



Pumping Apparatus Operations

Course Plan

Course Details

- Certification:** Pumping Apparatus Driver/Operator (2017)
- CTS Guide:** Fire Apparatus Driver/Operator (2017)
- Description:** This course provides the knowledge and skills needed to operate and perform preventative maintenance on a pumping apparatus. Topics include routine tests, inspections, and servicing functions; producing hand, master, and foam fire streams; relay pump operations; and supplying water to fire sprinkler and standpipe systems.
- Designed For:** Personnel who drive and operate a fire department pumping apparatus
- Course Prerequisites:** OSFM certified Fire Fighter 1 or certified Fire Fighter 2 tenured path (Appointment to the rank of Officer (Lieutenant or higher) waives this prerequisite. Appointment to the CAL FIRE rank of Fire Apparatus Engineer is equivalent to Officer level. Performing in an “acting” capacity does not fulfill this requirement.)
- 1A: Fire Apparatus Driver/Operator (2008 or newer)
- A valid driver’s license
- Standard:** Successful completion of all skills and activities
- Achieve a minimum score of 80% on a cognitive summative test
- Hours (Total):** 40 hours (17 lecture / 23 application)
- Maximum Class Size:** 30
- Instructor Level:** One primary instructor and sufficient assistant instructors to meet skills ratio requirements
- Instructor/Student Ratio:** 1:30 (Lecture) / 1:10 (Application)
- Restrictions:** Sufficient fire apparatus and space to accommodate classroom and skills training
- SFT Designation:** CFSTES

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Required Resources

Instructor Resources

To teach this course, instructors need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
or
Pumping and Aerial Apparatus Driver/Operator Handbook (IFSTA, current edition)
- Maintenance and inspection forms
- Manufacturer's specifications and requirements
- Digital or print access to NFPA 13, NFPA 13D, NFPA 13E, NFPA 13R, NFPA 14, and NFPA 20

Online Instructor Resources

The following instructor resources are available online at

<https://osfm.fire.ca.gov/divisions/state-fire-training/cfstes-professional-certification/>:

- Pumping Apparatus Operations required activities
 - Activity 3-1: Produce an Effective Hand Line and Master Stream
 - Activity 3-2: Pump a Supply Line for a Relay Operation
 - Activity 3-3: Produce a Foam Fire Stream
 - Activity 3-4: Supply Water to Fire Sprinkler and Standpipe Systems

Student Resources

To participate in this course, students need:

- *Fire Apparatus Driver/Operator: Pump, Aerial, Tiller, and Mobile Water Supply* (Jones & Bartlett, current edition)
or
Pumping and Aerial Apparatus Driver/Operator Handbook, (IFSTA, current edition)
- Personal protective equipment

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

- Standard learning environment or facility
- Writing board or paper conference pads
- Markers, erasers
- Computer or tablet with presentation or other viewing software
- Amplification devices
- Projector and screen
- Sufficient pumping apparatus to accommodate the students in the class
 - Recommend at least 30 minutes of pumping time per student across Topics 4-1 through 4-7.
- Tools and equipment for inspection and testing

- Pressurized water source (hydrant or supply line from another pumping apparatus)
- Static water source (drafting pit, portable tank, or natural water source)
- Hard suction hose
- Foam portioning system
- Foam or foam substitute
- Sprinkler system or mockup appliance
- Standpipe system or mockup appliance
- Tools and equipment
- Personal protective equipment (students)
- Adequate space to accommodate the required skills

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Topic 1-2: Pumping Apparatus Driver/Operator Certification	0.5	0.0	
Unit 1 Totals	1.0	0.0	1.0
Unit 2: Roles and Responsibilities			
Topic 2-1: Fire Pump Driver/Operator Roles and Responsibilities	2.0	0.0	
Unit 2 Totals	2.0	0.0	2.0
Unit 3: Preventative Maintenance			
Topic 3-1: Perform Visual and Operational Checks	4.0	0.0	
Unit 3 Totals	4.0	0.0	4.0
Unit 4: Operations			
Topic 4-1: Responding on an Apparatus to an Emergency Scene	0.25	0.0	
Topic 4-2: Establishing and Operating at Emergency and Nonemergency Scenes	0.25	0.0	
Topic 4-3: Connecting to a Water Supply	0.5	0.0	
Topic 4-4: Producing Effective Hand Lines and Master Streams	7.0	*	
Topic 4-5: Pumping a Supply Line for a Relay Operation	1.0	*	
Topic 4-6: Producing a Foam Fire Stream	1.0	*	
Topic 4-7: Supplying Water to Fire Sprinkle and Standpipe Systems	2.0	*	
Unit 4 Totals	12.0	21.0	
Summative Assessment			
Determined by AHJ or educational institution	TBD	1.0	TBD
Skills Practice (Lab / Sets and Reps)			
Determined by AHJ or educational institution	TBD	TBD	TBD
Course Totals	17.0	23.0	40.0

* Individual application time determined by instructor for a total of 21 hours for Unit 4. Recommend at least 30 minutes of pumping time per student across Topics 4-1 through 4-7.

Time Table Key

1. The Time Table documents the amount of time required to deliver the content included in the course plan.
2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.
3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.
4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.
5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, skills exercises, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities and skills exercises
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 1-2: Pumping Apparatus Driver/Operator Certification

Terminal Learning Objective

At the end of this topic a student will be able to identify the requirements for Pumping Apparatus Driver/Operator certification and be able to describe the certification task book and examination process.

Enabling Learning Objectives

1. Identify the prerequisites for certification
 - OSFM certified Fire Fighter 1
 - or**
 - Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. (*Performing in an “acting” capacity does not fulfill this requirement.*)
 - and**
 - Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver’s license (per California Vehicle Code, Section 12804.11)
2. Identify the course work required for certification
 - 1A: Fire Apparatus Driver/Operator (2008 or newer)
 - 1B: Pumping Apparatus Operations (2008 or newer)
3. Identify the exams required for certification
 - No exams outside of class testing
4. Identify the task book requirements for certification
 - Pumping Apparatus Driver/Operator Certification Task Book (2017)
5. Identify the experience requirements for certification
 - A minimum of one year full-time paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
 - A minimum of two years volunteer or part-time paid experience in a California fire department with the primary responsibility as a pumping apparatus driver/operator
6. Identify the position requirements for certification
 - Appointed to the rank or position of Fire Apparatus Driver/Operator (performing in an acting capacity does not qualify)
7. Describe the certification task book process
8. Describe the certification examination process
 - Not applicable

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Roles and Responsibilities

Topic 2-1: Fire Pump Driver/Operator Roles and Responsibilities

Terminal Learning Objective

At the end of this topic a student, given AHJ roles, responsibilities, policies and procedures, will be able to describe the roles and responsibilities of a fire pump driver/operator and identify how they differ from being a passenger.

Enabling Learning Objectives

1. Describe the organization of the fire department
2. Describe the role of the driver/operator in the organization
3. Describe the mission of the fire service
4. Describe the fire department's standard operating procedures (SOPs) and rules and regulations as they apply to the driver/operator
5. Describe the value of fire and life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities
6. Describe the role of other agencies as they relate to the fire department
7. Describe aspects of the fire department's member assistance program
8. Describe the importance of physical fitness and a healthy lifestyle to the performance of the duties of a fire fighter
9. Identify the critical aspects of NFPA 1500

Discussion Questions

1. How are SOPs different from SOGs and they apply to pump operations?
2. What injuries are common to pump driver/operators?
3. How does your agency provide incident stress support for driver/operators?
4. Why is physical fitness important for a pump driver/operator?

Application

1. Determined by instructor

Instructor Notes:

1. None

CTS Guide Reference: CTS 4-1

Unit 3: Preventative Maintenance

Topic 3-1: Perform Visual and Operational Checks

Terminal Learning Objective

At the end of this topic a student, given a pumping apparatus, tools and equipment, maintenance and inspection forms, manufacturer's specifications and requirements, and AHJ policies and procedures, will be able to perform and document visual and operational checks on the systems and components unique to a pumping apparatus to verify their operational status.

Enabling Learning Objectives

1. Identify manufacturer specifications and requirements
2. Identify AHJ policies and procedures including documentation requirements
3. Describe pumping systems and components
 - Types
 - Positive displacement
 - Centrifugal
 - Single/multistage
 - Transfer of power
 - Priming systems
 - Pumping systems
 - Foam systems
 - Pressure control devices
 - Gauges
 - Valves and plumbing
 - Water tank and other extinguishing agent levels (if applicable)
 - Steel tanks
 - Aluminum tanks
 - Poly tanks
4. Use tools and equipment
5. Inspect fire pump and components
6. Recognize system problems and out-of-service criteria
7. Correct any deficiency noted according to AHJ policies and procedures and/or manufacturer specifications and requirements

Discussion Questions

1. What are the advantages/disadvantages of positive placement and centrifugal pumps?
2. What is the function of the priming system?
3. In what ways can power be transferred to the pump?

Application

1. Determined by instructor

Instructor Notes:

1. None

CTS Guide Reference: CTS 4-2

Unit 4: Operations

Topic 4-1: Responding on an Apparatus to an Emergency Scene

Terminal Learning Objective

At the end of this topic a student, given safety equipment as provided by the AHJ, will be able to respond on an apparatus to an emergency scene so that the apparatus is correctly mounted and dismounted and seat belts are used while the vehicle is in motion.

Enabling Learning Objectives

1. Describe mounting and dismounting procedures for riding a fire apparatus
2. Identify hazards and ways to avoid hazards associated with riding a fire apparatus
3. Identify prohibited practices
4. Describe types of department safety equipment the means for usage
5. Use each piece of provided safety equipment

Discussion Questions

1. What passenger and vehicle safety considerations should a driver/operator complete before leaving the station and en route?
2. What precautions should a driver/operator take when entering an intersection?

Application

1. Determined by instructor

Instructor Notes:

1. Although this is covered in Fire Fighter 1, reteach it here from a pumping apparatus driver/operator perspective.

CTS Guide Reference: CTS 5-1

Topic 4-2: Establishing and Operating at Emergency and Nonemergency Scenes

Terminal Learning Objective

At the end of this topic a student, given safety equipment, traffic and scene control devices, emergency and nonemergency scenes, traffic and other hazards, an assignment, and SOPs, will be able to establish and operate in work areas at emergency and nonemergency scenes so that procedures are followed, safety equipment is utilized, protected work areas are established as directed using traffic and scene control devices, and the driver/operator performs assigned tasks only in established, protected work areas.

Enabling Learning Objectives

1. Identify potential hazards involved in operation on emergency and nonemergency scenes including vehicle traffic, utilities, and environmental conditions
2. Describe proper procedures for dismounting apparatus in traffic
3. Describe procedures for safe operation at emergency and nonemergency scenes
4. Identify safety equipment available for members on emergency and nonemergency scenes
5. Use safety equipment
6. Deploy traffic and scene control devices
7. Dismount apparatus
8. Establish and operate in the protected work areas as directed

Discussion Questions

1. What items will a driver/operator need for traffic control?
2. What considerations go into vehicle placement at an incident?
3. What are some potential hazards when parking at a traffic collision?

Application

1. Determined by instructor

Instructor Notes:

1. Although this is covered in Fire Fighter 1, reteach it here from a pumping apparatus driver/operator perspective.

CTS Guide Reference: CTS 5-2

Topic 4-3: Connecting to a Water Supply

Terminal Learning Objective

At the end of this topic a student, given supply or intake hose, hose tools, and a fire hydrant or static water source, will be able to connect a pumping apparatus to a water supply as a member of a team, so that connections are tight and water flow is unobstructed.

Enabling Learning Objectives

1. Describe loading and off-loading procedures for mobile water supply apparatus
2. Describe fire hydrant operations
3. Identify suitable static water supply sources
4. Describe procedures and protocol for connecting to various water sources
5. Hand lay a supply hose
6. Connect and place hard suction hose for drafting operations
7. Deploy portable water tanks as well as the equipment necessary to transfer water between and draft from them
8. Make hydrant-to-apparatus hose connections for forward and reverse lays
9. Connect supply hose to a hydrant
10. Fully open and close the hydrant

Discussion Questions

1. What are some considerations when choosing a fire hydrant?
2. What are some considerations when spotting at a fire hydrant?
3. What are your agency's standard operations guidelines for choosing a supply line?

Application

1. Determined by instructor

Instructor Notes:

1. Although this is covered in Fire Fighter 1, reteach it here from a pumping apparatus driver/operator perspective.

CTS Guide Reference: CTS 5-3

Topic 4-4: Producing Effective Hand Lines and Master Streams

Terminal Learning Objective

At the end of this topic a student, given an internal water tank, a pressurized water source, and a static water source, will be able to produce an effective hand line and master stream by engaging the pump, setting all pressure control and apparatus safety devices, achieving and maintaining the rate flow of the nozzle, while continuously monitoring the apparatus for potential problems.

Enabling Learning Objectives

1. Describe hydraulic calculations for friction loss and flow using both written formulas and estimation methods
 - Single line
 - Multiple lines
 - Mixed GPM
 - Mixed hose lengths
2. Explain pump discharge pressure calculations
3. Describe water sources
 - Internal water tank
 - Pressurized
 - High pressure
 - Low pressure
 - Static
 - Private
4. Describe the reliability of static sources
5. Describe proper positioning of a pumping apparatus
 - Hydrant
 - Standpipes
 - Drafting
6. Describe the safe operation of the pump
 - Introduction of water
 - Cavitation
 - Water hammer
 - Overheating
 - Discharge gates
 - Pressure control devices
7. Describe how to pump
 - Single line
 - Multiple lines
 - Mixed GPM
 - Mixed hose lengths
8. Identify the problems related to small-diameter or dead-end mains
9. Describe hydrant coding systems
10. Describe the principles of drafting

11. Identify communication points between pump driver/operator and crew
 - Supply established
 - Charging hose lines
 - GPM changes
 - Low supply
12. Position a pumping apparatus to operate at a fire hydrant and at a static water source
13. Transfer power from apparatus engine to pump
14. Draft
15. Operate pumper pressure control systems
16. Operate the volume/pressure transfer valve (multistage pumps only)
17. Operate auxiliary cooling systems
18. Make the transition between internal and external water sources
19. Assemble hose lines, nozzles, valves, and appliances
20. Apply hydraulic calculations to produce an effective stream

Discussion Questions

1. Why are pump calculations important to pump operations?
2. What is the earliest indication of impending cavitation?
3. How does a discharge relief valve operate?

Application

1. Activity 3-1: Produce an Effective Hand Line and Master Stream

CTS Guide Reference: CTS 5-4 and CTS 5-5

Topic 4-5: Pumping a Supply Line for a Relay Operation

Terminal Learning Objective

At the end of this topic a student, given a relay pumping evolution the length and size of the line and the desired flow and intake pressure, will be able to pump a supply line of 2½ in. (65 mm) or larger to provide the correct pressure and flow to the next pumping apparatus in the relay.

Enabling Learning Objectives

1. Describe the need for relay pumping operations
2. Describe hydraulic calculations for friction loss and flow using both written formulas and estimation methods
3. Describe pump discharge pressure calculations
4. Identify communication points between pump driver/operators
 - Supply established
 - Charging hose lines
 - GPM changes
 - Pressure changes/needs
 - Low supply
5. Position a pumping apparatus to operate at a fire hydrant and a static water source
6. Transfer power from pumping apparatus engine to pump
7. Draft
8. Operate apparatus pressure control systems
9. Operate the volume/pressure transfer valve (multistage pumps only)
10. Operate auxiliary cooling systems
11. Make the transition between internal and external water sources
12. Assemble hose lines, nozzles, valves, and appliances
13. Apply hydraulic calculations to a relay operation

Discussion Questions

1. What method do you use when calculating your pump discharge pressure for a relay operation?
2. What needs to be considered when pumping to an aerial master stream?
3. In what situations would you use a relay pumping operation?

Application

1. Activity 3-2: Pump a Supply Line for a Relay Operation

CTS Guide Reference: CTS 5-5

Topic 4-6: Producing a Foam Fire Stream

Terminal Learning Objective

At the end of this topic a student, given a pumping apparatus, foam-producing equipment, foam concentrate, and manufacturer's specifications and requirements, will be able to produce a foam fire stream to provide properly proportioned foam.

Enabling Learning Objectives

1. Describe proportioning rates and concentrations
2. Describe equipment assembly procedures
3. Identify foam system limitations
4. Identify manufacturer's specifications and requirements
5. Identify communication points between pump driver/operator and crew
6. Operate foam proportioning equipment
7. Connect foam stream equipment

Discussion Questions

1. In which incidents would you not want to use foam?
2. How do you prime the foam system?
3. What options do you have if your primary system fails?

Application

1. Activity 3-3: Produce a Foam Fire Stream

CTS Guide Reference: CTS 5-6

Topic 4-7: Supplying Water to Fire Sprinkler and Standpipe Systems

Terminal Learning Objective

At the end of this topic a student, given a pumping apparatus, sprinkler and standpipe system, and specific system information, will be able to supply water to fire sprinkler and standpipe systems at the correct volume and pressure.

Enabling Learning Objectives

1. Describe hydraulic calculations for friction loss and flow using both written formulas and estimation methods
2. Describe how to calculate pump discharge pressure
3. Describe hose layouts
4. Identify the location of fire department connections
5. Describe alternative supply procedures if fire department connection is not usable
6. Describe operating principles of sprinkler systems as defined in NFPA 13, NFPA 13D, and NFPA 13R
7. Describe fire department operations in sprinklered properties as defined in NFPA 13E
8. Describe the operating principles of standpipe systems as defined in NFPA 14
9. Identify communication points between pump driver/operator and crew
 - Supply established
 - Charging hose lines
 - GPM changes
 - Pressure changes/needs
 - Low supply
10. Describe how to augment structures with built-in fire pumps (NFPA 20)
11. Position a pumping apparatus to operate at a fire hydrant and a static water source
12. Transfer power from pumping apparatus engine to pump
13. Operate pumper pressure control systems
14. Operate the volume/pressure transfer valve (multistage pumps only)
15. Operate auxiliary cooling systems
16. Make the transition between internal and external water sources
17. Assemble hose lines, nozzles, valves, and appliances
18. Apply hydraulic calculations to sprinkler and standpipe systems

Discussion Questions

1. How do your operations differ when supplying a wet versus a dry standpipe?
2. What is your operation when pumping to a high-rise?
3. When and how should you connect to a sprinkler or standpipe system?

Application

1. Activity 3-4: Supply Water to Fire Sprinkler and Standpipe Systems

Instructor Notes:

2. None

CTS Guide Reference: CTS 5-7

How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details

The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources

The Required Resources segment identifies the resources, equipment, facilities, and personnel required to deliver the course.

Unit

Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics

Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective

A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives

The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master in order to complete the TLO.

Discussion Questions

The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application

The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes

The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference

The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Skill Sheet

The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.

Produce an Effective Hand Line and Master Stream

Activity 3-1

Format: Individual

Time Frame: Open (based on a total of 21 hours for skills practice and completion)

Description

This activity provides students with an opportunity to practice producing hand lines and master streams from four identified water sources. Hand line practice should include using both single hose line and variable hose line (multiple lines, mixed GPM, mixed hose lengths) configurations.

Standard of Completion

Produce effective hand and master streams, given the sources specified in the following list, so that the pump is engaged, all pressure control and *apparatus* safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems:

- 1) Internal tank
- 2) Pressurized source
- 3) Static source
- 4) Transfer from internal tank to external source
(NFPA 1002 (2017) / Paragraph 5.2.4)

Materials

- Pumping apparatus
- Pressurized water source (hydrant or supply line from another pumping apparatus)
- Static water source (drafting pit, portable tank, or natural water source)
- Hard suction hose
- Tools and equipment
- Radio equipment
- PPE (including gloves and helmet)

Instructor Notes

- Demonstrate the skill for the students before they practice and complete each skill.
- The goal for hand lines is to have students flow hand lines from various water sources (tank water, hydrant, etc.)
- The goal for master streams is to put a master stream in service from a hydrant.

Pump a Supply Line for a Relay Operation

Activity 3-2

Format: Individual

Time Frame: Open (based on a total of 21 hours for skills practice and completion)

Description

This activity provides students with an opportunity to practice pumping water from one apparatus to the next using a 2½" or larger supply line.

Standard of Completion

Pump a supply line of 2½ in. (65 mm) or larger, given a relay pumping evolution the length and size of the line and the desired flow and intake pressure, so that the correct pressure and flow are provided to the next *pumping apparatus* in the relay. (NFPA 1002 (2017) / Paragraph 5.2.5)

Materials

- Two (2) pumping apparatus
- Tools and equipment
- Radio equipment
- PPE (including gloves and helmet)

Instructor Notes

- Demonstrate the skill for the students before they practice and complete each skill.

Produce a Foam Fire Stream

Activity 3-3

Format: Individual

Time Frame: Open (based on a total of 21 hours for skills practice and completion)

Description

This activity provides students with an opportunity to practice properly proportion the foam and producing a foam fire stream.

Standard of Completion

Produce a foam fire stream, given foam-producing equipment *and manufacturer's specifications and requirements*, so that proportioned foam is provided. (NFPA 1002 (2017) / Paragraph 5.2.6)

Materials

- Pumping apparatus
- Foam portioning system
- Foam or foam substitute
- Tools and equipment
- Radio equipment
- PPE (including gloves and helmet)

Instructor Notes

- Demonstrate the skill for the students before they practice and complete each skill.

Supply Water to Fire Sprinkler and Standpipe Systems

Activity 3-4

Format: Individual

Time Frame: Open (based on a total of 21 hours for skills practice and completion)

Description

This activity provides students with an opportunity to practice supplying water to fire sprinkler and standpipe systems at the correct volume and pressure.

Standard of Completion

Supply water to fire sprinkler and standpipe systems, given specific system information, a pumping apparatus, and sprinkler and standpipe systems, so that the water is supplied at the correct volume and pressure. (NFPA 1002 (2017) / Paragraph 5.2.7)

Materials

- Pumping apparatus
- Sprinkler system or mockup appliance
- Standpipe system or mockup appliance
- Tools and equipment
- Radio equipment
- PPE (including gloves and helmet)

Instructor Notes

- Demonstrate the skill for the students before they practice and complete each skill.



Pumping Apparatus Driver/Operator Certification Application Instructions

Overview

The California Office of the State Fire Marshal (OSFM) Pumping Apparatus Driver/Operator Certification is based on NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications set by the National Fire Protection Association.

The Pumping Apparatus Driver/Operator Certification Application is for applicants who have completed the Pumping Apparatus Driver/Operator academic training and all other certification requirements.

Certification Requirements

Prerequisites

- Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver's license (per California Vehicle Code, Section 12804.11)

Certifications

- OSFM Fire Fighter 1 certification
or
- Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. (*Performing in an "acting" capacity does not fulfill this requirement.*)

Education

- 1A: Fire Apparatus Driver/Operator (2008 or newer)
- 1B: Pumping Apparatus Operations (2008 or newer)

Certification Task Book

- Pumping Apparatus Driver/Operator Certification Task Book (2017)
or
- Fire Apparatus Driver/Operator – Pumping Apparatus (2014) with required updates (if applicable)

Experience

- Have a minimum of one year full-time or two years' volunteer or part-time paid experience in a recognized fire agency in California with the primary responsibility as a Pumping Apparatus Driver/Operator

Position

- Be appointed to the rank or position of Fire Apparatus Driver/Operator (*Performing in an acting capacity does not qualify.*)

Application Process

1. Applicant mails the Pumping Apparatus Driver/Operator Certification Application, supporting documentation, and fee(s) to:

State Fire Training
Pumping Apparatus Driver/Operator Certification
2251 Harvard Street, Suite 400
Sacramento, CA 95815

2. State Fire Training conducts an application review.
 - If the applicant does not meet the eligibility requirements, SFT issues a denial.
 - If the applicant meets the eligibility requirements, SFT issues the digital certification(s) through the applicant's SFT User Portal.



Pumping Apparatus Driver/Operator Certification Application

(REV. **###**)

Identification

Full Name:

SFT ID Number:

Phone (Mobile):

Mailing Address:

City, State Zip Code:

Email:

Submission Requirements

Submit documentation to verify completion of the following requirements. You do not need to submit verification for anything issued by State Fire Training (SFT) already documented in your SFT User Portal.

Prerequisites

- Valid Class C Firefighter Endorsed **or** Commercial A **or** Commercial B driver's license (per California Vehicle Code, Section 12804.11)

Certifications

- OSFM Fire Fighter 1 certification
or
- Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. (*Performing in an "acting" capacity does not fulfill this requirement.*)

Certification Task Book

- Pumping Apparatus Driver/Operator Certification Task Book (2017)
or
- Fire Apparatus Driver/Operator – Pumping Apparatus (2014) with required updates (if applicable)

Experience

- Have a minimum of one year full-time or two years' volunteer or part-time paid experience in a recognized fire agency in California with the primary responsibility as a Pumping Apparatus Driver/Operator

Position

- Be appointed to the rank or position of Fire Apparatus Driver/Operator (*Performing in an acting capacity does not qualify.*)

Fee

- \$100 (non-refundable)



Pumping Apparatus Driver/Operator Certification Application
(REV. ####)

Authority

I, the undersigned, am the person applying for certification. I hereby certify under penalty of perjury under the laws of the State of California, that all information contained in this application is true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documents may be cause for rejection. If SFT rejects my application due to falsification of information or documents, I understand that SFT will place a two-year restriction on my ability to reapply for certification.

Applicant Signature: _____ Date: _____

(CAL FIRE Account Code: 0198-####-4143500-4143500014-35405902-59210)

Pumping Apparatus Driver/Operator (NFPA Fire Apparatus Driver/Operator)

Certification Task Book (2017)



California Department of Forestry and Fire Protection
Office of the State Fire Marshal
State Fire Training

Overview

Authority

This certification task book includes the certification training standards set forth in the Fire Apparatus Driver/Operator Certification Training Standards Guide (2017) which is based on NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications (2017).

Published: **Month Year**

Published by: State Fire Training, 2251 Harvard Street, Suite 400, Sacramento, CA 95815
Cover photo courtesy of Alameda County Fire Department.

Purpose

The State Fire Training certification task book is a performance-based document that identifies the minimum requirements necessary to perform the duties of that certification. Completion of a certification task book verifies that the candidate has the required experience, holds the required position, and has demonstrated the job performance requirements to obtain that certification.

Assumptions

With the exception of the Fire Fighter and Emergency Vehicle Technician (EVT) certifications, a candidate may begin the task book initiation process upon completion of all required education components (courses).

Each job performance requirement (JPR) shall be evaluated after the candidate's fire chief initiates the task book.

An evaluator may verify satisfactory execution of a job performance requirement (JPR) through the following methods:

- First-hand observation
- Review of documentation that verifies prior satisfactory execution

State Fire Training task books do not count towards the NWCG task book limit. There is no limit to the number of State Fire Training task books a candidate may pursue at one time as long as the candidate meets the initiation requirements of each.

It is the candidate's responsibility to routinely check the State Fire Training website for updates to an initiated task book. All State Fire Training issued updates to an initiated task book are required for task book completion.

A candidate must complete a task book within five years its initiation date. Otherwise, a candidate must initiate a new task books using the certification's current published version.

Roles and Responsibilities

Candidate

The candidate is the individual pursuing certification.

Initiation

The candidate shall:

1. Complete all Initiation Requirements.
 - Please print or type.
2. Obtain their fire chief's signature as approval to open the task book.
 - A candidate may not obtain evaluation signatures prior to the fire chief's initiation approval date.

Completion

The candidate shall:

1. Complete all Job Performance Requirements.
 - Ensure that an evaluator initials, signs, and dates each task to verify completion.
2. Complete all Completion Requirements.
3. Sign and date the candidate verification statement under **Review and Approval** with a handwritten signature.
4. Obtain their fire chief's handwritten (not stamped) signature on the fire chief verification section.
5. Create and retain a physical or high-resolution digital copy of the completed task book

Submission

The candidate shall:

1. Submit a copy (physical or digital) of the completed task book and any supporting documentation to State Fire Training.
 - See Submission and Review below.

A candidate should not submit a task book until they have completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

Evaluator

An evaluator is any individual who verifies that the candidate can satisfactorily execute a job performance requirement (JPR).

An evaluator may verify satisfactory execution through the following methods:

- First-hand observation
- Review of documentation that verifies prior satisfactory execution

A qualified evaluator is designated by the candidate's fire chief* and holds an equivalent or higher-level certification. If no such evaluator is present, the fire chief shall designate an individual with more experience than the candidate and a demonstrated ability to execute the job performance requirements.

A task book evaluator may be, but is not required to be, a registered skills evaluator who oversees a State Fire Training certification exam.

A certification task book may have more than one evaluator.

All evaluators shall:

1. Complete a block on the **Signature Verification** page with a handwritten signature.
2. Review and understand the candidate's certification task book requirements and responsibilities.
3. Verify the candidate's successful completion of one or more job performance requirements through observation or review.
 - Do not evaluate any job performance requirement (JPR) until after the candidate's fire chief initiates the task book.
 - Sign all appropriate lines in the certification task book with a handwritten signature or approved digital signature (e.g. Docusign or Adobe Sign) to record demonstrated performance of tasks.

* For certification task books that do not require fire chief initiation, academy instructors serve as or designate evaluators.

Fire Chief

The fire chief is the individual who initiates (when applicable) and then reviews and confirms the completion of a candidate's certification task book.

A fire chief may identify an authorized designee already on file with State Fire Training to fulfill any task book responsibilities assigned to the fire chief. (See *State Fire Training Procedures Manual*, 4.2.2: Authorized Signatories.)

Initiation

The fire chief shall:

1. Review and understand the candidate's certification task book requirements and responsibilities.

2. Verify that the candidate has met all **Initiation Requirements** prior to initiating the candidate's task book.
3. Open the candidate's task book by signing the **Fire Chief Approval** verification statement with a handwritten (not stamped) signature.
4. Designate qualified evaluators.

Completion

The fire chief shall:

1. Confirm that the candidate has obtained the appropriate signatures to verify successful completion of each job performance requirement.
 - Ensure that all **Job Performance Requirements** were evaluated after the initiation date.
2. Confirm that the candidate meets the **Completion Requirements**.
3. Sign and date the Fire Chief verification statement under **Review and Approval** with a handwritten signature.
 - If signing as an authorized designee, verify that your signature is on file with State Fire Training.

Submission and Review

A candidate should not submit a task book until they have completed all requirements and obtained all signatures. State Fire Training will reject and return an incomplete task book.

To submit a completed task book, please send the following items to the address below:

- A copy of the completed task book (candidate may retain the original)
- All supporting documentation
- Payment

State Fire Training
Attn: Certification
2251 Harvard Street, Suite 400
Sacramento, CA 95815

State Fire Training reviews all submitted task books.

- If the task book is complete, State Fire Training will authorize the task book and retain a digital copy of the authorized task book in the candidate's State Fire Training file.
- If the task book is incomplete, State Fire Training will return the task book with a notification indicating what needs to be completed prior to resubmission.

Completion of this certification task book is one step in the certification process. Please refer to the *State Fire Training Procedures Manual* for the complete list of qualifications required for certification.

Initiation Requirements

The following requirements must be completed prior to initiating this task book.

Candidate Information

Name: _____

SFT ID Number: _____

Fire Agency: _____

Prerequisites

The candidate meets the following prerequisites.

- OSFM Fire Fighter 1 certification
- or
- Appointment to the rank of Officer (Lieutenant or higher) or CAL FIRE rank of Fire Apparatus Engineer waives this certification prerequisite. *Performing in an “acting” capacity does not fulfill this requirement.*

Rank	Appointment Date

- Valid Class C Firefighter Endorsed or Commercial A or Commercial B driver’s license (per California Vehicle Code, Section 12804.11)

License or Permit	Granting Agency/Institution	License/Permit #	Expiration Date

Include documentation to verify prerequisite requirements when you submit your task book unless verification is already documented in your SFT User Portal.

Education

The candidate has completed the following course(s).

- 1A: Fire Apparatus Driver/Operator (2008 or newer)
- 1B: Pumping Apparatus Operations (2008 or newer)

Fire Chief Approval

Candidate's Fire Chief (please print): _____

I, the undersigned, am the person authorized to verify the candidate's task book initiation requirements and to initiate State Fire Training task books. I hereby certify under penalty of perjury under the laws of the State of California, that the completion of all requirements to open the task book documented herein are true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documentation may be cause for rejection.

Signature: _____ Date: _____

Signature Verification

The following individuals have the authority to verify portions of this certification task book using the signature recorded below.

Please print except for the Signature line where a handwritten signature is required.
Add additional signature pages as needed.

Name: _____
Job Title: _____
Organization: _____
Signature: _____

Name: _____
Job Title: _____
Organization: _____
Signature: _____

Name: _____
Job Title: _____
Organization: _____
Signature: _____

Name: _____
Job Title: _____
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Job Title: _____
Organization: _____
Signature: _____

Name: _____
Job Title: _____
Organization: _____
Signature: _____

Name: _____
Job Title: _____
Organization: _____
Signature: _____

Job Performance Requirements

The candidate must complete each job performance requirement (JPR) in accordance with the standards of the authority having jurisdiction (AHJ) or the National Fire Protection Association (NFPA), whichever is more restrictive.

When California requirements exceed or require revision to the NFPA standard, the corresponding Office of the State Fire Marshal-approved (OSFM) additions or revisions appear in *italics*.

All JPRs must be completed within a California fire agency or State Fire Training Accredited Regional Training Program (ARTP).

For JPRs that are not part of a candidate's regular work assignment or are a rare event, the evaluator may develop a scenario or interview that supports the required task and evaluate the candidate to the stated standard.

Each JPR shall be evaluated after the candidate's fire chief initiates the task book.

Fire Apparatus

Preventative Maintenance

1. Perform visual and operational checks on the systems and components specified in the following list (battery(ies), braking system, coolant system, electrical system, fuel, hydraulic fluids, oil, tires, steering system, belts, tools, appliances, equipment, built-in safety features), given a fire **apparatus**, its manufacturer's specifications, **tools and equipment**, and policies and procedures of the jurisdiction, so that the operational status of the vehicle is verified. (NFPA 4.2.1) (CTS 1-1)

Evaluator Signature: _____ Date Verified: _____

2. Document visual and operational checks, given maintenance and inspection forms, so that all items are checked for operation and deficiencies are reported. (NFPA 4.2.2) (CTS 1-2)

Evaluator Signature: _____ Date Verified: _____

Operations

3. Operate a fire apparatus **during emergency and non-emergency responses** using defensive driving techniques, given **an apparatus, an assignment**, a predetermined route on a public way that incorporates the maneuvers and features that the driver/operator is expected to encounter during normal operations, and **AHJ policies and procedures**, so that control of the apparatus is maintained and the **apparatus** is operated in compliance with all applicable state and local laws and **AHJ** rules and regulations. (NFPA 4.3.1 & 4.3.6) (CTS 2-1)

Evaluator Signature: _____ Date Verified: _____

4. Back a **fire apparatus** from a roadway into restricted spaces on both the right and left sides of the **apparatus**, given a fire apparatus, a spotter where the spotter assists the driver in performing the maneuver, and restricted spaces 12 ft (3.7 m) in width, requiring 90-degree right-hand and left-hand turns from the roadway, so that the vehicle is parked within the restricted areas without have to stop and pull forward and without striking obstructions. (NFPA 4.3.2) (CTS 2-2)

Evaluator Signature: _____ Date Verified: _____

5. Maneuver a **fire apparatus** around obstructions on a roadway while moving forward and in reverse, given a fire apparatus, a spotter where the spotter assists the driver in performing the maneuver, and a roadway with obstructions, so that the vehicle is maneuvered through the obstructions without stopping to change the direction of travel and without striking any obstructions. (NFPA 4.3.3) (CTS 2-3)

Evaluator Signature: _____ Date Verified: _____

6. Turn a fire apparatus 180 degrees within a confined space, given a fire apparatus, a spotter for backing up, and an area in which the **apparatus** cannot perform a U-turn without stopping and backing up, so that the **apparatus** is turned 180 degrees without striking obstructions within the given space. (NFPA 4.3.4) (CTS 2-4)

Evaluator Signature: _____ Date Verified: _____

7. Maneuver a fire apparatus in areas with restricted horizontal and vertical clearances, given a fire apparatus and a course that requires the operator to move through areas of restricted horizontal and vertical clearances, so that the operator judges the ability of the **apparatus** to pass through the openings, **using continual motion**, and so that no obstructions are struck. (NFPA 4.3.5) (CTS 2-5)

Evaluator Signature: _____ Date Verified: _____

8. Operate all fixed systems and equipment on a **fire apparatus** not addressed elsewhere in this standard, given **fixed** systems and equipment, manufacturer's specifications **and requirements**, **and AHJ** policies and procedures for the systems and equipment, so that each system or piece of equipment is operated in accordance with the applicable instructions and policies. (NFPA 4.3.7) (CTS 2-6)

Evaluator Signature: _____ Date Verified: _____

Pumping Apparatus

Preventative Maintenance

9. Perform **and document** visual and operational checks on the systems and components specified in the following list (water tank and other extinguishing agent levels (if applicable), pumping systems, foam systems) in addition to those in **NFPA 1002** 4.2.1, given a **pumping apparatus**, its manufacturer's specifications, and **AHJ** policies and procedures, so that the operational status of the **pumping apparatus** is verified. (NFPA 5.1.2) (CTS 4-2)

Evaluator Signature: _____ Date Verified: _____

Operations

10. Produce an effective hand **line**, given an internal tank, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

11. Produce an effective master stream, given an internal tank, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

12. Produce effective hand **line**, given a pressurized source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

13. Produce effective master stream, given a pressurized source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

14. Produce effective hand **line**, given a static source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

15. Produce effective master stream, given a static source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

16. Produce effective hand **line**, given a transfer from internal tank to external source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

17. Produce effective master stream, given a transfer from internal tank to external source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

18. Pump a supply line of 2½ in. (65 mm) or larger, given a relay pumping evolution the length and size of the line and the desired flow and intake pressure, so that the correct pressure and flow are provided to the next **pumping apparatus** in the relay. (NFPA 5.2.5) (CTS 5-5)

Evaluator Signature: _____ Date Verified: _____

19. Produce a foam fire stream, given foam-producing equipment **and manufacturer's specifications and requirements**, so that proportioned foam is provided. (NFPA 5.2.6) (CTS 5-6)

Evaluator Signature: _____ Date Verified: _____

20. Supply water to fire sprinkler and standpipe systems, given specific system information, a **pumping apparatus, and sprinkler and standpipe systems**, so that the water is supplied at the correct volume and pressure. (NFPA 5.2.7) (CTS 5-7)

Evaluator Signature: _____ Date Verified: _____

Completion Requirements

The following requirements must be completed prior to submitting this task book.

Experience

The candidate meets the following experience requirements.

- Have a minimum of one year full-time or two years' volunteer or part-time paid experience in a recognized fire agency in California with the primary responsibility as a Pumping Apparatus Driver/Operator

Agency	Experience	Start Date	End Date

Position

The candidate meets the position qualifications for this level of certification. The position requirement is met when the applicant fulfills the role of the specific duties as defined by the fire chief.

Updates

The candidate has completed and enclosed all updates to this certification task book released by State Fire Training since its initial publication.

Number of enclosed updates: _____

Completion Timeframe

The candidate has completed all requirements documented in this certification task book within five years of its initiation date.

Initiation Date (see Fire Chief signature under **Initiation Requirements**): _____

Review and Approval

Candidate

Candidate (please print): _____

I, the undersigned, am the person applying for certification. I hereby certify under penalty of perjury under the laws of the State of California, that the completion of all requirements documented herein is true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documentation may be cause for rejection or revocation.

Signature: _____ Date: _____

Fire Chief

Candidate's Fire Chief (please print): _____

I, the undersigned, am the person authorized to verify the candidate's qualifications for certification. I hereby certify under penalty of perjury under the laws of the State of California, that the completion of all requirements documented herein are true in every respect. I understand that misstatements, omissions of material facts, or falsification of information or documentation may be cause for rejection.

Signature: _____ Date: _____

Update 21-1

Justification

In 2021, State Fire Training updated the Fire Apparatus Driver/Operator certification series to align with NFPA 1002: Standard for Fire Apparatus Driver/Operator Professional Qualifications (2017).

Revision/Update

1. NFPA made minor language revisions to the text that does not impact job performance requirement (JPR) intent.
 - No updates required.
2. The JPRs based on paragraph 5.2.1 of the 2014 standard requires that candidates “produce effective hand or master streams”. OSFM has determined that candidates must be able to produce both a hand line and a master stream.
 - JPR 11, 12, 13, and 14 have been separated into two separate JPRs, one for hand line and one for master stream.
 - Candidates must complete the following:

JPR (2014)	JPR (below)	Output	Source
11-a	1	Hand Line	Internal Tank
11-b	2	Master Stream	Internal Tank
12-a	3	Hand Line	Pressurized Source
12-b	4	Master Stream	Pressurized Source
13-a	5	Hand Line	Static Source
13-b	6	Master Stream	Static Source
14-a	7	Hand Line	Transfer
14-b	8	Master Stream	Transfer

- If you have already completed any of these JPRs in your existing task book, identify whether it was for a hand line or master stream and then complete the other output on this update.

Additional Requirements

1. Produce an effective hand **line**, given an internal tank, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

2. Produce an effective master stream, given an internal tank, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

3. Produce effective hand **line**, given a pressurized source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

4. Produce effective master stream, given a pressurized source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

5. Produce effective hand **line**, given a static source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

6. Produce effective master stream, given a static source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

7. Produce effective hand **line**, given a transfer from internal tank to external source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____

8. Produce effective master stream, given a transfer from internal tank to external source, so that the pump is engaged, all pressure control and **apparatus** safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is monitored for potential problems. (NFPA 1002 (2017); 5.2.4) (CTS 5-4)

Evaluator Signature: _____ Date Verified: _____