



Fire Protection Training

Procedures Handbook 4300

PUMPING

TOPIC: Fire Engine Pump Plumbing Systems

TIME FRAME: 30 Minutes

LEVEL OF INSTRUCTION:

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will be able to list and describe components within the pump plumbing system of a fire engine.

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- An engine
- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- CDF, Vehicle Operation and Maintenance Guide Handbook, (6804)
- IFSTA, Fire Department Pumping Apparatus, 7th Edition, Chapter 5

PREPARATION: A basic understanding of pump plumbing systems is required in order to diagnose and correct pump problems. An interruption of a fire stream can be critical during firefighting operations. Failure to take proper corrective measures and re-establish the fire stream may be disastrous.



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FIRE ENGINE PUMP
PLUMBING SYSTEMS

| PRESENTATION | APPLICATION |
|--|-------------|
| <p>I. PUMP PLUMBING COMPONENTS ARE DIVIDED INTO TWO AREAS</p> <p>A. Suction - Refers to the Intake (inlet) Portion of the Plumbing. This Includes All Plumbing and Valves Attached to the Suction Eye of the Pump.</p> <p>B. Discharge - Refers to the Delivery (Pressure) Side of the Plumbing. This Includes All Plumbing and Valves Attached to the Pump Volute.</p> <p>II. VALVES DIRECT OR ROUTE AND CONTROL WATER MOVEMENT</p> <p>A. Suction Valves are Located in the Portion of the Plumbing System Prior to the Pump</p> <ol style="list-style-type: none">1. Unpressurized side of the pump<ol style="list-style-type: none">a. Tank suction valve (main suction) - controls water flowing from the booster tank to the suction eye of the pumpb. Inlet suction valve (hydrant suction valve) - controls water flowing from an external source into the suction eye of the pump <p>B. Discharge Valves are Located In the Portion of the Plumbing System After the Pump</p> <ol style="list-style-type: none">1. Pressurized side of the pump<ol style="list-style-type: none">a. Main discharge valve - controls water flowing from the pump volute to the discharge portion of the plumbing system.b. Tank fill valve or churn valve - controls water flowing from the discharge portion of the pump to the booster tank | |



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|--|-------------|
| <ul style="list-style-type: none">(1) Valve used to keep water circulating through the pump to keep components cool when water is not flowingc. Discharge valve(s) - control water flowing from the discharge portion of the pump to discharge valves <p>C. Special Valves</p> <ul style="list-style-type: none">1. Eductor valves<ul style="list-style-type: none">a. Control additives (usually foam) flowing from a storage area to the discharge portion of the plumbing system2. Pressure relief valve<ul style="list-style-type: none">a. Controls discharge pressure by redirecting water from the discharge plumbing to the suction plumbing.3. Check valve<ul style="list-style-type: none">a. Controls the direction of water flow4. Cooling valves (indirect cooling/direct cooling)<ul style="list-style-type: none">a. Directs water flow from the discharge plumbing to the engine's cooling system5. Drain valves<ul style="list-style-type: none">a. Provided at discharge valves to<ul style="list-style-type: none">(1) Exhaust air from plumbing system(2) Relieve water pressure in hoseline when discharge valve is closed6. Primer valves | |



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| <ul style="list-style-type: none">a. Connected to suction side of pump plumbing systemb. Evacuates air from system creating a low pressure area within that portion of the pump plumbing <p>7. Transfer valve</p> <ul style="list-style-type: none">a. Connected to suction side of pump plumbing on multi-stage centrifugal pumpsb. Allows operator to set valve in the parallel or series mode depending upon whether high pressure or high volume fire stream is required | |
| <p>III. OTHER SYSTEM COMPONENTS</p> <ul style="list-style-type: none">A. Tank Fill (Overhead Filler)<ul style="list-style-type: none">1. An opening designed to allow filling of the booster tank without using the pump plumbing systemB. Water Level Gauge<ul style="list-style-type: none">1. A device for indicating water level in the booster tank<ul style="list-style-type: none">a. Sight gaugeb. Electrical deviceC. Booster Tank Sump<ul style="list-style-type: none">1. Traps debris which may otherwise damage pump<ul style="list-style-type: none">a. Sandb. Gravel | |



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PRESENTATION

APPLICATION

D. Main Drain Valve

1. Valve used to drain the entire plumbing system

4314.4

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SUMMARY:

The student should be able to list and describe the basic components of a plumbing system on a fire engine and determine the function of each components.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).