

FIRE APPARATUS DRIVER/OPERATOR 1B

P U M P O P E R A T I O N S

I N S T R U C T O R G U I D E



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Pump Operations

State Fire Training

Mission Statement

The mission of State Fire Training is to enable the California fire service to safely protect life and property through education, training, and certification.

California Fire Service Training and Education System

The California Fire Service Training and Education System (CFSTES) was established to provide a single statewide focus for fire service training in California. CFSTES is a composite of all the elements that contribute to the development, delivery, and administration of training for the California fire service. The authority for the central coordination of this effort is vested in the Training Division of the California State Fire Marshal's Office with oversight provided by the State Board of Fire Services.

The role of CFSTES is one of facilitating, coordinating, and assisting in the development and implementation of standards and certification for the California fire service. CFSTES manages the California Fire Academy System by providing standardized curriculum and tests; accredited courses leading to certification; approved standardized training programs for local and regional delivery; administering the certification system; and publishing Certification Training Standards, Instructors Guides, Student Manuals, Student Supplements, and other related support materials.

This system is as successful and effective as the people involved in it are. It is a fire service system developed by the fire service, for the fire service... and we believe it is the best one in the country.

Acknowledgments

State Fire Training coordinated the development of the material contained in this guide. Before its publication, the Statewide Training and Education Advisory Committee (STEAC) and the State Board of Fire Services (SBFS) recommended this guide for adoption by the State Fire Marshal (SFM). This guide is appropriate for fire service personnel and for personnel in related occupations that are pursuing State Fire Training certification.

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PRESENTATION	APPLICATION
<ul style="list-style-type: none">3) Used when water flow exceeds 50% of rated capacity c) Net pump pressure should not exceed 50 psi when changing from volume to pressure or pressure to volume	<p>SLIDE: 2-1-25</p>



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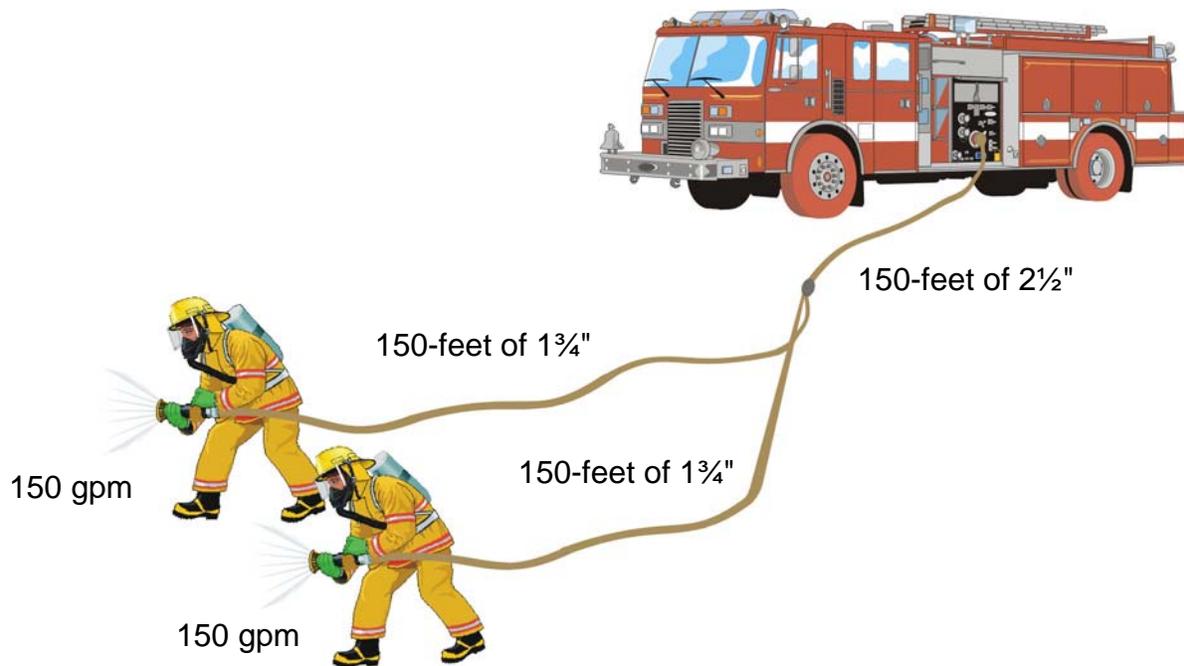
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PRESENTATION	APPLICATION
<p>C. Example</p> <ol style="list-style-type: none">1. $FL = (2 \times 1^2)(3)$2. $FL = (2 \times 1)(3)$3. $FL = 2 \times 3$4. $FL = \underline{6 \text{ psi}}$ <p>VI. MULTIPLE HOSELINES OF EQUAL SIZE AND LENGTH</p> <p>A. Calculate FL for one hoseline <u>only if</u> other hoselines will have the same pressure and gpm</p> <p>B. Example</p> <ol style="list-style-type: none">1. Calculating Q<ol style="list-style-type: none">a) $gpm = (29.7)(d^2 \times \sqrt{NP})$b) $gpm = (29.7)(1^2 \times \sqrt{50})$c) $gpm = (29.7)(1 \times 7.0711)$d) $gpm = (29.7)(7.0711)$e) $gpm = 210 \text{ gpm} = \underline{200 \text{ gpm}}$<ol style="list-style-type: none">1) Round off for when calculating Qf) $Q = \frac{200}{100}$g) $Q = 2$2. Calculating friction loss<ol style="list-style-type: none">a) $FL = (C \times Q^2)(L)$b) $FL = (2 \times 2^2)(4)$c) $FL = (2 \times 4)(4)$d) $FL = (8)(4)$e) $FL = \underline{32 \text{ psi}}$	<p>SLIDE: 3-8-9</p> <p>What is the friction loss of two 2½" hoselines with 400 feet of hose each and a 1" nozzle?</p> <p>SLIDE: 3-8-10</p> <p>SLIDE: 3-8-11</p>

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3. Find the correct friction loss.



2 1/2" Line:

$$FL = (C \times Q^2)(L)$$

$$C = \underline{2}$$

$$Q = \underline{3 (300/100)}$$

$$L = \underline{1.5 (150/100)}$$

$$FL = \underline{(2 \times 3^2)(1.5)}$$

$$FL = \underline{27 \text{ psi}}$$

Wye Line:

$$FL = (C \times Q^2)(L)$$

$$C = \underline{10}$$

$$Q = \underline{1.5 (150/100)}$$

$$L = \underline{1.5 (150/100)}$$

$$FL = \underline{(10 \times 1.5^2)(1.5)}$$

$$FL = \underline{34 \text{ psi (33.75)}}$$



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PRESENTATION	APPLICATION
<p>V. RULE OF THUMB FOR WYED HOSELINES</p> <p>A. Example</p> <ol style="list-style-type: none">1. gpm = 2002. PDP = NP + FL + AL3. PDP = 135 + (10 x 1)4. PDP = 135 + 205. PDP = <u>145 psi</u> <p>VI. RULE OF THUMB FOR ELEVATION LOSS</p> <p>A. Example</p> <ol style="list-style-type: none">1. gpm = 1502. PDP = NP + FL +/- EL3. PDP = 50 + (5 x 2) + 104. PDP = 50 + (10) + 105. PDP = 50 + 206. PDP = <u>70 psi</u>	<p>What is the PDP and total gpm when pumping to 150 feet of wyed 1½" hoselines using fog nozzles through 100 feet of 2½ " hoseline?</p> <p>SLIDE: 3-10-12</p> <p>What is the PDP and total gpm when pumping to a 7/8" smooth bore tip nozzle through 200 feet of 2½" hoseline up to a third floor?</p> <p>SLIDE: 3-10-13</p>