



Fire Protection Training

Procedures Handbook 4300

WATER SUPPLY SYSTEMS

TOPIC: Introduction to Water Distribution Systems

TIME FRAME: 1 Hour

LEVEL OF INSTRUCTION:

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will list and describe the components of water distribution systems

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- Appropriate visual aids
- Supplies and handouts

REFERENCES:

- IFSTA, Essentials of Firefighting 2nd Edition, Chapter 8
- IFSTA, Water Supplies for Fire Protection, 4th Edition, Chapter 2
- NFPA, Fire Protection Handbook, 17th Edition

PREPARATION: In order to provide efficient and professional emergency fire service, the student must have a thorough working knowledge of the physical features of a water system.

With this thorough knowledge, the student will be better able to determine the available fire flow, the dependability of the water system, how to cope with system problems and how to anticipate the need for alternate methods of obtaining an adequate water supply.



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INTRODUCTION TO WATER
DISTRIBUTION SYSTEMS

PRESENTATION	APPLICATION
<p>I. TYPES OF WATER DISTRIBUTION SYSTEMS</p> <p>A. Direct pumping</p> <ol style="list-style-type: none">1. Pumps and pumping stations required2. Used when gravity systems are not available or are unreliable<ol style="list-style-type: none">a. May be used as adjunct to gravity system3. Generally highly efficient<ol style="list-style-type: none">a. Usually completely automatedb. Electrical systems subject to power outages4. Pumping capacity<ol style="list-style-type: none">a. Varies from a few hundred gallons per minute to millions of gallons per dayb. Diesel pumps permit greater capacity and fuel economy <p>B. Gravity System</p> <ol style="list-style-type: none">1. Uses natural elevation<ol style="list-style-type: none">a. Most practical method of delivery	<p>How does the water get from the source to the hydrant?</p> <p>What is the most efficient type of distribution system?</p> <p>What is the most economical type of distribution system?</p>



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<ul style="list-style-type: none">b. Most economical method of deliveryc. Least installation costsd. Least maintenance costse. Not subject to power failures <p>2. Capacity limited by basin, tank or reservoir size</p> <p>C. Combination System</p> <ul style="list-style-type: none">1. Combines gravity flow and pumps<ul style="list-style-type: none">a. Used in majority of communitiesb. System can continue restricted operations if pumps failc. Elevated tanks or reservoirs are filled at times of low water demand and excess supply and are then tapped at times of high demand and inadequate supply	
<p>II. FEEDERS</p> <p>A. Primary Feeder</p> <ul style="list-style-type: none">1. Large diameter pipes2. Wide spacing3. High capacity4. 16" to 52" pipes or greater5. Carries water to points for local distribution <p>B. Secondary Feeders</p> <ul style="list-style-type: none">1. Intermediate diameter pipes	<p>Information sheet #1</p>

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<ul style="list-style-type: none">2. Form loops closely spaced3. High capacity4. 12" to 36" pipes or greater5. Carries water to distribution lines <p>C. Distribution Line</p> <ul style="list-style-type: none">1. Smaller diameter pipes that create mains serving individual fire hydrants or block customers2. Close spacing3. High capacity4. Sizing of distributor lines<ul style="list-style-type: none">a. 4" and 6" pipe found in older/smaller systemsb. 8", 12" and 16" lines now in general usec. Residential districts<ul style="list-style-type: none">(1) 8" minimum recommended(2) 6" should be cross connected every 600'd. Shopping/commercial/industrial districts<ul style="list-style-type: none">(1) 12" minimum(2) Larger size main depending on layout and occupancy	<p>What size are most distribution lines?</p>
<h3>III. HYDRANTS</h3>	



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<p>A. Dead End System</p> <ol style="list-style-type: none">1. Water supplying hydrant comes from one direction only <p>B. Circulating System</p> <ol style="list-style-type: none">1. Water supplying hydrant comes from two or more directions. <p>IV. VALVES</p> <p>A. Types</p> <ol style="list-style-type: none">1. Indicating valves - visual inspection of valve exterior tells whether valve is in open or closed position<ol style="list-style-type: none">a. Post indicator valve (P.I.V.)b. Outside screw and yoke valve (O.S.&Y.)2. Non-indicating valve-visual exterior inspection does not signify valve position <p>B. Function</p> <ol style="list-style-type: none">1. To control water flow within system2. Ideally closely spaced in order that valve malfunction or pipe breakage can be isolated to a small section of the system<ol style="list-style-type: none">a. In high value areas spaced every 500'b. Other area spaced 800' <p>C. Inspection</p> <ol style="list-style-type: none">1. Every valve should be operated at least annually to ensure continued operation	



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SUMMARY:

It is important that you understand the main components and features of water systems. You should also understand the types of water distribution systems and the types of problems which can be anticipated for those systems.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).