



# Fire Protection Training

Procedures Handbook 4300

PUMPING

**TOPIC:** Drafting - Trouble Shooting

**TIME FRAME:** 30 Minutes

**LEVEL OF INSTRUCTION:**

**BEHAVIORAL OBJECTIVE:**

*Condition:* A written quiz

*Behavior:* The student will be able to identify and describe problems and corrective actions to be taken when water supply problems develop during drafting operations.

*Standard:* With a minimum of 70% accuracy

**MATERIALS NEEDED:**

- Appropriate visual aids
- Audio visual equipment

**REFERENCES:**

- IFSTA, Fire Department Pumping Apparatus, 7th Edition, Chapter 6

**PREPARATION:**

During fireground operations an engine operator is called upon to make many decisions. The most important decisions often revolve around supplying an uninterrupted water supply to the nozzle person. When drafting from a static water source the operator must anticipate, recognize, diagnose and resolve water supply problems quickly.



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DRAFTING—TROUBLE SHOOTING

PRESENTATION	APPLICATION
<p><b>I. DRAFTING PRINCIPLES</b></p> <p><b>A. Physical Laws</b></p> <ol style="list-style-type: none"><li>1. Atmospheric pressure<ol style="list-style-type: none"><li>a. The weight of the air within the atmosphere is subject to a downward gravitational pull as is all other matter</li><li>b. This downward pull or weight creates a pressure on the earth's surfaces including static water supplies<ol style="list-style-type: none"><li>(1) As elevation increases the weight or pressure decreases by one half PSI per 1000 feet of elevation</li><li>(2) The ability to draft or lift water decreases by one foot per 1000 feet of elevation</li></ol></li></ol></li><li>2. Equilibrium<ol style="list-style-type: none"><li>a. As a pressure in an area increases or decreases, the balance or equilibrium is destroyed</li><li>b. In order to bring the system back into balance, high pressure matter flows into the low pressure area</li></ol></li></ol> <p><b>B. Mechanics of Drafting</b></p> <ol style="list-style-type: none"><li>1. A primer pump on an engine evacuates air from the system thereby lowering pressure in the suction hose and the pump suction plumbing</li><li>2. The static water source is now subject to higher atmospheric pressure and therefore</li></ol>	



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<p>flows toward the low pressure area of the pump</p> <p>3. As long as a prime is maintained and water is discharged from the pump, water from the static source will move into the pump which remains in a low pressure condition</p> <p>C. Drafting Problems</p> <p>1. Failure to prime or maintain a prime may indicate</p> <ul style="list-style-type: none"><li>a. Air leaks within the system<ul style="list-style-type: none"><li>(1) Loose hose connection</li><li>(2) Open or leaking valves</li><li>(3) Packing dried out</li></ul></li><li>b. Defective primer</li><li>c. Suction hose or strainer blocked</li><li>d. Insufficient water depth. Whirlpool develops allowing air into system</li><li>e. Primer oil reservoir empty. In rotary vane primer oil seals air leaks to permit priming</li><li>f. Defective priming valve</li><li>g. Blocked vent hole prevents primer oil from recognizing pressure differential and flowing into primer pump</li><li>h. Attempting too much lift (excess of 15 feet)</li><li>i. Primer not run long enough<ul style="list-style-type: none"><li>(1) May run for up to 30 seconds</li></ul></li></ul>	



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<p>(2) The greater the size of air leaks or length of suction hose the longer the priming period required</p> <p>j. Suction hose has collapsed and is restricting water flow into the suction inlet</p> <p>k. Discharge valve opened too quickly allowing air into the system</p> <p>l. Suction hose elevated above suction eye of the pump forming an air pocket which was drawn into pump destroying the prime</p> <p>m. Primer motor turning too slowly to evacuate air from system</p> <p>2. Corrective actions</p> <p>a. Repair or replace broken or defective parts</p> <p>b. Tighten all caps, valves, and hose couplings</p> <p>c. Close valves which may let air into the system</p> <p>d. Reduce lift</p> <p>e. Search for restrictions or blockages within the system</p>	

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## ***SUMMARY:***

Drafting water from a static water source is the most difficult of the three basic pumping operations. Set up time is longer and since the water source is not pressurized it will not assist in the priming operation.

During emergency operations in rural areas, drafting may be the only practicable method of obtaining water. Therefore, it behooves every pump operator to become proficient in this skill.

## ***EVALUATION:***

A written quiz.

## ***ASSIGNMENT:***

To be determined by instructor(s).