>System Flow (from Pump Curve)</td>
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<tr>
<td>Maximum Flow</td>
<td>GPM</td>
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<tr>
<td>New Cover</td>
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<td>Replacement Date</td>
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<tr>
<td>Maximum Drawdown (Calculated)</td>
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<tr>
<td>Measured</td>
<td>Measured</td>
<td>Measured</td>
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</tbody>
</table>

**NOTE:** Check cover manufacturer’s installation instructions for the following items per ANSI/APSP.16.

- Cover compatible with sump
- Attachments (hardware/screws)
- Field fabricated sump as specified by cover manufacturer

**Cover/Grate Audit**

<table>
<thead>
<tr>
<th>Inspected by</th>
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<th>Phone</th>
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<td>Owner/Operator</td>
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**EVALUATION / ACTIONS TAKEN**

- [ ] Cover compatible with sump
- [ ] Attachments (hardware/screws)
- [ ] Field fabricated sump as specified by cover manufacturer

The provisions described herein are not intended to prevent the use of any alternative configuration or system, provided any such alternative meets the intent and requirements of these Guidelines.