Pump Quality and Design Basics

Considerations for Choosing the Right Dosing Pump

How to pick it,

Install it,

And keep it running,

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Why Pump

Necessity

- Pressure Dosing
- Enhanced Flow
  - Hilly Site Profile

Enhancement

- More Control
- More Options
- Aesthetic Reasons

Separating the Good from the Bad

- Pumps are available everywhere
- Truth: A cheap pump is just a cheap pump

  (You really do get what you pay for)
- What to look for…

Part I :
What Makes a Good Pump?

1. Quality Manufacturer
2. Quality Construction
3. Quality Design

Manufacturers

- Many good options
  - Myers, Zoeller, Goulds, Barnes, Sta-Rite, etc.
- Also many poor options

Look For:

- Track Record in the industry
- Commitment to quality
- Product Selection
- Industry involvement (SSPMA, etc.)

Construction Materials

- Cast Iron/Stainless Steel vs Plastic
  - Iron or Steel motor housing provides more rigidity
  - Plastic caps, bases, or impellers are often justified

- Seals and Bearings
  - Quality seals and bearings are crucial to the life of the pump

Overall Pump Design

- Solids Capability
  - Some pumps have restricted access to inlet
- Oil filled vs. Air filled
  - Oil runs cooler
  - Air is potentially cleaner
- Switches
  - In dosing applications, adjustable switches are better than preset

Part II:
Three Keys to a Good System

1. Proper Pump Selection
   - Picking the right pump for the job
2. Correct Installation
   - Clean, safe, organized
3. Periodic Maintenance
   - Keeping a pump in top shape

Key 1: Pump Selection

The most critical step for long pump life

- Right Type for the Application
  - Sump / Effluent
    - Little or no small solids
  - Sewage Ejectors
    - Varying solids passing capabilities
  - Specialty (Grinders, etc.)

- Right Size for the Conditions

  Size pumps based on curve, not horsepower

Pump Sizing in Two Slides!

- **Static Head** – Actual elevation change

- **Friction Head** – Loss due to frictional resistance between water and pipe

- **Operating Head** – Pressure required in some systems (LPP, Pressure Dist., etc.)

Static Head + Friction Head + Operating Head

= Total Dynamic Head (TDH)

Don’t Be Confused

This is NOT Static Head!

This is NOT Friction Head!

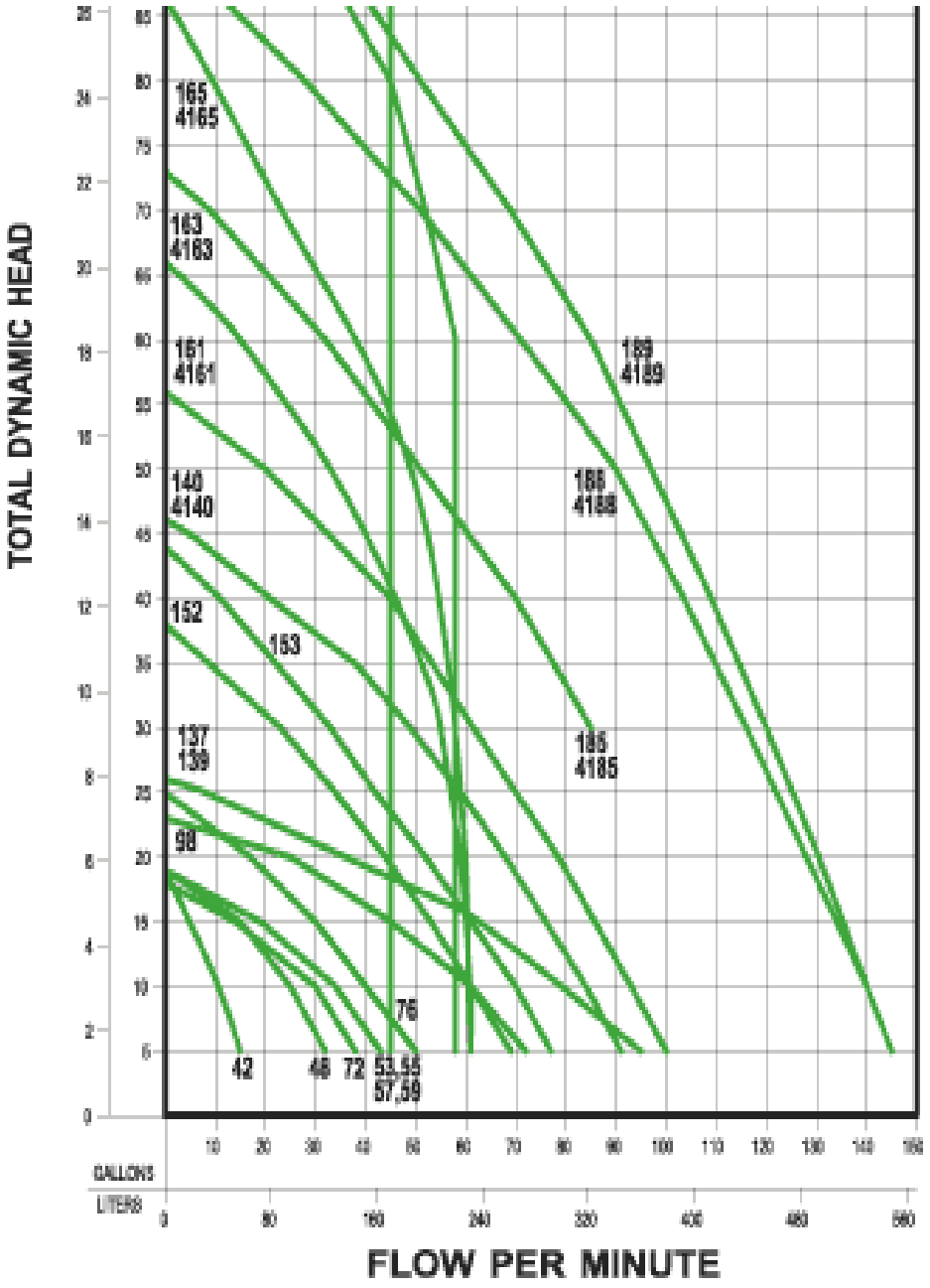
This is NOT Operating Head!

Size Based On Pump Curve

Pump Curves are easily accessible for any pump on the market.

Find where the calculated TDH and the desired flow intersect on the graph. Select a curve which crosses close to but above this point.

Always try to stay toward the middle of the curve, as this is where the pump is most efficient.



Key 2: Pump Installation

Installing the right components, in the right places, the right way matters.

Important components to consider:

- Weep Holes
  - Necessary for priming
  - Prevent “dead-heading”
  - Locate below check valve
- Check valves
  - Guard against impeller backspin
  - Prevent short cycling
- Correct Float Settings
  - Ensure clearance between float and basin wall
  - Adequate distance or tether prevents short cycling
- Elevation
  - Raise a pump off the floor to avoid grit

Watertightness

Keep water in where you want it and out of where you don't.

Basin lids and risers must be sealed to not leak.

- Leaky containers force a pump to do more work than necessary.
- Infiltration brings unnecessary grit and dirt into a system.

Water and Electricity don't play nice!

- Junction boxes are notorious for failing to seal out moisture.
- If cord ends are exposed to wetness, they will wick water into the pump housing. The result is pump failure.

Very Good Installation!

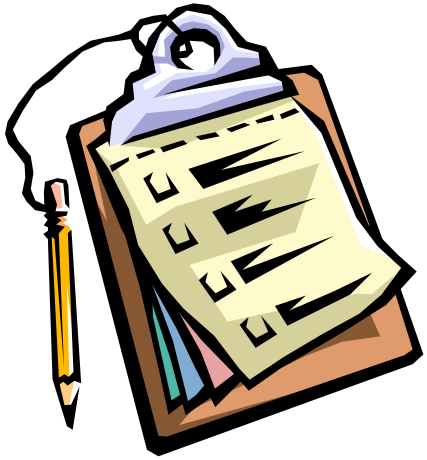
Very, Very Bad Installation!!

Key 3: Pump Maintenance

Pump maintenance and system maintenance are one and the same.

One will always affect the other.

- On average, a pump system should be inspected once every 6 months.
- Develop a maintenance plan or routine.
- Instruct the owner of what to do in the event of a problem.



Six Month Maintenance

- Listen to pump
  - Detect abnormal or irregular noises
  - Scraping, buzzing, rattling
- Clear obstructions from pump inlet
- Ensure the weep hole is not blocked
- Inspect check valve
- Open j-box for wetness
- Check floats for clearance
- Open control panel
  - Detect strange or burn odors
  - Check time meters and counters

Annual Maintenance

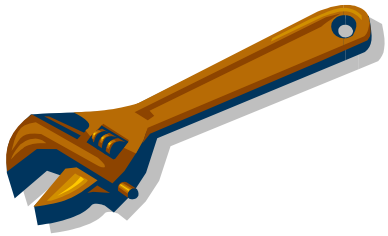
- Clean pump
- Inspect impeller for wear
- Inspect impeller cavity for buildup

Two Year Maintenance

Check oil in the motor cavity
Note the following symptoms:

- Burnt appearance or smell
  - » Pump has overheated – Check motor resistance
- Milky look to the oil
  - » Shaft seal has failed – Refill cavity with new appropriate replacement oil and check motor resistance
- Oil is clear and clean
  - » No problems – Replace and secure oil plugs

Major Service



Problems listed below require attention from an authorized service station

- Inspection or poor performance reveals excessively worn impeller
- Poor performance and resistance testing indicates bad stator
- Sensors reveal a seal failure around the shaft
- Noisy operation reveals a bearing failure

Effluent Turbine Pumps

Turbine pumps are designed and built very differently than centrifugals.

- These pumps have no solids handling capabilities.
- Units consist of a motor end and an impeller end.
- Replacement ends, motor or impeller, are typically available and simple to change out.

Safety

Always remember:

Dealing with pumps, potentially contaminated water, and electricity is dangerous.

The primary goal of every day is not to make a buck, but to make it home healthy and in one piece!

Thank You for Your Attention