

# Pump Technology & Selection of Pumps Intro

(Pumps and System Curves)

Module 1

1

## What's the goal?

- Move water (water like fluid)
- Keep dry stuff dry, and wet stuff wet
- Not destroy the equipment
- Less time on maintenance
- Less money on power
- Less money on parts/replacement

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## So where do we start?

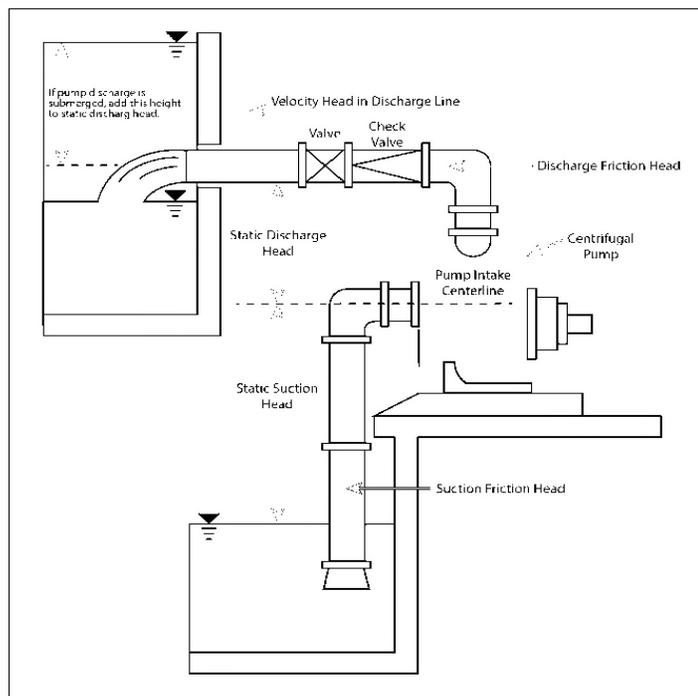
- What?

3

What?

Lo to Hi.

Here to there.

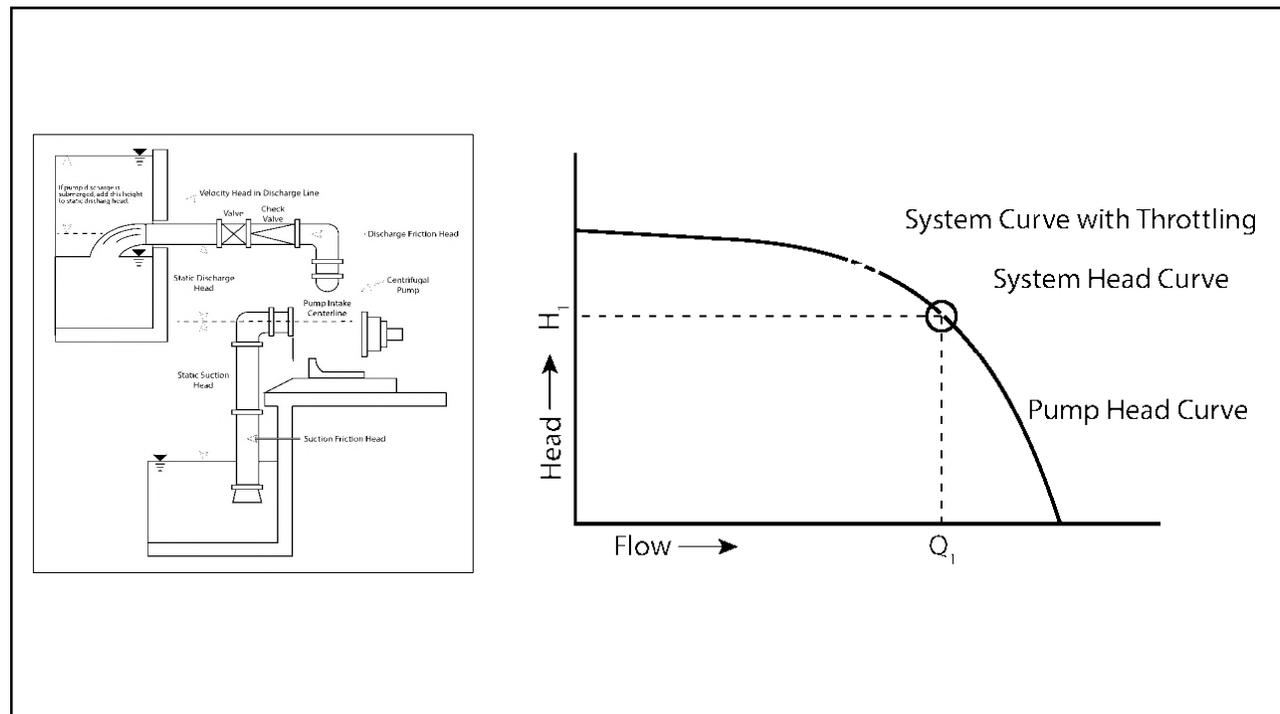


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## So where do we start?

- What?
- SYSTEM CURVE

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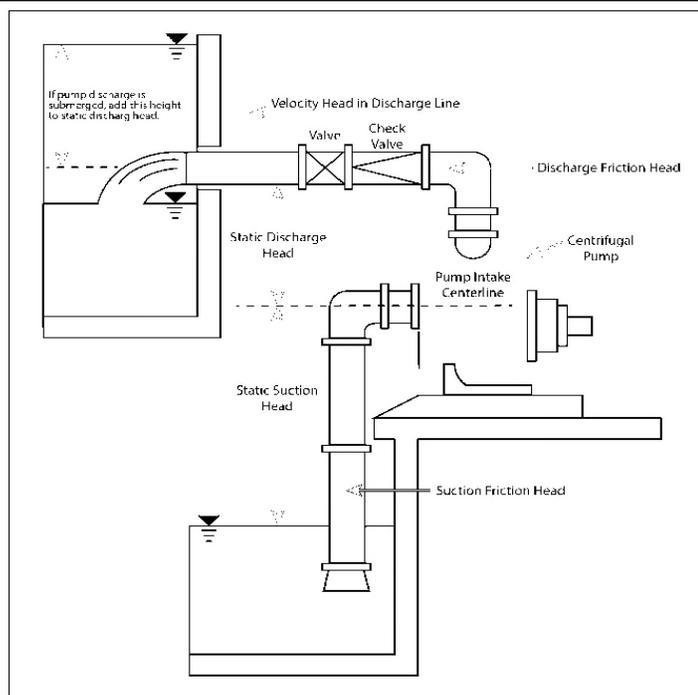
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## So where do we start?

- What?
- SYSTEM CURVE
  - Static Head
  - Friction Loss
  - Minor Loss

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### STATIC HEAD (STATIC LIFT)



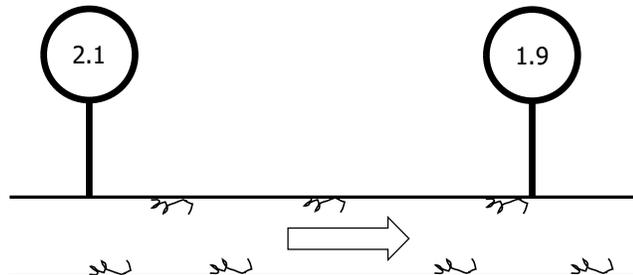
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## So where do we start?

- What?
- SYSTEM CURVE
  - Static Head
  - Friction Loss
  - Minor Loss

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**FRICION LOSS**



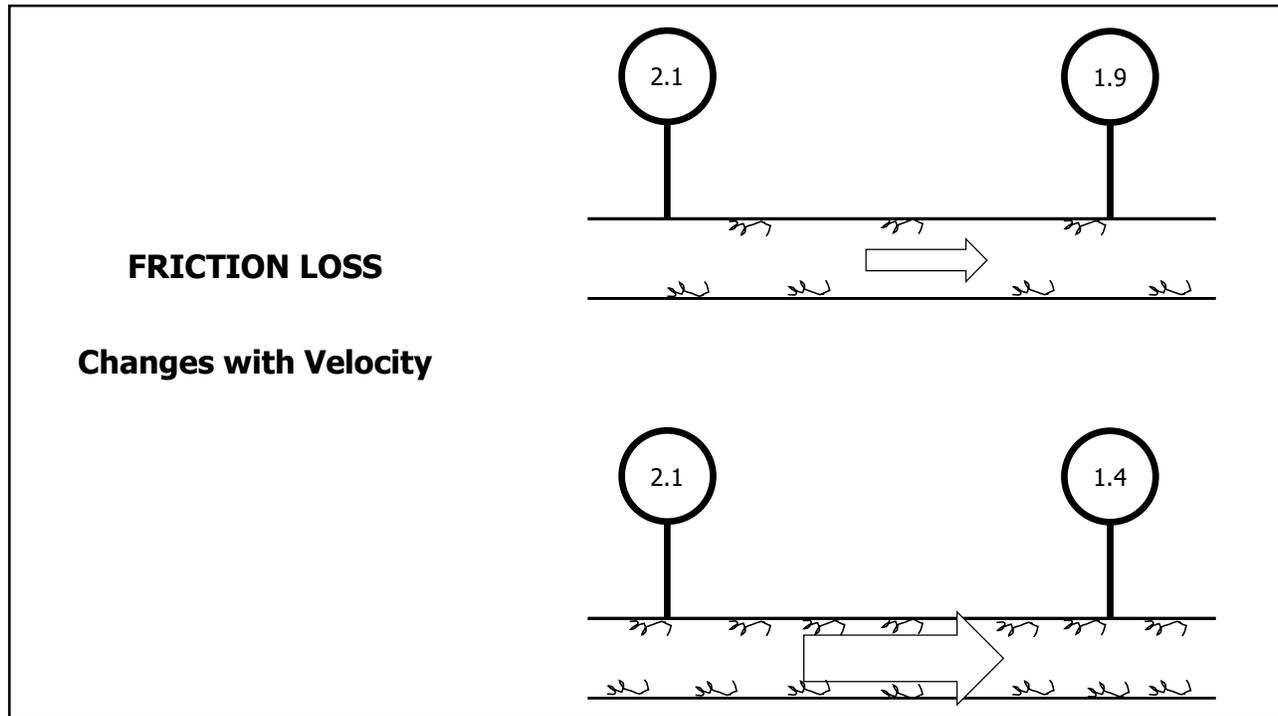
**Roughness Factor: "C = 100, or C = 140"**

**PVC = 150**

**Cast-iron = 100**

$$hf = 0.002083 \times L \times (100/C)^{1.85} \times (gpm^{1.85} / d^{4.8655})$$

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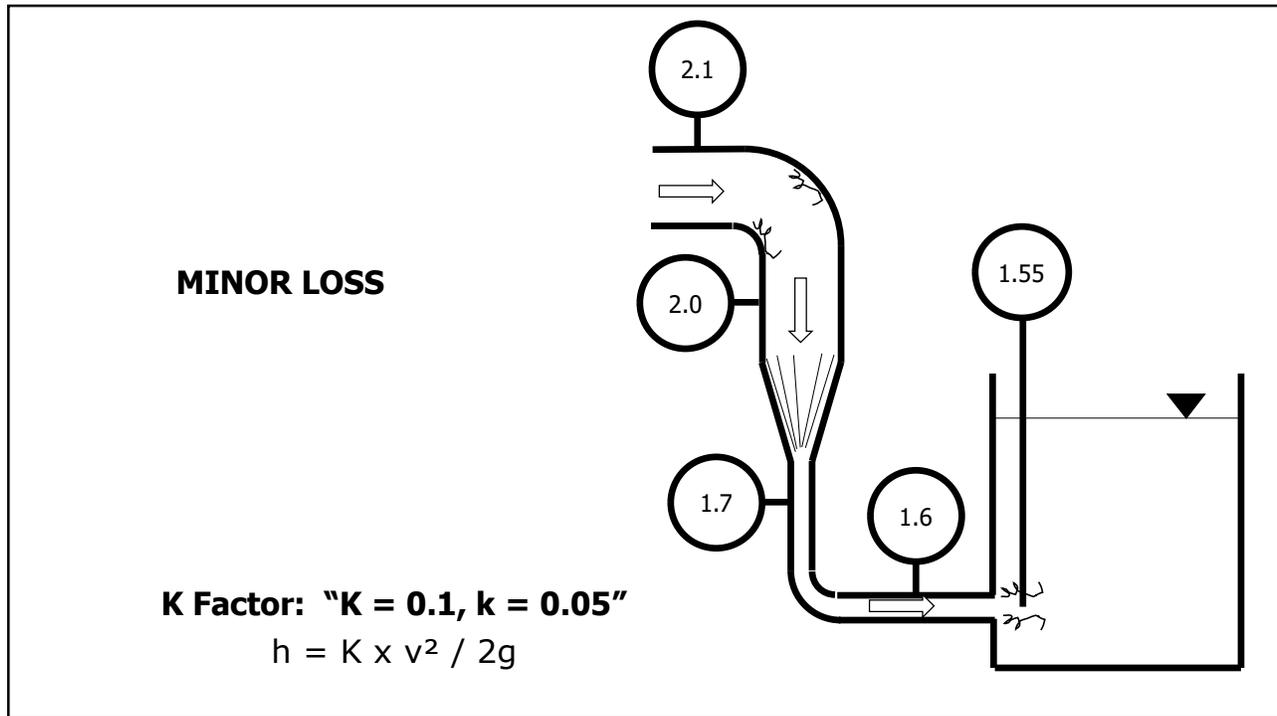


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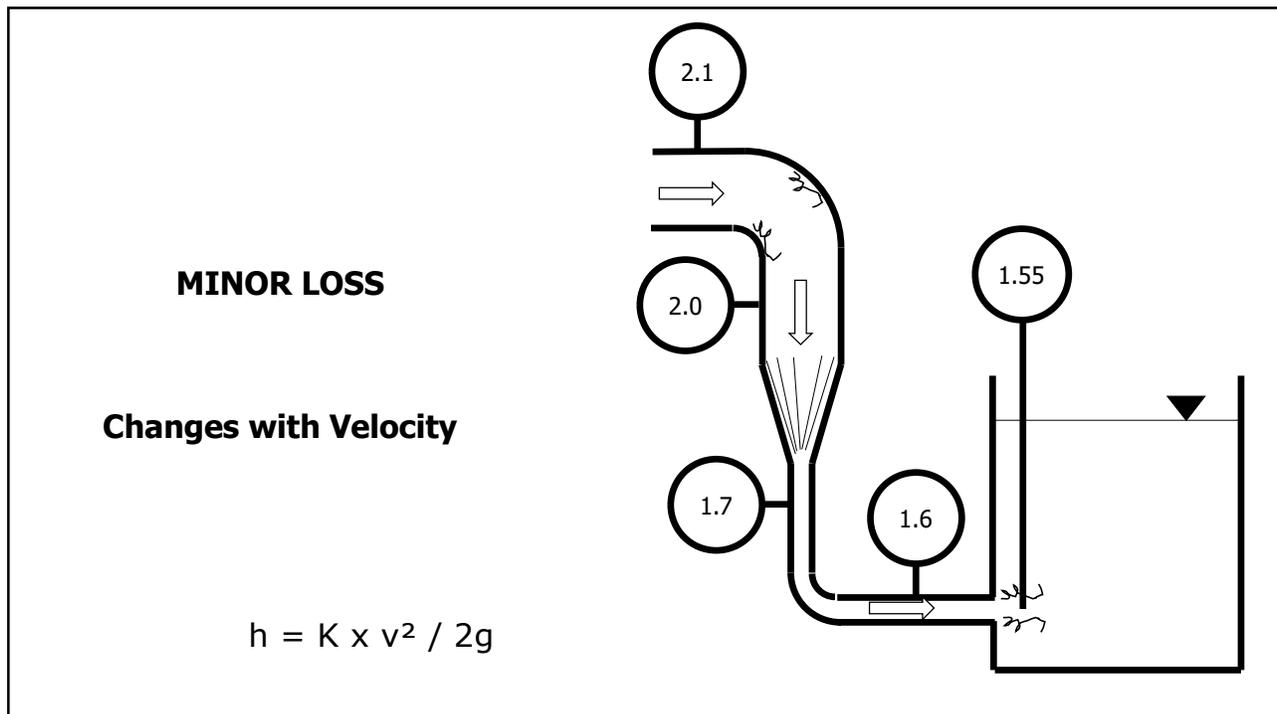
## So where do we start?

- What?
- **SYSTEM CURVE**
  - Static Head
  - Friction Loss
  - Minor Loss

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## So where do we start?

- What?

**Static – Doesn't change with velocity.**

- SYSTEM CURVE

- Static Head
- Friction Loss
- Minor Loss

**Friction & Minor Losses – need either an equation & program (Excel, PumpFlo)**

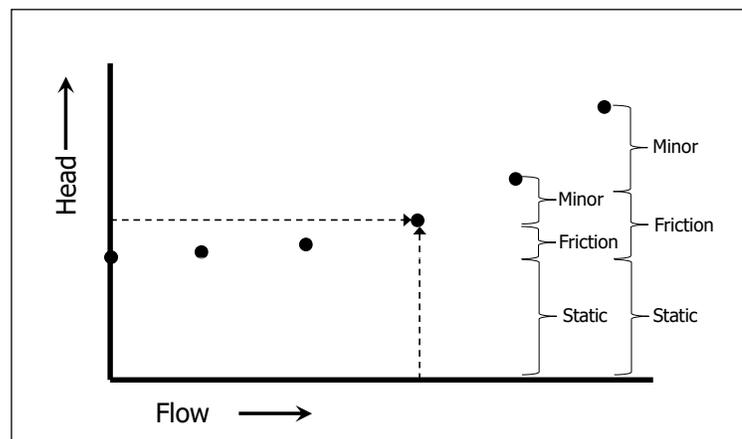
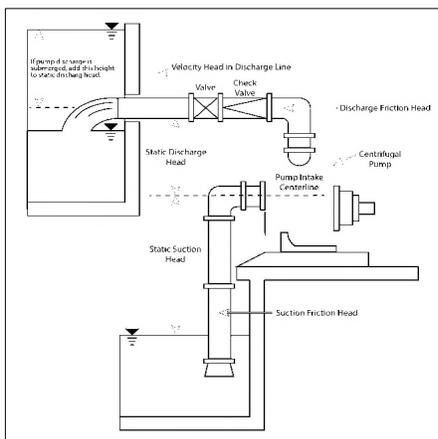
**Or**

**Tabulate Manually**

**End Goal = Curve**

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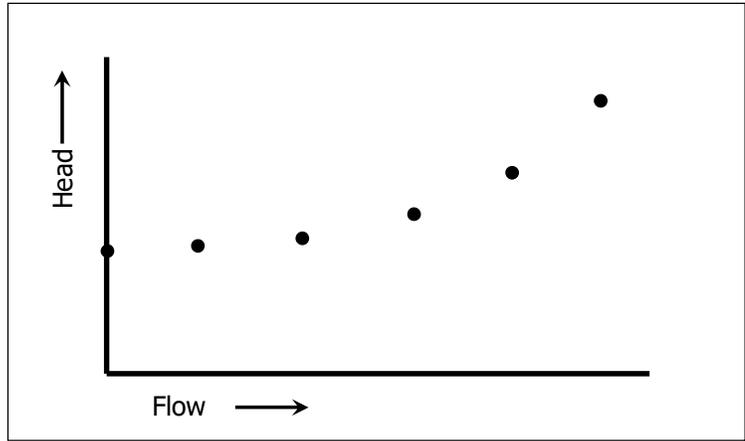
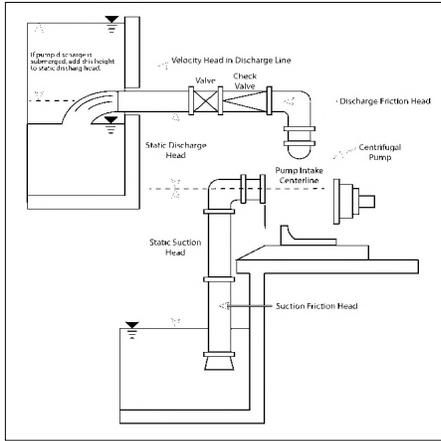
## Putting it together... System Curve



$$\text{SYSTEM CURVE} = \text{Static Head} + \text{Friction Loss} + \text{Minor Loss}$$

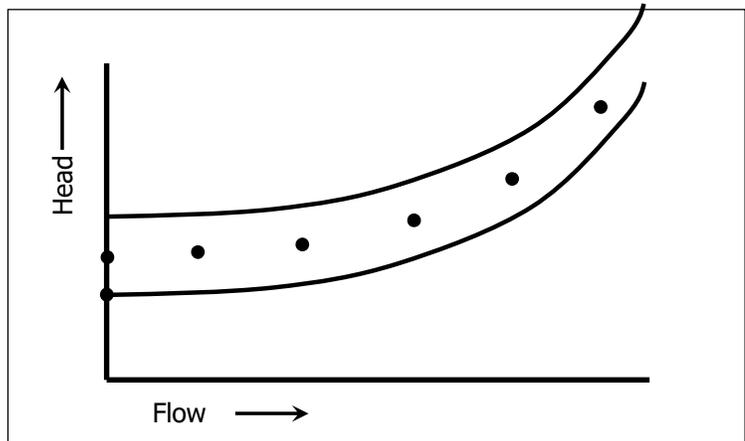
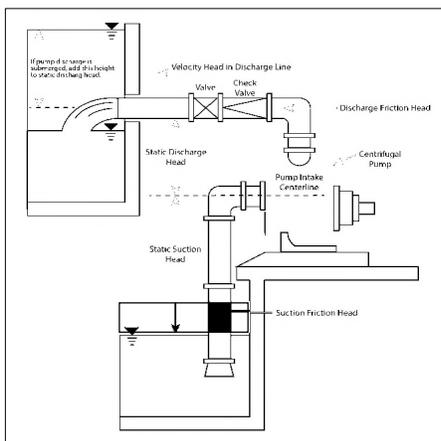
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# Putting it together... System Curve



**SYSTEM CURVE = Static Head + Friction Loss + Minor Loss**

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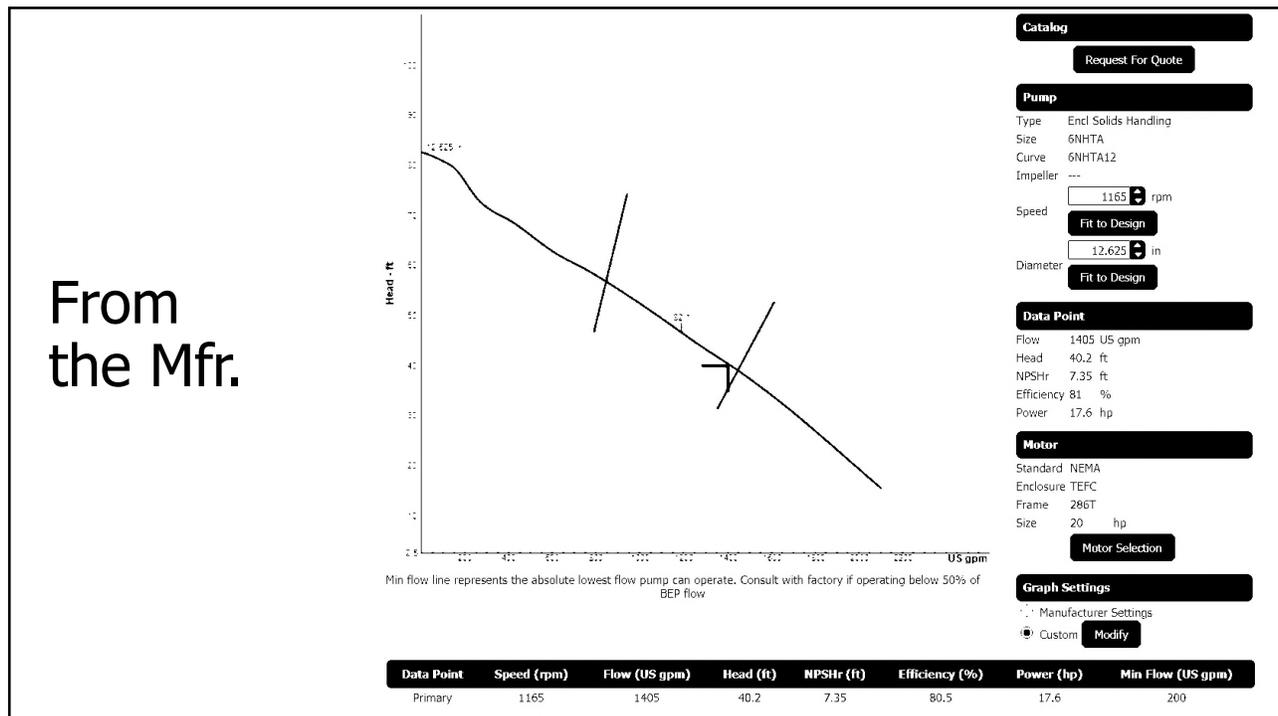


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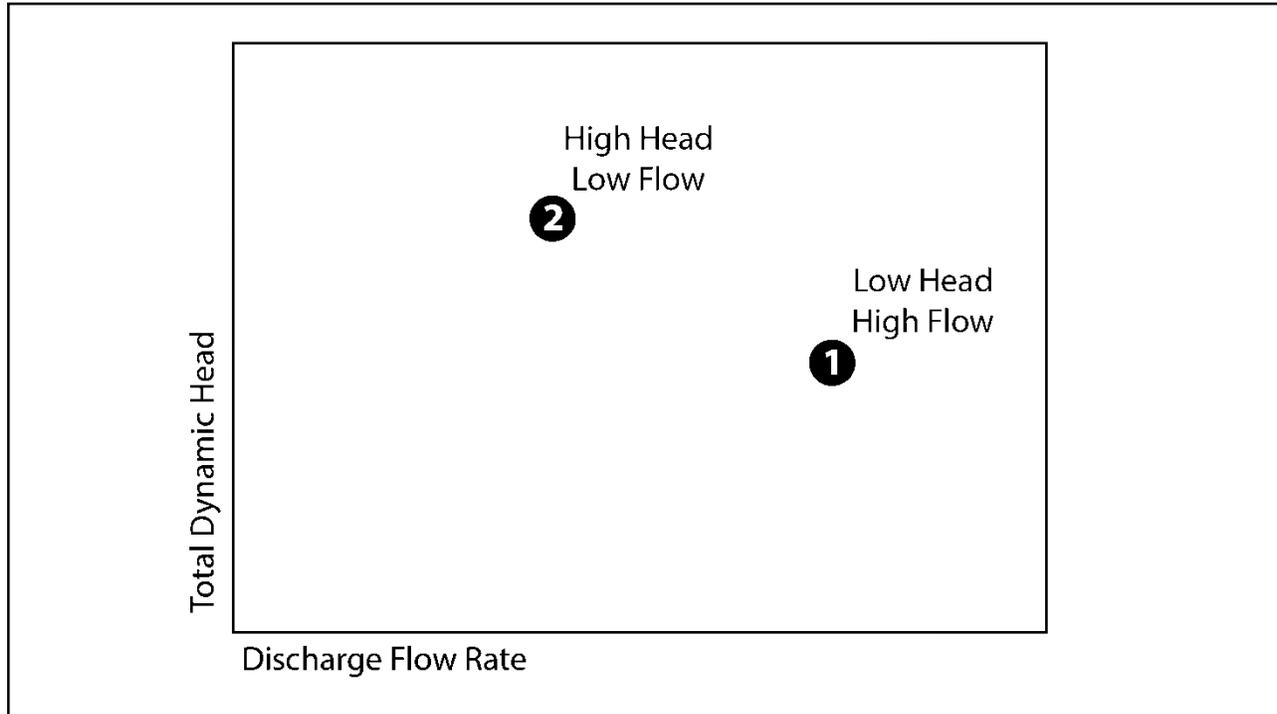
# So where do we start?

- What = System Curve
- How = Pump Curve

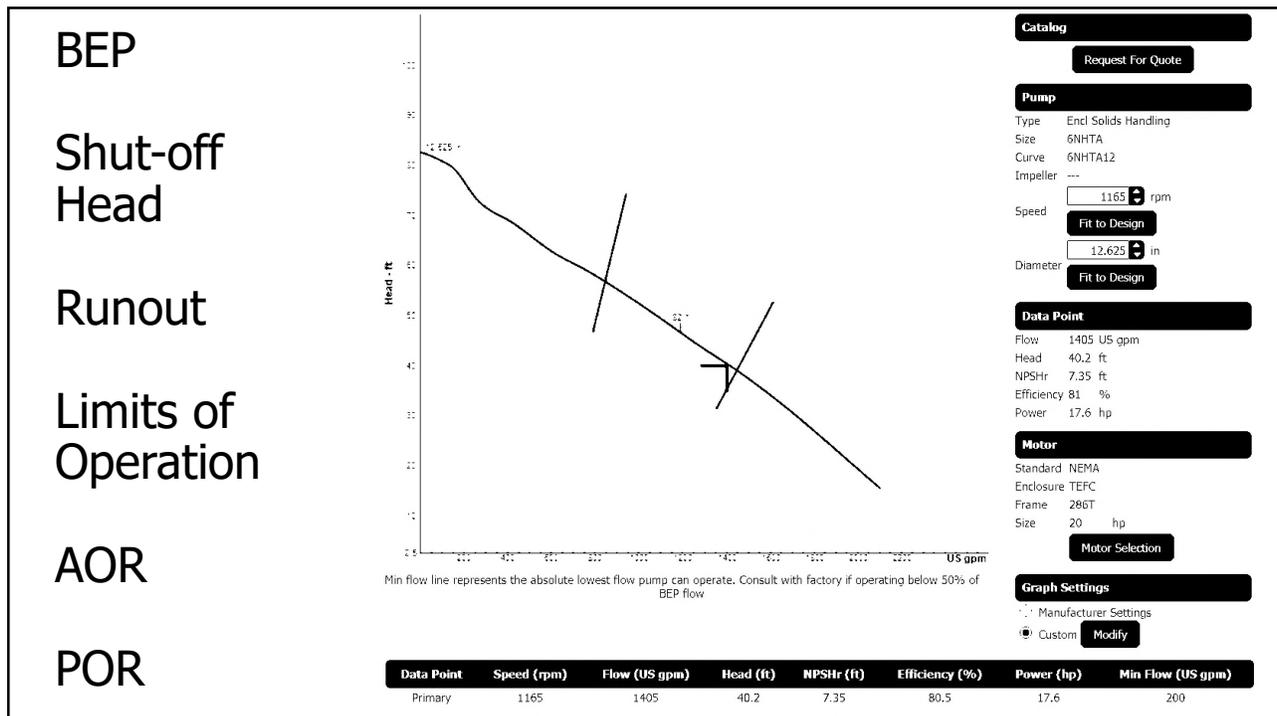
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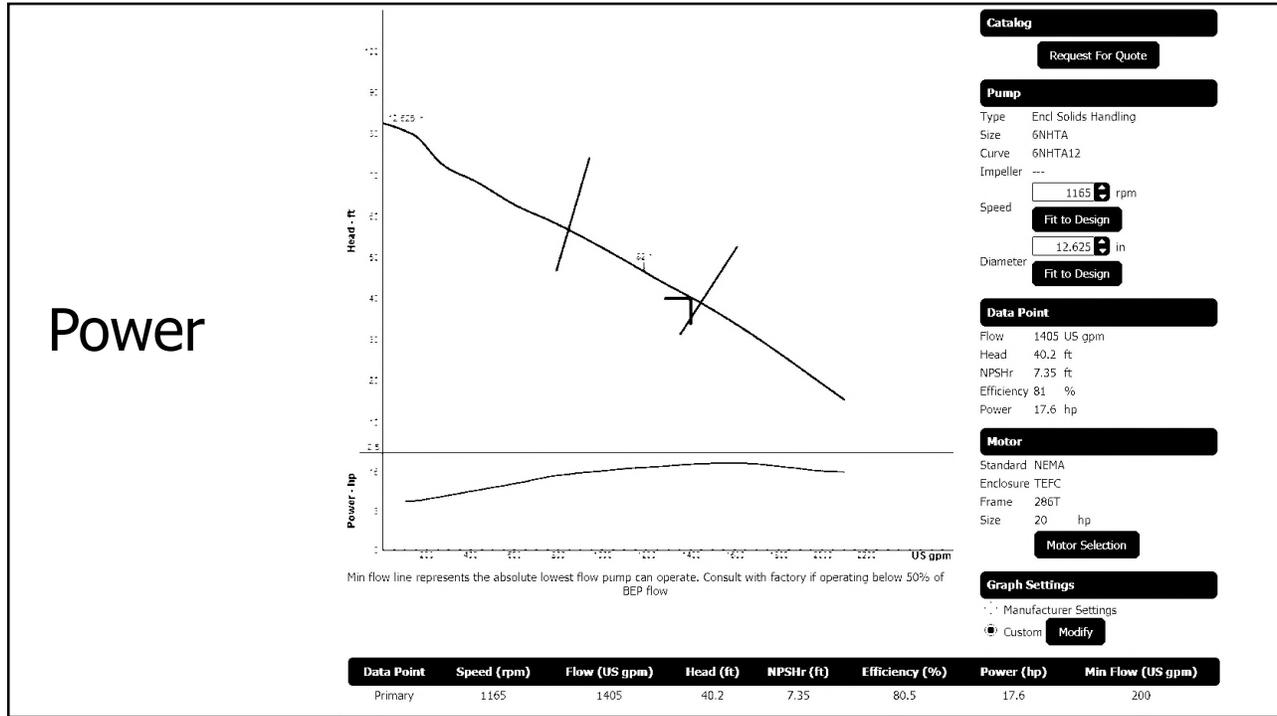
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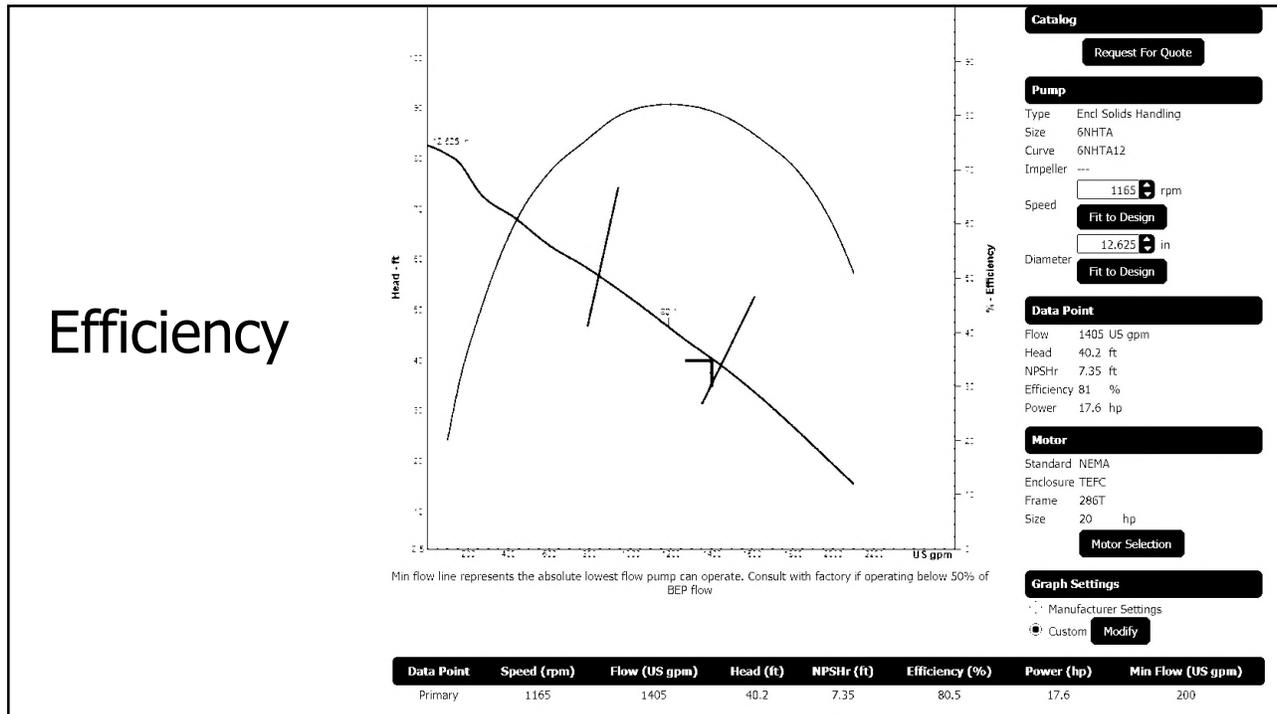
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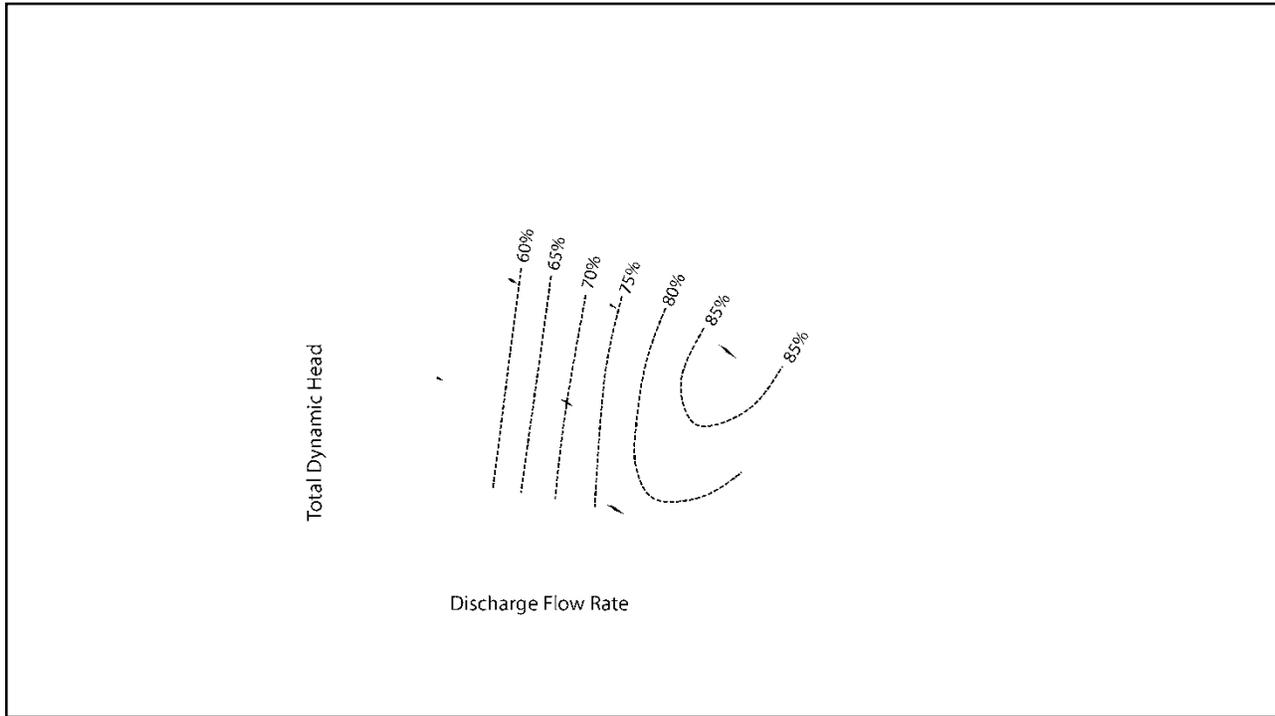
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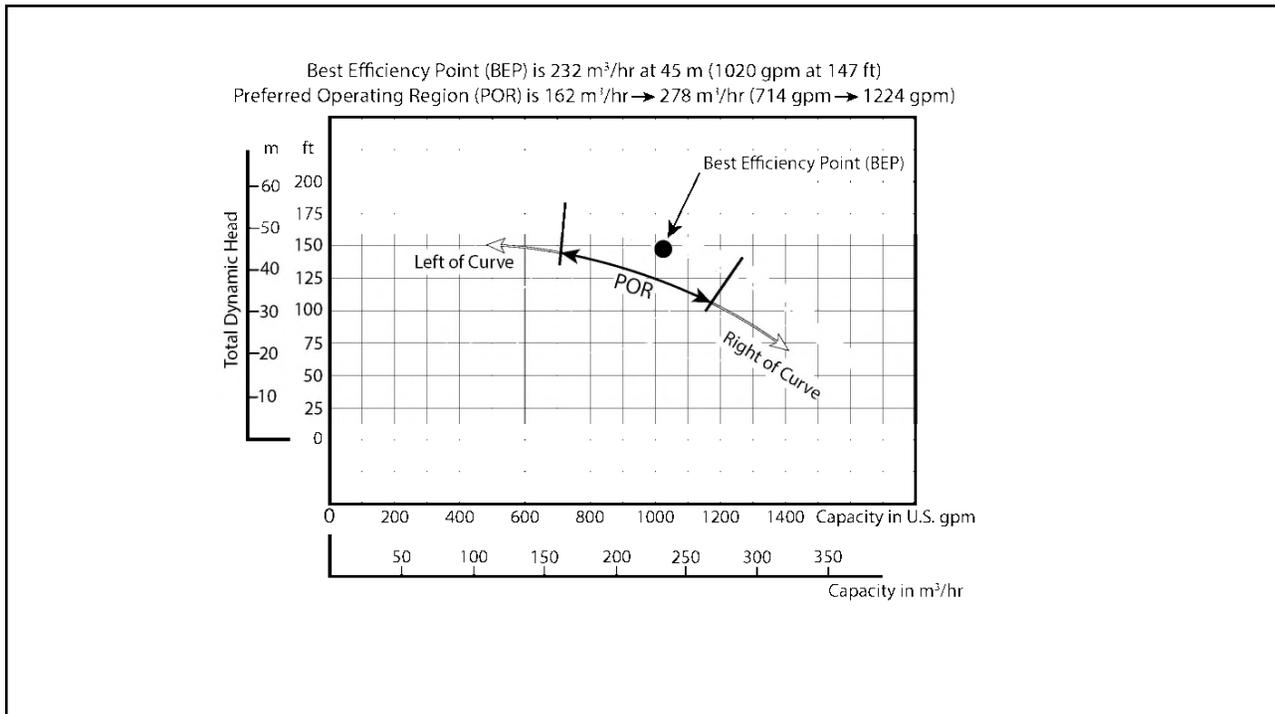
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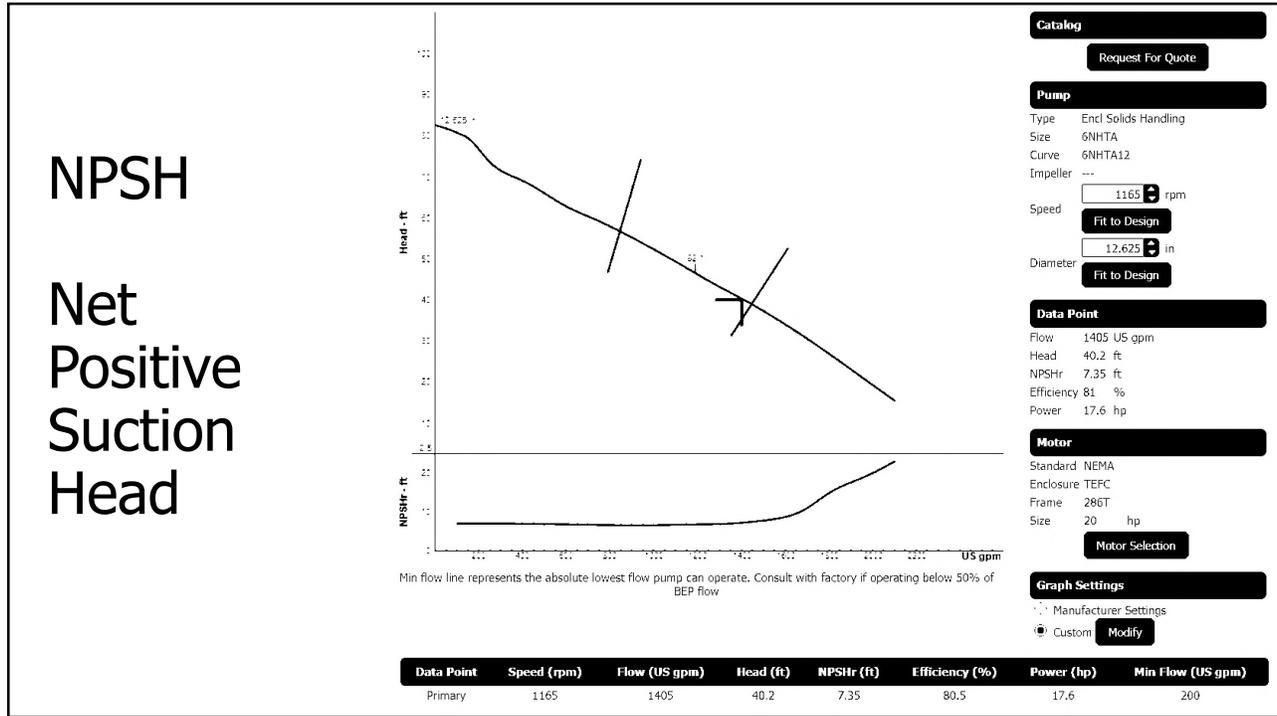
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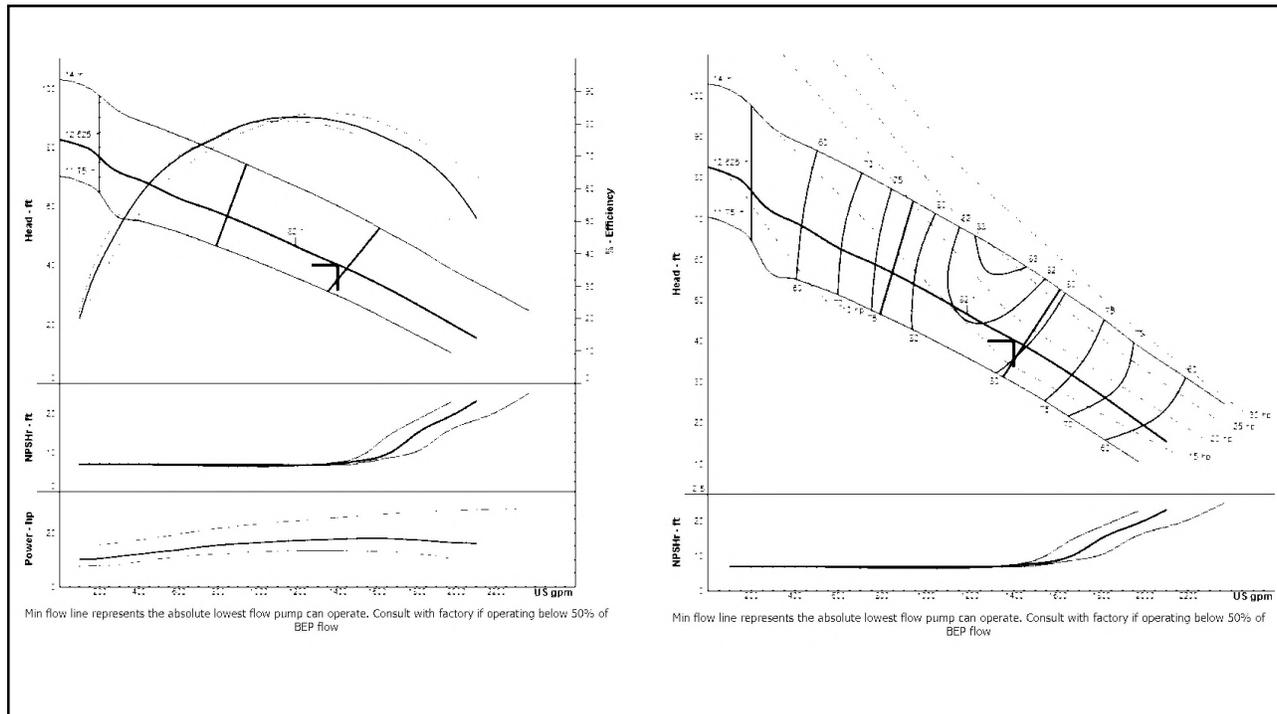
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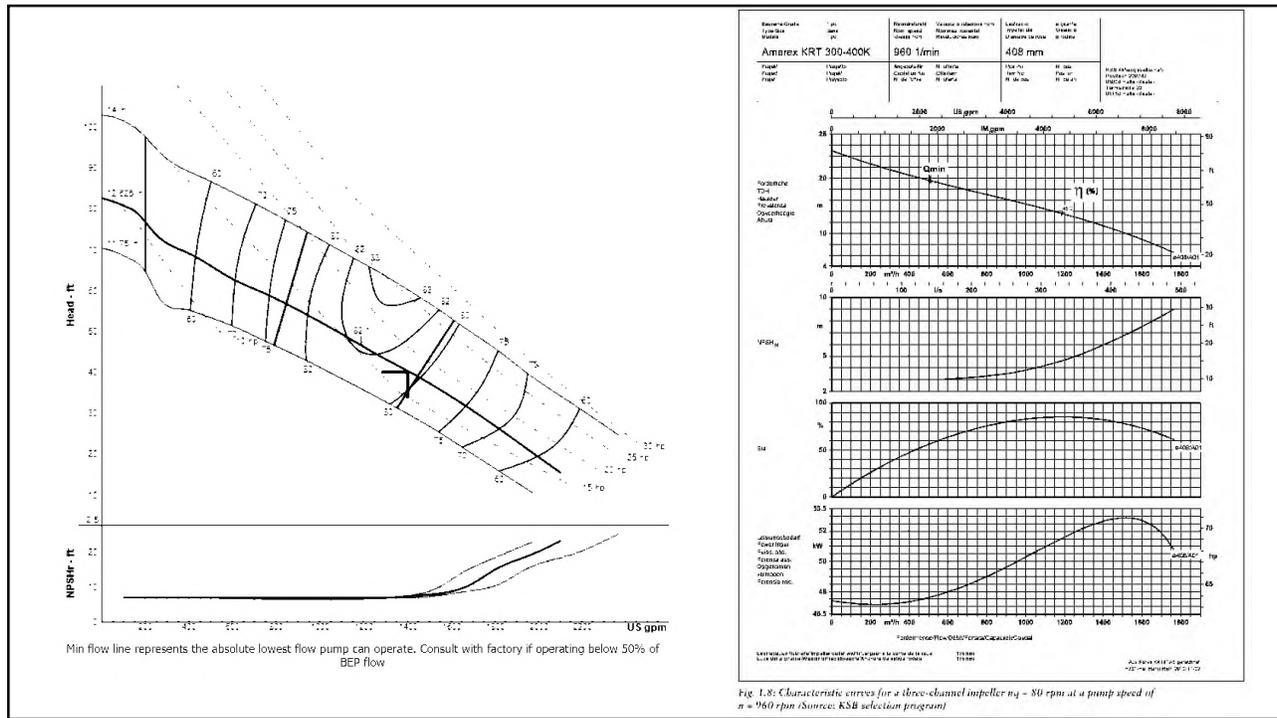
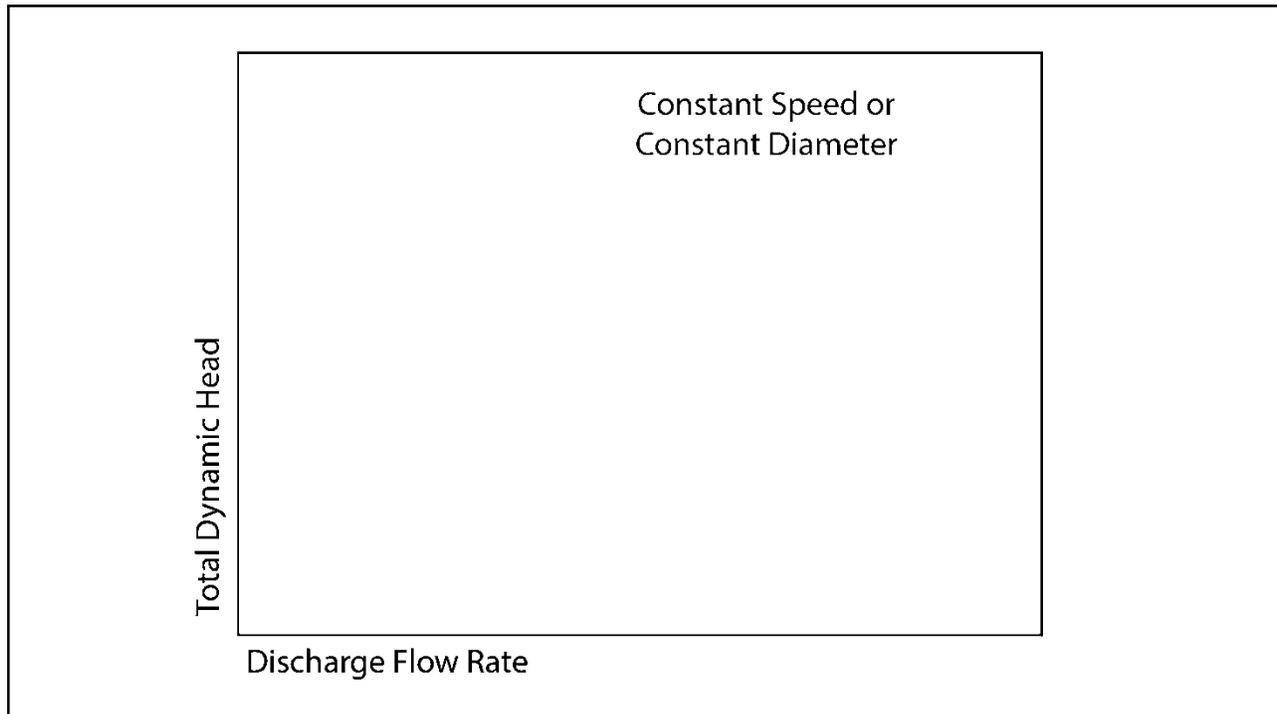
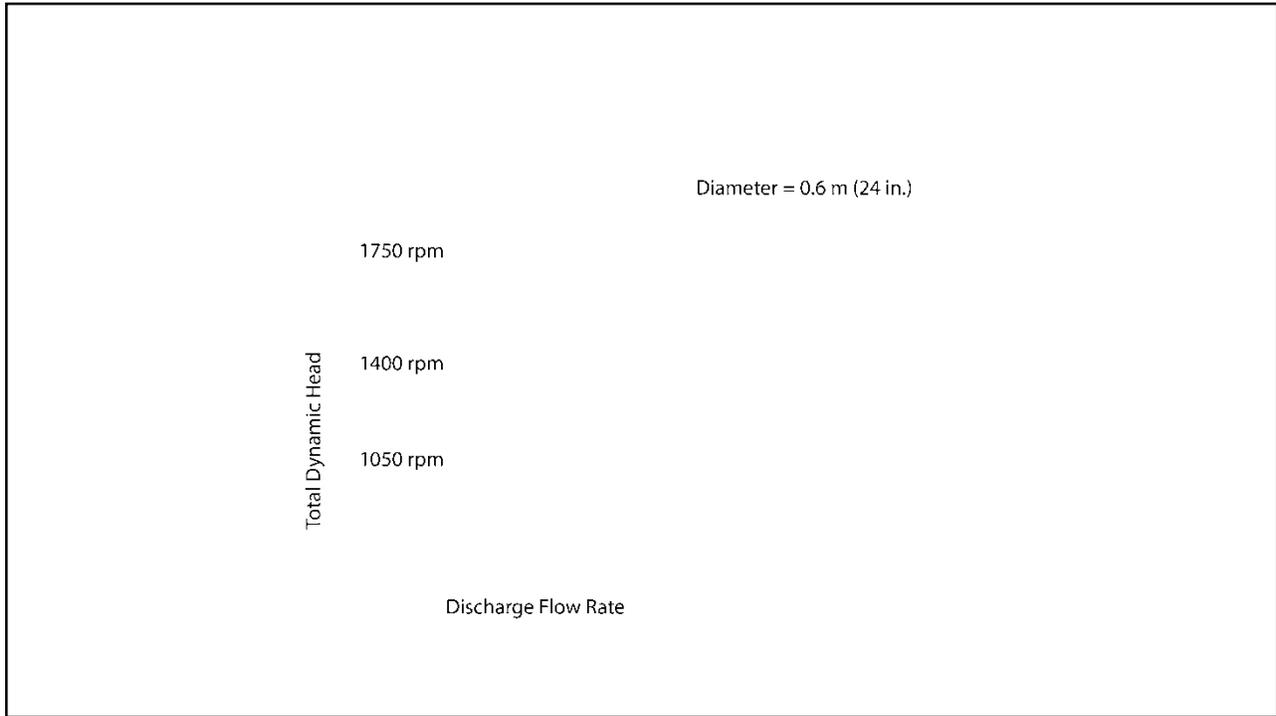


Fig. 1.26. Characteristic curves for a three-channel impeller  $n_d = 30$  rpm at a pump speed of  $n = 960$  rpm (Source: KSB selection program)

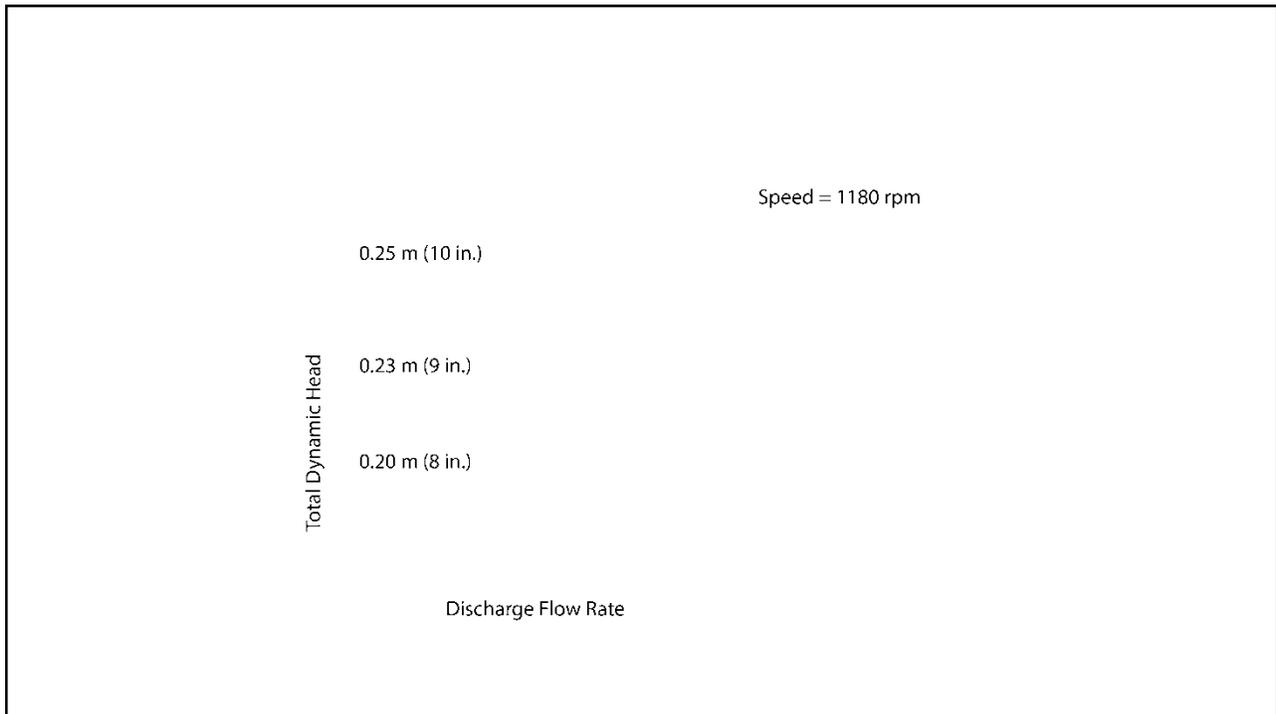
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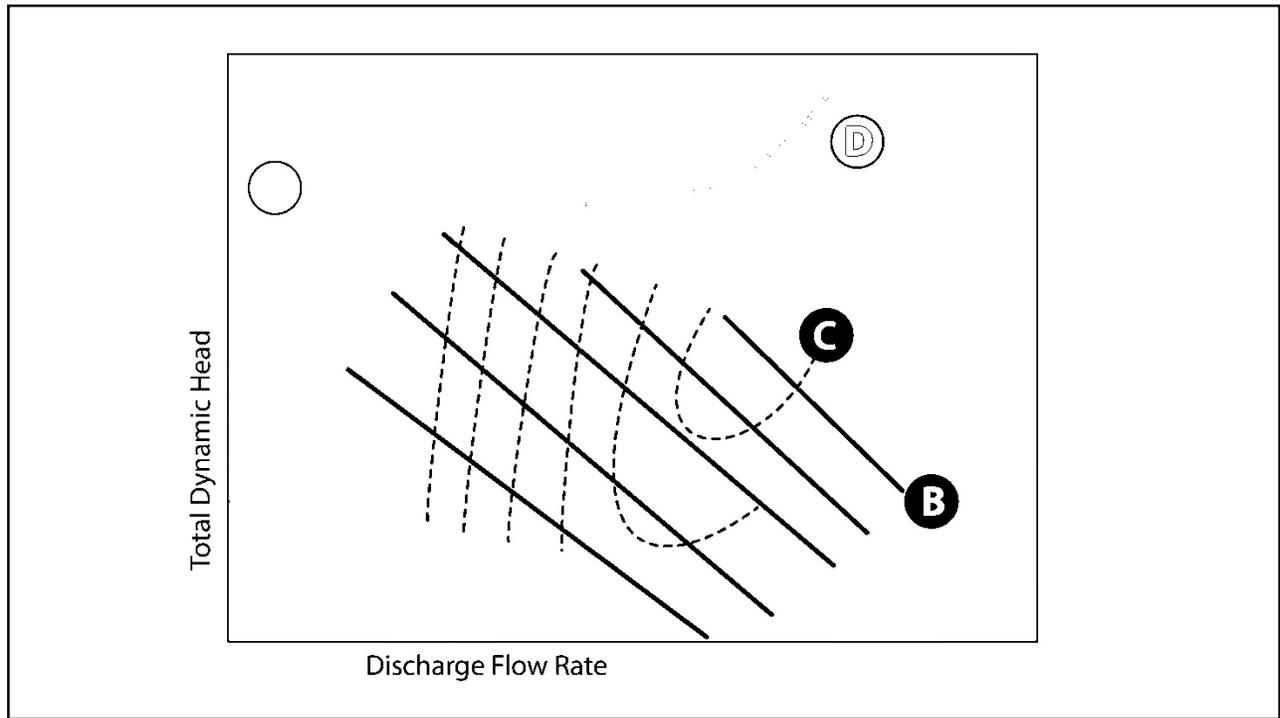
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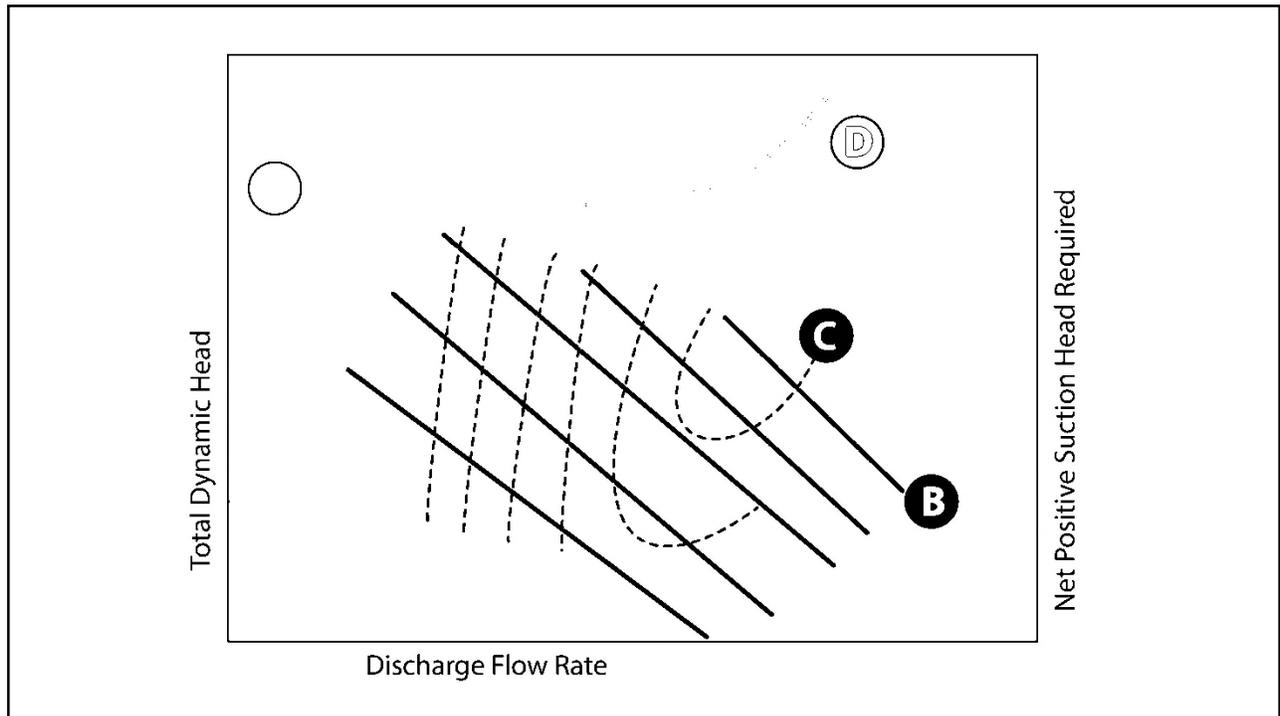
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