*2018 Engineer Pre-Test Module*

# ALAMEDA COUNTY FIRE

DRAFTING


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# Drafting

# Drafting Operations

- For many departments, drafting operations are rarely practiced. This is especially true in urban and suburban area with reliable pressurized water systems. However, pressurized systems have been known to fail or a static non-pressurized source may be all that is available for firefighting operations.

- In the ACFD, we pride ourselves in preparing for these situations. We do have large rural areas without pressurized supplies. Furthermore, even in our urban areas, we should be fully prepared if these systems fail like in an earthquake.

- Successfully operating a fire department pumper from draft is one of the most challenging tasks pump operators face. It requires a thorough knowledge of the principles involved in drafting as well as familiarity with the apparatus. All driver/operators should master these necessary skills even if they are not required to perform them often.

# Course Outline

- Drafting
- Scenarios when to draft
- Engines
- Principles of lift/cavitation
- Operations from start to finish
- Troubleshooting and common mistakes
- Field exercises

# Why do we need to draft?

- Static water supply is the most convenient.
- Natural disaster has compromised the municipal water system.
- Non pressurized connection to a water tank (a.k.a. wharf hydrant)

# What are other examples?


San Francisco, CA


A

# What Engines are capable of drafting?


# Type 1 Engines


# Type 3 Engines


# Type 6 Engines


# Portable Honda Pump


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# Quint

# Static water supply

Swimming pools

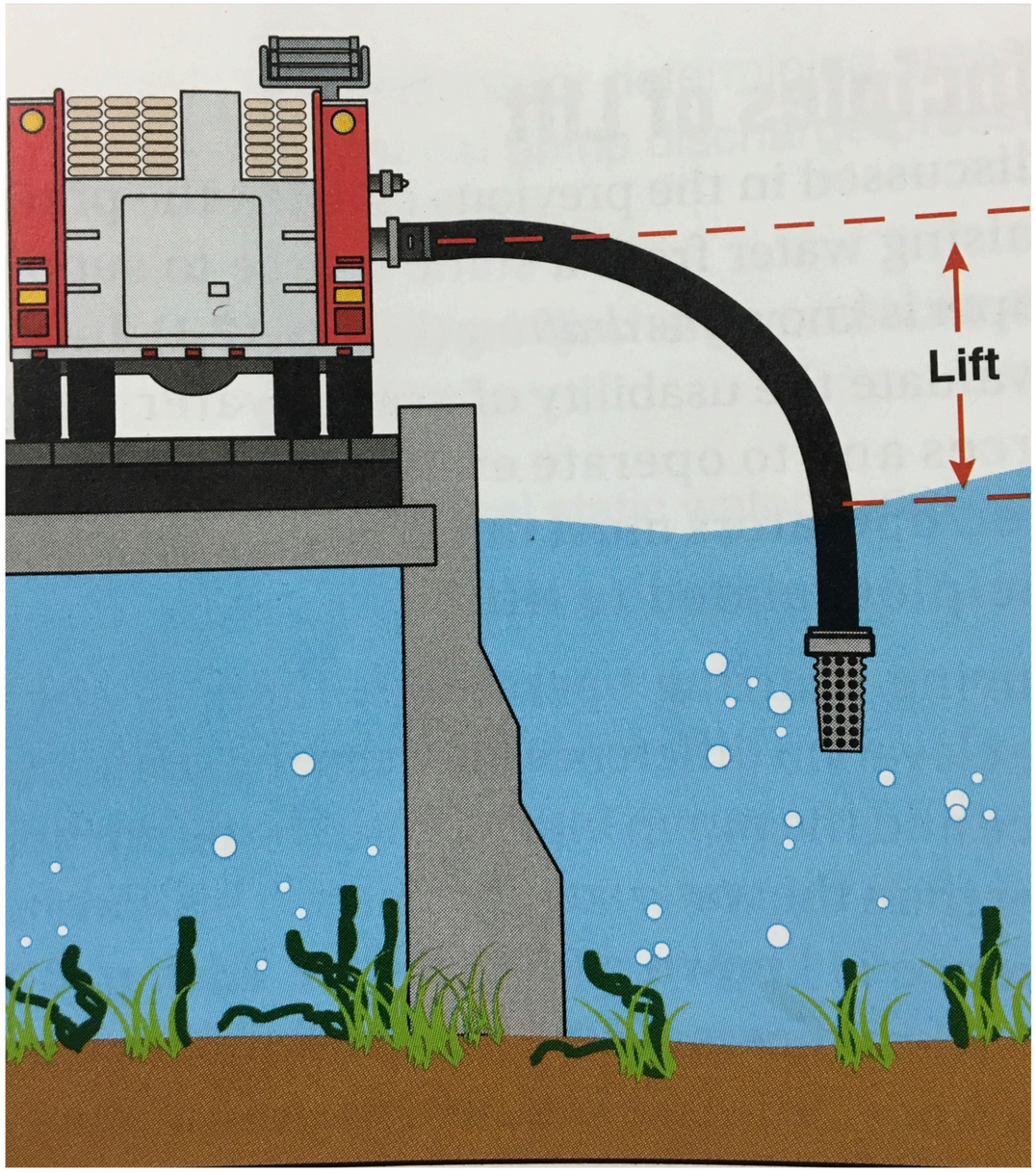
Lakes

Ponds

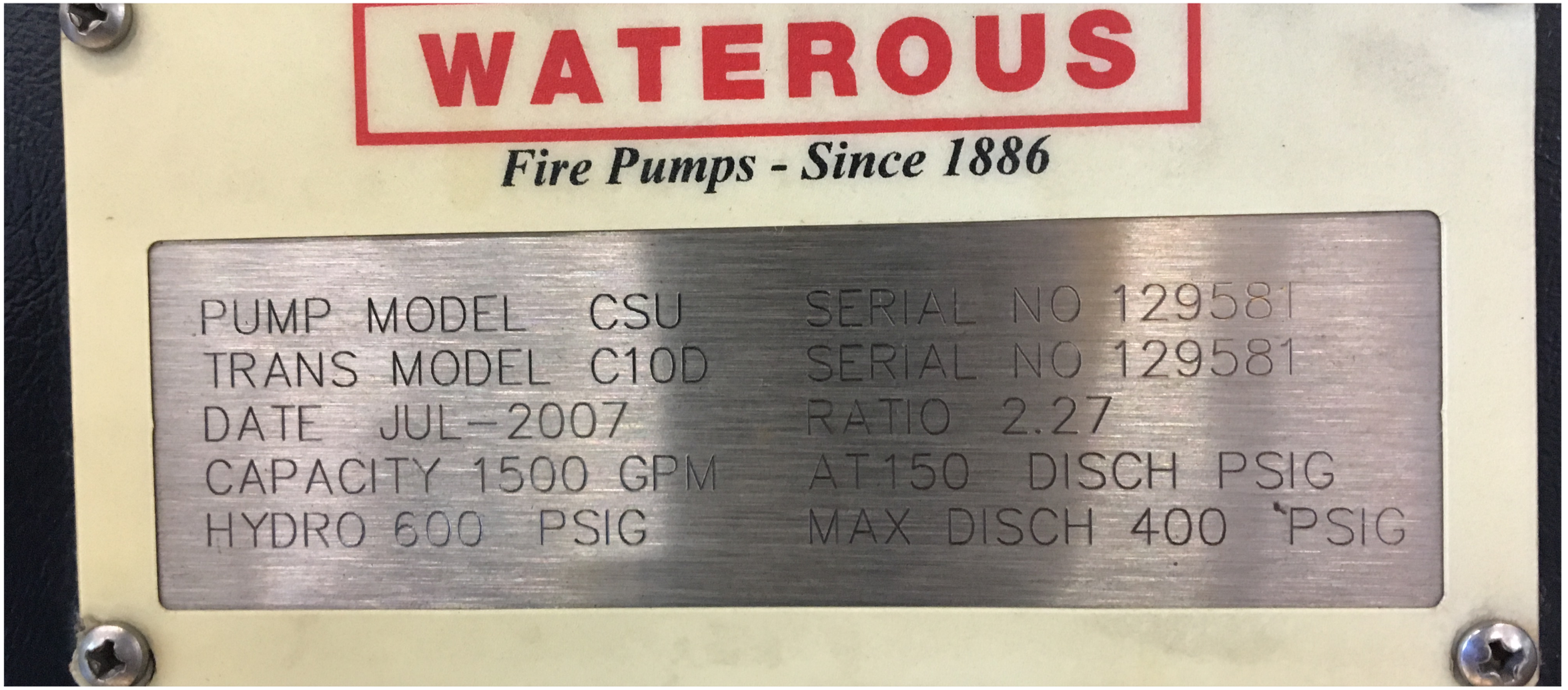
Creeks

Portable tank/Water tender operations

# Principles of Lift



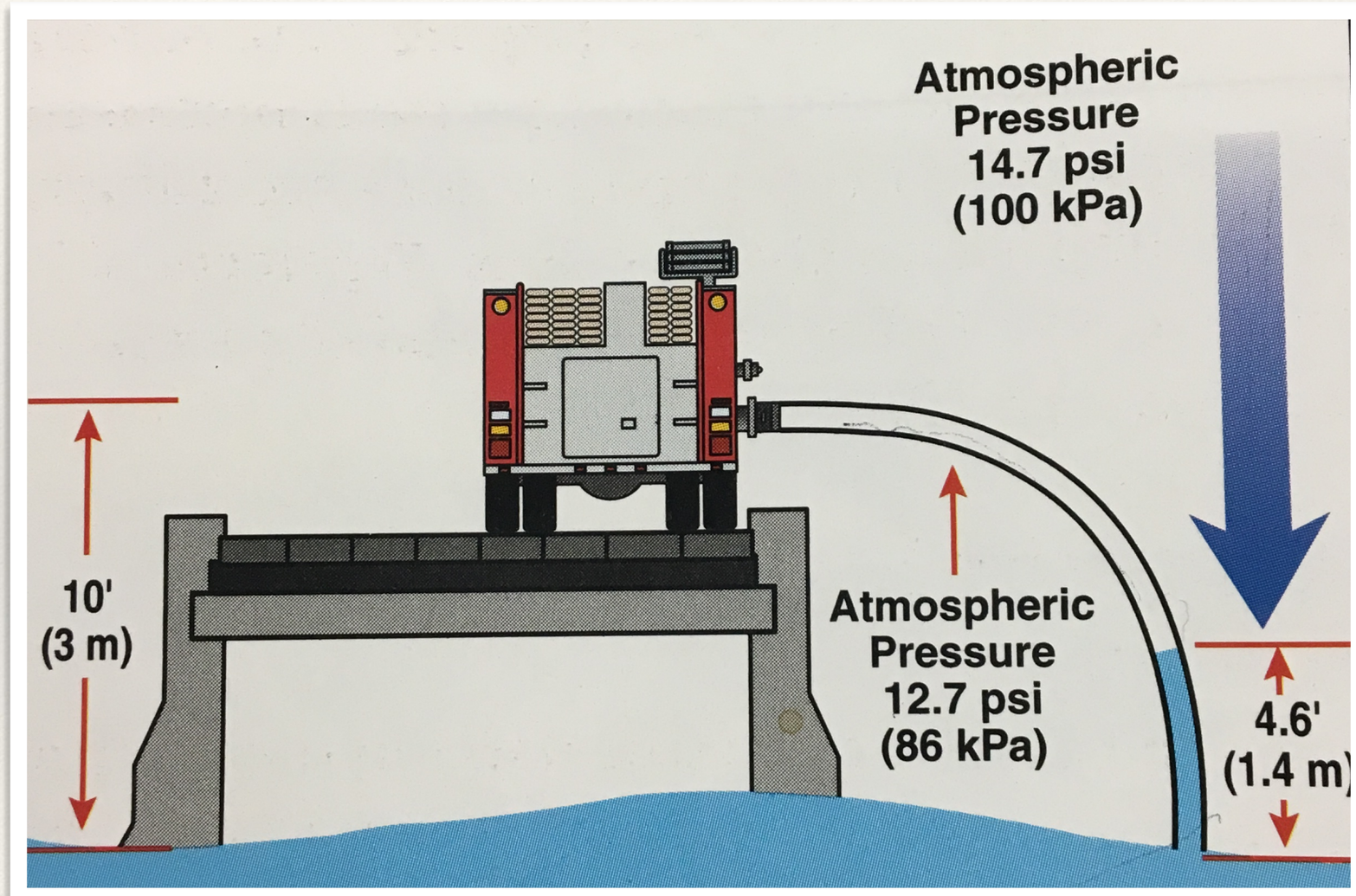

- The elevation difference between the static water source and the pump intake.




# Engine capacity

# Principles of lift

- Atmospheric pressure is 14.7 at sea level.
- 10 Feet of lift



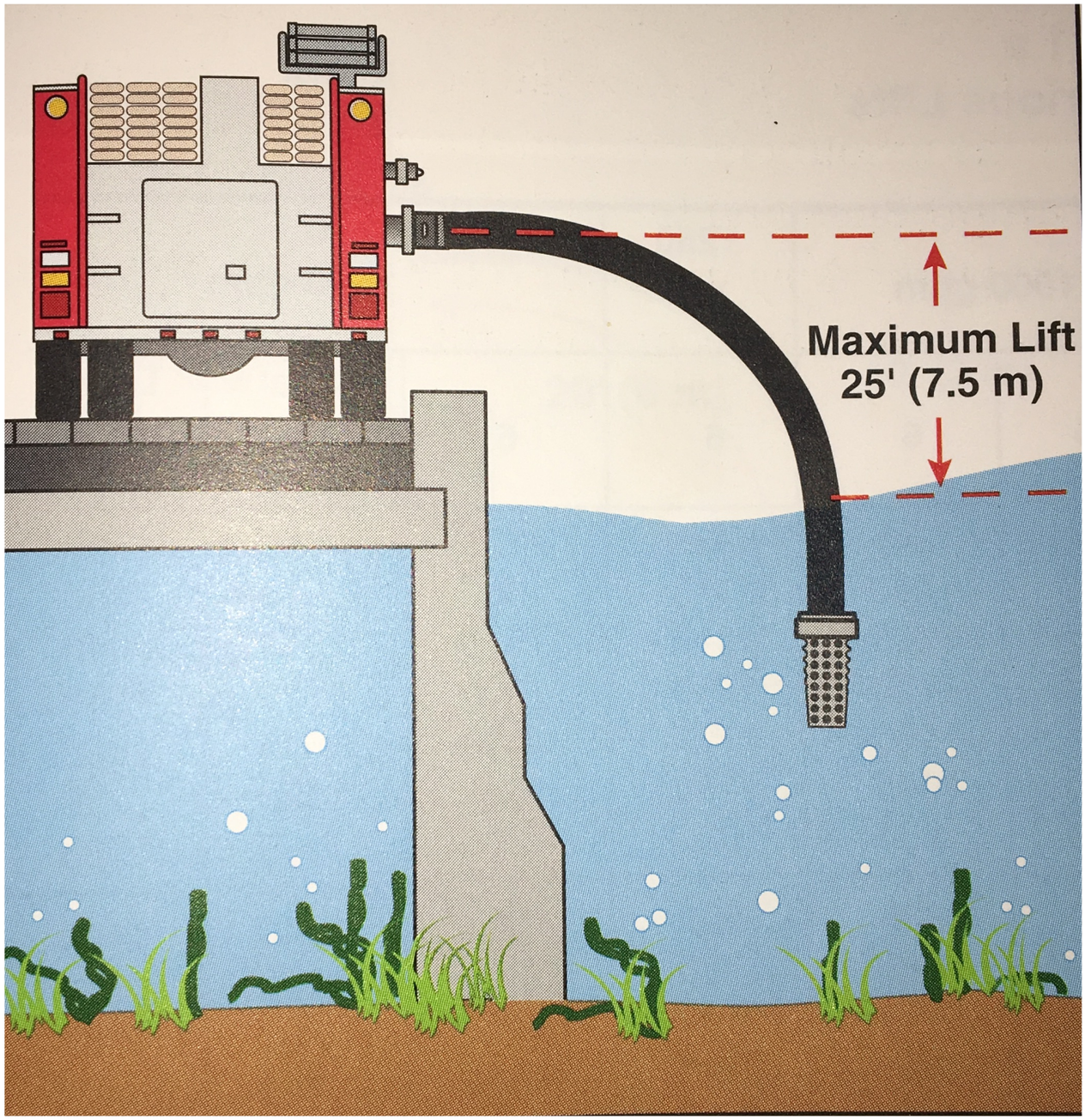
# Theoretical Lift

- A pump at sea level can lift water 33.8 feet.  (14.7 psi X 2.3 ft/psi
- For every 1000 ft of elevation atmospheric pressure is recused 0.5 psi
- FD pump theory vs. real life: A total vacuum can not be achieved in the field.

# Maximum Lift

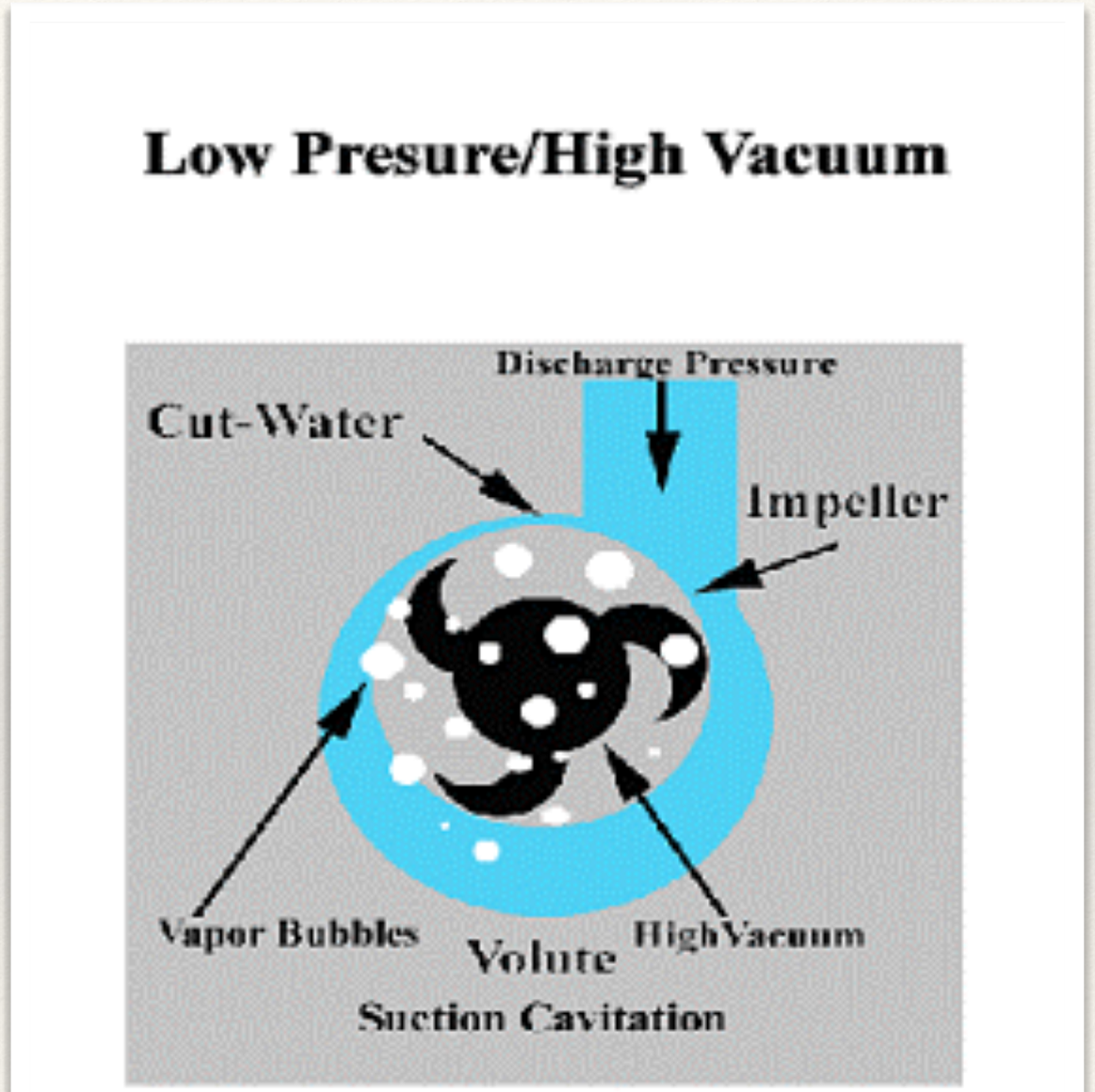
In most situations, maximum lift is 25feet.

What are some factors that contribute to the success and failure to establish a draft and to maintain it?



# Cavitation

- Water being discharged from the pump faster than it is coming in.
- In vacuum, water boils at much lower temperatures.
- Air bubbles are created



# Cavitation

- Air bubbles causes space or cavities in the water.
- Rapid change of temperature and discharging water causes bubbles to implode.
- Sounds like gravel is passing through the pump
- Causes damage to pump

# Indications Of Cavitation

- Noisy pump
- Discharge gauges are a fluctuating
- Increase RPM but no increase of pressure

# Cavitation Video

https://www.youtube.com/watch?v=0dd6AlyOnfc

# Selecting A Draft Site

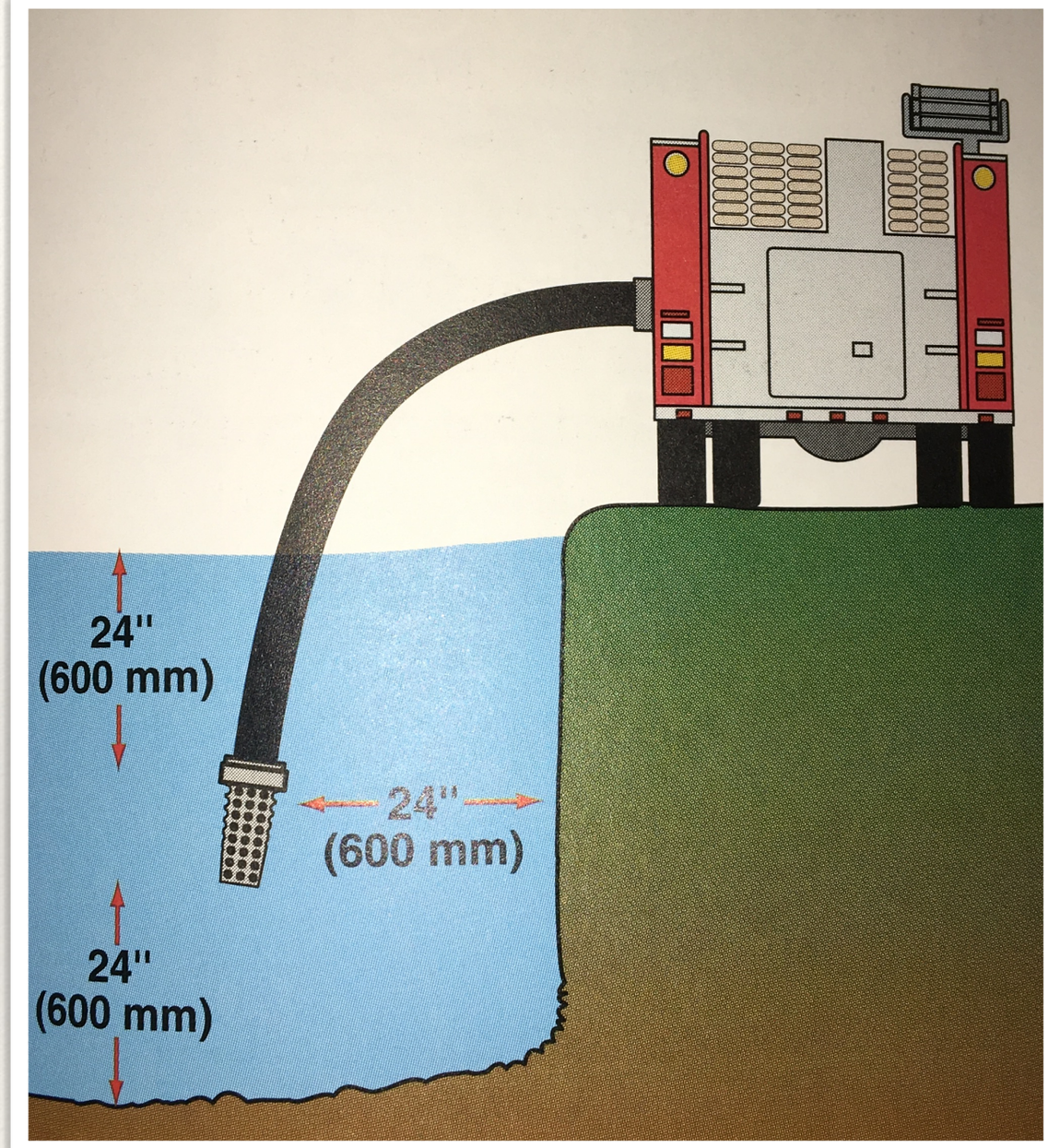

AED
WHFR

# Check Draft Site

Use a pike pole to check for depth and debris.

Know what the factors are for the type of strainer you are using.

Barrel strainer vs. low level strainer.

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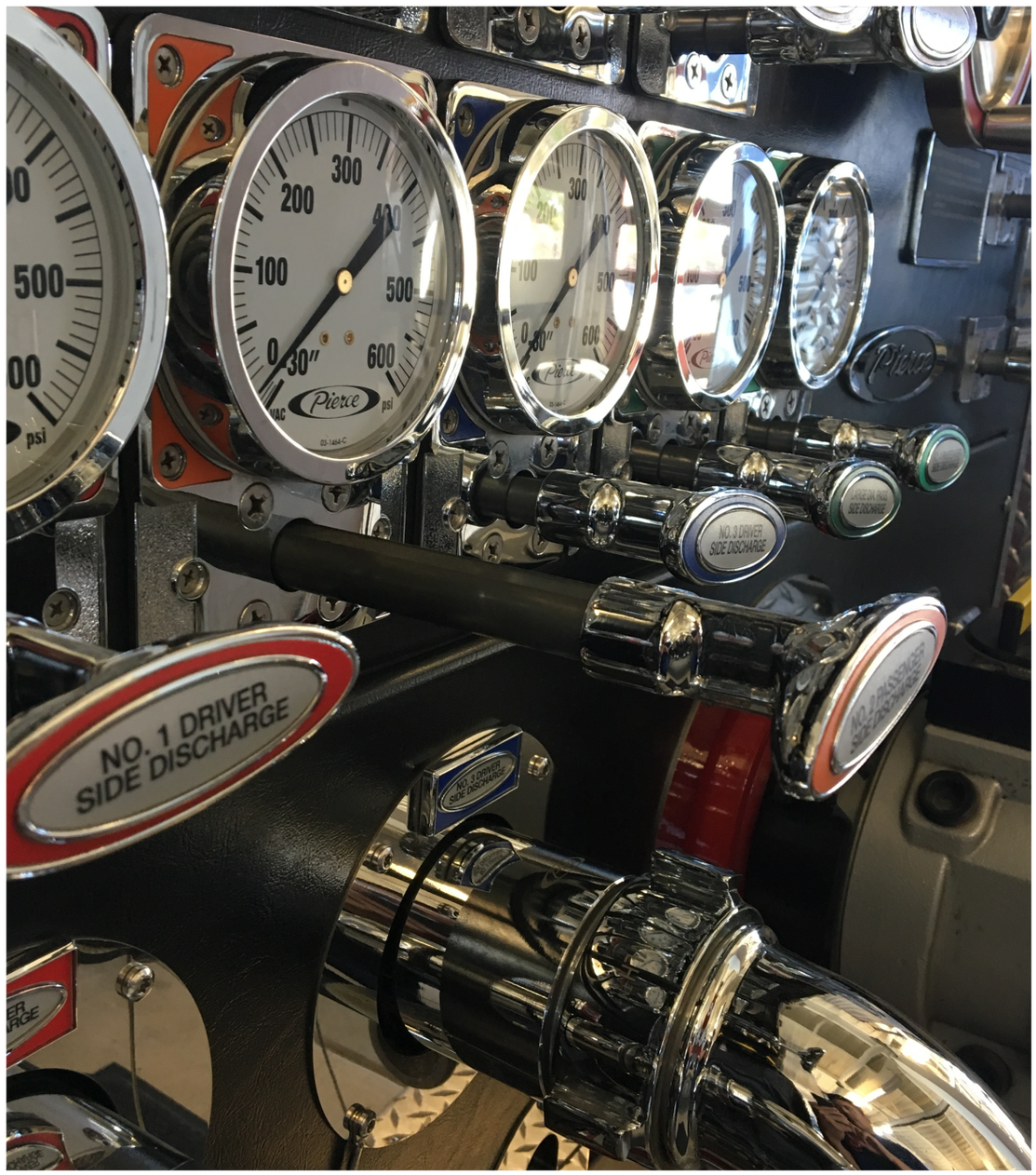
# Beginning Operations

- Choose a draft site
- Spot apparatus accordingly
- Perform a 360 around the apparatus

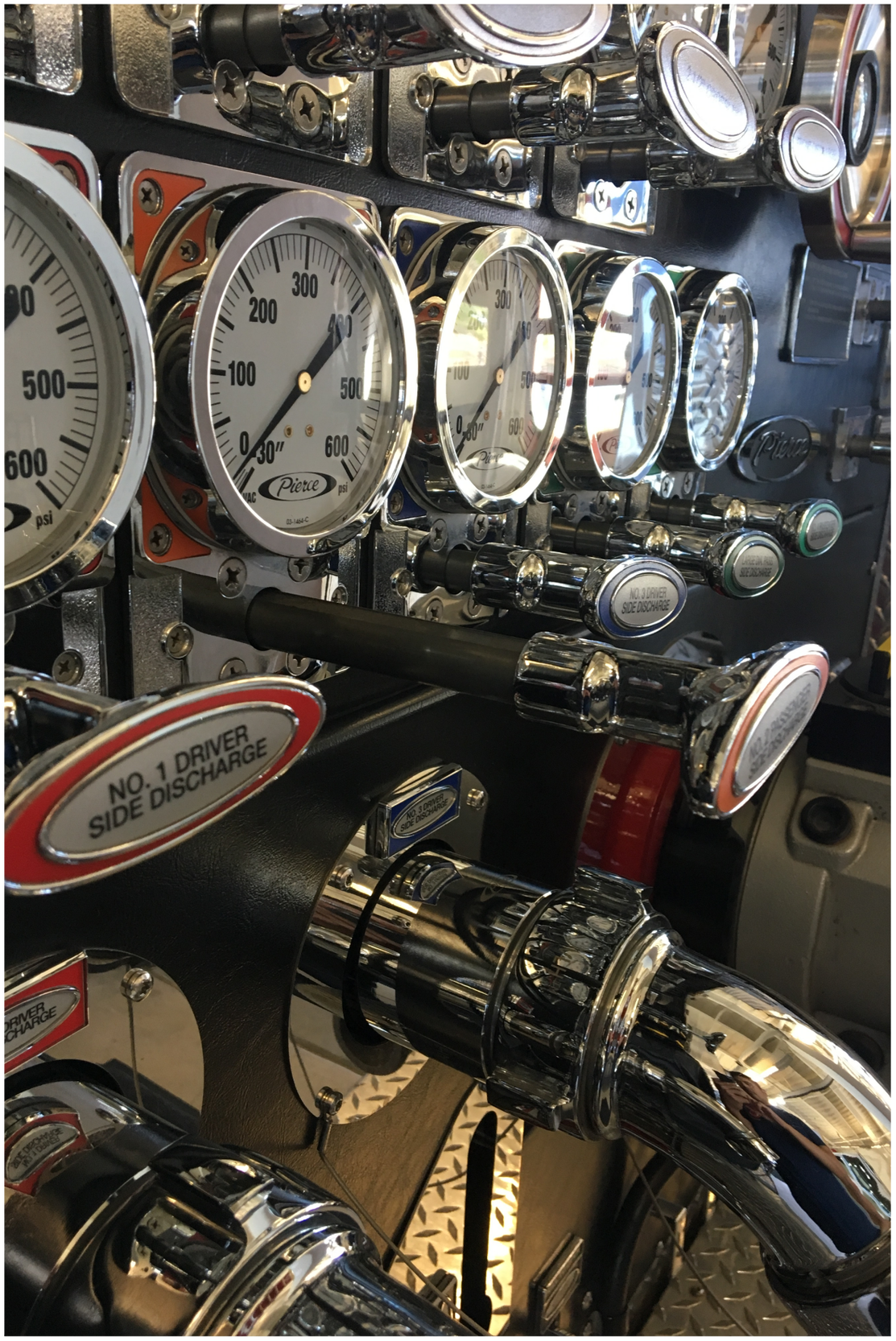
# Systematic checklist

- Starting point
- Start at the pump panel
- Finish at the pump panel



# Check and Close…

- Every cap
- Every valve
- Every drain
- Close everything


NO. 1 DRIVER
SIDE DISCHARGE
Pierce
psi

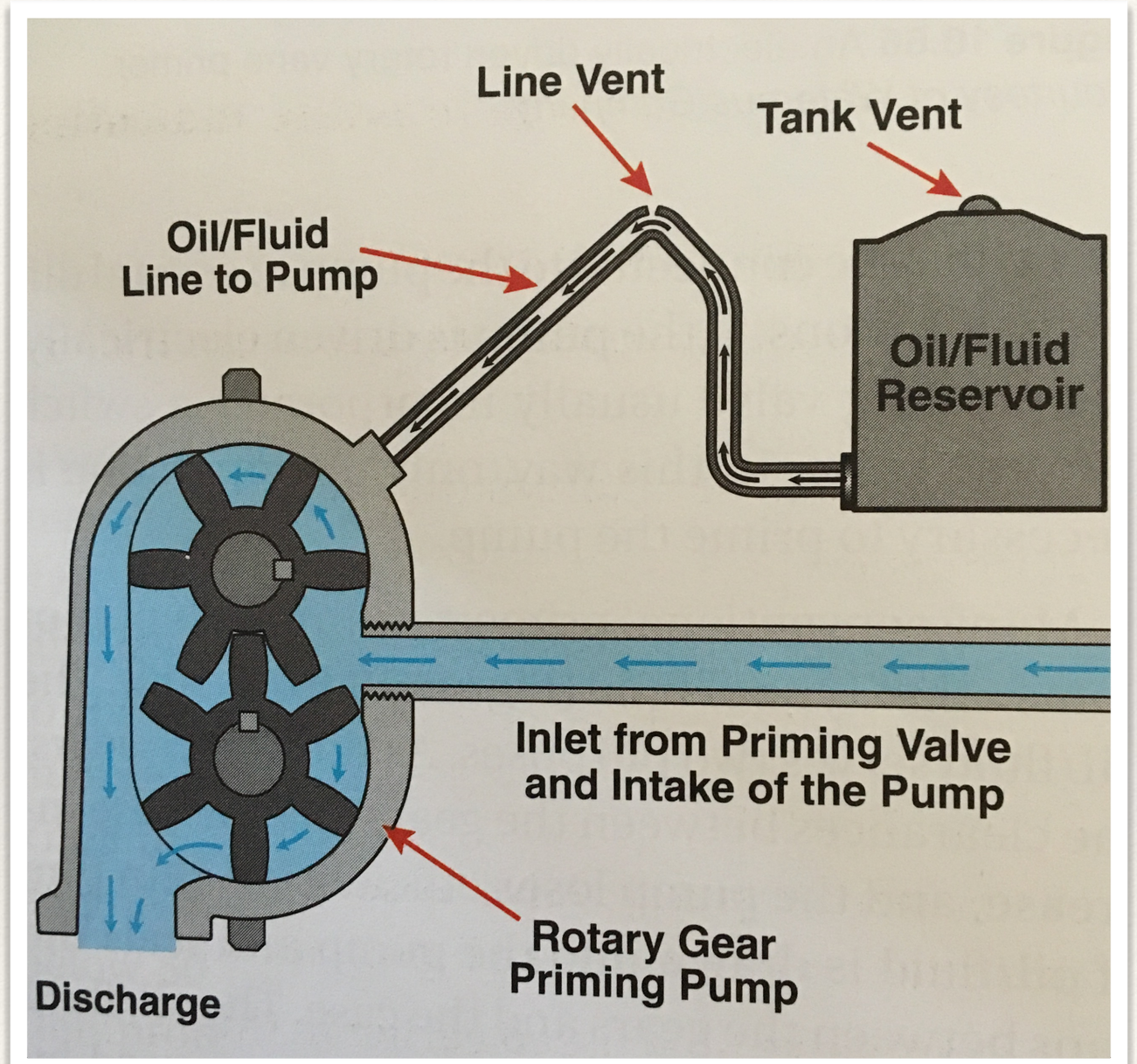

PUMP
DRAIN
PULL TO DRAIN


PASSENGER SIDE
AUX. INLET
OPEN
CLOSE


61
UNITED STATES
AIR FORCE

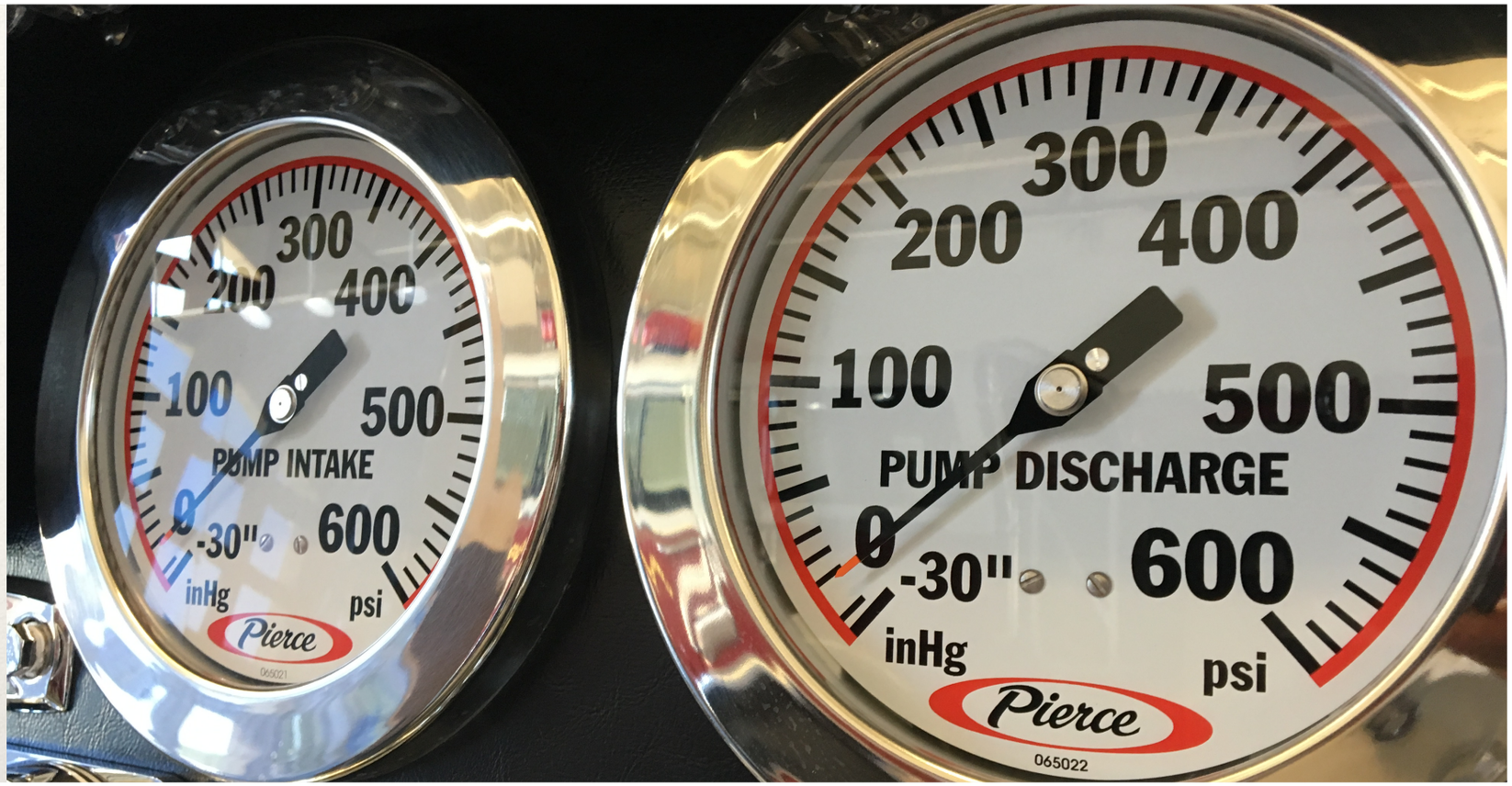
# Priming Pumps

- Rotary vane
- Rotary gear
- Oill-less primers
- Electric
- Trident primer (XT)



# Priming Pump

- Throttle to 1000-1100 RPM
- Why?
- Hold for no longer than 45 seconds.
- Why?
- Should only take 10-15seconds.
- Factors such as length and diameter of hard suction will affect time to prime the pump.
- Look, listen and feel.




Which gauge should we be looking at?

# Establishing Draft

vs.

# Maintaining Draft

# Establishing A Draft

- Discharge pressure is constant
- Water being discharged is coming from where? The static water source or your tank?
- Constantly checking to "Maintain Draft Ops”

# Maintaining Draft

- Close TANK TO PUMP
- Tank Fill
- Advise IC a static W/S has been established
- Mark discharge gauges
- Estimate how much water you have left
- Call for more resources. i.e. Water tenders
- Perform 360

# Discipline

- Have discipline to say NO. Know what your capabilities and capacities are.
- Provide a solution.

# Troubleshooting

- Pump will not engage
- Pull a draft but loses it
- Drafting for a while and suddenly lose draft
- Sounds like gravel is passing through the pump.
- Will not prime.

# Shutting Down Operations

- Smooth controls
- Radio comms
- Throttle down
- Warning: Opening the Tank To Pump valve while Intake Valve is open will drain the tank water.